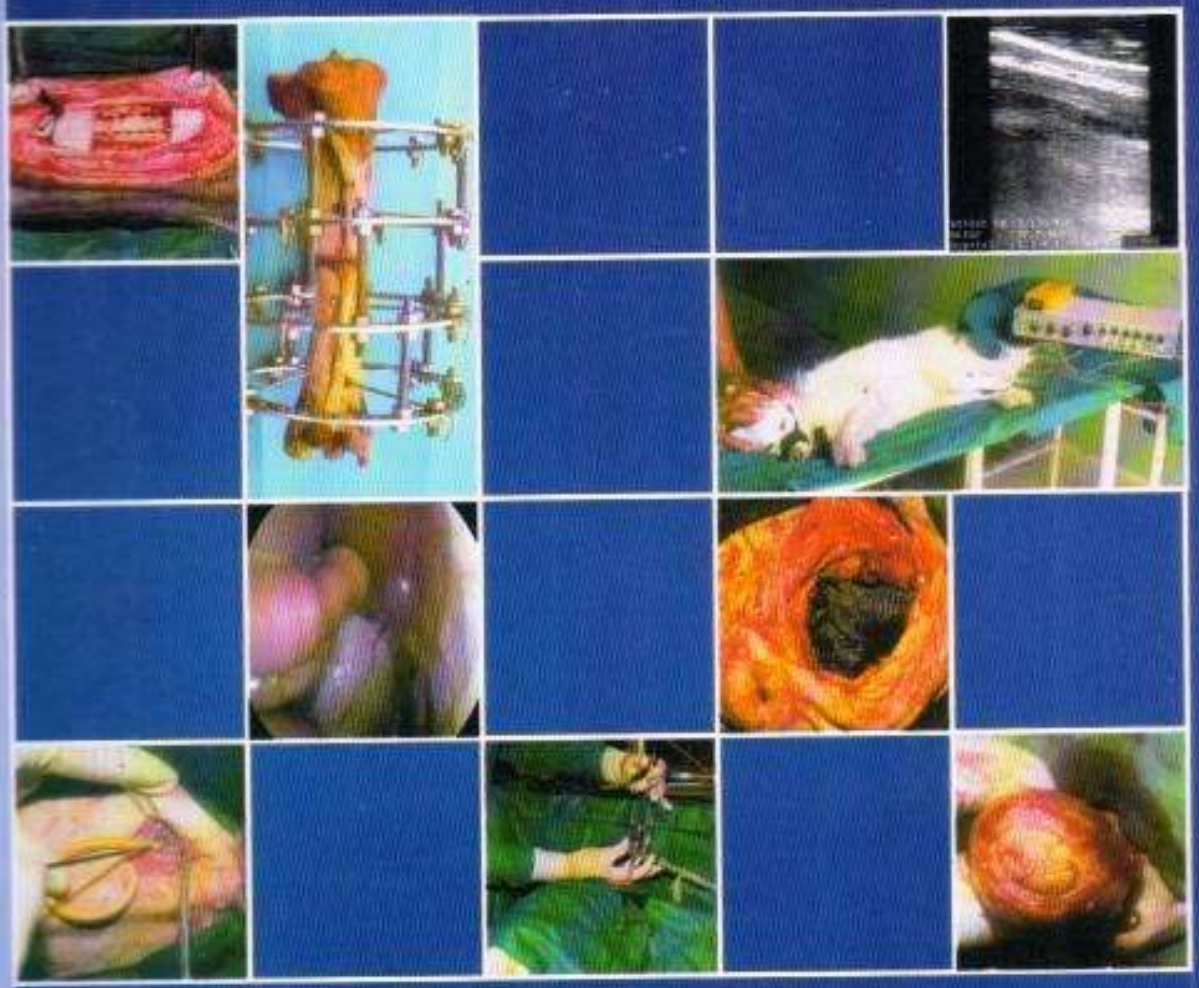
ABSTRACTS

XXIX Annual Congress of Indian Society for Veterinary Surgery
and
National Symposium
on
Alternative Teaching and Research Methods to
Animal Experimentation in Veterinary Surgery



Division of Surgery
Indian Veterinary Research Institute
Izatnagar-243 122 (UP) INDIA
www.isvs.org

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XXIX Annual Congress
of
Indian Society for Veterinary Surgery
and
NATIONAL SYMPOSIUM
on

Alternative Teaching and Research Methods to Animal Experimentation in Veterinary Surgery

9th-11th November, 2005

Division of Surgery
INDIAN VETERINARY RESEARCH INSTITUTE
Izatnagar-243 122 (UP) INDIA

ABSTRACTS

XXIX Annual Congress of Indian Society for Veterinary Surgery and NATIONAL SYMPOSIUM

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FOREWORD

At the outset I welcome the delegates of XXIX Annual Congress of Indian Society for Veterinary Surgery and National Symposium, to the Indian Veterinary Research Institute (IVRI), proudly known as Mecca of veterinary profession in India. Indian Veterinary Research Institute, though, has a glorious history of more than 115 years, the discipline of Veterinary Surgery at IVRI is relatively young. However, Division of Surgery IVRI made rapid strides in the field of teaching and research and made its presence felt at National level soon after its inception in 1975. It is the mark of our recognition that Indian Society for Veterinary Surgery has entrusted us for hosting of its Annual Congress for the second time.

I am fully aware of the magnitude of the task ahead of us, but I am convinced that with the help of my colleagues, and supervision of my superiors and cooperation of fellow delegates, we would be able to accomplish it in a manner befitting to the reputation of the Institute and expectations of the delegates.

The topic of the symposium i.e. 'Alternative Teaching and Research Methods to Animal Experimentation in Veterinary Surgery' was chosen to discuss the societal, scientific, legal, and ethical issues related to the use of experimental animals in teaching and research in veterinary science in general and veterinary surgery in particular. I am sure that deliberations and discussion during the symposium would provide necessary impetus for change in attitude and approach of the participants towards the more rationale and humane use of experimental animals. In addition to the symposium, new developments taken place in last one year in the field of veterinary surgery are to be discussed during the Congress. We have planned the three-day event in such a way that maximal time is devoted to serious scientific discussions and exchange of views among the delegates on emerging challenges in the area of veterinary surgery. We have not left any stone unturned to make this event a memorable one.

This Herculean task could have not been completed without the support from all corners. First of all, I would like to express my sincere gratitude to Dr Mangala Rai, Director General ICAR and Secretary DARE, Govt. of India and Dr V.K. Taneja, Deputy Director (AS) ICAR for kind support and encouragement since beginning. I am greatly thankful to Dr M.P. Yadav, Director, IVRI and Patron of the Congress. He has been the real source of inspiration and force of guidance behind us. I would also like to express my sincere thanks to Dr Nem Singh, Joint Director (Research) IVRI and Chairman Core committee who was always keen to help us. Thanks are also due to Dr R.S. Chauhan, Joint Director (CADRAD) and Dr M.C. Sharma, Joint Director (Extension) for their help and support. Heads of different Departments, scientific staff and non-scientific employees of IVRI deserve all the praise for their cooperation in organization of this event. I am pleased to have a strong dedicated faculty who were keen as mustard in performing assigned duties. The cooperation and untiring efforts of Dr O.P. Gupta, Dr K. Pratap, Dr A.K. Sharma, Dr M.Hoque, Dr Naveen Kumar, Dr P. Kinjavdekar, Dr A.M. Pawde, Dr Amarpal, Dr H.P. Aithal, Dr S.K. Maiti, Sri H.C. Setia and Smt. A. Lakshmanan are praise worthy. The assistance and help provided by ministerial and supporting staff of the Division are also thankfully acknowledged.

My special thanks are due to our co-sponsor, CPCSEA, Ministry of Environment and Forests, Govt. of India for their financial support for organization of the Symposium of this elephantine event.

All the scientific instruments and pharmaceutical companies namely, Frontline Electromedical Ltd., Intas Pharmaceutical Ltd., Karl Storz Endoscopy, Hospital Equipment Technology Inc, Sonosite Medical System, Asha Medical Company, Hospimedica International Ltd., Alembic Veterinary Division, MS Medicare Bareilly, Track Information New Delhi, Vetcare Ltd. Bangalore and others who have come forward to participate in the event also deserve kudos.

We have made every possible effort to ensure a comfortable stay for the delegates but shortcoming are always there. I beg your pardon for the lapses on our part and hope you would grin and bear it.

I wish the delegates a pleasant and fruitful stay at this National Institute.

– Gaj Raj Singh

Dated: 09-11-2005

PROGRAMME

TIME		EVENTS
DAY 1: 09.11.2005		
08.00 AM to 10.00 AM	:	*Breakfast cum Registration*
10.00 AM to 12.00 Noon	:	*Inaugural Session*
12.00 Noon to 12.30 PM	:	*Inaugural Tea*
12.30 PM to 01.00 PM	:	*Dr R.P.S. Tyagi Oration* *(Chairman: Dr. M. P. Yadav, Co-Chairman: Dr. P. Kulkarni)*
01.00 PM to 02.00 PM	:	*Inaugural Lunch*
02.00 PM to 05.00 PM	:	*Theme Session* *(Chairman: Dr. V. Ramakumar, Co-Chairman: Dr Lal Krishna* *Rapporteur: Dr. D. Swarup)*
05.00 PM to 05.15 PM	:	*Tea Break*
05.15 PM to 07.00 PM	:	*Anaesthesia and Analgesia Session* *(Chairman: Dr. S.S Hussain, Co-Chairman: Dr. B. Ramesh Kumar* *Rapporteur: Dr. T.K.Gahlot)*
07.00 PM to 10.00 PM	:	*Cultural Programme cum Dinner*
DAY 2: 10.11.2005		
08.00 AM to 08.30 AM	:	*Breakfast*
08.30 AM to 09.30 AM	:	*Demonstration on Laparoscopic Surgery*
09.30 AM to 01.00 PM	:	*Parallel Poster Session*
09.30 AM to 11.00 AM	:	*Orthopaedic Surgery Session* *(Chairman: Dr. Harpal Singh, Co-Chairman: Dr. L.B.Sarkate* *Rapporteur: Dr. T.N.Ganesh)*
11.00 AM to 11.15 AM	:	*Tea Break*
11.15 AM to 01.00 PM	:	*Small Animal Surgery Session* *(Chairman: Dr. J.M.Nigam, Co-Chairman: Dr. C.C.Wakankar* *Rapporteur: Dr. S.K.Sharma)*
01.00 PM to 02.00 PM	:	*Lunch Break*
02.00 PM to 04.00 PM	:	*Ruminant Surgery Session* *(Chairman: Dr. O. Ramakrishna, Co-Chairman: Dr. M.S.Vasanth* *Rapporteur: Dr. B.V.Shivaprakash)*
04.00 PM to 04.15 PM	:	*Tea Break*
04.15 PM to 06.00 PM	:	*Wild and Zoo Animal Surgery* *(Chairman: Dr. A.P.Bhokre, Co-Chairman: Dr. M.K.Bhargav* *Rapporteur: Dr. I. Nath)*
08.00 PM to 10.00 PM	:	*Dinner*
DAY 3: 11.11.2005		
08.00 AM to 09.00 AM	:	*Breakfast*
09.00 AM to 10.00 AM	:	*Equine Surgery Session* *(Chairman: Dr. S.S.Rathore, Co-Chairman: Dr. S.S.Singh* *Rapporteur: Dr. Rishi Tayal)*
10.00 AM to 11.00 AM	:	*Radiology and Imaging Techniques Session* *(Chairman: Dr. A.P.Singh, Co-Chairman: Dr. V.K.Sharma* *Rapporteur: Dr. M.M.S.Zama)*
11.00 AM to 11.15 AM	:	*Tea Break*
11.15 AM to 01.00 PM	:	*Award Session* *(Chairman: Dr. K. Aneerjan, Co-Chairman: Dr. N.S.Jadon* *Rapporteur: Dr. M.S.Kanwar)*
01.00 PM to 02.00 PM	:	*Lunch Break*
02.00 PM to 03.00 PM	:	*Plenary Session*
03.00 PM to 03.15 PM	:	*Tea Break*
03.15 PM to 05.00 PM	:	*General Body Meeting*
08.00 PM to 10.00 PM	:	*Dinner*

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CONTENTS

10.4 Treatment of severe carpal laxity by arthrodesis using hydroxy apatite and dynamic compression plate fixation in a dog
HP Aithal, Amarpal, P Kinjavdekar, AM Pawde, Kiranjeet Singh and GR Singh

10.5 Study on prevalence of surgical disorders in Kashmir valley
Md. Moin Ansari, BA Buchoo, FU Peer, HK Bhattacharya and AQ Mir

10.6 Successful surgical management of a rare case of an extensive odontoma in a she buffalo
SK Tiwari, R Sharda, SD Hirpurkar and S Jogi

10.7 Surgical treatment of chronic uterine prolapse in a she buffalo
SK Tiwari, MK Awasthi, SP Ingole, R Sharda and OP Mishra

10.8 Retrieval of a metallic foreign body from the thoracic wall of a crossbred cow calf
SK Tiwari, R Sharda and PK Pandey

10.9 Extra-luminal leiomyoma in a bitch and its successful surgical management
SK Tiwari, R Sharda, RC Ghosh, SD Hirpurkar and UK Mishra

10.10 Successful surgical management of chronic ottorrhoea by lateral ear resection in an Alsatian dog
Raju Sharda and SK Tiwari

10.11 Urinary incontinence in a dog following castration for bilateral testicular tumours
Chandy George , KM Srinivasamurthy and MS Vasanth

10.12 An unusual case of urethral calculus in a two month old pup
Chandy George, KM Srinivasamurthy and MS Vasanth

10.13 Surgical treatment of tumorous growth at paw region in a dog
AK Gangwar, HN Singh, Shive Prasad and Kh Sangeeta Devi

10.14 Treatment for tibiotarsal dislocation and Montegia's fracture in dogs
BV Shivaprakash, SM Usturge and Vivek Kasaralikar

10.15 Management of implant induced fibromatous epulis with rostral hemimandi-bulectomy in a dog
S Ayyappan, Md. Shafiuzama, L Nagarajan, TN Ganesh, R Jayaprakash, Peter Nolesco, R Suresh Kumar and K Ameerjan

10.16 Clinical studies on bone tumours in dogs
S Ayyappan, TN Ganesh, C Balachandran, R Jayaprakash, Nikhil Prabhugaonkar, N Dhanalakshmi, R Suresh Kumar and K Ameerjan

10.17 Surgical management of cystic calculi in a stallion
DB Patil, PV Parikh, NH Kelawala, SH Talekar, SS Patel, Poonam Gupta, VK Joshi and BM Patel

10.18 Substitute materials for routine manoeuvres in clinical practice
PB Patil

10.19 Intussusception in a GSD pup
DB Patil, PV Parikh, VK Joshi, PB Patil and SS Patel

10.20 LC-DCP plating for the correction of radial malunion in a dog
PV Parikh, VK Joshi and PB Patil

10.21 Ascites due to closed pyometra in a Great Dane bitch
DB Patil, PV Parikh, NH Kelawala, SH Talekar, PB Patil and SS Patel

10.22 Surgical management of chronic wound by transposition flap in a dog
GD Rao, L Nagarajan, S Ayyappan, R Suresh Kumar and K Ameerjan

10.23 Surgical management of an unusually large vaginal infiltrative lipoma in a bitch
GD Rao, L Nagarajan, S Ayyappan, R Suresh Kumar and K Ameerjan

10.24 Surgical management of hystiocytoma of uterus and vagina by hysterotmy and chemotherapy in a bitch
L Nagarajan, GD Rao, S Ayyappan, R Suresh Kumar and K Ameerjan

10.25 Surgical management of prostatic abscess and testicular tumour in a dog
L Nagarajan, GD Rao, C Ramani, R Sureshkumar, Md. Ali, Justin Jeba Kumar and K Ameerjan

10.26 Squamous cell carcinoma of the penis and its surgical management by scrotal urethrostomy
L Nagarajan, GD Rao, S Ayyappan, R Suresh Kumar and K Ameerjan

10.27 Surgical management of comminuted supracondylar fracture of femur in a cat
Md. Shafiuzama, N Dhanalakshmi, T Peter Nolosco, K Ramanujam and R Suresh Kumar

10.28 Arthroscopic evaluation of metacarpophalangeal joint in a horse
S Halder, RS Kumar, L Nagarajan, BJ William, A Ramanathan and K Ameerjan

Dr RPS TYAGI ORATION

Changing scenario of veterinary education and profession

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Our profession is founded on service to society

"Being admitted to the profession of veterinary profession, I solemnly swear to use my scientific knowledge and skills for the benefit of the society through protection of the animal health, the relief of animal suffering , the conservation of livestock resources, the promotion of public health and the advancement of medical knowledge"

Introduction

It is a well known fact that veterinary medicine is an ancient and renowned profession with technical excellence and outstanding service in treatment of animals. The first written evidence of veterinary practice is recorded in Babylonia's Laws of Hammurabi tracing to 2100 BC which contains an entry on the fees for treating a cow or an ass and the penalty for causing the animal to die or for any malpractices as well. In India, Salihotras Circa 1800 BC wrote on horses and veterinary practice. Further, around 250 BC, King Asoka established the first well-equipped veterinary hospital for health care of animals.

The veterinary profession is a unique and important health profession that contributes to human health, welfare and well being and enhances the quality of human life through improvement of health, utility and productivity of all kinds of vertebrate animals. Additionally, it contributes to the generation of new biological and medical knowledge, protects the quality of the environment and assists in the preservation of genetic resources. In other words, regular veterinary service serves human welfare through animal welfare.

The profession is presently challenged with, meeting the increased demands for animal and animal products of the growing human population, developing and maintaining the country's food supply from the acts of bioterrorism, from the growing threat of foreign, emerging and reemerging diseases, and from multi-drug resistance among pathogenic organism. With approximately 16-17% of the world's animal population in India, the care and management of animals requires attention of skilled veterinarians.

Expectations from veterinarian are quite high in terms of their service and therefore a knowledgeable and skilled professional is the need of the present time. Though this need has been well recognized, the response has been too slow to cope up with the changing scenario. The changes are required in the veterinary education to better equip the profession to provide for the changing role in the changing world. There is no clear cut concept to what veterinary medicine can offer to the society or community and in spite of a distinguished past, it could not achieve its proper place and position in India.

Professional needs

Veterinary profession of the day is not just limited to treatment of the animals but has considerably diversified. Veterinarians have been pursuing diverse careers like aquaculture, wild animal medicine and management, food safety, industrial research and biotechnology. In addition to ensuring food security during the coming time the veterinarians have a great role in preservation and conservation of genetic resources. Thus the job of making education relevant and practical yet solidly based in the changed scenario is the need of the hour.

People's attitude towards animals, their care, welfare and management are changing. Society expects that the animals be treated humanely, receive proper care and also deserve health care equal to what people receive. Now with revolution in Information Technology, a common man in rural or urban area is well aware of the development and advancement in animal and human welfare.

The professional activities of veterinarians are listed below

1. Primary healthcare for livestock, pet and performing animals, laboratory animal and captive and free ranging wild animals.
2. Protection of the environment through epidemiological studies in such areas as animal waste management, drug residue research and bio-containment
3. Participation in emergency disaster relief for wild and domestic animals.
4. Maintenance of the public health through diagnostic testing and inspection of animal and animal products.
5. Protection of public health through local and governmental programs to reduce the transmission of zoonotic diseases from animals to humans.
6. Development of strategies to protect and defend animals and human health in the event of bio-terrorism/agro-terrorism.
7. Development of pharmaceutical and biological material for human use through animal testing.
8. Application of comparative medicine expertise to basic and applied biomedical research.
9. Management of wildlife populations both in captivity and free ranging situations through assisted reproductive technologies and other management practices.
10. Application of biotechnology advances for the propagation and conservation of wild and valuable domestic species.

Background information

Meeting these needs had been a challenge ever since the profession came into being. Service to livestock sector was achieved with the concerted efforts of both, the animal husbandry department and different veterinary institutes.

The first civilian veterinary institute was established in 1885 at Lahore (now in Pakistan) and subsequently, other institutes were started in Bombay (1886), Calcutta (1893), Madras (1903). Gradually with the increase need of professionals in the animal husbandry sector, more colleges were setup in various states. Most of the veterinary institutes made phenomenal progress after independence in terms of the needs of the profession and the institutes themselves. Veterinary colleges adopted high standards and were strongly supported by the government. Well-educated veterinarians provided for a wide variety of society's needs. The profession flourished as never before and gained a high level of public acceptance. After 1960's, these colleges came under affiliation of Agricultural university under land grant pattern so as to meet the rural requirement locally/ regionally.

Presently all the states have one or more than one veterinary college. There are 33 veterinary colleges and 5 veterinary Universities in the country undertaking teaching, research and extension activities including continuing veterinary education and higher studies. All the institutions are supported by government grants.

Presently, the veterinary colleges in India are clearly identified with land grant universities and are influenced in a fundamental way, some positively and some negatively

by this affiliation. Without exception, the development of veterinary colleges was supported by agricultural interest that exerted the political influence required for their establishment.

Keeping in view the community's need and keeping pace of the advancements in the field of science and technology, it seems relevant to introspect and address the existing issues related to veterinary education and profession.

Reviewing veterinary education and profession

In spite of a distinguished past of veterinary education and profession, it could not achieve its proper place and position in India. Veterinary profession is being threatened as never before by powerful forces of change in society attributed to by rapid advances in science and technology and the changing needs and expectations of the society. Decisive steps must be taken so that the profession can fulfill its responsibilities and obligations and bring them in line with the changing needs of the society. Although, it cannot be defined as a crisis, the veterinary profession is not geared up adequately to meet the changing needs of the society. There are number of factors related to veterinary education and profession that need to be addressed.

A. Education system

Affiliation to agricultural university: Initially, the veterinary college affiliated to the Agricultural universities had research on priority rather than on teaching which considerably affected the quality of veterinary education.

Facilities for veterinary education: The facilities for veterinary education in most of the institute/Colleges were inadequate in terms of manpower, infrastructure and clinical and farm facilities and this aspect has not changed much over the years. Further, there are only a very few dedicated, illustrious veterinarian who can serve as role models for young veterinarian who are undecided about their future career. There is also a problem of the non availability of veterinarian in terms of quality and quantity. This is further aggravated by infrastructural problems on multiple levels. Laboratory equipment is outdated and infrastructure is obsolete and needs updating.

Veterinary Council of India: As there was no uniformity in veterinary education and practices in the country a need was felt to have a council that could regulate the veterinary education and practices in addition to its advisory role to the central and state government on veterinary matters. It was essential to plan educational strategies properly and effectively for optimal use of instructional resources. The teaching-learning process was to be enhanced through effective curriculum planning.

VCI has formulated the curriculum for minimum standard of education of veterinary science in all the veterinary colleges. The main objective was to develop the concept of self-education, valued veterinary education, multi-disciplinary approach and small group teaching and discussion with emphasis on practical, clinical and farm practice. It is presumed that VCI must have considered the different factors such as valid objectives to be achieved, targets deciding learning outcome, development of suitable teaching strategies and evaluation and assessment. However, under such circumstances, the scope of curriculum planning is limited and the teachers delivering instructions are required to follow the guidelines and course content prescribed by the VCI. The teachers have full freedom to decide the teaching strategies and plan for imparting instruction. However, most teachers are accustomed to traditional learning and teaching process and as such it affects the effectiveness of teaching. Though verbal teaching has worked for many years in the past, it may not work in the present times looking into the changing demands. Though the veterinary colleges have been recognized, they lack in facilities recommended by VCI.

Veterinary curriculum/Syllabus: It is also important for traditional practices and livestock production system to be evaluated in terms of their impact on environment. The management skills described in the subject of livestock production and management during BVSc & AH Degree course need to be updated and operated to grab the newer opportunities and to steer out of the threats of unsustainable development. Though this course already includes topics like animal management, building and material management, personnel management, resource management, product management and market management, the student could be encouraged to use the principles of management in hospital, information management, feed technology animal product technology etc.

B. Administration

University Administration: Administration in the university expects the teachers to be highly competent and excellent research workers so also outstanding clinical practitioners. Guidelines for merit promotions usually expect exceptional performance but it is not applicable in majority of the cases. In fact, exceptional performance could only be in any one field with strong performance in second and minimal competency in the third area is appropriate. It is becoming more and more difficult to reward people who do an excellent job in teaching, performing high quality continuing education and other professional and administrative activities.

C. Changing scenario

Information: Though advancements in biomedical sciences offers better tools that gives an increasingly detailed view of structures and functions, it is essential to make education relevant and practical by ensuring strong fundamental which are normally overlooked. More and more information is available at an increasing rate, and without information management system, the quantity of relevant knowledge is far beyond human capacity to cope.

Biological, medical and veterinary information is increasing at a rapid rate, creating new challenge for veterinary education and making the practice of veterinary medicine increasingly complex.

Veterinary education contains too much information and too little thinking and analysis, too much memorization and too little understanding, too much listening and too little involvement. It is well known that there is too much information accumulating which is to be taught and mastered in curriculum. On the other hand, changing attitudes come very slowly and it has not been possible to resolve this dilemma successfully. Thus continuous efforts are essential and new approaches are to be developed, tried, adopted, modified or distorted according to the success of tackling such fundamental problems.

Attempts must be made not only to manage the increasing amount of information, but also in increasing opportunities for students to acquire skills in communication.

Advances in Technologies: The spectacular advances made in field of science and technology has a major impact on teaching and practice of veterinary medicine in the years ahead. New and improved animal health technology, genetic alteration of animals and embryo manipulation will profoundly affect veterinary practices. Advances in micro-electronics and computers will alter ways veterinary medicine is practiced taking into consideration the large and growing body of knowledge relevant to animal health. These advances will change teaching, veterinary practices, practice management and the effectiveness of animal health delivery system.

Demands of the Livestock Industry: Livestock industry is undergoing marked and progressive structural changes and this would profoundly change the animal production practices and the kind of veterinary services required by the livestock industry. These industries desperately need veterinarians. who can provide unbiased advice and services in the inter-connected domain of production and health.

Change in perception: Lack of vision for community demand of the service by the people has affected the performance of the colleges. It could be illustrated by the fact that most of the people (faculty members, senior students and field veterinarian) are of the opinion that education standards have deteriorated. It has been a common observation that new graduates are well trained and full of knowledge and excitement but totally impractical. They have no working knowledge and have a minimal experience with day to day problems and lack team-spirit. The institute must evolve strategies and practices that will provide information on changing needs emanating from the society in general and specifically those sectors served by veterinary medicine. The changing status of animals is having profound effect on profession and education.

Human element: One of the most important elements that are forgotten in teaching and learning is the human element. The student must learn in an environment in which they can enhance their ability to respond with concern and sensitivity to the problems of the people whom they serve and to develop trust and confidence in their peers, co-workers and clients.

One of the major fundamental threats includes the professional attitudes of both students and the faculty. Most students do not select or prefer veterinary science as profession in India but because of a compulsion either socially, financially or because of job security. Further, the teaching faculty do not select the teaching career because to their interest or inclination but because of some other considerations. Another aspect that needs to be addressed is the diversity among the students not only because of their gender, ethnic difference but also because of their up-bringing (rural v/s urban), career interest and aspirations (practice, research, academics, govt. service and industry etc) as a result the task of the faculty has become more challenging and complex.

Approaches to meet the challenges

Curriculum change

A number of approaches are being recommended to keep education in pace with scientific information. Thus, the strategy could be in having fewer lectures with more group-study and more library time; integrated teaching, limiting course content to relevant information; teaching from clinical problems & even to reorganize the basic and clinical sciences and realizing the difficulties of changing faculty attitude and persuading them to adopt these approaches.

Flexibility and choice for both students and faculty will be great help for successful curricula of the future. There has been a lacuna in terms of efficient researchers in the veterinary field because most veterinarians prefer the lucrative field of practice, whether large or small. Nearly 80% of all veterinarians prefer to have a job in some govt. department, 10% opt for private practice and the rest opt for higher studies for a career in teaching or research.

Suggestion with respect to the curricular changes include integration of subjects that logically relate to one another, provides greater emphasis on principles rather than rote learning and ensures better selection of key information. More emphasis on practical training and total system rather than various components of those systems should be

given. It is increasingly difficult to provide veterinary students with information in undergraduate courses to prepare them, for any of the roles they may need to play in public or private practice. The course would become too long and too cumbersome for the effective development of the required skill in emerging graduates. The government regulations, changing expectations of new graduates, employers and clients shall also influence veterinary education, thus planning of curriculum is needed.

Reorganization

One of the big challenges for the profession is to meet the specific demands for professionals within the same static or declining financial resources at the education level. To overcome these challenges, strategies should be developed that should not only be broad to include various aspects of education but at the same time must be balanced. It is no longer realistic or possible to expect any single individual in the broad fabric of veterinary education to have the same degree of expertise in all areas of veterinary and animal science, which has prompted the making of the kind of curriculums we have today. The colleges can afford to be different and certain sections can be created or added to cater for the regional/local needs. One of the examples may be in development facility for wild and exotic animal medicine because of rapidly increasing importance of these species. This could be done with the active collaboration of different departments in the college. These departments could also collaborate with the dept. of wildlife and forests and also fisheries while dealing with diseases and other aspects. Collaboration with the dept. of the college is to be done by sharing the faculty, as is being done frequently in research but should be much more widely applied to the classroom and the clinics.

Most of the veterinary colleges have been rigid in their adherence to traditional programs and practices and not supportive enough to new directions like laboratory animal medicine, wildlife medicine and management, animal dentistry, food hygiene, veterinary epidemiology and public health have been neglected by veterinary colleges.

Perception change: The success of any treatment depends upon the accurate diagnosis, though this aspect is quite often overlooked. The entire treatment has been only focused on drug delivery. Unfortunately if such a perception or impression is conveyed to politicians or to the administration, the concept of veterinary service does not differentiate between professional service and quack medicine. Trained veterinarians have to have a holistic approach while attending the cases; in contrast to para-veterinary staff that is trained to assist in drug delivery or first aid etc. At times the para-veterinary staff illegally practices veterinary medicine, resulting in great economic loss to livestock owners and industry. Additionally they may also lead to drug abuse and subsequently resistance to infectious agents. Therefore, it is essential to provide comprehensive, complete, effective and professional training to veterinarians. If such a step is taken then it will enable professionals to confront and successfully resolve the issues affecting production and management and ultimately the profitability of the farmer.

Apart from specific veterinary role in public service, there are a number of more general features of the public policy environment that will impinge on veterinary education in the future. These may include information handling skills, computers usages and public accountability. Increased educational level of community gradually leads to a greater requirement to persuade people rather than to instruct them. Increasing concern world wide, for environmental and preservation of global diversity is creating new areas for veterinary involvement, particularly, management, and conservation of wild life and endangered species. Veterinary profession must look carefully at the world around it and become sensitive to changing environment and react accordingly i.e. LEARN TO CHANGE

WITH THE TIMES. An important lesson of veterinary history is that when the profession did not respond to changing need as in the early years of the century, it quickly fell upon hard times affecting both welfare of the profession and of individual veterinarian.

Changes in Education strategy: The veterinary practice requires human skill supported by sound knowledge of animal life and an attitude of compassion for all life. The knowledge imparted in colleges should develop an awareness, comprehension, application, analysis and synthesize quality that would reflect the technical competence. The increasing use of paraprofessional working with veterinary surgeons requires that the veterinary surgeon must stay well abreast with advancements in treatment.

Traditionally, veterinarians in public service require many skills, some of which are provided by standard veterinary curricula. Also desirable but not necessarily provided in detail at college are more general competencies such as good communication skills, both oral and written. Communication skills are of critical importance not only while dealing with clients but also for safe and effective team working. An understanding of rural sociology appropriate to a particular state, the adult learning process, extension methodology, understanding local legal and regulatory framework and staff supervision and motivation are additional skills that need to be addressed. The veterinarian should also be exposed to risk analysis related to epidemiology, management, surveillance and prevention to control natural or man made disasters. It is high time that veterinary education is tailored to meet the needs of veterinary services however; the design, orientation and development of training systems are usually subordinated to the **WILL** of those in charge.

Integrated learning: Experts of field research can teach at any time in the undergraduate veterinary curriculum and will be most effective during para-clinical and clinical years. The aims and methods of research can be implicit throughout the entire veterinary course. There is no reason why aspects of field research cannot be conveyed to students from the earliest days of the veterinary program through appropriate examples. The interested and experienced teacher will be able to meet the challenge by reorganizing existing material and by using modern teaching aids, good printed materials, video etc. The analysis of the case studies, scientific papers or research results can convey both basic principle and provide insight into research methods at field level. Problem solving exercises may include field examples. Clinical conference should be a part of the clinical course but its effectiveness in field research depends on the type and amount of material to which a student has access. It is important that the student is trained to select problems of great economic importance, some of which are sub-clinical.

In training students in para-clinical sciences the role of laboratory in field research should be emphasized. The scope of field research based on para-clinical science is almost unlimited.

Specialization/Continued veterinary education/ Competence development program: The field research is a broad concept encompassing work at the level of a small farm, commercial production unit, abattoir or diagnostic laboratory and even at the national surveillance level. It can involve any one of a wide range of economic animals and avian species as well as fish. In India, veterinary colleges are not yet offering specialized training in these areas. Short courses are useful means of technology transfer and competence development programs (CDP).Continued veterinary education (CVE) in the management of wild and pet animals, quality assurance of meat and meat product, livestock production and allied field is necessary. CVE is a process by which veterinarian keep up to date with advances in their field and to certain extent increase there competence. These programmes should be of variable duration which may vary one day, one week, and one month or

longer depending on the aims of the technical program. They have the advantage of minimally disrupting the organizations. Great skill is required to design an effective course which may be taken care of by senior faculty members of the college and also involving external consultants drawn from the commercial sector, national or international agencies. It is essential that the curriculum is relevant, understandable and pitched at a level that will yield results of practical value to the farmer. The rush to high technology should be resisted when more appropriate intermediate technology is needed.

The clinics in the college and animal husbandry sector have the responsibility to protect animal health and improve animal care. The role of pets including human-animal bond has geometrically increased. The animals are woven in the fabric of people's lives as pets, food, economic livelihood and wild life appreciation.

Other Challenges

The veterinary educationists are facing a number of ongoing challenges in the attempt to prepare veterinarian. There is a continued pressure on university resources for competent faculty. The structure of the profession is gradually changing and leading towards specialization. It may be a dynamic period for the profession, but it is difficult to predict economic or social change. The causes of the recent outbreak of bird flu/ BSE may not be clear for sometime but there is a greater scope for veterinary surveillance. Further, veterinarians have an increasingly important role in the production of safe and high quality animal and animal products. It is now time to take a holistic view of the education as per the need of the profession including continuing professional development and post-graduation. It is proposed that the council (VCI) must define a process of distinguishing between veterinarians with skill and knowledge to practice veterinary medicine from those involved in academic activity, prior to registration.

Despite sophisticated tools of modern science, the clinical judgment and rational decisions making, in the face of ambiguity and incomplete information, is a major challenge for successful clinical practices.

Vision for veterinary education

The social, economic, technological, and political changes that are occurring in the country today would determine the type of service needed in animal husbandry sector in future.

The efficiency of the profession and of individual veterinarians is determined by the type of serves extended to society in those areas and functions for which veterinarians have a comparative advantage over other professions, disciplines, and businesses. Therefore, the profession must be responsive to societal change and continually adapt services to changing needs.

Future concerns

Veterinary practice in future will be much more precise, predictable and effective as a result of more knowledge about biology and diseases of animals, improved animal health technology, improved animal health strategies and the demands of users of veterinary services.

Veterinarian will limit their professional activities to a class of animal species and a larger number will provide discipline oriented specialized services. Field veterinarian will serve as important sources of information on care, husbandry, health of all kinds of animals as well as the prevention and control of disease. The structure of veterinary practice will be changed to better use of new technology to improve management, increase the efficiency

Veterinary technology will markedly advance, i.e., drugs, vaccines, diagnostic tests, etc., thereby greatly increasing the effectiveness of veterinary interventions.

Veterinary profession has important role in controlling the devastating effect of progressive environmental deterioration. The veterinary profession has to be better prepared to cope with animal health issues within a more global context. The new visionary curriculum needs have to be developed to prepare veterinarians for meeting the challenges of bioterrorism and agro-terrorism.

Therefore, the management of veterinary institutions in the 21st century will be a challenging and demanding job that would require special management training. Most of the challenges would provide opportunities for the profession to improve quality, effectiveness and usefulness of its services to society.

The veterinary medicine is the only profession that spans the food chain from farm to fork. There is a need felt amongst the length and breadth of veterinary professionals that promotion of education and research management in veterinary science has not met the developmental need of the country in particular and profession at large. For better and pragmatic human resource development and for targeting research and education programmes based on field needs, there is an urgent need of an exclusive organization concerning veterinary and animal sciences. It is high time in India, that every state should have a veterinary university, which will help veterinary science and the profession to make independent policies. In case, where there are no separate veterinary universities, agriculture universities must ensure that veterinary colleges are granted autonomous college status. The establishment of independent Indian council of veterinary education research must now be created and be given the opportunity to develop and tap the scientific potential in public interest.

Veterinary education is a key leverage point for change in the profession

of the animal health delivery systems and to improve overall quality of veterinary services. Animal health disease research will become more important to the public and the profession will be given higher priority by individual veterinarian. Skills in epidemiology, economics, sociology, information management, risk assessment, public policy and legal concepts and in other biological, medical and social sciences disciplines also will be required by many of these veterinarians.

Significant changes will be required in the educational process to prepare veterinarian for the future. The focus of the professional education will be directed from excessive emphasis on accumulation of information to the acquisition of skills on how to find and use information on problem solving and on the behavior and attitude, essential to achieve success as a veterinarian. Attention must be paid to making the professional education experience more supportive of a student's individual psychological needs. The clinical component of the curriculum should be reoriented to provide an opportunity for in depth clinical instruction and experience with all kinds of animals. More emphasis may be placed at postgraduate diploma, higher studies and continuous professional development. With the changing scenario, the veterinary colleges of the future will have to be different from today's college.

The services extended by teaching hospitals will have to be expanded, as the profession would grow in competency and sophistication. There would be a need for colleges to develop referral hospitals. The colleges would become centers of learning rather than teaching institutes and the students will be given more responsibility for their education. Veterinary colleges would have to expand their interaction with the rest of the university in order to maintain competency in modern biology and the quality of graduate education and research programs.

Student's time would have to be divided between self learning, didactics and assisting faculty with research and service missions of the college.

Electronic information centers that manage information bank relevant to animal production, health, technology and diseases are destined to become a central focus of teaching/ learning in veterinary colleges.

The knowledge of science, animals, animal production, and animal health is expanding rapidly. Consequently, people expect more and more from the profession. The veterinary profession must become capable of routinely delivering higher and higher levels of services to all the classes of animals important to people and to achieve ever-higher levels of competence in all veterinary activities. It is not enough to provide services just to livestock and companion animals. All classes of animals are considered by the public to deserve high quality veterinary services.

Veterinary practice will focus more and more on the care, health, welfare, utility, and productivity of animals rather than mainly on diseases and their control. This changing focus is happening more rapidly with food, laboratory, aquatic and wild animals than it is with companion animals.

Growing understanding of the importance of companion animals to human health and well being, and continuing importance of animals and zoonosis to human health, practicing veterinarians, should more actively involved in the human health delivery system.

The profession will develop information banks and practical systems of organizing and using information so that veterinarians will be able to more easily and routinely use the vast store of knowledge that exists on health, disease, drugs, and management.

1.0 THEME SESSION

(Papers and Abstracts are Listed in Souvenir)

2.0 ANAESTHESIA AND ANALGESIA SESSION

2.1 Studies on thiopentone sodium as maintenance agent for haloperidol-ketamine anaesthesia in dogs

Ashok Kumar and VK Sobti
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The study was undertaken to assess the suitablity of haloperidol as premedicant to ketamine anesthesia supplemented with thiopental sodium as a maintenance agent in dogs. Twelve clinically healthy dogs of either sex, 3-5 years of age and weighing 7-16 kg kept under uniform managemental conditions were given haloperidol @ 0.85 mg/kg b.wt. intravenously. Five minutes later ketamine was given "to effect". The dose of ketamine was calculated to be 22.75 mg/kg b.wt. intravenously. This combination resulted in rapid and smooth induction of anaesthesia. Good to moderate muscle relaxation and analgesia were achieved. Eye reflexes were present, although pain reflexes were absent up to 20 min of ketamine administration. After reappearance of pedal reflex at 20 min of ketamine administration, thiopental sodium (5%) @ 9.6 mg/kg b.wt. intravenously was given to prolong the anaesthesia for another 45 min. Mean arterial pressure, central venous pressure and tidal volume decreased significantly. Significant tachycardia and hyperglycemia were observed throughout the study. Recovery was delayed with thiopental supplementation.

2.2 Blood gas and electrolyte changes during propofol anaesthesia in buffalo calves.

MMS Zama, Harbans Lal, AK Gupta and MS Bhadwal
Division of Surgery and Radiology, Faculty of Veterinary Sciences and Animal Husbandry, SKUAST-J, RS Pura-181102, Jammu (J&K)

The study was conducted in four healthy male buffalo calves of 1 year of age. The anaesthesia was induced with propofol 6 mg/kg b.wt. administered intravenously as a bolus dose. The induction of anaesthesia was quiet and smooth. The anaesthesia was maintained for 30 min with propofol I/V infusion at the rate of 0.2 mg/kg /min in dextrose normal saline. Arterial blood gas and electrolyte estimations were done before and at 5, 20, 45 and 180 min of propofol injection. A decrease in blood pH, PaO_2 and SO_2 and an increase in blood $PaCO_2$ were observed during the period of anaesthesia, which returned to normal after 15 min of termination of propofol infusion. Changes in sodium were significant, whereas potassium and chloride did not show any remarkable change during and after the anaesthesia.

2.3 Clinical and physiological effects of ketamine and ketamine-diazepam combination in swine: A clinical study

Bedanga Konwar and Basanta Saikia
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The study was carried out on 18 piglets irrespective of age weighing between 15-30 kg presented for spaying, hernia operation and castration divided into two groups. Based on the results of the pilot and experimental study, group I received ketamine alone @20 mg/kg intramuscularly, while group II received ketamine @15 mg/kg intravenously after intravenous injection of diazepam @2 mg/kg. The clinical and physiological parameters

were studied and the required operation was performed at the peak of analgesia. Down time was significantly ($P<0.05$) different between groups, which were 5.27±0.35 and 0.45±0.15 min in groups I and II, respectively. Anaesthesia was produced for 20.22±0.35 and 25.35±0.45 min and the animals recovered after 90.48±2.55 and 64.57±2.35 min, respectively. Significant increase in heart rate and decrease in rectal temperature were found in both groups and non-significant increase in respiratory rate was recorded in both groups. The surgical anaesthesia was attained in group II only.

2.4 Comparative evaluation of meloxicam and rofecoxib in the management of postoperative pain in canine orthopaedic cases

MR Fazili, SK Chawla, Jit Singh, SM Behl and Rishi Tayal
Department of Surgery and Radiology, College of Veterinary Sciences, CCSHAU, Hisar

Twenty dogs subjected to the long bone fracture repair under thiopentone (2.5% and 5%) anaesthesia premedicated with atropine sulphate (0.02 mg/kg, s.c.) and triflupromazine (1.0mg/kg, i.m) were administered meloxicam (0.2 mg/kg, i.m.) or rofecoxib (1.0 mg/kg, i.m.) as sole analgesics half-an-hour preoperatively and repeated daily for three days. Assessment of pain was done by a single investigator using a behavioural multifactorial numerical rating scale (NRS). Postoperative assessments were made in owner's premises. All animals were comfortable and had mean total pain score (MTPS) value of less than 4.5 throughout the postoperative period. The MTPS values reduced progressively during the postoperative period. Both analgesics were found effective for controlling postoperative pain.

2.5 Evaluation of glycopyrrolate as an anticholinergic to xylazine induced sedation in calves

S Chander, K Singh, A Kumar and J Singh
Department of Surgery and Radiology, College of Veterinary Sciences, CCS HAU, Hisar, Haryana

The study was conducted on 12 clinically healthy male calves randomly divided into 2 groups of 6 animals each. Glycopyrrolate was administered intravenously 0.01 mg/kg and after 5 min xylazine was injected intravenously 0.02 mg/kg. Administration of glycopyrrolate caused a significant increase in respiratory rate heart rate and blood pressure. The heart rate continued to be near the base value; however, after 25 minutes of xylazine administration the blood pressure was significantly lower than the base value. Xylazine also caused a significant increase in the central venous pressure. There were no significant changes in any of the haematological and blood biochemical parameters.

2.6 Clinico-surgical effects of acepromazine or medetomidine as premedicants to propofol anaesthesia in canines

Sanjay Dubey, SK Tiwari and R Sharda
Department of Surgery and Radiology, College of Veterinary Science and A.H. Anjora, Durg (CG)

The study was conducted in 10 dogs brought for surgical treatment. The dogs were anaesthetized using propofol alone 5 mg/kg b.wt. i.v. (Group I) or acepromazine (0.2 mg/kg b.wt. i.m.) and propofol (5 mg /kg b.wt. i.v.) combination (Group II) or medetomidine (20 µg/kg b.wt. i.m.) propofol (5 mg/kg i.v.) combination (Group III). The operations performed were gastrotomy (2), enterotomy (2), spaying (2), haematoma of ear (2), and castration (2). The induction time varied from 25 to 35 seconds in all 3 groups of animals. The duration of anaesthesia ranged from 9 min to 58 min, while complete recovery time ranged from 20 to 95 min in various groups. The combination of medetomidine- propofol

caused excellent analgesia and muscle relaxation sufficient to perform major surgeries like gastrotomy and spaying in canines without any untoward effect, whereas propofol alone and in combination with acepromazine produced short duration of surgical anaesthesia with good analgesia and muscle relaxation. This combination was suitable for short duration surgical procedures like castration, ear haematoma and enterotomy. Acepromazine and medetomidine were found to be suitable premedicants for propofol anaesthesia for short and long term surgical manoeuvres in canines.

2.7 Anaesthetic management for laparotomy in New Zealand White rabbits

Raju Sharda, SD Hirpurkar, PK Suryavanshi and SK Tiwari
Department of Surgery and Radiology, College of Veterinary Science and AH, Anjora, Durg (CG)

Five healthy rabbits weighing between 1 and 1.5 kg, aged 6 to 8 months were used to study the detection of enterotoxins released by *E.coli* by ileal loop technique. The rabbits were handled with care to avoid self injury. Atropine sulphate 2 mg/kg was given intramuscularly prior to premedication with xylazine administered 3 mg/kg b.wt. General anaesthesia was induced with ketamine administered 20 mg/kg b.wt. intravenously. The induction time was between 16 and 22 seconds and duration of anaesthesia lasted for 48 to 60 min. Recovery time was between 82 and 105 min. Laparotomy was done through linea alba and small intestine was located. Ileal loops of 5 cm in length were made. Identical anaesthetic regimen was adopted for all the rabbits. It was concluded that the anaesthetic procedure produced suitable surgical anaesthesia for performing surgery in rabbits.

2.8 Use of blow pipe to tranquilize vicious animals

PB Patil
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Vicious animals can be easily restrained chemically preventing risk of injury to veterinarian, owner, as well as to the animal. Blow pipe with syringe can be easily made with use of cheap, easily available and routinely used materials from clinic.

2.9 Midazolam and ketamine anaesthesia in ruminants

P Kinjavdekar, Amarpal, HP Aithal, R Tiwari, Kailash Thakur, AM Pawde and GR Singh
Division of Surgery, Indian Veterinary Research Institute, Izatnagar-243 122 (UP)

Midazolam, a benzodiazepine derivative 0.03 mg/kg b.wt., intramuscularly followed by ketamine, after 10 min, intravenously till effect, was administered in large ruminants for application of external skeletal fixators. Different clinical and physiological parameters were studied for a period of 120 min during anaesthesia.

Pin prick reflex was abolished after 5 min of ketamine administration. Surgical anaesthesia was recorded from 20 to 90 min post-induction. The palpebral reflex was feeble or absent from 20 min onwards till 105 min. Eye ball movements were absent from 15 min onwards till 105 min. Heart rate and respiratory rate remained near the base line throughout the observation period. Rectal temperature did not show any significant change during the post-induction period. The animals could stand and walk normally after 120 min of observation period. The study suggested that the combination of midazolam and ketamine produced surgical anaesthesia of sufficient duration without any side effect. Further, the combination did not produce any deleterious effect on the physiological parameters and is safe in large ruminants.

2.10 Haematobiochemical effects of electroacupuncture analgesia in sheep

DK Yadav, NS Jadon, Amresh Kumar, VK Sharma and GD Singh
Department of Surgery and Radiology, College of Veterinary Sciences, Pantnagar-263 145 (UA)

On electrostimulation of various acupoint combinations (ST-34, SP-9, BL-23, GB-34, ST-36, SP-6 and GV-20) with and without xylazine, a gradual and significant increase ($P<0.05$) in haemoglobin, packed cell volume, total leucocyte count, and neutrophil count was observed up to 2 hours in sheep. A gradual and significant ($P<0.05$) increase was observed in serum total protein, globulin and cholesterol values up to 12 hours of electrostimulation. A non-significant ($P>0.05$) increase was observed in serum albumin, glucose, sodium, potassium and chloride level. There was significant decrease ($P<0.05$) in serum creatinine and serum urea nitrogen. A non-significant decrease was observed in aspartate amino-transferase value. These parameters returned to prestimulation level by 24 to 48 hours.

2.11 Clinico-surgical studies on electrostimulation analgesia of abdomino-pelvic region in sheep

DK Yadav, NS Jadon, Amresh Kumar, VK Sharma and GD Singh
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The animals used in this study were divided in four groups (1, 2, 3 and 4). The animals of group 1, 2, 3 and 4 were subjected to electrostimulation of ST-34, SP-9, BL-23 and GV-20, and GB-34, ST-34, SP-6 and GV-20 with and without xylazine, respectively. Surgical operations *viz.*, laparotomy, ovariohysterectomy, episiotomy and rumenotomy were performed in all the groups of animals. Extent of surgical analgesia was best in the animals of group 4 followed by the animals of group, 3, 2 and 1.

2.12 Electroacupuncture analgesia in sheep: A haemato-biochemical study

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On electrostimulation of various acupoint combinations (BL-30, LIV-14, GV-4, GB-34, ST-36, SP-6 and GV-20) with and without xylazine, a gradual and significant increase ($P<0.05$) in haemoglobin, packed cell volume, total leucocyte count and neutrophil count was observed up to 2 hours in sheep. A gradual and significant ($P<0.05$) increase was observed in serum total protein, globulin and cholesterol values up to 12 hours. A non-significant increase was observed in albumin, glucose, sodium, potassium and chloride levels. There was significant decrease ($P<0.05$) in serum creatinine and urea nitrogen. A non-significant decrease was observed in aspartate amino transferase value. These parameters returned to pre-stimulation level by 24 to 48 hours.

2.13 Acupuncture analgesia of abdomino-pelvic region in sheep: A clinico-physiological study

DK Yadav, NS Jadon, VK Sharma and GD Singh
Department of Surgery and Radiology, College of Veterinary Sciences, Pantnagar-263 145 (UA)

The electrostimulation of acupoints GB-34, ST-36, SP-6 and GV-20 with and without xylazine in sheep for 30 min produced a significant increase ($P<0.05$) in the duration of analgesia (28.00±1.47 min) in comparison with electrostimulation of acupoints BL-30, LIV-14, GV-4 and GV-20 with and without xylazine (24.0±1.42 min). The recovery occurred in 21.50±0.73 to 25.00±1.27 min. The combined electrostimulation of acupoints GB-34,

ST-36, SP-6 and GV-20 with xylazine produced complete desensitization of flank region, lateral and medial aspect of thigh, lateral aspect of hip, perineum base of tail and ventral abdomen. Electrostimulaiton of acupoints caused a significant ($P < 0.05$) increase in heart rate, significant decrease ($P<0.05$) in respiratory rate and non-significant increase in rectal temperature in all groups of animals.

2.14 Haemato-biochemical studies on electro-stimulation of LIV-14, BL-30 and GV-20 acupoints in cow calves

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Sixteen healthy male cow calves were divided into four groups. The animals of groups 1 and 2 were subjected to the electrostimulation of LIV-14 and BL-30 acupoints alone and with xylazine, respectively, and the animals of groups 3 and 4 were subjected to the electrostimulation of LIV-14, BL-30 and GV-20 acupoints alone and with xylazine, respectively. Xylazine was administered at a dose rate of 0.05 mg/kg b.wt. intramuscularly. A gradual and significant increase in PCV, TEC, TLC and neutrophil count with corresponding decrease in lymphocyte count was observed in all the animals up to 2 hours, which reached near prestimulation level by 12 hours. A non-significant increase in haemoglobin was observed in all the animals up to 15 min after electrostimulation, which reached near prestimulation level by 24 hours. A gradual and significant increase in total proteins, globulin, glucose and sodium with decrease in albumin and potassium along with a non-significant increase in serum urea nitrogen, aspartate amino transferase and chloride was observed in all the animals up to 12 hours, reaching prestimulation level by 24 hours. A non-significant decrease in serum creatinine and cholesterol was observed in all the animals after electrostimulation up to 12 hours, which reached near normal level by 24 hours.

2.15 Effect of anaesthetics on intraocular pressure in dogs

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Study was conducted on 12 mongrel dogs between 8 and 15 kg of b.wt. divided equally in 3 groups A, B and C. Group A and B dogs were premedicated with atropine sulphate 0.045 mg/kg i.m. and anaesthetized with ketamine hydrochloride 5 mg/ kg i.v. (group A) and 2.5% thiopentone sodium 20 mg/ kg to effect (group B). In group C animals, retrobulbar nerve block was achieved by injecting 2-3 ml of 2% lignocaine hydrochloride through lateral canthus. In all the groups, intraocular pressure was measured by Schiotz indentation tonometer before anaesthesia and at 0, 10 and 30 min post-administration of anaesthetics. In group A, a sudden rise in intraocular pressure was observed in both eyes, which was 18±1.94 mm Hg in left eye and 18.42±2.52 mm Hg in right eye. Increase in ocular pressure persisted for 10 min. In group B animals, intraocular pressure significantly reduced in both eyes (11±1.73 mm Hg in left and 10.8 ± 1.77 mm Hg in right eye) after administration of the anaesthetic, which persisted up to 10 min. In group C, intraocular pressure initially decreased in both eyes (11.55±2.0 mm Hg in left eye and 11.55±2.0 Hg in right eye) up to 10 min. Intra ocular pressure in all the groups became normal within 30 min. On the basis of results, it was concluded that intraocular pressure reduce under thiopentone anaesthesia and retrobulbar nerve block and increases under ketamine anaesthesia.

2.16 Clinico-surgical studies on electro-stimulation of LIV-14, BL-30 and GV-20 acupoints in cow calves

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Sixteen healthy male cow calves were divided into 4 groups. The animals of groups 1 and 2 were subjected to the electrostimulation of LIV-14 and BL-30 acupoints alone and with xylazine, respectively, and the animals of groups 3 and 4 were subjected to the electrostimulation of LIV-14, BL-30 and GV-20 acupoints alone and with xylazine, respectively. The xylazine was administered at 0.05 mg/kg b.wt. i.m. The assessment of analgesia was done by determining: clinical (onset, duration, recovery time, degree and extent of analgesia), physiological (heart rate, rectal temperature and respiration rate) parameters. A significant increase in heart rate and respiration rate was observed in the animals of different groups up to 30 min after electrostimulation. However, a significant decrease in respiration rate in animals of groups 2 and 4 was observed up to 30 min. A non-significant increase in body temperature was observed in the animals of groups 1 and 3, up to 30 min. The value of different parameters reached near prestimulation level by 2 hours.

2.17 Evaluation of anaesthetic regimens for cataract surgery in dogs

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A total of 12 mesocephalic cataractic dogs of either sex, weighing 8 to 15kg were randomly placed into 2 groups, A and B. Dogs of both groups were premedicated with atropine sulphate 0.04 mg/kg i.m. and diazepam hydrochloride 1 mg/kg i.v. In group A retrobulbar analgesia was achieved by injecting 2 to 3 ml of 2% lignocaine hydrochloride solution before induction of general anaesthesia, by i.v. administration of 2.5 % solution of thiopentone sodium. In-group B pancuronium bromide was given 0.01 mg/kg i.v. in thiopentone anaesthetized patient. In animals of both groups eyes were centrally fixed during anaesthesia, which facilitated excellent access of eye for surgery. However, intraocular pressure was observed less before surgery in both groups. In group A patients, exophthalmia was observed during cataract surgery, which was so marked that it resulted in prolapse of iris through incision site causing difficulty in reconstruction of the anterior chamber with visco-elastic jel. Hemorrhage due to iris injury was observed in this group of patients. In group B patients, procedure of capsulorrhexis and irrigation- aspiration of cataractogenic lens and reconstruction of anterior chamber were easy due to stability of eye.

2.18 Effect of propofol in combination with xylazine and triflupromazine in buffalo calves: A clinical study

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The study was conducted on 6 healthy male buffalo calves weighing 100-150 kg to evaluate the efficacy of propofol with xylazine and triflupromazine. In treatment I, xylazine hydrochloride was given i.m. at 0.2 mg/kg followed, 10 min later by propofol i.v. till effect. Anaesthesia was maintained with continuous infusion of propofol i.v. for 30

min. In treatment II, triflupromazine was given 0.4 mg/kg i.v. followed by induction and maintenance with propofol as in treatment I. In treatment I, the duration of surgical anaesthesia was 35-40 min, however, analgesia remained for 50.0±2.89, 35.3±1.33 and 40.3±1.66 min in flank, forelimbs and hind limbs, respectively. Treatment II calves exhibited very good hypnosis with mild analgesia but they did not show surgical anaesthesia. Fair to poor analgesia remained for 30.83±0.47 min in hind limbs. Both treatments caused excellent muscle relaxation, however, it was of longer duration in treatment I. Recovery time was 74.16±4.88 and 8.0±0.68 min in treatments I and II, respectively. The induction dose of propofol was 0.70±0.12 mg/kg and 1.78±0.40 mg/kg and maintenance dose was 0.04 mg/kg/min and 0.07 mg/kg/min in treatments I and II, respectively. The rectal temperature increased transiently in treatment I, whereas significant decrease was observed in treatment II. Respiration rate and heart rate showed significant decrease in treatment I.

2.19 Haematobiochemical changes following spinal anaesthesia with bupivacaine, xylazine, buprenorphine and their combinations with ketamine in buffalo calves

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The study was conducted to evaluate the effects of bupivacaine, xylazine, buprenorphine, and their combinations with ketamine for lumbosacral spinal analgesia in 6 male buffalo calves in a latin square method. The treatments were bupivacaine (0.25 mg/kg), xylazine (0.05 mg/kg), buprenorphine (20 µg/kg), bupivacaine + ketamine (0.25 mg/kg + 2.5 mg/kg) xylazine + ketamine (0.05 mg/kg + 2.5 mg/kg) and buprenorphine + ketamine (20 µg/kg + 2.5 mg/kg) in groups A, B, C, D, E and F, respectively. A total volume of 6 ml of the drug(s) injected was at the lumbosacral space spinally. Haematological studies revealed a decrease in Hb and PCV in groups A, B, C, D and E with no significant change in group F. TLC increased in groups A, C, D, E and F, except in group B where it decreased from 30 to 60 min post-injection. At 24 hrs. the values in groups A, B, C, D and E were non significantly higher than baseline and in group F it was significantly higher than base line value. There was a slight neutrophilia and concomitant lymphocytopaenia in all groups up to at 24 hr. Monocytes and eosinophils did not show any change. The plasma glucose increased in groups A, B, C, E and F and showed significant decrease in group D. Plasma urea nitrogen values decreased in groups A, B, C, D and F throughout the period of observation and increased in group E animals. Plasma creatinine concentration increased in group A but decreased in groups B, D and E. In group C, the values fluctuated near the baseline with a non-significant rise. Plasma cortisol showed a non-significant rise in groups A and B. In groups D, E and F there was a rise in plasma cortisol. Group F animals showed significantly higher values of GGT than all groups.

2.20 Clinicophysiological changes following spinal anaesthesia with bupivacaine, xylazine, buprenorphine, and their combinations with ketamine in buffalo calves

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The study was conducted to evaluate the effects of bupivacaine, xylazine, buprenorphine and their combinations with ketamine for lumbosacral spinal analgesia in 6 animals used in a latin square method. The treatments given were bupivacaine (0.25 mg/kg),

xylazine (0.05 mg/kg), buprenorphine (20 µg/kg), bupivacaine + ketamine (0.25 mg/kg + 2.5 mg/kg) xylazine + ketamine (0.05 mg/kg + 2.5 mg/kg) and buprenorphine + ketamine (20 µg/kg + 2.5 mg/kg) in group A, B, C, D, E and F, respectively. A total volume of 6 ml of the drug(s) was injected at the lumbosacral space spinally.

The earliest onset of analgesia was observed with xylazine and ketamine, followed by bupivacaine with ketamine, buprenorphine with ketamine, bupivacaine alone, xylazine alone and buprenorphine alone. Bupivacaine in animals of group A produced a maximum of moderate analgesia of perineum, inguinal and tail, and mild analgesia of hind limbs, flank and thorax; whereas bupivacaine-ketamine combination produced moderate analgesia of thorax, abdomen and flank, and complete analgesia of tail, perineum, inguinal region, hind limbs and digits. Xylazine alone produced no analgesia of thorax and flank, mild analgesia of digits and abdomen, and a moderate analgesia of tail, perineum, inguinal region and hind limbs. Xylazine-ketamine combination produced moderate analgesia of thorax, abdomen and flank, and complete analgesia of digits, perineum, inguinal region, hind limbs and tail. Bupivacaine alone and bupivacaine-ketamine produced the least sedation among all the groups. Xylazine produced extreme sedation but the animals could sit without support throughout the observation period. Xylazine-ketamine produced maximum sedation with lateral recumbency from 5 to 75 min. Buprenorphine and buprenorphine-ketamine produced mildest degree of sedation. Motor incoordination was higher in groups D and E as compared to all other groups. Animals of groups A, B, C and F showed only very mild to moderate degree of motor incoordination. The duration of analgesia was longest in group D followed by group E. Groups C and F had significantly lower duration of analgesia. All the groups showed a decrease in HR except groups C and F where the HR did not chang. Groups D and E showed decrease in RR, whereas groups A, B, C and F showed non-significant change in RR. The RT was significantly lower in groups E and D as compared to groups A, B, C and F.

2.21 Effects of spinal anaesthesia with bupivacaine, xylazine, buprenorphine, and their combinations with ketamine in uraemic buffalo calves

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The study was conducted to evaluate the effects of combination of bupivacaine, xylazine, buprenorphine, with ketamine for lumbosacral spinal analgesia in clinical cases of obstructive urolithiasis with uremia in buffalo calves. Thirty six animals having obstructive urolithiasis, rupture of bladder and uremia were randomly divided in to 3 groups (G, H and I) with 12 animals in each group. The treatments bupivacaine + ketamine (0.25 mg/kg + 2.5 mg/kg), xylazine + ketamine (0.05 mg/kg + 2.5 mg/kg) and buprenorphine + ketamine (20 µg/kg + 2.5 mg/kg) in groups G, H and I, respectively. A total volume of 6 ml of the drug(s) was injected at the lumbosacral space spinally.

The animals were observed for Depth and extent of analgesia, sedation and motor incoordination. Surgery was performed, catheterization of bladder with foleys catheter and repair of the ruptured bladder. In all the animals time of surgery from the start did not take more than 25 min. Animals were also observed for their response to skin incision and to any other stimuli during surgery. Additional dose of drug required or use of local anaesthetics as infiltration analgesia was also recorded. Physiological observation up to HR, RR and RT were recorded 180 min post-injection. The onset of analgesia was quickest in group H followed by group I and group G. Group I animals did not show complete

analgesia of any regions and only group G animals showed a complete analgesia of perineum, inguinal region, digits and tail, and rest of the regions achieved moderate analgesia only. Whereas group H animals showed a complete analgesia of all the regions recorded. Sedation, ataxia, duration and recovery were comparitively longer in group H followed by group I and group G. HR, RR, RT were significantly lower in group H. PCV, Hb, TLC decreased significantly in all groups. Neutrophil count was decreased and lymphocyte count was increased in all groups. Plasma glucose decreased significantly in groups G and H, and increased non-significantly in group I. BUN values showed a significant decrease in group H. Plasma creatinine decreased in groups G and H. Plasma cortisol showed a decrease in groups G and I, followed by an increase after 60 and 120 min, respectively. From the results of the study it could be concluded that the combination, ketamine and bupivacaine can be considered safe for uremic buffalo calves suffering from obstructive urolithiasis.

2.22 Haemodynamic changes following spinal anaesthesia with bupivacaine, xylazine, and buprenorphine with ketamine in buffalo calves

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The present study was conducted to evaluate the haemodynamic effects of combinations of bupivacaine, xylazine, buprenorphine with ketamine for lumbosacral spinal analgesia in buffalo calves. Nine animals were divided into 3 groups D, E and F. Bupivacaine + ketamine (0.25 mg/kg + 2.5 mg/kg), xylazine + ketamine (0.05 mg/kg + 2.5 mg/kg) and buprenorphine + ketamine (20 µg/kg + 2.5 mg/kg) were administered in animals of groups D, E and F, respectively. A total volume of 6 ml of the drug(s) was injected at the lumbosacral space spinally under aseptic conditions. After catheterization of carotid artery and jugular vein, changes in mean arterial pressure (MAP) and central venous pressure (CVP) respectively were recorded before the injection of drugs and then up to 180 min. ECG recordings were also made by using a lead II ECG at 1 mV and 25 mm/sec paper speed by bage-apex lead using ECG machine. The fresh heparinized arterial blood was utilized for the estimation of pH, PO_2, PCO_2, BE, HCO^-_3, Na^+, K^+, Cl^- and calcium using blood gas analyzer. pH values fluctuated within normal limits. Groups D and E showed significantly higher PO_2 values than group F, and group E had higher PCO_2 value than groups D and F. Groups D had E had higher base excess value than group F and group D had significantly lower base excess value than group E. The bicarbonate concentration showed a transient non-significant rise in all the groups at 30-60 min post-injection. However, there was no significant variation in the levels of sodium, potassium, chloride and calcium. Group F animals showed significantly higher CVP and lower MAP as compared to other groups. Maximal arrhythmia between 5-10 min, 45-75 min and also at 180 min was seen in group F animals. Group E animals showed lowest P-wave amplitude and group F animals showed significantly higher P-wave duration and QRS amplitude as compared to all groups. Groups E and F had higher PR and QT intervals. Group F animals showed presence of inverted T-waves. T-wave duration was longer in groups D and E than in group F.

On the basis of the results of the study it was concluded that spinal bupivacaine and xylazine with or without ketamine produced only transient alterations in haemodyanamic and ECG parameters and therefore, could be considered safe in healthy buffaloes. The combination of ketamine and buprenorphine should be used with caution in cases with compromised cardiac functions.

2.23 Comparative evaluation of ketamine alone and ketamine-diazepam combination for induction of general anaesthesia in butorphanol-xylazine premedicated horses

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Six healthy, thorough bred horses of either sex, 3-5 years age and weighing 250-310 kg were used. Each animal underwent 2 replicates of each treatments viz. treatment I [butorphanol (0.06 mg/kg i.m.) + xylazine (0.5 mg/kg i.v. after 10 mins of butorphanol) + ketamine I/V till effect], treatment [butorphanol (0.06 mg/kg i.m.) + xylazine (0.5 mg/kg i.v. after 10 min of butorphanol) + ketamine -diazepam mixture (20:1) i.v. till effect].

Mean doses of ketamine in T_1 and T_2 were 1.83±0.18 and 1.77±0.09 mg/kg and of diazepam in T_2 was 0.085±0.039 mg/kg. Duration of surgical anaesthesia was 15.25±1.89 and 18.00±2.86 min in T_1 and T_2 groups, respectively. Depth of analgesia and muscular relaxation were excellent in T_1 group and fair in T_2 group. Complete recovery occurred is 55.00±6.72 and 45.50±2.72 min, respectively. Degree of abolition of different reflexes and relaxation of anal sphinctor and dribbling of urine at maximal depth of anaesthesia were observed more in T_2 in comparison to T_1 group. In both groups heart rate decreased significantly ($P<0.05$) at complete sedation and increased significantly after administration of induction agents and returned to pretreatment values by 6 hours. Decrease in respiration rate was more in T_2 group in comparison to T_1 group. Significant fall in rectal temperature was observed in both groups. Majority of haematological parameters viz. PCV, Hb, TLC, and DLC and biochemical parameters viz. creatinine, SGOT, SGPT, sodium, potassium and chloride changed within physiological limit. Results of present study revealed that diazepam-ketamine combination provided good surgical anesthesia with good muscular relaxation and more depth of anesthesia.

2.24 Comparative evaluation of ketamine-xylazine and ketamine-midazdam combinations for induction of general anaesthesia in horses after premedication with butorphanol and xylazine

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The study was conducted on six healthy thorough bred horses of 3-5 years of age and weighing 250-310 kg. All the animals were given 2 replicates of each treatments viz. treatment I [Butorphanol (0.06 mg/kg i.m.) + xylazine (0.5 mg/kg i.v. after 10 min of butorphanol) + ketamine - xylazine mixture (10:1) i.v. till effect, treatment II - butorphanol (0.06 mg/kg i.m.) + xylazine (0.5 mg/kg i.v. after 10 min of butorphanol) + ketamine - midazolam mixture (30:1) i.v. till effect]. Mean doses of ketamine in T_1 and T_2 groups were 1.76±0.267 and 1.30±0.12 mg/kg, respectively while the required mean doses of xylazine and midazolam were 0.143±0.015 and 0.046±0.080 mg/kg in T_1 and T_2 group, respectively. Induction period, duration of anaesthesia and complete recovery period were 60.00±4.56 sec (T_1), 55.75±3.61 sec (T_2); 12.25±1.93 min (T_1), 17.25±2.59 min (T_2), and 57.75±5.89 min (T_1), 53.75±3.97 min (T_2), respectively. Degree of abolition of reflexes, degree of muscular relaxation were found more prominent in T_2 group in comparison to T_1 group. Attempts to regain standing was seen in 2.25±0.94 in T_1 group and 1.25±0.25 in T_2 group. In both groups heart rate decreased significantly at complete sedation and increased after administration of induction agents and again decreased at maximal depth

minutes later, general anaesthesia was effected with i.v. injection of 1% w/v Propofol and was maintained with incremental dose(s) of propofol as intermittent boli when ever required. ECG was recorded using lead II system at a paper speed of 25 mm/s before and after premedication and every 15 min after induction till recovery. The changes noticed after premedication were tachycardia in 3 animals of group I, decrease in heart rate with 2nd degree heart block in 2 dogs of group II, sinus bradycardia in 1 dog of group II, sinus bradycardia in 1 dog of group II, wandering pace maker in 2 dogs of groups I and II, ventricular pre-excitation, atrial premature contraction and increase in the duration of QRS in one dog each in group I and ST coving in one dog of group I and 2 dogs of group II. Fifteen min after induction, heart rate increased from the value after premedication in all animals except one dog in group I. Tachycardia was noticed in 3 dogs, but in group II there was increase of heart rate in 4 animals and decrease in 2 animals. T wave was biphasic at 45 min, and negative and more than ¼ R wave at 60 min and 75 min after induction in 1 dog of group I, while 1 dog of group II had T wave greater than ¼ R wave at 30 min post induction. ST coving was seen throughout the period of observation in 2 dogs of group II.

2.28 Clinical evaluation of xylazine-propofol anaesthesia in dogs

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The study was undertaken in 15 dogs of different breeds and either sex divided into 2 groups – Group I consisting of 8 apparently healthy dogs presented for elective surgery, and Group II consisting of 7 dogs presented for emergency surgery. All the animals were premedicated with atropine sulphate @ 0.04 mg/kg and xylazine @ 1 mg/kg b.wt. i.m. Ten min later, general anaesthesia was effected with i.m. injection of 1% w/v propofol and was maintained with incremental dose(s) of propofol as intermittent boli as and when required. Palpebral reflex was sluggish in both groups during induction and throughout the period of maintenance. Eyeball rolled down during induction and remained so throughout the period of maintenance. The duration of anaesthesia after initial bolus was 14.03 ± 2.04 min. in group I and 18.54 ± 1.64 min. in group II. The average incremental dose of propofol needed was 2.78 ± 0.45 mg/kg in group I and 2.98 ± 0.50 mg/kg in group II. The average duration of effect of incremental dose obtained was 10.04 ± 0.75 min. in group I and 16.85 ± 2.71 min. in group II. Animals of group I were able to stand by themselves 14.72 ± 1.63 min. after recovery, while it was 20.9 ± 1.25 min. in group II. The gait of the animals of group I became normal by 19.69 ± 1.55 min, while it was 27.2± 3.06 min. in group II animals. Respiration rate showed significant decrease in both groups after premedication and at 15 min. after induction with propofol. Pulse rate and heart rate decreased after premedication and increased on induction with propofol. There was decrease in haemoglobin concentration and total erythrocyte count after premedication, which increased on induction in both groups. Total leukocyte count decreased after premedication followed by an increase after induction. Neutrophilia was observed both after premedication and on induction with propofol in group I, whereas in group II neutrophil count showed a decrease on Premedication, which increased after induction. Lymphocyte count decreased after premedication and increased after induction in group I. But in group II lymphocyte count showed an increase after premedication, which decreased on induction of anaesthesia. Propofol under atropine-xylazine premedication was found to be safe and effective anaesthetic for induction and maintenance of anaesthesia for surgery in both healthy and compromised dogs.

of anaesthesia. Respiration was more deep and slow in T_2 group in comparison to T_1 group. Rectal temperature decreased significantly during maximal depth of anaesthesia in both groups. Majority of haematological and biochemical parameters changed within normal physiological limit. Results of the present study revealed that both the treatments can be safely used for routine surgical procedures. Further, butorphanol-xylazine-ketamine-midazolam combination was found better than butorphanol-xylazine-ketamine-xylazine combination.

2.25 Standardization of the dose rates of midazolam, pentazocine and propofol for induction and maintenance of anaesthesia in swine

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The study was conducted on 15 Yorkshire pigs weighing 28±0.8 kg, divided into 3 groups, 3 pigs in group I and 6 pigs in-group II and group III. Standardization of doses of propofol, midazolam and pentazocine was done in group I. From the above study it was concluded that intravenous administration of propofol 6 mg/kg b.wt. was sufficient to induce smooth, rapid and short duration of general anaesthesia in pigs. Preanaesthetic injection of either midazolam (0.3 mg/kg b.wt.) or pentazocine (3 mg/kg b.wt.) reduced the dose of propofol to about 15% i.e. 5 mg/kg b.wt. and it could ultimately reduce the cost of anaesthesia. Propofol (5 mg/kg b.wt.) in combination with midazolam (0.3 mg/kg b.wt.) appeared an ideal anaesthetic for smooth induction and maintenance of longer duration of anaesthesia in swine

2.26 Evaluation of propofol for induction and maintenance of anaesthesia in swine: A clinical study

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A total 12 Yorkshire pigs weighing 28 ± 0.89 kg were randomly divided into 2 equal groups. In group I propofol was administered i.v. 5 mg/kg b.wt. 10 min following the intravenous injection of 0.3 mg/kg midazolam. In group II pentazocine was administered i.v. @ 3 mg/kg b.wt., 10 min prior to propofol (5 mg/kg b.wt). Comparison was made within and between groups with respect to effect of propofol on induction time, duration of anaesthesia, time taken to attain sternal recumbency and different clinical parameters. There was no significant difference noted in any of the parameters studied. Hence it was concluded that propofol (5mg/kg) in combination with either midazolam (0.3mg/kg) or pentazocine (3mg/kg) could be safely used for undertaking major surgical procedures in swine.

2.27 Electrocardiogram changes during xylazine-propofol anaesthesia in dogs: A clinical study

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Fifteen dogs of different breeds of either sex presented for clinical surgery were divided into 2 groups – group I consisting 8 apparently healthy dogs presented for elective surgery and group II consisting seven dogs presented for emergency surgery. They were premedicated with atropine sulphate (0.04 mg/kg i.m.) and xylazine (1 mg/kg i.m.). Ten

2.29 Advancements in canine pain management

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Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. There are situations where we can safely assume a dog is experiencing pain such as with obvious injuries or after some surgical procedures. In veterinary medicine, the most common cause of impaired mobility and pain in dogs is osteoarthritis. This can range in severity from slight stiffness to extreme lameness. Nowadays, a combined approach of appropriate therapies is being practiced, which includes neutraceuticals, COX-2 selective NSAIDs and chiropractic care. The main principles of management of osteoarthritis, are the relief of pain and the control of inflammation (swelling of the joint), to try to keep the joint working, alongside a sensible and controlled weight and exercise programme.

2.30 Evaluation of detomidine hydrochloride as a sedative in camels (*Camelus dromedarius*)

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The study was conducted in 12 adult clinically healthy domesticated Bikaneri camels, 9-13 years of age and weighing 350 to 550 Kg. Animals were randomly divided into 2 groups of 6 animals each. Detomidine hydrochloride was administered 50 µg/kg i.m. In group I, clinical and haematobiochemical parameters were observed. In group II, Haemodynamic and acid-base parameters ECG and EEG were recorded.

Marked decrease in spontaneous activity ataxia, sedation were evident in all the animals. There was drooping of lower lip and frequent urination in four animals. Animals showed indifferent response to pin pricks. The analgesia effect began 12.57±1.48 min after administration of detomidine. Animals recovered from the effects of detomidine within 03.47 hours.

There was no significant change in Hb, PCV and ESR at any stage of observation, however, there was 7.13% decrease in TLC at peak effect of detomidine and a steady rise at recovery. There was a significant increase in BUN level 24 hour 48 hour after recovery. The blood glucose level rose significantly at peak effect of detomidine and remained higher even 48 hour after recovery. Plasma creatinine, calcium, inorganic phosphorus, total proteins, magnesium, sodium, potassium, chloride, alkaline phosphatase and cholesterol did not show much change.

Detomidine caused significant decrease in heart rate, and increase in MAP. The blood pressure slowly returned to the base value by 45 minute interval. By 90 minute, the blood pressure was slightly below the base value. The CVP values were significantly higher than the base values after detomidine administration. There was no significant change in arterial blood pH, carbon dioxide tension and arterial bicarbonate concentration. There was significant decrease in arterial oxygen tension at 15 minute after detomidine administration. The EEG studies did not show any significant alteration in electric activity of the brain. The low voltage-high frequency patterns observed before administration of detomidine continued to remain so after detomidine administration. At occasions, there was an increase in the amplitude of waves without any consistent pattern. Based on the observations, detomidine proved to be an effective sedative and analgesic for shorter duration in camels.

3.0 ORTHOPAEDIC SURGERY SESSION

3.1 Incidence of patellar luxation in dogs

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Dogs presented with hind limb lameness were screened for luxation of patella and the positive cases were included in the study. Out of 15 cases, only 33.33% were males and the rest were females. The age of these animals varied from 4 months to 7 years and their b.wt. varied from 4.5 to 26 kg. Sixty per cent of dogs were below 1 year of age and 33.33% were between 4 and 6 months of age. Out of 15 dogs, 53.33% weighed 10 kg or less and only 6.67% weighed more than 18.2 kg. Among different breeds, 53.33% were nondescript and 20% were Spitz. Out of all the dogs only 6.66% had the history of trauma and remaining (93.44%) cases were congenital in origin. Out of 16 stifle joints examined, 75% had lateral luxation and remaining had medial luxation of patella. Out of 15 cases examined 26.67% had bilateral luxation of patella and remaining had unilateral involvement.

3.2 A study on the anatomical and conformational changes associated with luxation of patella in dogs

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Fifteen dogs presented with the luxation of patella were investigated for anatomical and conformational defects. Eleven dogs were suffering from lateral luxation of patella and 4 from medial luxation of patella. There were varying degrees of lateral deviation of anterior tibial tuberosity in the cases of lateral luxation of patella and medial deviation of tibial tuberosity in medial luxation of patella. Defects associated with femoral trochlea varied from shallow trochlear sulcus to dome shaped ones and the medial or lateral trochlear ridges were deficient in their height resulting in luxation of patella towards the respective sides. There were varying degrees of medial or lateral deviation of quadriceps femoris muscle mass, shortening of the quadriceps muscle mass and patellar ligament resulting in hyperflexion of the stifle joint of affected limbs, genuvarum and genuvalgum in the case of medial and lateral luxations, respectively, stifle and hock joint stiffness and in bilateral cases, crouching of hind quarters.

3.3 Effect of homeopathic drugs, *Symphytum 30* and *Calcarea phosphorica*, on growing long bones in normal rabbits

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The study was conducted to see the effects of homeopathic drugs, *Symphytum 30* and *Calcarea phosphorica* on long bones in growing rabbits. Eighteen New Zealand white rabbits of either sex, 60 day old, were used in 3 groups of 6 animals each. The animals of group I were kept as control and no treatment was given. The animals of group II were given oral supplementation of calcium (100 mg/kg), vit-D3 (20 IU/kg) and zinc (5 mg/kg of feed) for 30 days. The animals of group III were administered with *Symphytum 30* (16 globules) and *Calcarea phosphorica* (50 globules) in feed daily for 30 days. The animals of different groups were evaluated and compared based on radiographic (15 days intervals) and biochemical observations made up to 60 days.

In group I, radiographs taken at different intervals showed gradual increase in the

density and thickness of long bone cortices. The cortical index (CI) increased from 0.286± 0.044 (day 0) to 0.454± 0.064 (day 60). In group II, though there was slight increase in the cortical thickness and CI on day 15, it reduced at subsequent intervals and the CI on day 60 was almost 50% of that of group I (0.227±0.064), indicating osteopenia. In group III, there was early signs of increase in the bone density and on day 15 the CI almost doubled. Further increase in skeletal mineralization was observed on day 30. Subsequently though CI slightly reduced, on day 60 it was almost equal to that of group I and was almost double as that of group II (0.412±0.024). Plasma biochemical changes did not show marked change between groups. In groups I and II, slight decrease in Ca level was recorded on days 15 and 60. In group III, plasma Ca remained unchanged. Plasma phosphorus levels also did not show significant difference between groups. Plasma protein showed decreasing trend in group I. In group II, no marked change was seen. In group III, it slightly reduced on day 15 but subsequently showed an increasing trend. Alkaline phosphatase levels in group I showed significant increase on day 30 and it remained so till the end of observation period. In groups II and III, slight increase in alkaline phosphatase was seen on day 15, but the increase was relatively less. The results of the present study indicate that over supplementation of vit-D_3 and calcium in the feed leads to osteopenia in growing rabbits. Administration of homeopathic drugs, *Symphytum 30* and *Calcarea phosphorica*, have positive effect on mineralization of long bones in growing rabbits.

3.4 Evaluation of certain antiresorptive drugs in growing dogs affected with osteopenic bone diseases

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Ninety two cases of growing dogs affected with osteopenic bone diseases like nutritional secondary hyperparathyroidism and rickets, reported to IVRI polyclinics during the year 2004 -05 were subjected to treatment with different antiresorptive drugs. In all the animals, calcium (250 mg/kg)-vit D_3 (300000 IU/wk) and zinc (50 mg/wk) was administered. In group I animals (n=40), no other treatment was given. In groups II (n=12), III (n=13), IV (n=17) and V (n=6), in addition to Ca-Vit D-Zn therapy, Raloxifene (15 mg/day PO), Alendronate (5 mg/day PO), Nandrolone (Durabolin 12.5 mg/wk IM) and TGF β (20 ng/wk IM), respectively, were administered. The owners were advised to continue the treatment till satisfactory improvement is seen or for at least 1 month duration. Further, they were advised to come for follow up examination every week at least for 4-6 weeks. All the animals which came for follow up examination and treatment were observed for different clinical and biochemical observations at weekly intervals and radiographic observations at every 15 days. In group I, in general the response was seen after 2nd/3rd week of initiation of therapy. In majority of cases, good response was seen after 6-8 weeks of treatment. Animal of groups II and III showed relatively early signs of improvement as compared to group I. In animals treated with durabolin (Gp IV) and TGF β (Gp V), the clinical response was quicker than all other groups.

The radiographic changes in animals of groups I, II, III and V included gradual increase in the density at the physes leading to normalcy of physes (in rickets cases) and varied levels of increase in cortical thickness and density. However, in a few animals treated with durabolin, clear radiographic signs of mineralization like increase in density and thickness of long bone cortices was observed as early as on 15th post-treatment day.

The plasma calcium levels recorded on day 0 were generally below normal indicating hypocalcemia. In groups I, II and III animals Ca levels increased gradually till the end of observation period (day 45). On the other hand in group IV, plasma Ca levels decreased on days 7 and 15. In group V, there was no marked difference in the Ca values. In all groups, plasma phosphorus levels recorded on day 0 were above normal range. In groups I, III and IV, there was decreasing trend in the P level at different intervals. In group II, plasma P though slightly reduced on day 15, on day 45 mean value remained above the base value. In group V, there was fluctuation in the P values at different intervals. Plasma protein levels slightly increased at post-treatment intervals in animals of groups I, III, IV and V, whereas in group II, there was decreasing trend. Plasma alkaline phosphatase activity in animals of different groups was in higher range on day 0. AP activity decreased in all groups from day 7 onwards. By day 30, the decrease was more than 50% in animals of groups I, III, IV and V. In group II also AP activity decreased gradually, but to a lesser extent.

The results of the present study indicate that treatment with different antiresorptive drugs have positive response in growing dogs affected with osteopenic bone diseases. Nevertheless, durabolin probably is the most effective drug and Raloxifene is the least effective drug in growing animals with osteopenia.

3.5 Effect of antiresorptive drugs, *Raloxifene, Alendronate* and *Calcitonin* on skeletal growth in growing rabbits

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The effects of different antiresorptive drugs like *Raloxifene, Alendronate* and *Calcitonin* on skeletal mineralization were studied in normal growing rabbits. Twenty four New Zealand white rabbits of either sex, 60 day old, were randomly divided in 4 equal groups, A, B, C and D. The animals of all the groups were oral supplementation of calcium (100 mg/kg), vit-D3 (20 IU/kg) and zinc (5 mg/kg of feed) for 30 days. The animals of group A acted as control and no other treatment was given. The animals of groups B, C and D were administered with raloxifene (10 mg/kg b.wt. in feed), alendronate (5 mg/kg b.wt. in feed) and calcitonin (10 IU/kg b.wt., i.m.), respectively, for 30 days. The animals of different groups were evaluated and compared based on radiographic and biochemical observations made up to 60 days.

In control group (A), radiographs taken at different intervals did not show marked change in the density and thickness of long bone cortices. The cortical index (CI) increased initially on day 15 (0.205±0.014 to 0.273±0.014), subsequently reduced till day 45 (0.200±0.034) to recover slightly by day 60 (0.227±0.064). In group B animals, apparently there was no change in the density and thickness of cortices till day 30. In subsequent intervals slight improvement in the CI was noticed (0.173±0.010 on day 0 to 0.311±0.089 on day 60). In group C, slight increase in the CI was noted on day 30, it further increased in subsequent intervals (0.213±0.051 on day 0 to 0.367±0.049 on day 60). Whereas in group D animals treated with calcitonin, there was marked increase in the cortical thickness, density and CI on day 15 itself (CI increased from 0.251±0.015 to 0.353±0.032). In subsequent intervals it did not alter significantly till day 60.

Plasma calcium levels slightly reduced on day 15 in group A animals, otherwise it fluctuated near the base value at different intervals. In groups B and C, there was significant

increase in the plasma calcium on day 30, subsequently it reduced. Whereas in group D, calcium values fluctuated near the base value at different intervals with no significant change. Plasma phosphorus values did not show any pattern of change at different intervals in all groups. Total protein increased on day 30 in group A. In group B, the protein values remained near the base value throughout the observation period. In group C, there was slight but gradual decrease in the plasma protein till day 60. In group D also decreasing trend in the plasma protein values was observed at different intervals up to day 30. Alkaline phosphatase activity showed slight increase in group A at different intervals. In groups B and C, there was significant reduction in the AP activity on day 7. The reducing trend continued till day 45 in group B, but in group C, an increase was seen on day 15. In group D, there was gradual increase in plasma AP activity at different intervals of treatment.

The results of the present study indicated that calcitonin has positive response on mineralization of long bones in growing rabbits. Raloxifene and alendronate both showed some positive response, but alendronate is better than raloxifene.

3.6 Successful management of femur fractures with static intramedullary interlocking nailing

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Two cases of diaphyseal femur fractures and one case of distal third femur fracture treated with simple intramedullary pinning were reported with dislodged pins and displaced fracture fragments after a few days. One case of supracondylar femur fracture repaired with cross pinning and then re-fracture at the same site was reported after 2 months. All these fractures were treated with Static Intramedullary Interlocking Nailing using self tapping interlocking bolts in three cases and simple cortical screws in one case. All the dogs started immediate weight bearing and fracture healing was complete by 8-10 weeks. Self tapping interlocking bolts SIMILN provided good stability, even in most complicated fractures where other implant dislodged.

3.7 Use of different types of screws in static intramedullary interlocking nailing for stabilization of long bone diaphyseal fractures in thirty one clinical cases

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The study was conducted on 31 clinical cases of long bone fractures divided into three groups. Static intramedullary interlocking nailing was carried out in all the cases. In group I (n=17) simple cortical screws, in group II (n=8) partially threaded screws and in group III (n=6) self tapping interlocking bolts were used. Fracture reduction and intraoperative stability was comparable in all groups. The dogs were able to walk without any difficulty by 10th postoperative day. In all groups clinical outcome was found to be good especially in groups II and III even when the fractures were more complicated. This was due to the use of partially threaded screws and self-tapping interlocking bolts, which had greater holding power and fatigue strength. No case of rotational deformity or limb shortening was noted in any of the groups. The implant related complications included misdirected screws, screw back out, screw bending and screw breakage. These complications were mostly seen in screws where a 6 mm nail was used for fixation. No case of nail breakage or nail bending was found. Use of larger diameter screws viz. partially threaded screws and self-tapping interlocking bolts provided good stability and early bone

union with minimal screw related complications. Single distal locking with STIB in distal third fractures in heavy dogs provided excellent stability.

3.8 Hip scoring in dogs

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A study was carried out in 50 dogs with the history of hindquarter disability. All the animals were evaluated by palpation of hip joint as per the Ortolani procedure. Radiography of the hip joint was performed in the ventrodorsal hip extended view, distraction view and compression view. Radiographs obtained were evaluated for hip joint abnormalities by hip scoring methods (BVA scheme) for each joint and the scores obtained were compared with the breed mean score to measure the degree of dysplasia. Similarly, Hip Extended Index and Distraction Index were also measured from the radiographs. Results showed that occurrence of hip dysplasia was 60% and occurrence of unilateral hip dysplasia was 16.66%. Majority of the dysplastic dogs were in the age group of 6-12 months and of Labrador retriever breed followed by German Shepherds. Males had higher occurrence of hip dysplasia compared to females. Hip scoring as per the BVA scheme was found to be an accurate method for diagnosis of hip dysplasia in dogs. Measuring of Norberg Angle, Hip Extended Index and Distraction Index were found to be useful in categorizing different degrees of hip dysplasia.

3.9 Influence of nutraceuticals on hip dysplasia management in dogs

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A study was conducted in 30 clinical cases of hip dysplasia to evaluate the effect of nutraceuticals. All the dysplastic were advised with restricted exercise and controlled feeding. The dogs were maintained on a diet containing both chondroitin sulphate and glucosamine @ 4 mg/kg b.wt. for the study period of 12 weeks. The dogs were evaluated on the basis of clinical signs, haematobiochemical parameters, palpation and radiography 12 week. Results showed that there was no significant change in the haematological and biochemical parameters except for a significant decrease in serum alkaline phosphatase level. Although radiography revealed an absence or only a slight improvement in signs of hip dysplasia, there was definite clinical improvement as evident from the reduced lameness and pain score, and significant decrease in the serum alkaline phosphatase level, which might be attributed to the controlled exercise, reduced weight gain, feeding prescription diets and drugs containing glucosamine and chondroitin sulphate.

3.10 Influence of polymethylmethacrylate on femoral fracture healing in dogs

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A study was carried out in 12 clinical cases of femoral fractures in dogs divided into two groups. In group A, fracture repair was performed by the conventional intramedullary pinning and cerclage wiring. In group B, the fracture was repaired using intramedullary pinning and genatamicin impregnated polymethylmethacrylate (PMMA) applied as a luter in the form of splints placed medial and lateral to the fracture site and held in position by cerclage wires. The dogs were evaluated radiographically for fracture healing 60th day postoperatively. In both groups there was no significant difference in

facture healing up to 15th day postoperatively. On day 30, group B dogs showed less callus due to the good stability provided by the PMMA splints. 45th day radiograph revealed increased density and periosteal callus in group B. On day 60, radiograph showed presence of fracture line in group A, but no fracture line was visible in group B. Dogs of group B revealed perfect union of fracture segments with signs of early bone remodeling. There was no infection at the surgical site in group B dogs. Haematological analysis did not reveal any significant differences except for a slight leucocytosis in group B and elevated levels of alkaline phosphatase in both groups.

3.11 Comparison of ulnar osteotomy and radial physeal stapling for correction of carpus valgus in dogs

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A study was undertaken in 12 clinical cases of dogs with carpus valgus deformity. The dogs were divided into 2 groups. All the dogs were subjected to radiography for the diagnosis of premature closure of growth plate. In group A, ulnar osteotomy was performed and a 1.5 cm piece of bone was removed from the distal ulnar diaphysis. In group B radial stapling was performed using stainless steel staples of 2 mm diameter applied on medial aspect of the distal radial physis. Postoperatively, limbs were immobilized with plaster of Paris splints for 3 weeks. Results showed that both techniques could be used for the correction of carpus valgus in dogs. However, stapling was found to be more effective in early correction of the deformity. There were no changes in the haematological parameters but a significant increase in the serum alkaline phosphatase levels in both groups was recorded.

3.12 Management of rupture of caudal cruciate ligament in two dogs

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An eight year old female Spitz dog was presented with severe lameness of the left hind leg after jumping from a wall. Physical examination revealed pain and inflammation of the stifle joint and anterior drawer sign. Stressed radiographs of the stifle joint confirmed a caudal cruciate ligament rupture. Due to economical reasons, the owner declined surgery. The dog was treated with piroxicam @ 0.3 mg/kg b.wt. orally every 48 hours for 10 days and a modified Thomas splint was applied. Two months later there was no significant improvement in the lameness. A five year old German Shepherd dog was presented with severe lameness of the right hind leg after having jumped down from a sofa. The findings of physical examination and stressed radiography indicated caudal cruciate ligament rupture. Surgical correction of the condition was done by tightening the joint capsule of the stifle by lateral and medial imbrication and by imbrication of the tibial tuberosity to the caudomedial corner of the tibial plateau and the fibular head using No. 1 polypropylene sutures. Postoperatively, the movements of the limb were restricted for 10 days using a Thomas splint. Routine postoperative wound care and a course of antibiotic were given. There was considerable reduction in the lameness by the end of 2 weeks and the dog improved progressively with very little lameness being present by the end of the first postoperative month. These observations suggest that surgical correction in the form of imbrication techniques is useful in patients with caudal cruciate ligament rupture, whereas medical management of the condition may not yield favourable results even in smaller dogs.

3.13 Occurrence of fracture in dogs in and around Kolkata: A review of 150 cases

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The study was conducted on 150 clinical cases of canine fractures referred to the Department of Surgery and Radiology during March 1997 to March 2005. Majority of the cases were recorded in cultured Pomeranian (48.70%) followed by German shepherd (18.70%), Mongrel (13.40%), Labrador retriever (8.4%) and other breeds accounted for 10.8%. Higher incidence of fracture was seen in the age group of 3 to 6 months (43.33%) followed by 6 months to 1 year (23.33%), 2 years and above (20%) and 2 years (13.33%). The predisposition of fracture was found more in females (58.67%) than the males (41.33%). Fracture of hind limb (60.67%) was more compared with fore limb (26.6%). In the hind limb, the incidence was more on the right side (55.56%) and contrarily in fore limbs it was more in left side (58.82%). Fracture of femur (42.66%) was the highest followed by tibia and fibula (17.33%), radius and ulna (14.67%) and humerus (10%) while other fractures accounted for 15.33%. Fracture of femur was seen mostly in the diaphysis and distal metaphysis.

3.14 External fixator application for fracture management in dogs: The Madras veterinary college experience

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Eight clinical cases of diaphyseal fracture of different configurations in dogs (Femur n=7, Humerus n=1) were treated with application of unilateral uniplanar external fixator and an ancillary intramedullary pin to counter the fracture forces. In 4 cases, connecting bars and clamps were used. In other 4 cases, a corrugated flexible PVC tube filled with locally available epoxy was used as the connecting bar.

3.15 Arthrodesis of fetlock joint for repair of fracture in foal

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A six-month-old foal was presented to the Department of Surgery and Radiology, Veterinary College, Anand, with history of complicated fracture of left fetlock. It was referred for euthanasia, however, as a last resort, arthrodesis was done under general anaesthesia. Postoperative POP was applied by keeping window and window daily aseptic dressing for one month showed uneventful recovery.

3.16 Pectoral limb fracture in dogs: A review of 228 cases

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A retrospective study in 228 dogs was undertaken to find out the incidence of pectoral limb fracture in dogs with respect to their age, sex, breed, bone involved and the type of fracture. The incidence was highest in non-descript dogs (45.2%) in than any other pure breed. Fractures were common in young dogs (69.3%) below 1 year of age than in adults. Majority of the fractures were recorded in males with a M:F ratio of 2.25.

The incidence was highest in radius/ulna (71.9%) followed by humerus (12.7%), and carpals and metacarpals (10.1%). Transverse fractures were more frequently seen (69.3%) than oblique fractures (20.6%).

3.17 Arthroscopic diagnosis of gleno-humeral ligament rupture in a dog

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A ten-year-old female spitz was presented at the small animal out-patient unit of the Madras Veterinary College Hospital, Chennai with a complaint of right limb lameness and pain at the shoulder joint. A survey radiograph revealed no abnormality and symptomatic treatment with NSAID's, so physiotherapy was instituted. The treatment, however, did little to alleviate the symptoms. Arthroscopy revealed glenohumeral ligament rupture. Joint lavage and intra-articular corticosteroids followed by joint immobilisation and rest gave good results with the dog returning to near normal gait 8 weeks post operatively.

3.18 Successful management of hip dislocation using Ehmer sling in two dogs

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Two dogs with the history of limping on the hind limbs were confirmed to have cranio-dorsal dislocation of hip by radiography. The first one was a one year old male German shepard and the second one was an 18 month, old female, Golden retriever dog. In both cases duration of illness was less than 24 hours. Both dogs were premedicated with triflupromazine 1 mg/kg and anaesthetized using thiopentone sodium. The head of femur was replaced in the socket by traction and rotation. Ehmer sling was applied using crepe elastic bandage as described by Decamp (1993). Radiography during 15th and 30th days showed no dislocation and 2 days after removal of sling dogs started using the limb without much limping. By 60th day the dogs showed no symptoms of lameness.

3.19 Management of septic tenosynovitis in buffaloes

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The animals used in this study were divided randomly into 2 groups. Animals of group A were treated with systemic and intra-articular injections of gentamicin after proper aspiration of the synovial fluid while animals of group B were treated with systemic and intra-articular injections of gentamicin along with debridement and irrigation of affected site with normal saline mixed with gentamicin through an indwelling surgical drain placed in the tendon sheath. The efficacy of therapeutic regimens was determined on the basis of clinical signs, haematology, synovial fluid analysis, microbiological studies, faciagraphy and ultrasonography for a period of 60 days. The results suggested that both therapeutic regimens were effective for the treatment of septic tenosynovitis. However, medical treatment combined with periodic aspiration of synovial effusion was found better over the surgical treatment combined with indwelling catheterization. Medical treatment and aspiration of fluid was found easy to use and initiated less adhesion formation between tendon and tendon sheath. Surgical debridement and indwelling catheterization of tendon sheath produced marked adhesions tendon sheath, which restricted normal tendon function.

3.20 Trochlear wedge recession sulcoplasty for the correction of patellar luxation in a dog

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A one year old male Spitz dog was presented with the history of right hind limb, non weight bearing lameness. On examination it was found to have hyperflexion and outward rotation of stifle joint and toes pointing out. On detailed physical examination, a grade III, lateral luxation of right patella was diagnosed. The patient was subjected to trochlear wedge recession sulcoplasty through a medial parapatellar approach to deepen the trochlear sulcus and a row of imbrication sutures were placed on the medial retinaculum in order to restrain its lateral movement. After ensuring a straight line alignment between the quadriceps muscle mass, patellar ligament, patella and anterior tibial tuberosity, the joint capsule was sutured. The dog had an uneventful recovery from lameness and over a follow up period of 2 years no relapse was recorded.

3.21 Studies on diagnosis of septic tenosynovitis in buffaloes

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The diagnosis of tenosynovitis was done on the basis of clinical sign, hematological and synovial fluid alteration, microbiological studies, faciagraphy and ultrasonography for a period of 60 days. Clinical examination revealed significantly increased rectal temperature, lameness score, swelling and severe pain at the affected site. Haematological findings did not reflect any significant change except for an increase in neutrophils and a decrease in lymphocyte count. Colour and consistency of synovial fluid was recorded with high quantity of flocculant materials. Diseased animals had significantly lower value of MPQ, glucose and albumin and globulin ratio. A significantly high level of synovial fluid aspartate and alanine amino transferase, alkaline and acid phosphatase, lactate dehydrogenase and total protein was observed. On microbial isolation coagulase positive Staphylococcus sp. was found in all samples alongwith Streptococcus sp. and *E. coli*. On faciagraphy thickened flexor tendon sheath alongwith adhesions between tendon sheath and underlying tissues and skin were observed. Ultrasonogram revealed distension of the digital flexor tendon sheath evidenced by presence of anechoic zone and increased ehcogenicity of the superficial and deep digital flexor tendon and suspensory ligament.

3.22 Tenorrhaphies in bullocks

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Six bullocks of 4-8 years of age were attended in different incidences of accidents. Upward movement of hoof and fetlocks touching the land were the common symptoms. Animals were sedated with xylazine hydrochloride. The wound were opened and made broad to locate the cut ends of tendon and irrigated with dextrose normal saline solution. Movements of hoof were made to have the cut ends of the separated tendons close. Superficial and deep flexor tendons were sutured separately with number one synthetic absorbable suture. Superficial wounds were closed with nylon sutures. Postoperatively parenteral course of antibiotics was given. After 6 months of surgeries all the bullocks were in normal strength and ability.

3.23 Efficacy of *Cissus quadrangularis* in femur fracture healing immobilized by intramedullary pinning in dogs with particular emphasis on physical and radiological studies.

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The study was conducted on 16 clinical cases of diaphyseal femur fracture in dogs brought to the Department of Veterinary Surgery & Radiology, Bihar Veterinary College, Patna. These animals were divided randomly into two groups consisting of 8 animals in each. Special emphasis was given to allocate equal number of adult and young animals in each group. In both groups open method of intramedullary pinning was done to immobilize the fractured ends, while in group I (T_1) no herbal medication was used and in group II (T_2), *Cissus quadrangularis* was used on alternate days externally up to 28th post-operative day. The efficacy of treatment was evaluated on the basis of extent of weight bearing, functional limb usage and radiological findings.

Weight bearing was variable in control group. Most of these animals had partial weight bearing with paw touching the ground when walking by 14th to 21st post-operative day. In *Cissus quadrangularis* treated group, partial to moderate weight bearing was noticed on 14th post-operative day. These dogs could walk with paw on ground with complete weight bearing on 21st post-operative day. On 21st to 28th post-operative day, wide continuous dense zone of massive periosteal callus was visible radiologically in *Cissus quadrangularis* treated group, which indicated the optimum healing with early osteogenesis.

3.24 Efficacy of Symphytum in femur fracture healing immobilized by intramedullary pinning in dogs with particular emphasis on physical and radiological studies.

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Sixteen cases of diaphyseal femur fracture in dogs were divided randomly in 2 groups consisting of 8 animals in each. In both groups fracture was immobilized with intramedullary pinning. In group I (T_1) no other medicament was used; while in group II (T_2) pinning was followed by *Symphytum*, a homoeopathic drug, treatment in different potencies. The effect of treatment on fracture healing was assessed based on extent of weight bearing, functional limb usage and radiographic findings. In control group, the animals could walk by 21st to 28th day post-operatively except 2 dogs which showed non-weight bearing lameness. Pain perception on gentle palpation was also evinced on 7th to 14th post-operative day. In *Symphytum* treated group pain perception was absent on 7th post-operative day. Partial to moderate weight bearing was noticed on 14th post-operative day. By 21st to 28th post-operative day these animals could walk cautiously without any marked abnormality in gait. In this group, the beginning of formation of radiologically visible callus was seen by 14th to 21st post-operative day except in one dog. Periosteal callus was almost found to bridge the fracture gap on 28th post-operative day.

3.25 Surgical management of bilateral patellar dislocation in a dog

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A 7 months old Lhasa Apso male dog was presented to the Teaching hospital, pondicherry with a complaint of lameness on hind limbs since last 3 months. Physical

and radiological examination revealed bilateral lateral patellar luxation. Radiography confirmed the deviation of the tuberosity of the right tibia. Trochlear wedge recession sulcoplasty was performed on left stifle. Tibial tuberosity transposition on right femur was done at an interval after one month. The animal returned to normal use of left hind limb but the right hind limb did not return to normal due to severe pathological change of trochlea consequent to congenital malformation.

3.26 Pelvic limb fracture in dogs: A survey of 307 cases

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A survey was carried out to analyse the pelvic limb fractures in dogs recorded at the small animal clinics of the Madras Veterinary College, from 2000 to 2002. In total 307 cases of pelvic limb fractures were reviewed. Majority of the fractures were recorded in non-descript dogs (41.7%). The incidence was highest in young animals (70.3%) below one year of age. Male dogs were affected more frequently (57%) than female in all the age groups. Among the various bones of the pelvic limb, the incidence was highest in femur (43.3%) followed by tibia and fibula (36.8%). The occurrence of oblique fractures was more (43.9%) than transverse (27.4%) and avulsion fractures (9.4%).

4.0 SMALL ANIMAL SURGERY SESSION

Lead Paper

4.1 Current concepts in the management of cataract in canine

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Cataract is defined as any opacification of the lens, regardless of cause, size or location. Most cataracts in dogs are inherited, although they may be caused by congenital defects, nutritional deficiencies, toxic substances, uveal adhesions, and diabetes mellitus. The basic abnormality in cataract formation is degeneration of the normal protein structure of the lens fibers. As lens proteins degenerate they liquefy, and such cataracts are referred to as hypermature. Liquefied lens material may or may not leak out of the lens capsule. Leakage of lens material through an intact capsule typically results in a lymphocytic-plasmacytic inflammatory response called phacolytic uveitis. Mineralization is seen in extremely advanced cataracts, particularly in the lens capsule. Intumescent cataracts are recognized clinically by the presence of a shallow anterior chamber. Resorption of lens proteins is recognized clinically by wrinkling or flattening of the anterior lens capsule. In only very young dogs (< 2 years) can the lens proteins resorb completely.

Classifications

a. **Time of onset:**
   1) Congenital - Present at birth. Tend to be nuclear and may have clear cortex around them. They may or may not progress or be inherited.
   2) Juvenile - Developing before adulthood (1-2 yrs of age in dogs).
   3) Adult - Occur in adult animals.
   4) Senile - Aged animals (Beyond nuclear sclerosis).

b. **Location**–Important in that many inherited cataracts occur in the posterior cortex area.
   1) Structure affected - capsule, cortex or nucleus.
   2) Location in the lens - anterior or posterior, equatorial or polar (axial), zone (capsular, subcapsular, cortical, nuclear).

c. **Stage of development**
   1) Incipient - Small opacity and vision is maintained.
   2) Incomplete (immature) - Vision is impaired and the fundus is seen indistinctly. A tapetal reflex, however, is still seen.
   3) Intumescent - A swollen, opaque lens which may cause secondary glaucoma due to mechanical compression of the drainage angle.
   4) Complete (mature) - Entire lens is opaque with no tapetal reflex or fundus visible.
   5) Resorbing (hypermature) - The cortex may liquefy and permit visualization of the fundus around the opacity. These can be identified by noting wrinkles in the anterior lens capsule or "sparkles" in the lens, which consist of very fine particles that reflect light much as snow reflects sunlight. Often these types of cataracts are associated with lens-induced uveitis. May also be seen when the cortex "dries out" resulting in a smaller lens that may pull away from the zonules and luxate. Occasionally limited vision is restored in some patients but this is very unpredictable.

6) Morgagnian cataract - A hypermature lens with liquefied cortex and the solid nucleus sinks to the bottom.

d. **Lens consistency** - Important primarily for surgery. Cataracts in young animals tend to be soft whereas those in older animals tend to be hard.

Methods of cataract removal

There are 4 basic types of cataract extraction practices in veterinary ophthalmology today.

1. Discisssion
2. Intracapsular extraction
3. Extracapsulsar extraction
4. Phacoemulsification

1. Discission

Discission was one of the oldest methods of cataract surgery. In discission the anterior capsule of lens is incised in a cruciate fashion, using a cataract needle so that the aqueous humor will come in contact with the lens substance and will facilitate re-absorption of the opacity. Discission will have to be repeated periodically to obtain desired effect.

2. Intracapsular lens extraction

Entry point into anterior segment is through either limbal incision or clear corneal incision with limbus based conjunctival flap or fornix based flap. Here the lens material is removed within an intact lens capsule by either of method.

(1) Enzymatic zonulolysis

Though alpha chymotrypsin (1:5000) gives good results in intracapsular lens extraction in human beings, even higher concentration of 1:2500 to 1:500 give poor results in dogs. Also, there have been post-operative complications following this dose.

(2) Forceps delivery

Two methods are used tumbling and sliding.

(3) Extracapsular lens extraction

This has been the standard and the most popular method of lens removal in the dog for many years. Here the anterior/posterior lens capsule is left behind adhering to the cataract is essential for placing the intraocular lens (IOL) in the capsular "bag".

Corneal incision

The clear corneal incision is made 1 to 2 mm anterior to the limbal margin. This incision has become the most popular in the dogs. It is relatively quick and easy to perform, resulting in excellent exposure and visualization of the anterior chamber. The fornix – based flap may be used to cover wound following suture placement. Here the disadvantage is that of increased incidence of corneal optical opacification along the incision line. Eye is instilled with viscoelastic solution to maintain the corneal contour and prevent corneal endothelial damage.

Removal of anterior lens capsule

The pupil should be well dilated. To grasp the anterior lens capsule, the surgeon has to position the extra capsular forceps on the anterior lens capsule and open them widely. The teeth are then pressed against the anterior lens capsule and compressed slowly. This procedure can tear the capsule in the weaker equatorial region of the lens. The extra capsular forceps can be rotated slowly to free any remaining attachment of the anterior

capsule. Gentle irrigation of the anterior chamber with a balanced salt solution is done to remove remaining pieces of cortical material.

Closure of anterior chamber

Absorbable or non absorbable suture materials with swaged on spstula or reverse cutting needles may be used. Absorbable suture materials like polyglactin 910 and polyglycolic acid are commonly used. The sizes commonly used are 6-0 and 7-0. Non absorbable sutures are nylon and prolene (10-0).

4. Phaco-emulsification

In this method, high frequency ultrasonic vibrations are used to fragment the lens into fine particles, which can be aspirated from the anterior chamber. The major limiting factor for this method is the cost of the equipment. The advantages over extracapsular extractions are that the incision needs to be smaller, the surgery time is less, and there is less of postoperative uveitis and improved overall surgical result when done properly.

The anterior lens capsule is then lacerated near the equator and the ultrasonic tip placed into the lens cortex. The nucleus and the opacified cortical material are fragmented and aspirated; care must be taken to maintain the anterior chamber depth with the irrigating fluid and to keep the ultrasound tip within the capsule throughout the procedure. The anterior lens capsule and the remaining lens epithelium are removed with intraocular scissors. The second incision is closed first with a 9-0 absorbable suture material in a simple interrupted fashion. The chamber is reformed as the injection canula is removed and the first incision closed in a similar manner.

After phacoemulsification and aspiration of the cataract, if an intraocular lens has to be implanted and limbal incision has to be enlarged using corneal scissors according to the width of the IOL.

Intraocular lens implantation

A canine eye without lens has a reduction in visual acuity of less than 20/800 compared to the normal value of 20/80. This makes visually challenging tasks difficult. To correct this, intra-ocular lens implantation is necessary. A lens of +40 diopters is needed to approach emmetropia in majority of the dogs. Currently polymethyl methacrylate (PMMA) intraocular lens is most favored. The idea of intraocular lens prostheses was first proposed in the 18th century. The first intraocular lens operation was done by Dr. Harold Ridley in 1949 (Wilkie and Wolf, 1990).

Although aphakic canine patients function reasonably well, postoperative vision can be improved by inserting an artificial intraocular lens after cataract removal (Peiffer and Gaiddon, 1991). Because of the sensitivity of the canine uvea to contact with intraocular lenses, a posterior chamber implant inserted within the capsular bag is the best location.

The prosthetic lens has two parts – an optic and two haptics. The optical portion is made of polymethacrylate and measures about 7.5 mm in diameter, the haptics measure about 16 mm from tip to tip. There are different types of intraocular lenses available. Silicone lenses are also available, which require only a small part of entry into the anterior chamber for introduction. Although there is some individual variability in refractive need, an implant of about 40 dioptres brings the majority of canine patients acceptably close to emmetropia. Gaiddon (1991) has used biometry and keraometry for determining optimal power for intraocular lens implants in dogs.

Needle or scissor capsulotomy is preferred if an intraocular lens is to be inserted because of the desirability of having a controlled capsular tear with large anterior flaps.

After cataract extraction the incision is closed, except for an 8 mm superior wound (or extended to 8 mm if phacoemulsification is used). The anterior chamber and capsular bag are reformed with viscoelastic solution (hyaluronic acid, methyl cellulose, chondroitin sulphate alone or in combination), and the implant is inserted into the capsular bag. The lower haptic is inserted directly and the superior haptic either dialed with a hooked 30-gauge needle or otherwise manipulated into place. Dialing, however, ensures capsular placement of both haptics with minimal capsular stress. Viscoelastics are important to prevent corneal endothelial damage during insertion of IOL; this material is then flushed from anterior chamber before closure of the corneal wound completely. Intracameral viscoelastics can increase IOP in the dog and hence should be flushed before closure of corneal wound.

4.2 Fistulated paraprostatic cyst associated with bilateral cryptorchidism and sertoli cell tumour in a dog

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A 7-year-old male Boxer dog was presented to the hospital with a history of vomiting, anorexia and dysuria. Clinical examination revealed distended abdomen with distended bladder. Cystocentesis revealed a yellowish foul smelling fluid with white flakes. Bilateral cryptorchidism was also observed. Radiographic and ultrasonographic examination confirmed a distended fluid filled sac in the abdominal cavity. Midventral laparotomy was performed under xylazine, diazepam and ketamine anesthesia. A paraprostatic cyst was identified and exteriorized. A fistula between the cyst and urethra was noticed after incising the cyst through which the urine was accumulated in the cyst. The cyst was completely resected out after closing the fistula. The two enlarged intra-abdominally retained testicles were removed and later confirmed to have sertoli cell tumour. Post-operatively the animal was maintained with fluids and antibiotics and anti-inflammatory drugs. The animal passed urine on the 3rd day but collapsed after 7 days.

4.3 Preputial reconstruction in a pup

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A 15 day old male crossbred pup was presented to the college hospital with the history of not passing urine. On examination, the closure of the preputial opening was observed. Subcutaneous collection of urine in the preputial area was also palpated. Under xylazine-ketamine anaesthesia, an elliptical new preputial vent was created on the same site and the accumulated urine drained out completely. The penis was pulled out. The mucous membrane of the preputial opening was sutured with skin using silk thread. The animal was maintained with oral antibiotics and anti-inflammatory drugs for one week. The animal recovered uneventfully.

4.4 Surgical management of a rare intestinal tumour in a dog

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A one and a half year old, non descript male dog weighing 20 kg was presented to the hospital with a history of vomition, anorexia and passing tarry coloured watery faeces

for the last 7 days. Clinical examination revealed severe abdominal pain and dehydration. Abdominal palpation revealed a post-xiphoid hard mass. Plain radiograph and gastrography were taken, which revealed delayed gastric emptying time and stasis of barium even after 24 hours. The case was tentatively diagnosed as intestinal obstruction with a linear foreign body. Under xylazine-ketamine anaesthesia midventral laparotomy was performed. A hard portion of intestine from caudal part of duodenum and proximal part of jejunum was identified and exteriorized. Enterotomy revealed thickened intestinal wall for the entire length of 45 cm. Enterectomy and entero-anastoamosis was performed. The animal was maintained with fluids, antibiotics and anti-inflammatory drugs. The animal passed faeces from the 4th day and recovered completely on the 10th postoperative day. Histopathological examination of the intestine was suggestive of plasma cytoma, a rare tumour in intestine.

4.5 Comparison of three surgical approaches for correction of ventral abdominal hernia in pigs

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The study was conduced on 18 clinically affected piglets with ventral abdominal hernia. Irrespective of age and weight (20-30 kg) they were divided equally into 3 groups I, II, III. The group III was comprised of male piglets only. Midline incision through linea-alba was made over the hernial swelling in group I, two lateral elliptical incisions were made in group II and 'U' shaped incisions were made in group III. All the animals were controlled under diazepam 2 mg/kg and ketamine HCl 15 mg/kg b.wt. i.v. anaesthesia.

The complications encountered during the operation, manoeuvrability by surgeon at the time of operation and finally post-operative complications in all groups were compared. All the three surgical approaches yielded satisfactory results. However, from the point of view of convenience of the surgeon, the two lateral elliptical incision technique was found better for management of a big size hernia inspite of profuse cutaneous bleeding. The midline incision was found better in case of small hernial swelling and 'U' shaped incision behind the xiphoid cartilage was better in small hernial swelling on male abdomen.

4.6 Complications from students' small animal surgical laboratories

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One hundred and twenty four post-surgical complications were recorded in a retrospective study of operations carried out during the students' small animal surgical laboratories in the Department of Clinical Sciences, Gomal College of Veterinary Sciences, Gomal University, Pakistan between 2001 and 2004. Wound dehiscence (23.3%), wound infection (21%), and haemorrhage (20.8%) were the common complications observed. Other complications included, oedema, peritonitis, aural asymmetry, evisceration, intestinal obstruction, herniation, perivascular sloughing, self-mutilation, and adhesions. End to end anastomosis, splenectomy and nephrotomy resulted in higher number of complications. Interviews of instructors of the surgical laboratories, conducted through questionnaires revealed that the use of stray dogs with poor nutritional and health status, septic surgical procedures, poor use of surgical instrument and seldom cleaned/disinfected kennels were some of the factors that led to high incidence of complications. Management

of complications entailed the use of systemic antibiotics, treatment of surgical site as an open wound or in some cases reconstructive surgery.

4.7 Successful repair of acquired diaphragmatic hernia in two pups

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Two pups aged about 3 months were presented with a history of dyspnea following an automobile accident. Both were diagnosed as cases of diaphragmatic hernia clinically and with survey and contrast radiography. In one pup (non descript), there was evisceration of a part of stomach and intestine along with a tear in the diaphragm on the left side with herniation of a part of stomach and liver into the thoracic cavity. In the other case (German shepherd), no external injury was recorded but the animal was presented with severe respiratory distress. Both cases were treated surgically and diaphragm was repaired under general anesthesia and intermittent positive pressure ventilation. The animals recovered uneventfully and reported healthy up to a follow up period of 2 months.

4.8 Clinical report of pyometra in a german shepherd bitch following unusual ovariohysterectomy

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A female, German shepherd dog, 5 year old, was presented for routine spaying during a charity neutering programme in Iran. On clinical examination the bitch was lethargic and pyrexic (40.2 °C), but no other signs of illness were detected. Laparotomy revealed an enlarged uterus, severed at the cervix, with no communication to the vagina. Abdominal inspection showed an apparently normal, ligated vaginal stump. Surgery was performed under general anesthesia and the dog was treated with a seven-day course of i.v. fluid therapy, antibiotics (cefazoline + enrofloxacillin) and nutritional support. It subsequently made a full recovery.

4.9 A study of two methods of surgery and medical treatment of open -cervix pyometra in 12 bitches

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Twelve bitches affected with open cervix pyometra were presented to small animal hospital of Tehran University. They were 3-5 year old and their breeds were German shepherd (7) and mixed (5). In all the cases, a thick, bloody and pus-like vaginal discharge was noted. The dogs were lethargic, weak, anorexic, with signs of polydypsia, polyuria and frequent vomition. Diagnosis was done based on history, analysis of vaginal discharges, culture, blood counts, serum chemistry, urinalysis, X-rays and ultrasound. In 6 animals (group 1) ovariohyserectomy was performed. Prognosis was good. Dogs of group 2 examination stabilized with i.v. fluids (Ringer's lactate), antibiotics (Ampicillin + Cefazoline), PGF2α and general supportive care. One dog of this group died after 1 week of treatment, another dog had peritonitis after 1 month, 4 dogs of group 2 remained healthy. Medical therapy does provide an option but it is advised only for selective cases, as there are many risks inherent to the procedure and the drug itself. This disease is serious and requires prompt and aggressive treatment. Our advice is to surgically remove the affected organ.

4.10 Phacoemulsification for removal of complete and partial cataract in dog

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Ten dogs with complete and partial cataract were selected for removal of lens by phacoemulsification. Standard preoperative preparations comprised of preoperative screening to rule out diabetes and other existing ocular pathologies. Animal preparation was done by instillation of atropine ocular drops and phenylephrine 10%, from two days prior to surgery to achieve mydriasis. Antiinflammatory drugs used before surgery consisted of flubiprofen and prednisolone eye drops starting two days before surgery. Inj. Triamcinolone 40mg i.m. was given one day before surgery. Anesthesia was achieved with a combination of xylazine 1 mg/kg i.m., ketamine 5 mg/kg i.m. and diazepam 0.2 mg/kg i.v., retro bulbar block was done using 2% lignocaine. Phacoemulsification was carried out with and without Trypan Blue assistance in complete and partial cataracts, respectively. Vision was restored in all the dogs following standard postoperative therapy consisting of atropine eye drops, prednisolone eye drops and antibiotics and steroids given locally as well as systemically. To conclude, phacoemulsification in dogs was carried out successfully, and vision was restored.

4.11 Surgical management of an aural tumour by total ear canal ablation and bulla osteotomy in a dog

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A 12-year-old non-descript dog was presented with a hard mass in the right ear canal progressively growing for 6 months. No metastatic lesions were detected in survey radiography. The tumour was resected by total ear canal ablation, which was seen extending into the tympanic bulla. A bulla osteotomy was also performed to facilitate complete removal of the tumour.

4.12 Surgical correction of intestinal obstruction in dogs: A report of eight cases

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Intestinal obstruction was diagnosed in 8 dogs based on history, abdominal palpation, clinical signs and survey abdominal radiography. Laparotomy and surgical correction were undertaken either by performing enterotomy or intestinal resection and anastomosis. Laparotomy helped in correction of intestinal obstruction due to a stone, a plastic bottle cap, obstipation resulting from intramural neoplasm, a string, a scar formation, adhesions in one dog each and trichobezoars in two dogs. Enterotomy was performed in 5 cases. Exploratory laparotomy, and intestinal resection and anastomosis were performed in one dog with a complete intestinal obstruction due to scar formation. Multiple intestinal perforations due to a string in one dog were handled by cutting short segments of string and it's removal through perforation sites, and by local debridement of necrotic tissues at the sites of perforations, followed by closure with simple interrupted sutures. Adhesions at the jejunal region causing intestinal obstruction were freed following exploratory laparotomy in one dog. Six dogs recovered uneventfully. One dog with intestinal perforations and another dog with intestinal adhesions died during 1st and 2nd postoperative day.

4.16 An unusually large ovarian tumour in a dog

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A five years old female German shepherd dog was brought to the College Hospital with a history of progressive anorexia and an abnormally distended abdomen. A large mass could be palpated in the abdominal cavity. Lateral radiograph of the abdomen revealed a large soft tissue mass in the abdominal cavity. An exploratory laparotomy was performed by ventral midline approach. A large tumour mass involving the right ovary, having adhesions with the mesentery, omentum, intestines and the urinary bladder was removed along with the other ovary and the uterine horns. The ovarian mass was weighed 6.5 kg. Postoperatively the dog was treated with ceftriaxone @20 mg/kg b.wt. twice daily i.v. for 5 days and i.v. fluids for 3 days. The dog had an uneventful recovery and was discharged on the 10th postoperative day.

4.17 Effect of pancuronium bromide on intraocular pressure in dogs

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Study was conducted in 12 mongrel dogs of either sex, between 8 and 20 kg of b.wt. and 1.5 to 2 years of age. Animals were randomly distributed in 4 equal groups A, B, C and D. All animals were premedicated with atropine sulphate 0.04 mg/kg, i.m. and diazepam hydrochloride 1 mg/kg, i.v. and anaesthetized with 2.5% thiopentone sodium to the effect. Pancuronium bromide was injected in dogs at 0.01, 0.02, 0.04 and 0.06 mg/kg, i.v. in groups A, B, C and D, respectively. During the course of anaesthesia eyes were observed centrally fixed in all the groups within 20 to 25 min following administration of pancuronium bromide, which persisted for a duration of 40 to 50 min, thereafter eye rotated ventromedially. No change in heart rate was observed in any group of animals. In groups A and B, no apnoea was observed during any stage of anaesthesia, whereas in groups C and D apnoea was recorded after 5 to 6 and 4 to 5 min, respectively, following administration of pancuronium bromide, which persisted for a duration of 20 to 25 min in group C and 30 to 40 min in group D. Animals of groups C and D were maintained on controlled ventilation during this period. In animals of all the groups, a reduction in intraocular pressure persisted from 5 to 30 min, thereafter showed a decreasing pattern and became normal 60 min post administration of pancuronium bromide. Reversal of eye muscle relaxation marked by rotation of eye was observed at 15-20 min following administration of atropine sulphate 0.04 mg/kg and neostigmine 0.05 mg/kg. It was inferred that pancuronium bromide, 0.01 mg/kg, can safely be used to fix the eye in center for ocular surgery in dogs.

4.18 Comparative evaluation of surgical approaches for cataract extraction in dogs

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Twelve mesocephalic dogs of either sex, weighing 8 to 15 kg and suffering from cataract of one eye were selected for cataract extraction by manual extracapsular extraction technique. Animals were equally placed into 2 groups. In group 1 dogs, anterior chamber was approached through limbal incision given at 11 clock to 2 clock position whereas in group 2, anterior chamber was approached through clear corneal incisions placed at the

same position as used in first group. The effects of corneal and limbal approaches were studied by determining changes in the keratometry of operated eye. The degree of astigmatism was observed more in the corneal approach than the limbal approach. Complications like hemorrhage at the incision site, iris prolapse, and difficulty in aspirating residual lens material from ventral capsular bag, and poor access to lens were encountered with limbal approach. The complications encountered in the clear corneal approach were corneal edema, opacity and scarring of cornea at the incision site. Limbal approach was judged superior as it provided easy closure of incision and quick recovery. Corneal approach was associated with difficulty in putting sutures to close surgical wound, though access to the lens was easy.

4.19 Intraocular pressure changes following cataract surgery in dogs

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Intraocular pressure after extracapsular extraction of lens was measured in 12 mesocephalic dogs of either sex, weighing 8 to 15 kg. All the animals had preoperative ocular hypertension (15 to 17 mmHg). After manual extracapsular extraction of lens, intraocular pressure was measured one-month by using Schiotz identation tonometer. A decrease in intraocular pressure was observed one hour after surgery in all the dogs. Four out of 12 dogs developed postoperative hypertension (25 to 30 mmHg), which was above preoperative ocular hypertensive range within 3 to 5 hours post-surgery, which continued for duration of 24 to 72 post-surgery hours. After one-week post-surgery, intraocular pressure was found with in normal range. Degree of intraocular hypertension was observed more in those cases, which had developed some complications during surgery viz, hemorrhage, iris prolapse, reduced anterior chamber volume, use of more viscoelastic jel into the anterior chamber and poor aspiration of residual lens material. Corneal edema was also observed associated with greater degree of intraocular hypertension for duration of 7 to 15 days post-surgery. It can be concluded that close monitoring of intraocular pressure for the first 24 hrs after surgery is of utmost importance to prevent postoperative complications following cataract surgery in dogs.

4.20 Epidemiological, haematological and microbiological study of periodontal disease in dogs

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Thirty-two clinical cases of dogs in 4 equal subgroups (mild, moderate, severe and advance), suffering from periodontal disease were included in this study for recording the incidence in respect to age, breed, sex, diet, habitat, oral hygiene, and previous treatment, if any, with its response. The results suggests that pet dogs over 5 years of age mostly suffer from periodontitis of variable degrees. Highest breedwise occurrence was recorded in Pomeranian (40.22%) with more cases in the male (60.8%), and dogs fed on vegetarian diet (60.91%). The pet owners were unaware about the dental home care of pets and majority of veterinarians still not routinely practice the oral of dental examination.

In haematological study, lowest mean value of total erythrocytes counts was recorded on zero day in advance cases Total leucocytes count (TLC) was maximal in seven cases. Microbiological study showed presence of Streptococcus, Staphylococcus,

4.13 Surgical management of palatine melanoma in dogs: A report of two cases

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A 13 year old, male, non-descript dog and a 12 year old male, Labrador were presented with the history of dyspnoea and anorexia over a fortnight. Clinical examination revealed an irregular pigmented mass in the nondescript dog and a round pigmented mass in the Labrador, hanging from the posterior aspect of the hard palate and partially blocking the pharynx. Both animals were stabilized with intravenous fluids and antibiotic therapy. Endotracheal intubation was done and the tumor masses were excised with the help of electrocautery. The wound was closed with simple interrupted sutures with 1-0 catgut. The excised growth was found to be 15g in weight in the N.D. dog, while in the Labrador it weighed 17.55g. Both animals recovered uneventfully from anaesthesia. The non-descript dog collapsed 48 hours later and postmortem revealed gastric ulceration, enteritis and nephritis. The Labrador recovered uneventfully. Histopathological examination of the tumor biopsies showed them to be melanomas.

4.14 Epidural use of methylprednisolone acetate in paraplegic dogs: A clinical report of three cases

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A three year old female Cocker spaniel, an eight year old male German shepherd dog and a seven years old male Dachshund were presented to the College Hospital at various intervals of paralysis of the hind quarters of traumatic origin. Survey radiographs revealed no skeletal abnormality in all the 3 cases. Medical management was undertaken with methylprednisolone acetate (Depo-Medrol®, Pharmacia, Belgium) given epidurally 2 mg/kg b.wt. at weekly intervals for 4 weeks. The Cocker spaniel showed excellent clinical recovery by the end of 4 weeks. The Dachshund showed marginal improvement with it being able to stand for a few seconds when helped to do so. However, the German shepherd dog did not show any clinical improvement over the period of 4 weeks of study and had to be euthanized.

4.15 Chronic superficial keratitis in a German shepherd dog

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A German Shepherd male dog, aged 3 years, was presented with bilateral blindness since one and half year. The dog was treated with several topical and subconjunctival antibiotics and steroids but was not responding to the treatment. On ocular examination, the cornea showed extensive vascularization and pigmentation involving all the four quadrants of the cornea, affecting the entire cornea quite extensively, which affected the vision. The cornea appeared thickened and dry along the entire circumference. The Cotton ball, Maze and Menace tests were positive. The dog was administered with ciprofloxacin eye drops, tab. acetazolamide, tab. seratopeptidase and multivitamins for one month. There was improvement in the condition after one month and the Maze and Menace tests were negative. Later on, the dog was administered with 2% prednisolone eye drops and after 15 days with 0.2% cyclosporine eye drops along with prednisolone and other drugs. Significant improvement in the condition was seen after 2 months and the vascularization and pigmentation started to disappear from the periphery of the cornea in both eyes leading to improvement in the vision.

Peptostreptococcus, Veillonella and Bacteroides in the oral cavity as the part of normal flora. The most suitable antibiotic combination was amoxycillin-cloxacillin with metronidazole or clindamycin with metronidazole followed by ciprofloxacin with metronidazole in decreasing order.

4.21 Therapeutic study on canine periodontal disease: Medicinal vs surgical treatment

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The study was conducted on 32 clinical cases of dogs for evaluating the efficacy of medicinal vs. surgical treatment in different grades of periodontal disease. Dogs brought to TVCSC with the history of anorexia during a period of 3 months (May to July 2005) were examined and 32 cases with the clinical signs of periodontitis selected for this study. On the basis of clinical observations such as gingivitis, pain, bleeding, salivation with malodour, variation in appetite and clinical examination such as plaque formation, tartar deposition, abscessation, mobility of tooth and long tooth appearance and selective radiography, the cases were divided into two groups for treatment; group I – medicinal and group II – surgical. These cases according to course of illness and severity of the clinical signs were further divided into four subgroup as S.G. I – mild; S.G. II – moderate; S.G. III – severe and S.G. VI - advance.

In animals of subgroup I (mild) treated with brushing with chlorhexidine solution and local application of gel combination of chlorhexidine and metronidazole, recovered on 3rd to 5th post-treatment day. Subgroup II (moderate) treated with same as subgroup I in addition to antibiotics used according to the antibiogram obtained by swabs bacterial culture for 5 to 10 days. Few animals of this subgroup also required supragingival scaling. All animals responded well and clinical signs subsided on 5th to 7th day. Plain radiography with large films is of very limited value however, if may reveal few evidences in advance grade. In surgical subgroup III (severe) treated by supragingival and subgingival surgery, animals recovered on 5th to 7th day. In subgroup IV (advance)- 2 animals were treated with subgingival scaling, 3 with root planing and 2 with gingival flap surgeries while in one case repair of oronasal fistula was performed, which occurred after extraction of diseased canine tooth. All the animals recovered tremendously with great appetite within 2 days of surgery.

4.22 Subcutaneous form of metastasis of TVT and its remedy measures

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Present studies deals with focus on the histopathological findings and surgico-theraputical remedy measures of TVT in 37 dogs of either sex. The neoplastic growth was located mostly in the external genitalia. In only a female dog the neoplastic growth was extended into vagina. A subcutaneous lobulated growth was also evident in that female dog at the left lateral side to the vagina. In the lower degree neoplasia, the therapeutic treatment with Inj. Vincrystin Sulfate but in higher degree neoplasia, surgical exteriorization was preferred under general anesthesia and treated with Inj. Vincrystin Sulfate 0.01 mg/kg b. wt. Deep location of lesions created difficulties in complete exteriorization. Fresh samples of the tissues was collected and processed by routine paraffin technique for histopathological examination. Depending upon the degree of neoplasia, the number of

weekly treatment with Inj. Vincrystin Sulfate was decided. Minimum 4 and maximum 7 treatment regimen were advocated. Marked progressive reduction in the size of neoplastic mass was noticed after 2nd treatment and the complete regression was recorded after 4th treatment. The treatment that was comprised of surgical exteriorization and the weekly administration of Inj. Vincrystin Sulfate, provided the best results. The cases had no recurrence. The histopathological findings revealed high proliferation of TVT in the connective tissue stroma with increase blood vasculature.

4.23 Management of ruptured urinary bladder and urethral calculi in a dog

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A Pomeranian male dog aged 5 years was referred to the Department with the history of anuria for 3 days. The physical examination of the animal revealed rupture of urinary bladder and symptoms of uraemia. The radiographic examination showed presence of calculi just caudal to os-penis. The case was diagnosed as rupture of urinary bladder with urethral calculi. The operation was performed under triflupromazine sedation and lidocaine hydrochloride epidural anaesthesia. First urethrotomy was done to remove urethral calculi followed by laparotomy by caudal paramedian incision. After removing the urine from abdominal cavity, the vent was located on the ventral aspect of the bladder. After catheterization, cystorrhaphy was performed. The abdominal cavity was washed thoroughly 3-4 times by using normal saline mixed with 500 mg ampicillin. The laparotomy incision was closed in the routine manner. Postoperatively 200 ml Ringer's lactate in the morning and 200 ml of dextrose with normal saline in the evening was administered for 5 days. Parenteral administration of cefotaxim 500 mg twice daily for 7 days, metronidazole for 2 days, betamethasone 4 mg once and analgin 2 ml twice daily was done for 3 days. The animal recovered completely in 10 days.

4.24 Mammary tumours in canines: Diagnostic and therapeutic approaches

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The present study was conducted in 55 clinical cases of canine mammary neoplasm (CMN's) presented at IVRI Referral polyclinic. The incidence of mammary tumors was the highest in the age group of 6-8 years. The majority of the affected breed was German shepherd (54%), followed by Pomeranian (26%), Doberman (6%), Labrador (5%) and non-descript dogs (9%). Incidence in the male dog was two out of 55 cases. Majority of the animals were nulliparous. All the 53 cases in bitches were non-pregnant at the time of presentation. Number of glands involved varied from one to all. Second and fourth pairs of mammary gland were the most commonly affected. Seventy per cent cases had slow rate of growth. Size of neoplasm varied from 1- 20 cm and majority were recorded with a diameter > 5cm. Expensive mode of growth was recorded in 60% cases and the animals had better survival rates than those with infiltrative type of growth. In 37 animals out of 55 surgical excision (simple mastectomy (n=25) and *en bloc* dissection including lymph nodes (n=12) was done under xylazine-ketamine anesthesia. The remaining 18 animals (tumor size less than 4 cm) treated with vincristine sulphate (n=6) and cinnoline derivatives (n=12) @ 0.025 mg/kg b.wt. i.v. and 500 mg orally, respectively, at weekly interval. Fifteen animals showed complete regression whereas in other 3 animals, partial regression was seen along with transient signs of vomiting and anorexia. Chemotherapy was also given for 3-4 wks in 9 out of 37 animals of surgical excision in which X-ray

examination showed signs of metastasis. The surgical excision gave satisfactory results with a success rate of 66.6%, whereas, surgical excision followed by chemotherapy was found to be the most effective with a success rate of 86.33%. Significant decrease in TLC, accompanied by neutropenia, eosinopenia, lymphocytosis and monocytosis was observed in animals subjected to surgical excision followed by chemotherapy. Histologically, mammary tumours constituted of solid type mammary carcinoma (32%), malignant mixed tumor (8%), papillary adenocarcinoma (20%), fibroadenoma (12%), benign mixed tumor (12%), mammary adenoma (8%) and fibroadenochondroma (8%).

Apart from normal histological examination, special stains were also used to confirm tumor diagnosis. Among them, Argyrophilic Nucleolar Organizer Region (AgNOR) stain was found very useful. Detection of Proliferative Cell Nuclear Antigen (PCNA) by immunohistochemical methods was also found a valuable tool to tumor diagnosis.

A PCR-based genetic marker for detecting mammary cancer in dogs was developed. The genomic DNA was isolated from blood tissue of the spontaneously occurring tumor cases. Microsatellite allele A and B have been identified among the descript and non-descript dog breeds of India. Their DNA sequence sent to EMBL gene bank, USA and two-accession numbers have been obtained. These gene sequences are very much important in diagnostic point of view. This marker will aid the veterinarians to diagnose whether the animal is prone to mammary cancer or not. This diagnosis can not only to performed before actual occurrences of mammary cancer, but also at the time of birth of the animal, which will help the dog owners to take the preventive measures.

4.25 Laparoscopic diagnosis of intra-abdominal pathologies in canines

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Role of laparoscopy in the diagnosis of certain diseases in canines was aimed in this study. 1-2 cm (keyhole) skin incision was sufficient to insert a 5-mm trocar within the abdomen through which a rigid (30^0 oblique) telescope was introduced to visualize the interim of the abdominal cavity. Sixteen clinical cases referred to the Referral Polyclinic, IVRI with ailments involving abdominal cavity were subjected to laparoscopic examination after routine clinical examination and investigation. Biopsy of the diseased organs was taken using biopsy forceps wherever necessary followed by electro-coagulation. Intra-abdominal pathologies like intestinal intussusception, pyometra, polycystic uterine growth, super ovulation, persistent corpus luteum, intestinal adhesion, cirrhosis, splenic pathology and chronic hepatitis etc have been diagnosed by laparoscopic examination. Pneumoperitoneum was established and maintained throughout the procedure for better visualization. Twenty times enlarged live image of the suspected site provides the exact position of the pathology, its extent, colouration and vascularization in comparison to the same of the adjacent healthy tissue.

4.26 Efficacy of antioxidants against stress in rabbit diarrhoea

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Efficacy of some antioxidants along with standard antibiotic in experimental cases of diarrhoea was undertaken on 25 healthy New Zealand white rabbits of 2-3 months of age. All the rabbits were subjected for *E. coli* infection (approx. 10^{10} organisms) orally to induce diarrhoea as per the standard procedure. All the rabbits were divided randomly in

5 groups (Gr.) at the onset of diarrhoea *i.e.* on the third day of infection. All the rabbits received pefloxacin 10 mg/kg b.wt. orally twice daily for 3 days except the rabbits of Gr. I (Infected control Gr.), which received the same only after completion of experiment. In addition to antibiotic, zinc oxide 10.5 mg/kg b. wt. to Gr. III, sodium selenite 0.15 ppm to Gr. IV and vitamin E 10 mg/kg b. wt. to Gr. V rabbits were given orally daily for 5 days as antioxidants. Blood samples were collected by cardiac puncture on day 0 (healthy), day 3 (onset of diarrhoea) and day 8 (5th day of treatment) for different enzymatic studies. The study showed that rabbit diarrhoea causes higher level of malondialdehyde (MDA) in erythrocyte, which is an index of endogenous lipid peroxidation (7.5±0.2 nmol MDA / ml), accompanied with reduction of antioxidant enzymes like catalase (32.4±0.7 units/mg Hb) and super-oxide dismutase (5.8±0.2 units/mg Hb) activity in erythrocytes of diarrhoeic rabbits (Gr. I) on day 8. Treatment of diarrhoeic rabbits with antioxidants revealed that antibiotic in combination with zinc oxide (Gr. III) is superior to vit E and selenium in reducing lipid peroxidation (from 6.3±0.1 to 5.3±0.2 nmol MDA/ml) and in escalating level of catalase (from 30.09±0.7 to 33.6±0.9 units/mg Hb) and SOD (from 8.2±0.1 to 9.1±0.3 units/mg Hb) in erythrocytes after the completion of experiment. On the basis of clinical recovery and enzymatic study, it was concluded that Zinc oxide may have significant antioxidant properties followed by vitamin E and selenium in diarrhoeic rabbits.

4.27 Tear staining syndrome in dogs: Five case studies

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The dogs presented in the District Veterinary Centre, were screened for a period of one-and-a-half month, to detect the presence of tear staining. Five cases with the condition were diagnosed. A two month old pup with prominent bilateral tear staining had absence of lower puncta in both eyes. Most of the adults presented with tear staining revealed bulging of one or both the eyes. There was increased intra-ocular pressure on finger palpation and the condition was tentatively diagnosed as glaucoma. Acetazolamide was prescribed and the cases with prominent bulging of eye cured with the treatment.

4.28 Unusual large vaginal tumour in a Spitz bitch: A case report

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A 9 year old Spitz bitch presented at Department of Surgery & Radiology, Nagpur Veterinary College, Nagpur, with history of large size tumour protruded out from Vagina (Photo 1 & 2) and difficulty in urination and defecation since 7 month. On examination, the tumor was embedded in sub mucous coat at vaginal floor. The tumour was operated under dissociative anaesthesia, Postoperative regimen was fallowed for 7 days. The animal showed uneventful recovery.

4.28 A case of urinary calculi compounded with intra-mural tumour

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An eight year old female Spitz was referred to the hospital with the history of blood tinged urine and fresh blood post-evacuation. Lateral radiograph revealed one large and few small stones. The animal was operated under xylazine-ketamine anaesthesia. Exploration of the urinary bladder revealed the presence of a small oval soft tissue mass (about 3 cm diameter and 4 cm length) along with a large (3 cm diameter) and few small

calculi. The soft tissue mass was attached to the apex of the bladder with the help of a peduncle. The soft tissue mass was removed along with the bladder wall. Calculi were removed and retrograde flushing was done to confirm retrieval of all the calculi. Skin incision was repaired by subcuticular pattern using 3-0 chromic catgut. Animal had an uneventful recovery in about 6 days.

4.29 Glutaraldehyde preserved diaphragm in the repair of abdominal wall defects: An experimental study with and without ultrasound therapy in rabbits

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Sixteen (16) clinically healthy adult Newzealand white rabbits of either sex were equally divided into two groups (I and II) of eight animals. Under xylazine (5 mg/kg body weight) and ketamine (44mg/kg body weight) anaesthesia a full thickness (2x3 cm) defect in the ventral abdominal wall in each rabbit was created. In both the groups the defect was repaired with bovine diaphragm treated with 0.5% glutaraldehyde. In group II the pulse ultrasound therapy @ 0.5 watt/cm^2 for 5 minutes at the reconstructed site was also given on the alternate day for 2 weeks starting from day 3 postoperative. The healing wounds and host response were evaluated clinically, haematologically, immunologically, macroscopically,and histopathologically. The observations were made upto 90 days postoperatively. After surgical operation on day 4 onwards the rabbits became clinically normal with normal diet. Significant ($P<0.05$) increase in the rectal temperature was recorded upto 3 days in both the groups after surgical repair of defects. In group II (ultrasound treated) exudation was not seen at day 5. Significant ($P<0.05$) neutrophilia with corresponding lymphocytopenia was observed after repair of hernial defects upto 7 days postoperative. On day 14, the DLC was within normal limit. ELISA study revealed slight immunoreactivity of the grafts even after glutaraldehyde treatment. However, the grafts were very well taken up by the rabbits. On day 7, the graft was clearly visible and the host graft junction was highly vascular in both the groups. The graft was covered with thin layer of fibrous connective tissue. On day 21, mild adhesions in group I no adhesion in group II were observed. Wound healed without any complication in both the groups. Significant ($P<0.05$) hyperglycemia was recorded in both the groups after operation upto 21 days. The glucose level became normal by 14th day. The alkaline phosphatase enzyme activity remained significantly ($P<0.05$) increased upto 14 days in both the groups of animals. Slight increase in alkaline phosphatase activity was seen upto 21 days, thereafter, returned to its base line level. In both the groups at day 7, laying down of granulation tissue had started with infiltration of neutrophils and eosinophils. On day 21, immature fibrous connective tissue with calcification of muscle fibers at the host graft junction was seen. Eosinophils with mononuclear cells were present. At day 60, the healing was satisfactory and fibrous connective tissue was seen penetrating the graft. At day 90, graft was completely replaced by fibrous connective tissue and blood vessels were well developed. The ultrasound treatment had positive response on fibroplasias and laying down as well as organization of collagen bundles.

5.0 RUMINANT SURGERY SESSION

5.1 Studies on tail gangrene in bovine

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A detailed study on epidemiology, etiology, symptomatology, diagnosis and treatment of tail gangrene in bovine was undertaken on 24 cases presented in veterinary polyclinic of college and veterinary dispensary, Parbhani. Incidence of tail gangrene was more in humid climatic condition. *Staphylococcus aureus* and micrococci were common isolates found in affected tissue. Injury or trauma followed by invasion of organisms was etiological factor for moist type of gangrene. Symptomatology and radiographic examination helped in diagnosis of the disease. Fourteen cases were categorized in two group for conservative and surgical treatment.

5.2 Rumen protozoa profile in clinical cases of buffaloes suffering from traumatic reticuloperitonitis.

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A study was conducted on rumen protozoa profile of buffaloes (n=30) suffering from traumatic reticulo-peritonitis (TRP) and underwent laparorumenotomy. There was an increase in proportion of dead to live protozoa. On an average, 55.09±2.11% of rumen protozoa were found dead (range 41 to 78%). The intensity of iodine staining was variable. The number of protozoa stained by iodine in strained rumen liquor (SRL) samples were 20 to 30% in 8 samples, 10 to 20% in 19 samples and less than 10% in 3 samples. The protozoa number was few (0 to 10/ microscopic field) in 16 cases, followed by moderate (11 to 30/ microscopic field) in 9 cases, and numerous (> 30/ microscopic field) in 5 cases. Total rumen protozoa population was 32.85±1.4 $x10^4$ /ml of SRL. The predominant group of rumen protozoa was Entodiniomorph (27.59±1.42 x 10^4 /ml of SRL) followed by Holotrich (5.26 ± 0.79 x 10^4 /ml of SRL.

5.3 Diaphragmatic hernia in a pregnant cow

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An eight year old Jersey cross cow, pregnant for seven and a half months in sixth lactation was presented to the hospital with a history of distension of abdomen for 4 days. Laparo-rumenotomy was performed and a case of diaphragmatic hernia was confirmed. A few metallic penetrating foreign bodies were recovered from the herniated reticulum during rumenotomy. After 48 hours, diaphragmatic herniorrhaphy was performed in dorsal recumbency with right post-xiphoid local infiltration analgesia alone. About 3/4th of the reticulum was herniated into the thoracic cavity through a vertical defect of about 6 inches in the diaphragm at the level of right musculo-tendinous junction. The reticular adhesions were carefully separated by blunt dissection and the herniated reticulum was brought back to the abdominal cavity. The defect in the diaphragm was closed with black braided silk No.2 with Ford interlocking suture pattern. Only for essentially required period the animal was kept in dorsal recumbency for herniorrhaphy and for other closure procedures the animal was kept in oblique position. Post-operatively the animal was maintained with supportive therapy and antibiotics. Rumen cud transplantation and feeding was started

from 3rd day and the animal became normal on 4th day. The cow recovered uneventfully and was discharged on 14th day with maintenance of pregnancy.

5.4 Intussusception in a bullock

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A three and a half year old Kangeyam cross bullock was presented to the hospital with the history of not passing dung for the past 4 days. The case was diagnosed as intussusception by rectal examination. Under right paravertebral nerve block caudal right flank laporatomy was performed in standing position. On exploration of abdomen, a sausage shaped mass was palpated and exteriorized and confirmed as intussusception of jejuno-jejunum near to ilium. Enterectomy and entero-anastomosis was performed with vicryl No.1 in simple interrupted pattern and superimposed with 2-0 mersuture in cushing pattern. Laporatomy wound was closed as per standard procedure. The animal passed dung on the second day of surgery and recovered uneventfully. The bullock was discharged on 10th post-operative day.

5.5 Post-surgical complications from students' large animal surgical exercise

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A retrospective study of post-surgical complications was conducted on records of students' Large Animal Surgical Laboratories in the Department of Clinical Sciences, Gomal College of Veterinary Sciences, Gomal University, D.I.Khan, Pakistan from 2003 to 2005. Forty-eight surgical complications were recorded from five surgical procedures namely tail docking, opening of Guttural pouch, castration, opening of facial sinuses and enucleation of eyeball. The commonest complications were wound infection (25.5%), wound dehiscence (10.4%), sinusitis (15.7%), and hemorrhage (18.5%). Other complications included fever (7.3%), edema (1.6%) slipped ligature (6.4%), death (5.6%), and myiasis (9%). Enucleation of eyeball and castration resulted in more complications. Surgical site debridement and surgical reconstruction coupled with antibiotic therapy were used in the management of complications. Questionnaires administered to instructors of the surgical laboratories revealed that post-surgical complications were due to poor health status of donkeys used, broken asepsis during surgery, wrong use of instrument, poor surgical technique and dirty pens in which they were kept after surgery.

5.6 Caprine urinary stones: An ultrastructural examination

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In the present study 4 caprine urinary calculi and 2 urethral plugs collected from urethra and/or urinary bladder of the male goats suffering from urethral obstruction and stored at 4°C in the refrigerator were subjected to scanning electron microscopic examination for the determination of the structure and chemical composition. Both intact and decalcified segments of the calculus were examined layer-wise using Jeol, JSM scanning electron microscope for their crystal size, crystal habit, details of crystal arrangements, porosity and laminations at different magnifications. Ultrastructural examination of caprine urinary calculi

samples showed a lot of variations in the morphology. They varied from typical crystalline structures comprising of central nidus and concentric laminations, congregation of many small calculi to amorphous urethral plugs. Caprine urinary calculi were mixed in composition, with struvite constituting the major component, calcium phosphate deposits were detected in the interspaces of all the calculi, which indicated the epitaxial growth. Presence of calcium phosphate and amorphous cellular matrix in between the basic struvite crystal lattice further decreased the porosity of uroliths thus reducing the effect of agents used for the dietary and medicinal agents used for the dissolution of uroliths. Variable degree of porosity was observed. The structure of the nidus and concentric laminations may or may not differ morphologically. The crystal composition was also similar both in the center and periphery. Various concentric laminations indicated variable rates of growth of the calculi. No clear nidus and lamination patterns were observed in urethral plugs, which could be related to the rapid formation of the plugs, which did not allow them to form a typical calculus shape thus leading to porous, highly fragile structure having high content of amorphous material. Predisposing factors like high concentrate diet along with alkaline pH of the urine could be the reasons for the high incidence of the phosphate stones in these feedlot goats. Calcium oxalate was detected occasionally.

5.7 Effects of oral administration of ammonium chloride on the blood acid base and electrolyte status in uraemic goats

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Effect of oral administration of ammonium chloride on the acid-base and electrolyte balance was studied in 8 male goats suffering from obstructive urolithiasis. Animals were operated for the urinary retention by performing tube cystotomy. Medicinal dissolution of urinary calculi was started from day 3 by administration of ammonium chloride 500 mg/kg b.wt. after dissolving in water. Venous blood samples were taken at 3, 6, 9, 12, 15, 18, 21, 24 and 48 hours of the oral administration to study various acid base and electrolyte parameters like pH, pCO_2, pO_2, sodium, potassium, calcium, chloride, bicarbonate, base excess (BE) and anion gap using blood gas analyzer. Administration of ammonium chloride led to a significant decrease in pH, pO_2, haematocrit, haemoglobin, sodium, bicarbonate and BE. In contrast a rise in pCO_2, potassium and chloride was recorded. Values of anion gap fluctuated near the baseline during the entire observation period. Overall, most of the postoperative changes in blood gas and electrolyte parameters were within the normal limits, thus proving that the urine acidification by ammonium chloride is well tolerated by the goats and can be used routinely for the medicinal dissolution of phosphate uroliths.

5.8 Studies on blood biochemical changes in buffalo calves suffering from obstructive urolithiasis

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A total of 58 buffalo calves with the history of retention of urine were managed surgically to restore the patency of urinary tract. Elevated blood urea nitrogen, creatinine, aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (AP) levels, hypoglycemia, disturbed plasma protein profile (hypoalbuminaemia,

hyperglobulinaemia), hypocalcaemia and hyperphosphataemia were the major metabolic disturbances. Severity of these changes was more in animals having ruptured urinary bladder. Surgical correction of the condition was performed by urethrotomy, tube cystotomy and cystorrhaphy alone or in combination depending upon the condition. Pre- or post-scrotal urethrotomy was performed in 18 animals, in 12 cases where urinary bladder was found ruptured cystorrhaphy was also performed along with urethrotomy (group B). Fixation of Foley's catheter in urinary bladder was performed in 12 animals (group C). In 12 animals where bladder was found ruptured urinary bladder was repaired after fixing the Foley's catheter into urinary bladder (group D). Three cases of urethra rupture were encountered for which urethral repair was performed along with fixation of Foley's catheter in the urinary bladder (group E). Rapid recovery in the blood biochemical profile were recorded in all the animals, however, the recovery was comparatively faster in groups where tube cystotomy was performed alone or in combination with cystorrhaphy or urethral repair, thus indicating the technique to be better than for management of urolithiasis in buffalo calves.

5.9 Comprehensive study on prevalence, classification and medical and surgical treatment of yoke gall in bullocks

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Prevalence of yoke gall was studied among clinical cases, among animals disposed for sale and slaughter. Classification and evaluation of eight different treatments was made in 57 clinical cases of yoke gall from 2000 to 2004. Out of 2,61,882 total cases, 70,896 were suffering from different surgical disorders. Out of these, 2081 cases had yoke gall with an overall prevalence of 0.79% ; and prevalence among surgical cases was 2.94%. Out of 2225 cattle and buffaloes disposed for sale, 38 bullocks were affected with yoke gall showing the prevalence of 1.71%. Out of 1,148 animals disposed for slaughter at Bangalore slaughter house and Chitaguppa slaughter house, 33 bullocks were found affected with yoke gall showing the prevalence of 2.98%. The prevalence of acute yoke gall was maximum (40.13%) in clinical situation; subacute yoke gall was maximum (52.63%) among the animals disposed for sale; and the chronic was maximum (53.06%) among the animals disposed for slaughter. The prevalence was maximum in rainy season (46.23%) followed by winter (31.43%). The prevalence was maximum in the bullocks of 6 to 8 years of age (48.42%). The prevalence was maximum in males (88.42%). Based on clinical and histopathological features a standard list of classification was given to yoke gall.

Fifty seven bullocks were divided into eight groups for the evaluation of treatment. In group I, diclofenac sodium injection and topical application of Khand ointment (turmeric and lime juice) were given. There was no reduction in swelling of acute and subacute yoke gall during the first 15 days and only 25% reduction was seen after 30 days. In group II, diclofenac sodium injection and topical application of Khand ointment and dimethyl sulfoxide liquid were used. Initially there was no response and after one month only 25% reduction was seen in these bullocks. In group III, only topical application of dimethyl sulfoxide was employed. Response was negligible during initial 15 days and slight reduction (25%) was seen after 30 days in bullocks with acute and subacute yoke gall. In group IV, intravenous dimethyl sulfoxide 1.0 g/kg b. wt. resulted in 50% of reduction of acute yoke gall on third day, 75% reduction on 7th day, 90% reduction on 15th day and complete reduction on 30th day. In group V, dexamethasone injection was given directly into the swelling. The acute yoke galls showed 50% reduction in swelling on 3rd day, 75% on 7th

day and almost complete reduction on 30th day. In group VI, herbal treatment using paste of root of *Triumfetta rotundifolia* and leaves of *Dregia volubilis* were applied. The acute yoke galls showed 25% reduction on 3rd day, 50% reduction on 7th day and complete absorption of fluid by 30th day. The response was partial for subacute yoke gall and nil for chronic fibrosed yoke gall in groups IV, V & VI. In group VII, surgical drainage of acute yoke galls by stab incision resulted in immediate reduction but required second incision due to reaccumulation. In group VIII, surgical excision was followed in 9 bullocks with chronic yoke galls, which resulted in 100% improvement There was no change in haematological values before and after treatment. There was slight increase in SGPT level and marked increase in LDH level before and 30 days after treatment in all groups.

5.10 Surgical management of cauliflower like growths at stifle region in a buffalo

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A six year old buffalo with the history of 2 growths at the right stifle region was presented to the college polyclinic. Clinical examination revealed 2 ulcerated cauliflower like growths. These growths (about 4.0 inches diameter each) were excised after premedication with triflupromazine and local infiltration of 2% xylocaine at the site. Skin closure and post-operative treatment was done in routine manner. Slight wound dehiscence was observed due to breakage of three skin sutures during movement of stifle joint. Antiseptic dressing was done with Topicure. Rest of the sutures were removed on 12th post-operative day. The animal recovered completely by 25 days.

5.11 Surgical treatment of umbilical hernia by carbon fibers in a buffalo calf

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A 4 month old female buffalo calf was presented to college polyclinic with the history of swelling at umbilical region. Clinical examination revealed a hernial ring of 7.3 cm diameter with reducible hernial contents. After aseptic preparation of the site, the condition was corrected surgically by braided carbon fibers using vest-over pant technique. The wound was covered by a sterile gauze using stay sutures. The animal recovered completely after 12 days.

5.12 Development of no scalpel, sutureless tube cystotomy for the management of obstructive urolithiasis in goats

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Tube cystotomy is a method of choice for the management of obstructive urolithiasis in small ruminants, pigs and calves. A minimally invasive, economic and simple technique of tube cystotomy for goats was developed for field use. The surgery can be performed without scalpel and does not require any suture and thus can be performed at the farmers door with minimal facilities. In this technique animal is restrained in lateral recumbency with upper hind limbs pulled upward and candal after achieving lumbosacral epidural analgesia. A small cut of about 1 cm is made with small scissors 1.5" lateral to penis and 1.5" cranial to scrotum. The abdominal muscles are then separated carefully with the help of small scissors. Another 1 cm skin cut is made 1.5" lateral to preputial orifice. A Foley's catheter is then pulled through a subcutaneous tunnel from the skin cut at preputial level and brought out through the skin cut near the scrotum. The catheter is

loaded on a 5 mm K-wine anohored in the eye of the Foley's catheter. K-wire with Foley's catheter is then slowly inserted through the space made by separating the abdominal muscles. As soon the bladder is felt, the wire is inserted into the bladder with a sudden thrust. The balloon of Foleys catheter is inflated, K-wire is pulled back and the outer part of Foley's catheter is fixed to abdomen with adhesive tape and bandage. The technique was tried in 5 goats and found to be a 2 min procedure and easy to perform in goats with tense bladder.

5.13 Surgical management of unilateral cataract in a cow: A report

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A four year old Jersey cow was brought to the large animal surgical unit of Madras Veterinary College hospital with a complaint of complete loss of vision in the right eye (OD) for the past 6 months. Detailed ophthalmic examination was carried out after dilating the pupil with atropine sulphate 1%. Intra-ocular pressure was measured using Schiotz tonometer after desensitizing the cornea with 4 % lignocaine hydrochloride. Preoperative blood values and tonometric readings were within normal range. Hence, extra-capsular cataract extraction was performed for the right eye.

5.14 Pervious urachus and its surgical treatment in bovine calves (1992 to 2003)

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Ten new born calves, which had dribbling of urine from umbilicus were presented to TVCSC, Bidar. These animals had swelling in umbilical region. Dribbling of urine from the swelling and also from natural urethra were observed. These animals were subjected for laparotomy and the pervious urachus was diagnosed and treated as per standard procedure. All the animals showed uneventful recovery.

5.15 Laparorumenotomy: A rescue attempt of health hazard due to the polythene materials

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Inappetance, mild regurgitation, loss of appetite, uneasiness and drop in milk yield were the complaints from the owner of a 4 years old non-descripted cow. Bulged and hard, impacted rumen from the left paralumbar fossa was noticed on palpation. The withdrawal of rumen liquor with 18-gauge needle revealed the suspicious case of non-penetrating foreign body syndrome. Per-rectal examination revealed hard touch of the rumen, impacted rumen with non-penetrating foreign bodies. The animal was sedated with Xylodac, left paralumbar fossa was prepared aseptically and laparorument tomy was performed with standard surgical procedure. Accumulations of polythene in the rumen and towards the reticulum was observed. Tightly jammed plastic material was evacuated by cutting in short pieces with a large and sharp scissors. It divulged huge tightly blocked plastics along with other material, which as weighed about 32 kg. After complete evacuation these materials 4 boli of Yeasacc were put into the rumen and standard surgical procedure was applied for the closure of incision. Postoperative care with parenteral antibiotic regimen, B-complex injections, fluid therapy and the regular dressing led to uneventful record.

Supracath. Under clinical observations HR remained elevated in both groups during the observation period, while RR and RT remained within normal limits. No differences were observed between the two groups. The observation of this part of the study indicated that tube cystotomy with Foley's catheter was better than that with Supracath.

5.19 Superiority of *Luffa acutangula* and *Tridax procumbens* in wound healing against synthetic formulation

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Luffa acutangula,roxb (Ridge gourd) and *Tridax procumbens* (Ekdandi) leave juice ointments applied over the wounds in clinical cases of buffalo calves and compared with neosposin treated wounds. Clinical observations such as colour of wound, pain sensation, edema of wound, presence of pus, granulation tissue and wound size were appraised up to the complete healing. Biopsy samples were collected up to complete healing from wound site every 7th days and processed for the documentation of histomorphological findings.

Biopsied samples on the 7th day of treatment shown that histomorphologically all the wounds treated with juice of *Luffa acutangula, Tridax procumbens* and the control group, Neosporin ointment showed edema, haemorrhages and leucocytic infiltration indicating the progressive inflammatory phase of wound healing. On the 14th day, wound treated with *Tridax procumbens* and Neosporin ointment showed fibroblastic proliferation and capillaries indicating granulation of the wound. However, juice of *Luffa acutangula* treated wounds showed mild neutrophilic infiltration. The 21st day samples showed organized granulation tissue, covered with dermal epithelium in the treatment with the juice of *Luffa acutangula* and *Tridax procumbens* and neosporin treated wounds. However, keratinization of the dermal epithelium was prominent in *Tridax procumbens* treated wounds as compared to *Luffa acutangula* and Neosporin ointment group, suggesting the superiority of *Tridax procumbens* in wound healing.

5.20 Healing of a cyanotic uterus by way of neo-vascularization: A case report

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A Seven-year old goat was presented recumbent, 6 ½ months after breeding, with a history of rapidly descending abdomen for the past 1 ½ months. There was also a brownish-black vaginal discharge. Palpation revealed foetus inside. Laparotomy revealed a completely cyanotic uterus with adhesions from the surrounding tissues. There was neovascularization into the uterine wall from the adjacent sites of adhesions. Foetus was neither mummified nor macerated, but appeared as 1½ month old kid. The uterus was left to heal through the phenomena of neovascularization from the adhesions. There was an uneventful recovery and the animal came into oestrous several times after.

5.21 Rectal agenesis along with colovesical fistula in a calf

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A 3 day old tailless cross bred female calf was presented with a history of not passing meconium. The animal has not voided urine. The abdomen was distended. On

examination it was found that the anal opening was absent and the animal was straining to pass meconium. During straining the animal passed few drops of brown coloured urine containing some coarse particles. Based on the observations it was tentatively diagnosed as a case of Atresia ani along with recto vesical fistula.

The animal was sedated by using xylazine hydrochloride given i.m. @ 0.1 mg/kg b. wt. Local infiltration anesthesia was achieved by using lignocaine HCl given at the site of surgery. Surgery for atresia ani was performed in routine manner but rectal cul de sac was not identifiable. So laparotomy was performed through a mid right flank incision. On exploration of abdominal cavity it was found that the whole rectum was undeveloped. Colon was distended with meconium which was connected to the urinary bladder at the dorsal aspect.

An elliptical incision was made over the bladder around the colonic attachment so as to loft the colon. Colon was evacuated. The wound on the bladder was repaired in double layer of Cushing's suture using catgut. Colostomy at the right flank was performed since it was not possible to retract it back to the proposed site of anal opening. Closure of abdominal wall was performed in routine manner. Postoperatively the animal was kept under antibiotic coverage for 7 postoperative days.

5.22 Comparative studies on utility of mercerised cotton and chromic catgut as suture materials for repairing peritoneum ans muscles in laparotomy incision in caprine

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The experiment was conducted on 18 apparently healthy female goats, weighing in between 16-20 kg. They were randomly divided into two groups (A and B), which underwent laparotomy through left flank under xylazine HCl (@ 0.5 mg/kg b.wt.) i.m. and 20 ml of 2% xylocaine HCl. Peritoneum and muscles were sutured with 2/0 chromic catgut (group B) and 2/0 mercerised cotton threads (group A) were used using simple continuous technique. Observations were made on the basis of clinical macroscopic and microscopic studies of the tissues from the repaired area on 10^{th}, 20^{th} and 30^{th} post operative day. All the clinical signs exhibited by the operated animals were normal in both groups. Although the healing was marked normal grossly and histologically with both sutures. But the superiority of the cotton thread was marked on the basis of mild adhesions which could be detected only in group A (in 3 animals) which was lacking in Group B, on the same time the cost of chromic catgut is higher as comparison to cotton thread. There was lack of mortality after the surgery in any group.

5.23 Evaluation of tube cystotomy for the management of obstructive urolithiasis in buffalo calves

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Obstructive urolithiasis in buffalo calves is a very frustrating disease to the veterinarians and the animal owners. The conventional urethrotomy/urethrostomy is associated with many complications and very low success rate. A newer technique of urinary diversion with tube cystotomy followed by medical dissolution of calculi was evaluated in 46 buffalo calves in the present study. Age wise distribution showed 17.64% cases were in the age below 3 months, 58.82% in 3 to 6 months, 11.76% in 6 to 9 months, 2.9% in 9 to 12

months and 8.82% were in more than 12 months of age group. Duration of illness varied from 3 to 7 days with maximum 44.11% was reported after 3 to 7 days. Partial obstruction was seen in 8.82% cases and 91.17% had complete obstruction. Out of 46 buffalo calves reported with obstructive urolithiasis 24 cases had rupture of urinary bladder and 2 cases had rupture of urethra. Urinary pH was alkaline in 85.18% and acidic in 14.82% cases.

The cases of urethral rupture had variable degree of subcutaneous urinary infiltration, swelling, cellulites and necrosis of abdominal skin. In all the cases of ruptured bladder, ventral paramedian laparotomy was done in caudal abdomen. The urine was evacuated from the abdomen, lavaged with saline and cystorrhaphy was accomplished. Before completion of cystorrhaphy a Foley's catheter of 14 or 16 F was also fixed in the bladder after passing it through a subcutaneous tunnel of about 6" starting from the area near the prepuce to the site of laparotomy incision. The end of the Foley's catheter was inserted into the bladder on the ventral or lateral aspect of body of the bladder near the vertex. The balloon of the catheter was filled with NSS. In cases where the bladder was intact, the Foley's catheter was introduced in urinary bladder with the help of a K-wire. The laparotomy incision was closed and part of the catheter out side the body was fixed to the abdominal wall. The calves with urethral rupture were treated with urethrorrhaphy followed by tube cystotomy as described for other cases.

Post-operatively all the animals were given antibiotics, anti-inflammatory drugs for 5 days and oral administration of 20 to 25 g ammonium chloride till the animal started passage of urine through normal tract. Once free passage of urine was seen through the preputial orifice, the catheter was blocked for 2 to 3 days and then removed by deflating the balloon and simply pulling out the catheter. Out of a total of 46 treated animals, follow up of 34 cases was available. Thirty three animals showed complete recovery in 12 to 15 days. One animal died on the 2nd day after surgery. Recurrence was recorded in one case. There was no other major complication.

The results of the study suggested that tube cystotomy along with medical dissolution of calculi using ammonium chloride is the best option available for the management of obstructive urolithiasis in buffalo calves.

5.24 Congenital monster head in a heifer calf and its surgical management

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A cross bred Jersey female calf aged about 15 days was referred to the Teaching veterinary hospital, Pondicherry by a local veterinarian with the observation of a monster head attached to the lower jaw since birth. On clinical examination of the calf it was found a monster head with a firm skin attachment to the chin region of the calf. The additional head had single eye (Cyclops) with under developed ears. The upper and lower jaws were present with tongue protruding out. Radiological examination of the monster head (lateral view) revealed under development of the skull and mandible. No evidence of sinuses was seen in the cranial and facial cavities. Surgical management of the animal comprised of amputation of the monster head from the lower jaw. The animal was sedated with xylazine 0.05 mg/kg body IN and controlled on dorsal recumbency. Local infiltration analgesia with 2% Lignocain HCl was done at the base of the attachment. The monster head was then amputated from the site by making an elliptical incision at the base of the attachment. The blood supply to the monster head was ligated before amputation. The skin incision was closed by the routine manner. Postoperative care consisted of administration of

parentral antibiotics and local wound dressing. The cutaneous sutures were removed on 10th postoperative day and the animal made an uneventful recovery. Anatomical examination of the amputated head preserved in 10% formalin revealed Anencephaly. The monster head could be a result of duplication of first branchial arch.

5.25 Treatment of swelling of neck and shoulder in bullocks

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The Field trials were carried out on clinical cases of buffaloes suffering with swelling of shoulder and neck region. The clinical cases were randomly divided into two groups consisting of 10 animals in each group viz, groups A and B. The animals of group A were treated with the ointment prepared by mixing geru 30 g, snail shell or sipi 50 g boiled in caster oil, Alua 20 g and Kundru/shajan gum 50 g were mixed to it, and was applied in warm condition to tile affected area. Where as the animals of Group B were treated with Iodine ointment.

5.26 Wound management in buffaloes

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The 30 clinical cases of wounds in buffaloes were randomly divided into three groups consisting 10 wounds in each group and were subjected to the treatment of juice leaves of *Buffa acutangula* Roxb (Ridge Gourd), Juice leaves of *Tridax procumbens* (Ekdandi) and Neosporin ointment respectively. The assessment of wound healing was carried out on the basis of appearance of granulation tissue, wound contraction, average number of days required for healing, Histomorphological studies and *in vitro* antibacterial activity of juice.

6.0 WILD AND ZOO ANIMAL SURGERY SESSION

Lead Paper

6.1 Peculiarities of surgery in wild and zoo animals

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As recently as the beginning of the last century, humans had to struggle against the wild animals for their own survival. Just about hundred years of an all pervading civilization, however, drastically changed the face of the earth, which millions of years of existence of the hominids did not. Large numbers of plant and animal species on the earth have become extinct at an alarming rate that has threatened the very existence of human race itself. In this world, where man has arrogated unto himself virtually its entire habitable surface, animals are permitted to exist only in some relatively minute enclaves for man's benefit, amusement, education, curiosity and relaxation. These enclaves are proclaimed and deproclaimed, altered, contracted, fenced and surfaced at whim, and are in constant danger of being given away for exploitation to local people in return for political gain. In these constricted and often diminishing areas, animals are managed so as to avoid depletions of the food supply or destruction of the vegetation. This attitude has still not being abandoned completely, though alarm bell has started ringing rather stridently; there is vociferous public outcry in the conscientious circle for the protection of wild animals, lest we find ourselves a very lonely species during the coming days and perish due to the collapse of ecological balance.

So, the forestry and wildlife departments were established by the Governments of every country, but till the middle of the last century the modus operandi of the wildlife departments of many countries was only to eliminate the animals that proved dangerous in the human context. This perilous practice had to be discouraged in the prevailing situation, where most of the animals have become extinct or are at the brink of being wiped out.

The veterinary profession, in the global scenario, has been able to make some distinguished signature for the conservation and welfare of the surviving wild animals, though the contribution has been largely confined to a few glamorous species only. The awakening has finally arrived in India also, little belatedly though. It was laudable on the part of the Veterinary Council of India to have realized the role of veterinarians in the field of wildlife conservation by introducing a course in the undergraduate syllabus. Some leading veterinary colleges of the country are also coming up with department of wildlife health, which will train up the new generation of vets to take up the job more efficiently in the future.

Though, the principle of treatment of the farm livestock and pet animals also apply largely in case of treatment and surgery of wild animals, a lot of peculiarities exist which demands special considerations as mentioned briefly hereunder.

1. **Legal implications:** While treating a domestic animal, we are largely guided by the ethical considerations and the prevention of cruelty act. While this act also applies to the wild animals, another set of important laws (Wildlife Protection Act, 1972 with several amendments) governs the handling and surgery of wild animals. In general, the higher the status of the animal in the schedules in the WPA-1972, the stringent are the laws governing them. Treatment including surgery of scheduled animals should be undertaken only on the written request/permission of the Chief Wildlife Warden or his authorized

officer and not on the personal enthusiasm. Application of immobilization and surgery of a scheduled animal without authorization can be framed as poaching and a well intentioned move of a veterinarian could put him under some undue legal scrutiny.

2. **Restraint and anaesthesia:** Making a correct decision on the restraining technique in a specific animal of a given species under a given condition necessitates considerable expertise and resources. Interplay of several factors guides the decision, some of which are as follows:

a. Physical versus chemical restrain: In a zoo condition, many simple techniques can be performed by physical restraint alone or in adjunct with some mild sedatives. Dressing of a wound in a tiger or lion can be easily done in a squeeze cage. However, familiarities with humans, specifically with the handlers are important for handling a fully conscious animal. In the early days of use of chemical immobilization technique, a lots of casualties were encountered in many wild animals immobilized with the neuromuscular blocking agents, which were otherwise safe in the domestic animals. Later on, it was found that the proximity of humans proved to be too shocking for the immobile animals that were fully conscious. The animals succumbed to this shock though the surgery was successful. Later, safe drugs or drug combinations have been developed, which could overcome this shortcoming; moreover, now most of the immobilizing drugs could be titrated or effectively reversed with reversal agents and unduly long duration of sleep following completion of the procedure is not a problem. The general belief that the use of chemical agents would cause some severe internal biochemical changes and preference should be given for physical agents, is therefore, not based on any valid rationale. However, we must keep in mind as underlined by Harthroon (1976) that Chemical capture is essentially the capture of individuals, and individuals have idiosyncracies, peculiarities, differing sensibilities and varying degrees of resistance, and plainly obvious to anyone who has ever reared a wild animal, be it a young elephant, rhinoceros, warthog or one of the spotted cats, a definite individual personality.

b. Preanaesthetic evaluation: Prior to a human subject induced with a general anaesthetic or operated upon, a host of preanaesthetic evaluation is conducted to rule out any disorders in the vital systems of the body like the circulatory, respiratory, urinary or hepatic enzyme systems. Besides, a thorough check up of the haematological, biochemical and urinary systems are performed so as to avoid any untoward situations during anaesthesia. This is an advantage for the human anaesthetist and is now being gradually followed by the veterinary anaesthetist also. But a wildlife anaesthetist is greatly disadvantaged in this respect as he can never enjoy this opportunity of patient evaluation prior to the administration of chemical immobilization. Casualties have taken place in apparently healthy subjects with appropriate doses of immobilizing drugs; on post-mortem which were found to have lost the entire lung parenchyma to chronic tuberculosis or some other serious internal diseases.

c. Preanaesthetic medication: The wildlife anaesthetist is deprived of the advantage of the use of appropriate preanaestheic drug/drugs, which could increase the margin of safety of the general anaesthesia with lowered dosing, reduce the secretions, stabilize the heart etc. The nervousness caused by the hitting dart makes most of the wild animals to either run away or charge or in caged conditions, into a state of frenzy. The fear and exhaustion causes capture myopathy that often ends fatally. The safety of the sniper pursuing big games or predators is also at considerable peril and physically demanding.

d. Handling of drugs: Unlike the usual anaesthetic drugs used in the hospital conditions, most of the drugs used in the wild animals are necessarily highly potent and

dangerous to handle. The Narcotics like etorphine are most frequently used in wildlife immobilization practice and are very poisonous for humans; fatal accidents are known to have taken place due to callous handling.

*e. **Choice of drugs and dosing:*** Great variations exist in different species of animals in their sensitivity to the immobilizing drugs and response. Kreeger (1999) therefore made the following suggestions in respect of immobilizing drug dosing as:

I. Never memorize drug doses, always refer the book or diary.

II. If you are not sure, do not use it.

III. Physically calculate drug doses

IV. Calculate the doses at least twice

V. Look at your answer

*e. **Handling and positioning of the animal:*** Anatomical and physiological peculiarities exists in different species of animals and should be known to the anaesthetist going for a certain species. For example, the adult elephants are devoid of the pleural sac and therefore, should not be allowed to sit on sternal recumbency under anaesthesia; which might cause oedema and even be fatal within a short time. On contrary, rhinoceros normally go down to a sternal recumbent position under the influence of the opiates and is a normal and safe position in the species. Patent airways must, however, be maintained in any species and monitoring of anaesthesia must be maintained throughout the period. Sometimes, a surgeon, deeply engrossed with a procedure, may not keep account of time and thereby jeopardize his own safety and the safety of his team. It should, therefore, be made mandatory to use supplementary physical restraint during the period to avoid accidents and one of the experienced team mate engaged to keep watch on the sleeping animal. Protection of the eye from desiccation by applying an eye ointment and covering with a blindfold is also essential.

*f. **Recovery from anaesthesia:*** Though recovery from anaesthesia without the use of antagonists take place in most of the cases, slow recovery and prolonged sedation of an unattended wild animal may make him vulnerable to the predators and poachers. The drug selection, should therefore, be made keeping this fact in mind and preferentially drugs should be selected which can be completely reversed after completion of the procedure. Yet, the subject must be monitored for any post-reversal sedation.

3. Surgical procedure: The general surgical principles like asepsis, control of haemorrhage, gentle handling of tissues etc. also are equally applicable in case of the wild animals. Yet, every surgery in a wild animal presents a case for special consideration. Possibilities for post-surgical care, antibiotic therapy, removal of sutures, vulnerability to predators, human imprints and social rejection etc. are various factors that the surgeon must do good to bear in mind while handling a free ranging wild animal. In captive conditions the problems might be little less but lack of facilities for squeeze cage, vulnerability to self mutilation etc are some of the factors that should worry the surgeon.

Recalling personal experience and reported instances, it is observed that it has been mostly injuries in wild animals that necessitated some surgical interventions. Wild elephants in the human-elephant conflict areas are frequently found with metal spear tips or arrows embedded into tissues causing infections and abscesses. Bullet injuries from crop protection guns, injuries due to infighting are also frequently encountered. Frequently, tuskers with attractive tusks had to be immobilized and detusked to protect it from the ivory poachers. In the rhino also injuries caused by the crop protecting farmers are encountered, but

mostly they are affected with gaping wounds caused by other males. Most of the time, injuries caused extensive tissue damages and infections but only a single rendezvous was possible due to prohibitive cost and preparations on arranging such field operations. It was however, interesting to note that most of these cases positively responded quite unexpectedly to just a single day of treatment, which generally consisted of removal of the foreign body, debridement, irrigation of the wound with antiseptics, application of tincture of iodine followed by fly repellant skin ointments and on rare occasions a few stay sutures to partially cover a gaping wound. Parenteral administration generally included high doses of a long acting antibiotic, vitamins B-Complex, C, A and E plus antihistamin.

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6.2 "Down in the hip" in a tusker and its treatment

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An audit tusker, while being transported in a truck, met with an accident and sustained injury on the left side, when the truck overturned during transportation. The elephant got up by itself and could walk with dragging of the left hind limb. It was showing signs of pain and there was an area of tenderness at the external angle of ilium. The external angle of ilium was depressed and painful, and hence a distracted fracture of the external angle was suspected. Abrasions were noticed on the skin of cheek and temporal region. The wounds were cleaned and dressed, a dose of tetanus toxoid (10 ml) and streptopenicillin were administered. There was severe edema at the external angle of ilium at 24 hrs and the angle had a "cut off' appearance. Aloes mixed with egg white was applied as a paste at the region of odema, 3-4 times a day, antibiotic was repeated and aspirin tabs were administered for 10 days continuously. It was given rest for 10 weeks. Aspirin and application of aloes paste was done at weekly intervals, 7 days consequently at each instance. Pain and lameness disappeared by 10 weeks and it could walk but the 'down in the hip' appearance persisted.

6.3 Extracapsular cataract extraction in a captive lion (*Panthera leo*)

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A 20 year old lion belonging to Jaipur zoo was examined for blindness. It was reported that the lion was suffering from visual deficit in the right eye (OD) for the past 6 months. Ophthalmic examination was carried out after dilating the pupil with atropine eye drops, which revealed a mature cataract OD. The general physical examination was unremarkable for the age, and hence extra capsular cataract extraction was performed.

6.4 Surgical management of a cold abscess in an Indian rock python (*Python molurus*)

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A 10 year old and 10 feet long Indian rock python (*Python molurus*) weighing 10 kg b.wt. was presented to the Madras Veterinary College hospital with a history of chronic swelling of 18 months duration. Clinical examination revealed a fluctuating

min. All animals exhibited profuse salivation, opening of mouth, vocalization, protrusion of tongue, relaxation of cardia and vomition of rumen liquor and contents through the mouth as well as the nostrils. Good anal relaxation was achieved at 25 min. There was ventromedial rotation of the eyeballs. Palpebral reflex was partially abolished. The rings were fitted between 30-35 min. One very nervous female did not go down under the influence of the drug and though appeared drowsy when observed from some distance, got irritated on approach with erect ears and eyes wide open in fright and nervousness. The ring could not be fitted to her. Animals regained sitting position at 56.8 min and were on their feet at 75.5 min. Animals receiving yohimbine recovered in 6.78 min. The respiratory rate decreased to the minimum at 10 min, Heart rate at 30 min and body temperature at 60 min. There was a reduction in the values of Hb, PCV and TLC.

6.8 Surgical management of haematoma in a giraffe

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A six year old, male giraffe, belonging to Mysore zoo developed a swelling in the ventro-lateral aspect of thoraco-abdominal junction on the left side. It had gradually increased in size from about 2" to 10" in diameter over a period of 3 months. It was hard on palpation and a small quantity of serous fluid could be aspirated from the swelling, which was found to be sterile on culture and sensitivity test. It was decided to excise the growth surgically.

A chute was designed and the animal was conditioned to get into the chute for feeding during next 15 days. The giraffe was premedicated with atropine sulphate 3 mg i.m. and sedated with xylazine 80 mg, i.m. Lignocaine was sprayed over the swelling and a 3" incision was made on the swelling. The fibrin clots with serous fluids were removed and the swelling was flushed with copper sulfate solution followed by normal saline and packed with Tr. iodine gauze. Yohimbine 100 mg was given and the animal recovered completely within 20 min. Oral antibiotics for 7 days and regular wound dressing resulted in complete healing in 60 days.

6.9 Fibrosarcoma in a lioness (*Panthera leo*)

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A 15 year old rescued lioness had a chronic swelling on the anterior aspect of the right metatarsal region for 1 year. The swelling was hard in consistency and had no fluid content on exploration, but had a tendency to ulcerate. Symptomatic treatments with counter irritants, antibiotics had not shown any response. The swelling started to grow rapidly during last 1 month and hence it was decided to excise the growth. The lioness was anaesthetized with xylazine (200 mg) and ketamine (500 mg) i.m. Atropine Sulphate 5 ml was given i.m. The mass was located subcutaneously with firm muscular attachments but no attachments with the bone. The mass was excised by putting a longitudinal elliptical incision and careful subcutaneous dissection. Post-operatively the lioness was given long acting tetracycline (Terramycin LA®, Pfizer, Mumbai) 15 ml deep i.m. at two sites in the neck. The animal mutilated the wound by 3rd post-operative day. However, the wound healed completely by 2nd intention in 3 weeks. No recurrence was observed for 3 months after the surgery. The histopathological examination of the mass revealed it to be fibrosarcoma.

spherical swelling of 13 cm diameter on the right lateral aspect of the middle third segment. On palpation the swelling was cold to touch and gritty at the centre. Radiography was suggestive of inspissated abscess with characteristic soft tissue involvement and a radio dense area in the centre. Hence, the abscess was lanced under light plane of surgical anaesthesia (Ketamine 10 mg/kg b. wt., I/M) and about 1 kg of thick, foul smelling pus with layers of inspissated material was removed. The abscess cavity was managed following standard method.

6.5 Incidence of injuries and abscesses in the elephants of north east India

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A very high incidence of injuries and abscesses has been observed in the captive and wild elephants of the north east region. Highest incidence of work related injury has been farra gall with almost every privately logging elephants suffering from this painful problem at least once or several times in their working life. This was followed by foot affections, accidental or malicious gun-shot wounds, various kinds of abscesses, iatrogenic injuries (dart abscesses, abscesses on faulty i.v. injections, gangrenous ears due to faulty i.v. injections), tail gangrene, fractures, cut and lacerated injuries over the trunk, tusk injuries and pulp infections, injuries caused by wild animal attacks etc. Managerial defects caused injuries during training like rope bumps, lacerations, capped elbow, capped stifle and carpal hygroma. In wild elephants the commonest problem has been abscesses caused by gun pellets, arrows and spear tips etc.

6.6 Incidence of foot diseases in captive elephants of Assam

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A total of 224 Asian elephants (*Elephas maximus*) were scrutinized for foot affection 135 elephants belonged to the State Wildlife Department and the rest 89 were privately owned logging elephants. Altogether 50.89% of the study population had one or other kind of foot affections. A total of 14 different kinds of foot affections included over grown nail, over grown cuticle, split nails, cracked sole, pitted sole, Kari, over grown sole, cracked heel, over worn sole, ingrown nails, laminitis, injury, abscess and arthritis. With advancing age, incidence of the foot affections also increased. Males had higher incidence of foot affections compared to females. The privately owned logging elephants had significantly higher incidence of affections. Comparatively, the hind limbs were more affected. Management conditions were also the primary factors predisposing the foot of the elephant to different types of affections.

6.7 Sedation of swamp buffalo using xylazine and its reversal with yohimbine

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Twelve semi-adult swamp buffaloes were required to be fitted with bull nose rings for which sedation was given using xylazine hydrochloride. The effect of xylazine as a sedative and its reversal with yohimbine was studied in this semi-wild nervous species of animal. All the animals were under overnight fasting. Drinking water was withheld 12 hours prior to the medication. Xylazine hydrochloride was used @ 0.2 mg/kg b.wt. i.m. in all the animals. Yohimbine was used in 6 animals i.v. for reversal. The first sign of incoordination appeared in 10.67 min. Animals assumed recumbent position at 12.24

6.10 Myxoma in a leopard (*Panthera pardus*) and its surgical management.

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A 12 year old leopard (*Panthera pardus*) belonging to Gadag zoo in Karnataka was presented to the Zoo Animal Hospital, Bannerghatta Biological Park, Bangalore. The leopard had multiple, bilateral growth in the submandibular region. With 2 days of rest after transportation of over 300 km, the animal was fasted for 12 hours and prepared for aseptic surgery. Atropine sulphate 2 ml was given and 15 min later anaesthesia was induced with 100 mg of xylazine and 300 mg of ketamine given i.m. The surgical site was prepared for aseptic surgery and the growth was excised. The excised mass showed jelly like consistency. Copper sulphate crystal were used to cauterize the area. Sutures were applied leaving a large drainage point from each surgical site. Post-operatively the leopard was kept in a squeeze cage in the hospital premises. Daily dressing of the wound was done. On the 3rd day the skin sutures opened up, which were resutured under ketamine and xylazine anaesthesia. By 20th day after surgery, the wound completely healed and the skin sutures were removed. Histopathological examination of the mass showed it to be myxoma.

6.11 Open pyometra and its surgical management in a lioness (*Panthera leo*)

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A rescued lioness aged 9 years had small quantity of purulent vaginal discharge over a period of 18 months. The lioness was treated with different antibiotics based on the culture sensitivity report during this period. However, the condition not improved and it was decided to perform ovariohysterectomy.

The lioness was anaesthetized with xylazine 200 mg and ketamine 500 mg with atropine 5 ml given i.m. Midventral incision of 4" from pubic was made. Bilateral ovariohysterectomy was performed as per routine procedures. The abdominal incision was closed with umbilical tape in simple interrupted manner. Post-operatively long acting tetracycline (Terramycin LA®, Pfizer, Mumbai) was given. Three days later Cefixime (Mahacef, Mankind Pharma Pvt Ltd, New Delhi) tablets were given @ 15 mg / kg. The animal made an uneventful recovery. The uterus had hyperplastic appearance along with suppurative changes.

6.12 Immobilization of free ranging spotted deer (*Axis-axis*) with xylazine-ketamine and antagonism with yohimbine + 4- aminopyridine

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Eight adult, free ranging spotted deer inhabiting Pench Tiger Reserve, Seoni (M.P.) were immobilized with a combination of xylazine-ketamine by darting with teleinject gun from a distance of approximately 30 feets. Two different regimes of xylazine 3.5 mg/kg b.wt. and ketamine 2.6 mg/kg b. wt. in group I and xylazine 1.5 mg/kg b. wt. and ketamine 4.5 mg/kg b. wt in-group II were used. The sedation of all the immobilized animals was reversed by yohimbine + 4-aminopyridine 0.125 mg/kg b.wt. i.m. The mean induction time was 10±0.91 and 7.7±0.47 min in groups I and II, respectively. The mean

duration of immobilization was 30±0.91 and 27.7±0.47 min and mean recovery time was 4.5±0.35 and 17±0.23 min in groups I and II, respectively. A significant increase in respiratory rate of animals of group I was noticed after the administration of antidote. Further, the significant decrease in heart rate was observed in both groups, which increased non-significantly after the administration of antidote. However, no change was observed in rectal temperature of both groups when compared with control.

6.13 Castration in black buck (*Antilope cerricapra*) using baby Burdizzo's castrator

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The castration of 4 male black bucks of 2 to 3 years kept in captivity at Veer Jijamata Bhosale Udyan zoo, Mumbai was done. Each male animal was isolated in a closed shed and restrained properly in right lateral recumbancy for castration by Burdizzo's method. The area at the neck of scrotum was prepared for aseptic surgery. The left spermatic cord was held within the jaws of baby Burdizzo's castrator and jaws were closed and held firmly at the place for 1 min. The right spermatic cord was held in a similar manner. Tincture iodine was applied at the site of skin bite of Burdizzo castrator. No visible wound or bleeding was observed following castration by Burdizzo's method in any animals. Thus, the castration by baby Burdizzo's method can be recommended as simple, safe and practically useful in routine practices in zoo animals.

6.14 Fracture fixation in pigeon under ketamine and midazolam anaesthesia

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A stray pigeon, met with an accident, was presented at Department of Surgery and Radiology, Veterinary College, Anand, with epiphyseal fracture of right humerus. Under ketamine and midazolam anaesthesia the pigeon was operated successfully.

6.15 Base line haemato-biochemical values in spotted deer (*Axis axis*) reared in semi-captivity

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The spotted deer (*Axis axis*) is the most commonly found member of the deer family across the entire country except in the extreme northern regions. In the present study, the baseline values for haematological and serum biochemical parameters were determined in venous blood from 4 sedated male spotted deer/chital reared in semi-captive environment. Haematological values such as haemoglobin, packed cell volume, total erythrocyte count and total leucocyte count were 16.02±0.87 g/dl, 50.50±0.74%, 20.33±0.92 millions/µl and 2.10±0.15 thousands/µl, respectively. Plasma glucose, serum total protein, albumin, total bilirubin, cholesterol, and activities of ALT, AST and alkaline phosphatase were 102.30±2.67 mg/dl, 7.15±0.23 g/dl, 3.93±0.15 g/dl, 0.20±0.08 mg/dl, 105.48±5.23 mg/dl, 18.25±0.85 units/ml, 27.75±3.52 units/ml and 11.81±2.03 KA units, respectively. The mean blood urea nitrogen was 20.00±1.74 mg/dl and serum calcium and phosphorus levels were 10.6±0.61 mg/dl and 7.53±0.72 mg/dl, respectively. The reported baseline values in spotted deer/chital can be used as reference for physiological and pathological alterations, monitoring of health and nutritional status, surgical interventions and for disease diagnosis.

6.16 Characterization of cDNA encoding interleukin-18 gene of Nilgai (*Boselaphus tragocamelus*)

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Interleukin-18, a component of innate immunity with potent interferon-α-inducing activity, is not well characterized in wild ruminants. The IL-18 sequence of Nilgai (*Boselaphus tragocamelus*), a wild ruminant of *Bovidae* family and its comparison with other domestic ruminants is reported for the first time. Hellabrunn's mixture (Ketamine: xylazine, 1:1.25) 1.5 ml was used for tranquilization as per standard techniques and blood samples were collected by jugular venipuncture in a sterile syringe containing EDTA from Nilgai reared at the Wildlife Centre, IVRI, Izatnagar. Peripheral blood mononuclear cells were isolated using Histopaque and stimulated with 10 μg ml^{-1} Con A at 37°C in a humidified incubator with 5% CO_2. Total cellular RNAs were isolated and the first strand cDNA was synthesized using oligo (dT) primer. The gene for IL-18 was amplified from cDNA using specific oligonucleotide primers. The amplified product of 582 bp was cloned into pTZ57R vector and sequenced. The nucleotide sequence of Nilgai IL-18 cDNA was 582 bp long and contained its entire open reading frame encoding 193 amino acid residues. The sequence analysis indicated seven nucleotide substitutions with reported buffalo sequence showing 98.5% homology, 97.8% with cattle and 97.6% with sheep. The Nilgai IL-18 cDNA included a putative cleavage site of IL-1α-converting enzyme (ICE) and IL-1 signature-like sequence identified in human and cat IL-18 cDNA. Both nucleotide as well as amino acid sequence homology shows that the cloned sequence was closer to buffalo IL-18 sequence.

6.17 Cut injury of the cornea in an elephant and its surgical correction

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A temple elephant with a freshly cut injury of the cornea was presented with iris hanging out through the corneal injury. Under sedation, the iris was snipped off and the corneal tear was sutured in a simple continuous manner using 6-0 monofilament silk. Occular and parenteral antibiotic therapy was followed. The corneal injury started healing with peripheral vascularisation and corneal clouding. But the animal developed posterior paralysis unresponsive to treatment, and passed away after two weeks. The elephant was subsequently diagnosed positive for rabies.

6.18 Elephant tranquilisation and treatment - A report of 7 cases

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7.0 EQUINE SURGERY SESSION

Lead Paper

7.1 Surgical management of abdominal adhesions and peritonitis in equines

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With improved surgical techniques, anaesthetic regimens, and medical management of horses with colic, the number of abdominal surgeries performed in horses and the post-operative survival rate have increased in recent years. Intestinal diseases requiring surgical intervention remain major problems in horses admitted to referral hospitals for acute abdominal pain. Most commonly reported post-operative complications, which contribute to the poor survival rate of horses with small intestinal disease include intra-abdominal adhesions, anastomotic leakage, ileus and peritonitis.

Abdominal adhesions are relatively common complications after abdominal surgery in horses (Baxter *et al.*, 1989). Intra-abdominal adhesions is a major cause of post-operative intestinal obstruction in horses undergoing abdominal surgery and intestinal resections and anastomoses for small intestinal diseases (Mueller *et al.*, 2001). Adhesions become a clinical problem when they compress or anatomically distort the intestine. This may lead to intestinal constrictions, incarceration, or volvulus, predisposing the patient to intestinal obstruction and signs of abdominal pain, often requiring repeated celiotomy or euthanasia (Mueller *et al.*, 2001).

Incidence and risk factors associated with adhesions

Horses are not particularly prone to adhesion formation, but are extremely sensitive to them. Adhesions usually cause problems in the first 2 months after surgery, although they can develop at any time, are more likely after intestinal resection and anastomosis than other procedures, and are unlikely to develop after large intestinal surgery. Factors that could contribute to adhesions are post-operative ileus, ischaemia, violations of Halstead's principles of surgery, foreign materials, serosal abrasion by towels, and use of large suture material. In one study, the prevalence of confirmed adhesions was 6%, although inclusion of deaths from colic has a prevalence of 13% (Freeman, 2003). Adhesions were found to be the cause of recurrent colic in 18% of horses subjected to small intestinal resection and anastomosis (McDonald *et al.*, 1989). The percentage of "symptomatic adhesions" is higher in the horse than in most other species, with an incidence of post-operative recurrent abdominal pain in as many as 28% of the case population. The explanation for this phenomenon as yet remains unclear, but the horse's long mesentery lends the freely mobile intestine readily available to volvulus and internal hernia formation, once one or more adhesions have established a point of fixation. Additionally, the delicate balance of peristaltic intestinal activity in the horse may be a major contributing factor in adhesion induced alterations in ingesta flow (Schramme and Butson, 1997). Horses with lesions involving the small intestine and caecum had lower survival rates (75.2%) than colon (89.9%) (Mair and Smith, 2005). Another readily accepted surgical observation is the increased adhesion risk in foals compared with mature individuals (Lundin *et al.*, 1989).

Pathogenesis

Understanding of the pathogenesis of adhesion formation has improved in recent years, but much about this phenomenon remains unknown. Tissue, cellular, and certain biochemical events appear to be reasonably well characterized at least in human beings,

but molecular mechanisms are just beginning to be delineated. Decreased fibrinolysis may not be the main cause of adhesions in horses with abdominal disease. More information is required to determine the specific activators and inhibitors of fibrinolysis involved in adhesion formation in horses, the concentrations, interactions, and temporal changes of these activators and inhibitors in abdominal disease, and the effect of endotoxin in intraperitoneal fibrinolysis in horses (Southwood and Baxter, 1997).

Classification of abdominal adhesions

Abdominal adhesions may be classified as fibrinous or fibrous. Fibrinous adhesions rarely cause clinical problems and most commonly undergo fibrinolysis. Fibrous adhesions form if there is inadequate fibrinolysis and result from ingrowth of fibroblasts and endothelium into fibrinous adhesions and subsequent collagen deposition and maturation. Adhesions may be beneficial or detrimental to the horse. Beneficial are those that form to ischaemic intestine and provide a blood supply for tissue repair and localize contamination and infection such as omental adhesions. Types of adhesions causing intestinal obstruction include fibrous adhesions between intestine and omentum, mesentery, parietal peritoneum and abdominal wall incision, fibrous adhesive bands that may incarcerate intestine, adhesions between adjacent intestines resulting in hairpin kinks, adhesions between loops of intestine that may form a focal point around which a volvulus could occur, and matted adhesions involving multiple loops of small intestine. Although some adhesions such as omental adhesions often are not associated with clinical signs, all these forms of adhesions potentially interfere with the flow of digesta, leading to obstruction or strangulation; alternatively, they may alter normal peristalsis of the intestine.

Prevention and treatment of abdominal adhesions

A realistic current goal for surgeon is to reduce and prevent the formation of adhesions, especially in clinically important areas such as the small intestines. To this end, surgeons can today take a number of easily implemented measures, despite the unknowns and uncertainties surrounding adhesion development and prevention.

Studies to investigate methods for adhesion prevention have used a variety of adhesion models based on the proposed causes of adhesions. Variations in adhesion model, species studied, method of adhesion assessment, and time of adhesion assessment make comparison between studies evaluating prevention therapies difficult (Southwood and Baxter, 1997).

The causes for variation in adhesion formation demonstrated experimentally include an increase in adhesions to injured visceral peritoneum compared with parietal peritoneum, an increase in adhesions associated with sutured peritoneal defects versus open defects and an increase in adhesion formation with interrupted versus continuous suture pattern.

Numerous clinical trials and laboratory investigations have been devoted to determining methods of minimizing the formation of post-operative intra-abdominal adhesions. Broad spectrum antibiotics, non-steroidal anti-inflammatory agents, heparin, intraperitoneal administration of high molecular weight solutions, omentectomy, and post-operative peritoneal lavage have all been advocated to minimize adhesion formation (Mueller *et al.*, 2001). Despite advances in surgical techniques and pharmacologic therapy, horses in which adhesions form after surgery have a high incidence of recurrence of adhesions and poor prognosis for survival. The primary method of minimizing post-surgical adhesions continues to be a meticulous atraumatic surgical technique. However, the presence of pre-existing peritoneal inflammation and the inherent invasive nature of surgery limits our potential for adhesion prevention in horses. The methods adopted in clinical

practice for minimizing abdominal adhesion are given below:

1. A bioresorbable hyaluronate carboxymethyl cellulose membrane (HA membrane) has been developed to reduce post-operative adhesion formation. It is applied to the serosal surface of the intestine or parietal peritoneum, forming a temporary protective barrier against serosal-serosal or serosal-peritoneal adhesion formation during early post-operative healing (Mueller *et al.*, 2001). It remains at the site of application for up to 7 days to separate adhesiogenic surfaces and is then cleared from the abdominal cavity by peritoneal macrophages. It is completely eliminated from the body by 28 days. The ease of application, ability for accurate site-specific placement, and proven experimental efficacy and safety are advantages of HA-membranes for adhesion prevention. Potential disadvantages include the relatively small size of membrane, necessitating several membranes to cover a large area of affected tissue and the cost ($ 125/sheet).
2. Coating of affected intestinal surfaces with macromolecular solutions used as barriers like carboxymethyl cellulose 1%.
3. Combined topical and intraluminal Carolina rinse solution is used to prevent immediate inflammatory changes during re-perfusion (Young, 2001).
4. Laparoscopic adhesiolysis to remove fibrous bands is a safe and effective technique. Further abdominal instillation of 0.5% ferric hyaluronate gel after laparoscopic dissection was effective in minimizing adhesions (Boure *et al.*, 2002).

Peritonitis

Peritonitis is very rare after colic surgery, but leakage of an anastomosis in non-viable colon after resection of colon volvulus is one of the more common causes. Equine peritoneum can handle intra-operative contamination, which is removed at surgery, but even slight leakage from a suture line is poorly tolerated. Enterotomies are often done for large colon diseases, such as removal of enteroliths, impacted foreign materials, and feed impactions, dehiscence of the suture line is extremely rare and usually results from a surgical error. Intra-operative contamination during surgery is usually well contained and removed by copious lavage, and even severe contamination of exteriorized bowel rarely causes peritonitis. Rectal tears can result from a pre-operative palpation, and should always be considered as a possible cause of peritonitis in the post-operative period.

The surgical procedure that carries the highest risk of peritonitis is colostomy in the right ventral colon for resecting a caecocolic intussusception, whether or not the necrotic caecum is resected through the colostomy. The severe contamination from this procedure can be difficult to contain during surgery but can be prevented through isolation of the colostomy site by drapes or a sterile plastic sheet sutured around the proposed incision.

A focal small colon impaction with an enterolith or dehydrated feed material can cause transmural pressures. Although the vascular changes at the impaction site are recognizable, it is not unusual for the impacting mass to have undergone repeated impaction and spontaneous correlation at more proximal segments of small colonic site, which can progress to full thickness mural necrosis after surgery and cause peritonitis. Therefore, careful intra-operative inspection of the prestenotic segment of small colon is recommended to prevent this mishap. Horses with septic peritonitis have significantly lower peritoneal fluid pH and glucose concentrations than horses with nonseptic peritonitis and healthy horses.

As clinical research continues, the overall contribution of these adhesion prevention

adjuvants to clinical as well as economic outcome measures will be defined. By implementing current strategies and eagerly awaiting further advances both in human adhesion prevention and the understanding of molecular events in equine adhesiogenesis, would lead to a day in the not too distant future in which targeted adhesion-free healing becomes a clinical reality.

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7.2 Third degree perineal rupture and its surgical management in a mare

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A 4 year old primiparous mare was presented with the history of third degree perineal rupture where in entire rectovaginal wall was ruptured along with perineal body and anal sphincter which had resulted into cloaca formation. The reconstructive surgery was undertaken as per the standard technique under trifluropromazine hydrochloride tranquilization and epidural anaesthesia using 2% lignocaine hydrochloride in standing position. Animal recovered uneventfully.

7.3 Studies on olecranon bursitis of horse in and around Kolkata

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Olecranon bursitis is a surgical condition which makes horse unsound. A survey was carried out in 150 lame horses of different breed, sex and age in and around Kolkata to evaluate the gravity of bursitis. Eighteen per cent of total population were found positive for olecranon bursitis and treated after equally dividing into three groups with 2.5% tr.

iodine (group I), 7% tr. iodine (group II) and hyaluronidase (group III) intra-synovial injection. All samples of synovial fluid were assessed for antibiotic sensitivity, total protein, total leukocyte count and differential leukocyte count. As per antibiogram intrasynovial injection was given with specific antibiotic. Amongst all, 20%, 35% and 70% of horse of groups I, II and III, respectively, returned to work after 45±3.2 days of treatment. Six unsuccessfully treated animals (2 from each group) were operated for enmass resection of hygromatous mass, of which 5 horses became sound after 1.5 months of surgery and one showed complications like infection, dehiscence, which needed open wound dressing and became sound after 2.5 months of surgery.

7.4 Haematobiochemical alterations in sidebone in draught equines at Bikaner

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The side bone was diagnosed radiographically in 25 horses, aged between 2 and 11 years. It was restricted to fore limbs only and was bilateral in 7 cases and unilateral in 18 cases. The lateral sidebone was seen in all cases but medial was seen only in 22 cases. The mean values of calcium (10.37±0.12 mg/dl), calcium-phosphorus ratio(5.19±0.47), serum alkaline phosphatase (182.83±12.26 U/L), calcitonin (171.00±26.83 pg/ml), erythrocyte sedimentation rate (28.33±1.78 /20 min), and packed cell volume (40.78±1.55 %) were found significantly ($P<0.05$) higher and total leucocyte count (9.40±0.30 thousand/ml) was found significantly ($P<0.05$) lower than the mean value of the clinically normal animals of the present study. However, other haematobiochemicals like Hb, PCV and TEC did not change significantly in animals with foot affections in the present study when compared with the reference values.

7.5 Rare equine surgeries: Case reports

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The present report deals with 3 rare equine surgeries undertaken at the clinics of Department of Surgery and Radiology at Bikaner. Case 1 was a mare aged 7 years presented with the history of a laceration of mid-cervical muscles vertically and rupture of jugular vein on the right side by barbed fencing. Animal was sedated by xylazine 5 ml i.m. in standing position and a ligature was applied proximally and distally on the right jugular vein using chromic catgut No. 2. The skin and muscle wounds were scrubbed thoroughly with soap and water, and antiseptic dressing was done by BIPP daily. Animal was administered tetanus toxoid, antibioties and anti-inflammatory drugs. Complete healing occurred after 21 days.

Case 2 was a stallion aged 8 years, presented with the history of an enormous growth at right fetlock region of hind leg. Clinical examination revealed the growth to be a hard, multilobed with minor ulceration on lateroposterior aspect of the fetlock. Animal was operated under general anaesthesia using atropine, xylazine and ketamine combination and the affected limb was kept upwards. The growth was surgically resected and skin was apposed using horizontal mattress sutures in its 2/3rd length and rest of the skin could not be apposed and an open wound healing was allowed. The wound was dressed daily with sulpha powder. Post-operatively animal was administered tetanus antitoxin. The dressing was changed every alternate day. The skin sutures were removed after 10 days and healing occurred in open wound in 6 weeks.

Case 3 was a 10 month pregnant mare aged 8 years with serious traumatic injuries on the forehead involving its bones, following an automobile accident. Clinical examination revealed a vertical laceration in the forehead with multiple fractures of the frontal and nasal bones. Animal had slight dyspnea and a snoring sound could be heard during inspiration. Animal was secured in a trevis and a thorough scrubbing was done with soap and water at forehead and nasal regions. The local anaesthesia was infiltrated around the laceration. The fractured bone pieces were apposed by stainless steel wire sutures after drilling the hole through adjacent fractured pieces for the passage of wires. After a thorough debridement, the skin was apposed using simple interrupted sutures. Post-operatively, animal was administered with tetanus antitoxin, strepto penicillin and phenylbutazone for 3 days. Healing occurred by first intension at the frontal region. Mild sepsis occurred in 3-4 sutures at nasal region and it was treated by antiseptic dressing.

7.6 Management of eye lid tumours in equines

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Five GS mules and a TBI mare were presented to 6 Adv. Vet. Hospital, Bareilly with a complaint of eye lid tumours of either side. Excision was done in standing position under regional nerve blocks and sedation with xylazine 0.5 mg/kg i.v. In 3 mules and the mare, histopathological examination revealed adenoma and the animals recovered completely. However, recurrence was observed in the remaining animals, where histopathological examination showed squamous cell carcinoma of lower eye lid.

7.7 Maxillary sinusitis in a pony: Surgical drainage for enhancement of healing

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A six-year old pony was presented with purulent nasal discharge from the right nose. Also pus was hissing with every breath, from a fistula about 10 cm below the inner canthus of the right eye. Close examination revealed it to be purulent maxillary sinusitis. It had this condition for the past 11 months for which it had undergone several courses of antibiotics. Under sedation, the cavity was flushed out and a temporary fenestrated tube was anchored inside the sinus and fixed externally on to the facial skin. Culture of the discharge revealed *Proteus* sensitive to all aminoglycosides and Amoxycillin-Cloxacillin. Flushing of the sinus and antibiotic instillation was done daily for one week, combined with parenteral antibiotics. After removing the drainage tube, the edges of the skin were scarified and left for normal healing. There was uneventful recovery.

7.8 Clinical management of burns and complications in equines

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Thirteen horses were treated after a burn injury from an accidental fire, which broke due to short-circuiting in the stables, though the fire was brought under control in a short time and all the horses released from the stables, one horse succumbed to the extensive burns and asphyxiation in the stables. Rest of the 12 horses were treated immediately at Mil Vet Hosp. All the 12 horses, irrespective of the visible lesions, were given an ice cold water bath and were administered inj dexamethasone, inj avil, inj pethidine, inj TT, inj streptopenicillin and fluids (RL, NS, 5D and DNS). The lesions were cleaned and dressed

with soframycin oint. All these horses had extensive burns varying from 1st to 3rd degree affecting all limbs to more than half the body surface, particularly face and ventral aspect of head, neck, and body. After 6 hrs of the incident, one of the horses was euthanised as it suffered from sloughing of hoof, due to separation of hoof from sensitive laminae. In one of the remaining horses, which had extensive swelling on the face, lead to obstruction of upper respiratory passage and severe dyspnea. Tracheostomy was performed and tracheostomy tube was placed to relieve animal of respiratory distress. The horse had extensive tissue damage and became recumbent. Prognosis being unfavorable the horse was euthanised.

Of the remaining 10 horses, one horse, which had severe burns from 2nd to 3rd degree covering almost 2/3rd area showed tremendous recovery in healing. However, after almost 1 ½ month the horse showed generalized muscle wastage along with separation of of skin with underlying muscle, which lead to severe infection. This horse also had severe complications of laminitis, which lead to rotation of 3rd phalanx there by horse was euthanised. Six of the 10 horses, showed the symptoms of laminitis on 4th to 5th day of incidence. To control laminitis, horses were given inj isoxsuprine HCl, and fed metheonine, given hot fomentation of foot and mild exercise, and betadine was applied at coronary bands. Inspite of the treatment adopted, one of the horses with severe laminitis did not respond to the therapy and suffered from rotation of 3rd phalanx with dropped sole in both hindlimbs. Due to this, the horse had difficulty in ambulation and was also put to sleep. The remaining 8 horses showed uneventful recovery. The important observations made were the extent of burn and tissue damage was not visible in most of the cases as late as 10 days after the incidence and in some cases the necrotic skin peeled off after 15 days. The severe edema of lower abdomen, brisket and groin region occurred in 7 horses. Laminitis in all 4 limbs occurred in 6 horses, 4 recovered, and are in their full physical activity. The therapy adopted proved effective and application of silver sulphadiazine oint in place of soframycin oint, which was used for initial 2 days, proved very effective in controlling the infection and faster epithelization of the wound. None of the cases showed excessive granulation. The postmortem of 5 horses (01 died at the site and 04 euthanised) did not show any significant changes except for severe congestion of lungs, trachea and bronchi in first 2 cases.

8.0 RADIOLOGY AND IMAGING TECHNIQUES SESSION

8.1 Ultrasonographic features of uterine affections in bitches

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The present study was conducted on 22 bitches, presented at the Small Animal Clinics, PAU with the history of anorexia, vomition, polyuria, polydipsia, abdominal distension, pyrexia, recent oestrus, mating and bloody or purulent vaginal discharge. These bitches were considered to be suffering from uterine affections, while 7 bitches were presented for pregnancy diagnosis. Ultrasonography was done using a 3.5 MHz microconvex and a 7.5 MHz linear array transducer. Ultrasonographic features were correlated with clinical signs, haematobiochemical parameters and radiographic features. Ultrasonographically, pyometra (n=9), endometritis (n=4), dead foetus (n=1) and macerated foetus (n=1) could be differentiated and pregnancy diagnosis was done in 7 bitches. Ultrasonography was found to be sensitive, defined the architecture and consistency of uterus and was diagnostic for pyometra and endometritis, while the ability to detect foetal viability sonographically was useful to differentiate dead and macerated foetus as well. It was highly specific and sensitive for both early and late pregnancy diagnosis, but less accurate for the determination of litter size.

8.2 Ultrasonography of reticular and omasal disorders in bovines: A preliminary study

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The reticulum and omasum were subjected to ultrasonography in clinical cases of fore-stomach disorders in bovines using a 3.5 MHz microconvex transducer. The normal sonographic features of the reticulum and omasum were standardised *in-vitro* using phantom models before proceeding for ultrasonography in clinical cases. Various conditions like diaphragmatic hernia, omasal impaction, reticular adhesions and peritonitis could be diagnosed by ultrasonography and the diagnosis was confirmed upon exploratory rumenotomy. Ultrasonography was found useful in diagnosis of reticular and omasal affections in bovines.

8.3 ^{99m}Technetium-methylene diphosphonate three phase bone scintigraphy for evaluation of canine skeletal diseases

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Advanced imaging modalities like CT, MRI and NM are used for the disease diagnosis in veterinary patients. ^{99m}Technetium-MDP bone scanning is a routine clinical examination and a valuable tool in the evaluation of the whole skeletal system. It is based on the principle that actively metabolizing bone will incorporate the bone tracer proportional to the rate of bone turn over and blood flow. We have performed the bone scintigraphy in 11 cases of various skeletal disorders like lameness, joint diseases and bone cancer. Three phase bone scan was carried out after intravenous injection of 6-10 mCi of ^{99m}Tc-MDP. The Ist phase (vascular phase) was acquired immediately after the radiopharmaceutical injection for a period of 60 seconds. 2nd phase (Soft tissue phase)

and 3rd phase (Bone phase) was acquired 5 min and 3 hour post-injection respectively. The images were acquired using 256 x 256 matrix with 250k counts using GE single head digital SPECT gamma camera. Results of Ist phase provided very sensitive information about vascularity of the lesion, important for surgical decisions. The soft tissue phase findings were useful in locating the seat of lameness/inflammation. The bone phase revealed the degree and extent of skeletal disease, which is of prognostic value. It was concluded that radionuclide bone scan is a simple, non-invasive and sensitive method for evaluation of skeletal diseases in small animals.

8.4 Reconstruction of segmental radial defects with ceramic biomaterials: A radiographic, angiographic and scanning electron microscopic (SEM) study

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The study was conducted on 24 goats of either sex divided randomly in 4 equal groups (A to D). A total of 24 trials were conducted to evaluate and compare control (bone defect only) (group-A), calcium hydroxy apatite (group-B), tri-calcium phosphate (group-C) and bioglass (group-D) in the repair of segmental radial defect. In all animals, 1 cm x 0.5 cm radial diaphyseal defect was created under sedation with xylazine hydrochloride and local anaesthesia. In group-A (control), the defect was left as such without any implant. In groups B, C and D hydroxyapatite (HA), tri-calcium phosphate (TCP) and bioglass blocks , respectively, were placed in the defects. The bone healing was evaluated up to day 90 post-operatively on the basis of radiography, angiography and scanning electron microscopy. Radiologically there was evidence of resorption of bioglass implant at day 90, which was found to be initiated from 30 day, whereas other two implants were not reabsorbed by host tissue but acted as scaffold for new bone growth across the defect and the quality of bone defect healing in TCP and HA was almost indifferentiable radiographically. The angiographs taken at 90 day of experiment revealed that there was well organized angiogenesis and establishment of vascular supply across the bone defects in bioglass, whereas there was bridging of newly budded blood vessels through the implant in animals of both groups B and C. However, the evidence of transtransplant angiogenesis was more pronounced in animals treated with HA than TCP. The SEM picture of interfacial region in all groups showed gradual intervening of bony structures into the ceramic blocks. However, interfacial gap between the material and host bone was lesser in TCP and least in bioglass material as compared to HA suggesting faster healing in animals where bioglass was used followed by TCP and HA.

8.5 Porcine coronary artery model for evaluation of coronary stents

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Animal models have contributed much in defining most of the aspects of pathophysiology of in-stent re-stenosis thereby aiding in development of newer drug eluting coronary stents. The most widely used animal model of stent evaluation is porcine coronary artery overstretch injury model as they resemble human coronary artery both histologically and physiologically, and spontaneous atherosclerosis in the pig has been shown to occur occasionally. The paper describes the interventional radiological techniques involved in the biofunctional evaluation of coronary stent in porcine coronary artery model.

The objective of the study is to standardize the interventional radiological techniques involved in the evaluation of drug eluting coronary stent in porcine coronary artery model for its biofunctionality. Colony bred juvenile, domestic- crossbred swine of either sex were used for the study. The animals were given oral anti-platelet therapy daily starting two days before the implantation up to the end of the study. Under general anesthesia, positive pressure ventilation and full heparinisation, right and left anterior descending coronary arteries were catheterized using Judkins 6F left coronary catheter. Left circumflex coronary artery was catheterized using 6F right Judkins catheter. The stent was delivered with native vessel over-stretching ratio limited to 1:1.2. Intra-operative cardiac fibrillations were controlled by intravenous Amiodarone and defibrillation, whenever necessary. Heparin was not reversed post-surgically. The surgical wound was closed and dressed as routine. Analgesics and antibiotic coverage were given post-operatively besides two doses of low molecular weight heparin. Angiographic patency of stents was studied at 7, 28 and 180 days. Histopathological and histomorphometric evaluation on stented vessel were done at the above time periods to study any adverse tissue response besides studying neointimal proliferation. The techniques employed in this study gave consistent observations within the same group enabling statistical evaluation between test and control groups.

8.6 Abdominal radiography for diagnosis of intestinal obstruction in dogs: A report of seven cases

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Seven dogs suspected for intestinal obstruction based on history, physical examination of abdomen, and clinical signs were subjected to survey abdominal radiography. Common clinical signs and findings seen were persistent to intermittent vomiting, loss of appetite for the past few days, absence of defecation for the past 1 day to 6 weeks, lethargy, weight loss, dysphegia, and dehydration. Abdominal radiography revealed intestinal obstruction due to a stone, a plastic bottle cap in one case each, and trichobezoars in 2 cases. Barium series of gastrointestinal tract at 3 hours helped in confirmation of diagnosis of intestinal obstruction due to a plastic bottle cap, a radiolucent foreign body. Obstipation resulting from intramural neoplasm compressing on terminal colon in one dog, a scar formation in one dog, adhesions due to intestinal perforations by a string in 1 dog causing intestinal obstruction were also reported. Abdominal radiography provided non-invasive imaging of the abdomen with minimal discomfort or risk to the animal and was a useful diagnostic tool for the confirmation of diagnosis of intestinal obstruction.

8.7 Digital radiographic study of cardiopulmonary disorders in dogs: A study of 172 clinical cases

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Aim of this study was (i) to radiographically study the various cardiopulmonary disorders in dogs presented for surgery; (ii) to correlate clinical and radiographic findings, and (iii) to correlate radiographic and hematological findings. Patients presented for surgery were screened for cardiopulmonary disorders which included history, clinical examination, digital radiographs of chest (lateral and DV view), hematology and blood gas analysis. Radiographic changes in cardiac silhouette included general cardiac

enlargement, enlargement of left and right atriums and left and right ventricles. In the lung altered vascularity, increased bronchial marking, increased interstitial and alveolar density, pulmonary edema, abnormality of trachea, localized consolidation and metastatic lesions were recorded. Preoperative digital thoracic radiographs were extremely useful especially in dogs with cardiopulmonary disorders. Among the cardiac disorders, general cardiac enlargement (28%), right atrial enlargement (4%), right ventricular enlargement (11%) and left ventricular enlargement (9%) were common. General cardiac enlargement was more in males than in females. In the lungs, altered vascularity (19%), increased bronchial markings (6.5%), increased interstitial and alveolar density (34.5%), pulmonary edema (16%), abnormalities of trachea (12.8%), localized consolidation (4.7%) and metastatic lesions (2.2%) were frequently recorded. Blood gas analysis helped to determine the degree of respiratory impairment and need for oxygen supplementation.

8.8 Haematobiochemical evaluation of diatrizoate meglumine and iopromide as contrast agents for non-selective intra-arterial digital subtraction angiography of kidneys in dogs (*Canis domestica*)

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An experimental study on non-selective renal angiography using ionic contrast media diatrizoate meglumine (Group I, n=12) and nonionic contrast media iopromide (Group II, n=5) as contrast agents by intra-arterial digital subtraction angiography technique was conducted in dogs. The angiography procedure was carried out under general anaesthesia using mixture of ketamine hydrochloride 10 mg/kg b.wt. and diazepam 0.5 mg/kg b.wt. i.v. given 30 min after mild sedation with acepromazine hydrochloride 0.05 mg/kg b.wt. i.m. The non-selective renal angiography was performed by introducing pig-tail catheter using transfemoral approach. The aortographic flush was brought by intra-arterial injection of diatrizoate meglumine and iopromide 2 ml/kg b.wt. at the speed of 15 ml/s in animals of groups I and II, respectively. Preangiography, immediate postangiography and 48 hrs postangiography arterial blood and urine samples were obtained from animals of both groups for biochemical study and urinalysis.

The arterial blood samples were subjected to the gaseous parameter study viz., PaO_2 and $PaCO_2$, TCO_2, SaO_2 % and pH. A nonsignificant decrease and increase in PaO_2 and SaO_2 was observed in animals of group I and II, respectively, whereas, $PaCO_2$ showed a significant increase and a nonsignificant decrease in groups I and II, respectively. A nonsignificant and significant decrease in TCO_2 was seen in groups I and II, respectively. The pH significantly decreased in group I, while, in group II it showed nonsignificant changes up to 48 hrs. BUN and serum creatinine levels did not change significantly in any group, however, extent of decrease in serum creatinine and BUN were more in diatrizoate meglumine group than iopromide group. Group I showed nonsignificant transient decrease in concentration of all the electrolytes immediately after the angiography except for plasma sodium, which showed significant decrease. Significant decrease in all the electrolytes concentration was seen in group II with peak decrease seen at 48 hrs, except for nonsignificant decrease in plasma potassium. Urine pH, urine specific gravity, protein, creatinine and sodium, and fractional excretion of sodium and the urine protein to creatinine ratio changed non-significantly and in both groups. A significant increase in urinary N-Acetyl-beta-D-Glucosaminidase in both groups and urinary gamma glutamyl transferase and alanine-aminopeptidase was recorded in animals of groups I and II,

respectively. It was concluded that iopromide produced superior quality aortogram with less pronounced renal damage in dogs.

8.9 Clinical and physiological evaluation of diatrizoate meglumine and iopromide as contrast agents for non-selective intra-arterial digital subtraction angiography of kidneys in dogs (*Canis domestica*)

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An experimental study on non-selective renal angiography using ionic contrast media diatrizoate meglumine (Group I, n=12) and nonionic contrast media iopromide (Group II, n=5) as contrast agents by intra-arterial digital subtraction angiography (DSA) technique was conducted in dogs of either sex to compare their efficacy, safety and tolerance. The angiography procedure was carried out under general anaesthesia using a mixture of ketamine hydrochloride 10 mg/kg b.wt. and diazepam 0.5 mg/kg b.wt. i.v. given 30 min after mild sedation with acepromazine hydrochloride 0.05 mg/kg b.wt. i.m. The non-selective renal angiography was performed by introducing pig-tail catheter using transfemoral approach. The aortographic flush was brought by intra-arterial injection of diatrizoate meglumine and iopromide 2 ml/kg b.wt. at the speed of 15 ml/sec in animals of groups I and II, respectively.

Clinical observation and aortographic image quality was recorded following angiography in both groups. No clinical adverse effects were seen with use of either of the contrast material under study. The image quality was almost similar in both groups with regards to pacity of the renal vascular system, however, few minor details were more prominent with longer duration of sharp delineation visualized with iopromide as compared to diatrizoate meglumine. Optimum visualization up to inter-lobular branches was noticed alongwith the capillary phase in nephrograms. In postangiography clinical observation, general health, appetite, water intake and urination were found to be normal with postangiography haematoma (2-5 cm, diameter) noticed in 7 animals, which vanished within 48 hrs. It was concluded that under non-selective intra-arterial DSA, delineation of renal vacular anatomy was adequate using both diatrazoate meglumine and iopromide. On comparative basis, superior quality aortograms were obtained using iopromide.

8.10 Radiographic evaluation of diverse foot affections in draught equines at Bikaner

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The study was conducted in 51 horses of either sex, which were presented at Surgery Clinics, College of Veterinary and Animal Science, Bikaner, during January to December 2004, with a history of lameness. Clinical examination and radiography in antero-posterior, lateromedial or mediolateral and oblique views were done. Out of 51 cases, 33 cases had foot affections and 18 were found normal. In few cases there were more than one foot affections. The incidence of diverse foot affections were found more in females (87%) than males (13%). The incidence of sidebone was the highest (37%) followed by ringbone (27%), osselets (12%), navicular disease (9%), sesamoiditis (6%), pedal ostitis, contraction of flexor tendon and buttress foot, 3% each.

8.11 Effect of feeding processed Karanj (*Pongamia glabra*) cake on the alterations of long bone architecture in fattening lambs

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Karanj (*Pongamia glabra*) tree are distributed under wide agro-climatic conditions and its by-products were found to have wide medicinal uses. Though, rich in protein, Karanj cake is hitherto wasted due to presence of toxic principle, karanjin. A feeding trial of 196 days was, therefore, conducted to see the effect of feeding variously processed karanj cake on long bones of growing lambs. Twenty four lambs of 12.88±0.152 kg b.wt. were randomly divided into 4 groups and allotted to a soybean based control (T1), and 3 test diets, containing variously processed solvent extracted karanj cake (SKC) viz. water washed (T2), 2.5% lime (T3) and 0.4% binder (T4) treated SKC to replace 50% nitrogen moiety of soybean meal of control diet. At the end of experiment, long bones [metacarpal (MC) and metatarsal (MT)] of 4 representative lambs from each group were radiographed to evaluate for density and architecture including length, diameter of medullary cavity and thickness of cortices. The reduced radiographic density, thinner cortices and increased diameter of medullary cavity in binder treated SKC fed group lambs were suggestive of poor mineralization of the bones. However, these features of MC and MT bones in water washed and lime treated SKC fed group of lambs were found to be comparable with that of control group, which were suggestive of normal mineralization process. Among the test groups, however, the bones from lambs fed water washed and lime treated SKC incorporated diet appeared healthier and comparable to those of control group. Hence, SKC could be a suitable protein substitute of costly and scarce oil cakes after suitable processing for economic production of fattening lambs.

8.12 Ultrasonographic evaluation of udder and teat lesions in bovines

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Ultrasonographic examination of bovine udder and teat was standardized in 6 healthy bovines for its use in clinical cases. Fifty clinical cases of udder and teat lesions in cows and buffaloes were subjected to sonographic scanning for specific diagnosis. Scanning of animals restrained standing in a trevis with 6 MHz linear and 5 MHz sector transducers were found suitable for scanning udder and teat, respectively. Scanning of teats under water bath yielded images of good quality. Sonographic diagnoses included thelitis (12), intraluminal teat obstructions (15), foreign body in teat canal (1), teat trauma (10) atresia and fibrosis of udder and teat (7) and localized udder lesions (5). Thelitis produced thick hyperechoic teat lining replacing typical central hypoechoic images of teat canal. Echointensity and degree of thickness of the teat lining were directly proportional to the severity of the lesions. Intraluminal teat obstructions appeared as hyperechoic shadow located adjacent to the teat mucosa. Extent and level of obstruction could be detected that was helpful for precise surgical corrections. Intraluminal foreign body appeared as hyperechoic line in teat canal. The extent of traumatic tract could be assessed by its hypoechoic tubular appearance. Sonography also helped post-surgical evaluation of wound healing of traumatic teats. Atresia and fibrosis of the udder and teat could be easily detected by hyperechoic appearance and loss of typical echopattern of udder and teat. Udder abscess, necrosis, gangrenous area appeared as hypoechoic space occupying images. Udder scanning provided an indication regarding the extent and type of glandular replacement

that helped in determining the milk- yield potential of the udder. Ultrasonographic scanning was found a potential tool for diagnosis and evaluation of udder and teat lesions in bovines.

8.13 Splenic affections in canine: Ultrasonographic features

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In the present study splenic affections were recorded in 11 dogs of either sex, presented at the Small Animal Clinics, PAU with a history of anorexia, lethargy, vomition, abdominal pain and palpable abdominal mass. These animals were suspected to be suffering from splenic affections and were subjected to ultrasonography using 3.5 MHz microconvex and 7.5 MHz linear array transducers. Ultrasonographic features were correlated with the clinical signs and haematobiochemical parameters. Splenomegaly (n=7), splenic tumor (n=3) and hyperechoic nodules (n=1) could be differentiated ultrasonographically. It was found that ultrasonography was sensitive and reliable for detection of normal or altered splenic size and *lor* splenic parenchyma and was useful for diagnosis of both focal and diffuse splenic affections quickly and without any untoward side effects.

8.14 Radiographic evaluation of filling ulnar segmental bone defect using a tail vertebra (as an autogenous cortical bone graft) and cancellous bone grafting in dog

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The study was designed to evaluate tail vertebra as an autogenous cortical and cancellous bone grafts for filling ulnar segmental bone defect in 8 mongrel dogs (average age 37.5 months) randomly divided in 2 groups. A bone defect (2.5 cm) was created on the right ulna in each dog and immobilized with intramedullary pinning. In 5 dogs (test group), defects were filled with tail vertebra, and harvested cancellous bone from the iliac crest to promote bone healing in the host-graft interfaces. In other 3 dogs (control group) ulnar bone defects were not filled. Postoperative clinical assessment included measurement of vital signs and evaluation of the degree of lameness. Radiographic assessment of bone was done for 17 weeks. Significant difference ($P<0.05$) between 2 groups in the degree of lameness and soft tissue swelling were observed, and the difference of the mean of periosteal reaction was not significant between 2 groups. Bone healing process was completed in the test group and clinical union was observed in all the dogs in comparison with nonunion in all the animals of control group. The results of this study showed that tail vertebra can be used as an excellent material for filling of segmental ulnar bone defects in dogs.

9.0 AWARD SESSION

9.1 Some equine surgeries under field conditions: A review of 12 cases

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Study included 12 surgeries performed in equines at the Polyclinic. Four cases of tumorous growths at the base of the ear, pre-scapular region, ventral cervical region and ventral abdominal region, respectively, were surgically excised under xylazine-ketamine combination along with local infiltration analgesia. All the animals recovered uneventfully and histopathological examination of growths was also conducted. Four cases of traumatic injuries caused by barbed wire (one case) and automobile accidental trauma (three cases) were treated through reconstructive surgery. Two cases of enterolithiasis were treated by surgical removal of enteroliths through mid-ventral post-umbilical celiotomies under general anaesthesia and local infiltration analgesia. One case of dystocia in a mare due to narrow maternal pelvis was treated by conducting caesarian section under general anaesthesia and local infiltration analgesia. Tetanus prophylaxis and standard post-operative management was done in all cases.

9.2 Urinary affections in canines: A review of eight cases (2004-2005)

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On the basis of serum biochemistry, radiography and ultrasonography 5 cases of urolithiasis, 2 cases of tumours of urinary bladder, cystitis in 1 animal were diagnosed. The cases were treated with different treatment schedule viz., routine cystotomy for the cases of urolithiasis, combination chemotherapy with cyclophosphamide and vincrystine sulphate in cases of bladder tumour and antibiotic therapy for cystitis based on antibiotic sensitivity test. Prognosis was evaluated on the basis of serum biochemistry and ultrasonography.

10.0 POSTER SESSION

10.1 Evaluation of midazolam as a sedative in goats

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The study was conducted in 5 healthy goats. Midazolam was administered 0.4 mg/kg intravenously. The animals went into lateral recumbency in 3 min. Light to moderate watery salivation was observed. The palpebral, corneal and swallowing reflexes were diminished. Relaxation of the jaw, flaccidity of the tongue and relaxation of neck was observed. Limbs, tail and anal sphincters were mildly relaxed. Abdominal muscles relaxation was noticed for about 15 min. The head rightening reflex was seen at 18.2±3.28 m. The animals stood on their own by 43.4±4.47 min with slight ataxia. Complete recovery occurred after 69.2±5.06 min. There were no significant variations in any of the haematological and blood biochemical parameters.

10.2 Cardiopulmonary effects of midazolam in goats

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The study was conducted in 5 healthy goats. Midazolam was administered 0.4 mg/kg intravenously. There were no significant changes in heart rate, blood pressure, central venous pressure and respiratory rate. Primary T-wave changes were observed at varying time intervals after midazolam administration. The depression of ST-segment was recorded in three animals up to 5 min. No significant variations in pH, $PaCO_2$ HCO_3 concentration was seen. Appreciable reductions in PaO_2 and PvO_2 values were observed after midazolam administration, which did not return to normal up to end of the observation. The oxygen extraction ratio increased significantly from 5 min after and gradually increased to 52.95±1.50% at 30 min. There was no evidence of tissue hypoxia. No significant changes in haematological and blood biochemical parameters were recorded. Mean values of cardiovascular and respiratory parameters did not show significant changes. However, few animals showed appreciable decrease in heart rate and blood pressure, hypoxaemia and desaturation of haemoglobin.

10.3 External skeletal fixation in combination with intramedullary pinning and cerclage wiring for the management of comminuted fracture of humerus in a dog

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A four year old male German shepherd dog was presented with the history of automobile accident, sustaining injuries on the left fore limb leading to nonweight bearing lameness. On examination, there was fracture of humerus and extensor paralysis of left fore limb and it was confirmed radiographically as a case of comminuted fracture. The fracture was reduced by open method and immobilized with cerclage wires and intramedullary pin internally and a type I unilateral external fixation was provided to give better stability. There was good weight bearing from the first postoperative week itself and the fracture healed clinically by the end of 8 weeks, inspite of loosening of cerclage wire and distal migration of intramedullary pin. The intramedullary pin and external

fixator were removed at the end of 8th week and the animal showed steady improvement in the gait thereafter.

10.4 Treatment of severe carpal laxity by arthrodesis using hydroxy apatite and dynamic compression plate fixation in a dog

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A 6 month old German shepherd bitch was presented with severe laxity of left carpal joint and bending of fore legs for 2-2.5 months. History revealed that the bitch was provided with very little milk since birth and had pica for 1.5 month. The animal was fed with whole meat at least 3 times a week. Radiographic examination of the limbs showed very thin long bone cortices with mal-formation of distal radius (severe on left limb), probably due to an old fracture. Plasma analysis revealed ALP-16.072 IU, Ca- 6.254 mg/dL and P-26.324 mg/dL indicating severe hyperphosphataemia and imbalance in Ca:P ratio in the blood. Splint and bandage was applied on the limb and inj. Arachitol 3 lac IU/week and syp. Mecalvit b.i.d. was administered for one month. No improvement was seen up to one month; hence it was decided to go for carpal arthrodesis.

Under general anaesthesia, the distal half of radius/metacarpus was approached through a cranial incision extending from the distal half of radius up to the distal end of metcarpals. After exposing the bones, the distal end of radius/ulna, both ends of carpal bones and proximal end of metacarpals were scrapped. The gap between the bone ends were filled with sterile hydroxyapatite crystals and then an 8-hole self compression plate (DCP) was fixed along the distal end of radius through the radio-carpus and third metacarpus. Proximal 4 serews were fixed in the radius, one in the radio-carpal bone and the remaining three screws were fixed in the third metacarpus. The skin wound was closed routinely. Radiographs taken immediately after surgery showed good fixation and immobilization of the joint. Postoperatively, the animal was immobilized externally using Robert Jone's bandage for 15 days. Good weight bearing was seen on the limb in immediate postoperative period, which improved further till 6 weeks, though slight hyperextension of the carpus was seen. The plate was removed and the arthrodesis of the joint was confirmed by radiography.

10.5 Study on prevalence of surgical disorders in Kashmir valley

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Prevalence of surgical disorders in animals presented to the clinical complex during last 10 years (January 1993 to December 2002) was studied. The overall prevalence of the disorders was 20.87% (1431/6851). Surgical disorders were recorded mostly in bovines (70.85%), followed by caprine (13.41%), equine (8.94%) and ovine (6.77%). Wounds (46.15%) followed by udder and teat affections (10.90%), limb and joints affections (9.9%), urogenital (8.8%), abscess (8.6%), eye affections (5.5%), hernia (5.08%), yolk/saddle gall (4.3%), GIT affections (1.9%), dystocia (0.6%), tumor (0.28%) and heamatoma (0.28%) were mainly recorded. Among surgical disorders acquired conditions were observed in most of the cases (82.70%) owing mostly to traumatic injuries. Season-wise distribution showed 42.30% cases during summer (April to July) followed by 32.70% cases during winter (November to February).

10.6 Successful surgical management of a rare case of an extensive odontoma in a she buffalo

SK Tiwari, R Sharda, SD Hirpurkar and S Jogi
Department of Surgery and Radiology, College of Veterinary Science and AH Anjora, Durg (CG)

An 8 year old Murrah she buffalo was presented with the complaint of an overgrowth at the tip of the lower jaw for 3 months. The animal was feeling difficulty in mastication and deglutition due to the overgrowth and pain. The animal was prepared for radical surgery. After premedication with xylazine (30mg) i.m., mental nerve block was performed using 10 ml 2% lignocaine hydrochloride. The growth was incised and the incisors and premolars were also removed as they were also involved in the growth. The growth was highly vascular. The bleeding was controlled by cauterization using thermocautery. After perfect cauterization the cavity was first packed with tincture benzoin solution. The suturing of the incised wound was done using catgut No. 2 in simple continuous pattern leaving an opening at the dependent part. This was followed by application of silver sulphadiazine ointment impregnated gauze. Post-operatively, administration of streptopenicillin (5 g) i.m. for 7 days, meloxicam 15 ml i.m. for 3 days and Rintose 3 L i.v. for 2 days were given. The animal was kept on liquid/soft diet for 5 days.Daily dressing of wound was done with povidone-iodine liquid and silver sulphadiazine ointment. There was complete healing in a period of 21 days. No recurrence was seen in a follow up period of 6 months.

10.7 Surgical treatment of chronic uterine prolapse in a she buffalo

SK Tiwari, MK Awasthi, SP Ingole, R Sharda and OP Mishra
Department of Surgery and Radiology, College of Veterinary Science and A.H., Anjora, Durg (C.G.)

A 6 year old Murrah she buffalo was presented Radiology with the complaint of chronic uterine prolapse for 7 days. Earlier the animal was treated by local veterinarian and after correction it recurred twice. The prolapse mass was severely necrosed and therefore, it was decided to opt for radical surgery. The animal was sedated with xylazine (30 mg) i.m. and caudal epidural anaesthesia was induced using 20 ml lignocaine (2% solution). The site was aseptically prepared for surgery. Using the standard surgical technique, hysterectomy was performed. Post-operatively the animal was treated with Rintose 3.0 L i.m. daily for 2 days, Inj. Intacef 3 g i/m for 6 days and Inj. Melonox 15 ml for 3 days. Daily dressing was done with Wisprec cream and Topicure spary for 10 days. The animal recovered uneventfully in a period of 10 days.

10.8 Retrieval of a metallic foreign body from the thoracic wall of a crossbred cow calf

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A 2 month old crossbred cow calf was presented with the complaint of engulfing stitching needle along with the thread 3 days ago. The calf was stretching its neck and was anorexic. However, he was able to swallow water and milk. Clinical examination of the neck area did not reveal any foreign body externally. On radiographic examination, a metallic foreign body was found on the left thoracic wall. Probably the needle might have pierced the wall of the oesophagus and reached the left thoracic wall. The calf was sedated with xylazine (10 mg) i.m. and local infiltration of 2% lignocaine hydrochloride was done at the site to achieve the anaesthesia. A longitudinal incision was given just

above the expected site based on the radiographic picture. The foreign body was felt by inserting the index finger. The tip of the needle was caught with needle holder and slowly removed. The antiseptic powder was sprinkled at the site. The muscles were sutured using catgut No. 1 in continuous suturing pattern and the skin was sutured using silk in interrupted mattress pattern.

Postoperatively injection of ampicillin-cloxacillin (1g) was given i.m. for 5 days, Melonex (5 ml) i.m. for 3 days, dexamethasone (12 mg) for 3 days and dextrose normal saline 500 ml was given i.v. Daily dressing was done with povidone-iodine and Wisprec cream for 10 days. There was uneventful healing in 10 days.

10.9 Extra-luminal leiomyoma in a bitch and its successful surgical management

SK Tiwari, R Sharda, RC Ghosh, SD Hirpurkar and UK Mishra
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A 10 year old Pomeranian bitch was presented with the complaint of vulvar swelling alongwith blood mixed foetid discharge for last one month. The animal had already been treated with routine antibiotics and analgesics. Upon clinical examination, the swelling was hard, multilobulated with wide base. Considering it to be a case of vaginal tumour, it was decided to perform radical surgery. The bitch was premedicated with diazepam 2 mg/kg b.wt. i.v. and anaesthetized using Ketamine 5 mg/kg i.v. Episiotomy was performed and the growth, which was round, smooth and 6 in number at different places were removed. Haemorrhage was controlled by ligation using chromic catgut No. 1-0. After complete removal of the growth, the cavity was packed with tincture benzoin solution. Episiotomy wound was closed in the usual manner. Post-operatively, injection of cefotaxim (500 mg), dexamethasone (8 mg) and Melonex (2 ml) were administered i.m. for 5, 3 and 3 days, respectively. Daily dressing was done with betadine liquid and silver sulphadiazine ointment. The skin sutures were removed on 10th post-operative day after complete healing. Histopathologically, the tumour was confirmed to be extra-luminal leiomyoma. No recurrence was recorded in a follow up period of 3 months.

10.10 Successful surgical management of chronic ottorrhoea by lateral ear resection in an Alsatian dog

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A 9 year old Alsatian dog was referred with the complaint of swelling and intermittent oozing of thick foul smelling pus from the right ear. The dog had not responded to the conventional treatment for the last 2 weeks. Clinical examination revealed drooped and swollen ear almost completely occluding the eustachian canal. Base of the ear appeared rough, ragged and the head tilted on the affected side. It was decided to perform lateral ear canal resection (Zepp's method). The dog was premedicated with xylazine 1 mg/kg b.wt. i.m. followed by general anaesthesia using ketamine 5 mg/kg b.wt. i.v. The dog was placed in lateral recumbency with affected ear upside. Parallel skin incisions were made from intertragic and tragohelicine notch and flap reflected dorsally to visualize lateral wall of ear canal. The lateral cartilage of vertical ear canal was incised up to the level of horizontal ear canal. Cartilage flap was reflected. The excess portion of cartilage was trimmed and remaining was sutured to skin by simple interrupted sutures. The ear canal was thoroughly cleaned by hydrogen peroxide followed by povidone iodine solution. Antiseptic dressing on the suture line was done using Topicure spray and betadine ointment till complete

healing. The pinna was bandaged over the head. Sutures were removed on 12th postoperative day. Intamox (500mg) and Melonex (2ml) were given i.m. for 5 days. Gentamicin ear drops were used twice daily up to 20 days. No recurrence was reported up to a follow up period of 6 months.

10.11 Urinary incontinence in a dog following castration for bilateral testicular tumours

Chandy George, KM Srinivasamurthy and MS Vasanth
Department of Surgery and Radiology, Veterinary College, Bangalore - 24.

A nine year old male non-descript dog was presented with progressive enlargement of testicles noticed over period of 5 months. Both testicles were tumourous with lobulated surface. Bilateral orchidectomy was performed by a routine prescrotal approach. Histopathological examination revealed Leydig cell tumour of both testicles. Five days after surgery the dog was presented with a complaint of dribbling of urine since the 2nd day of surgery. On palpation of the abdomen, the urinary bladder was distended with urine. Free flow of urine was not observed on catheterization of the bladder. However, application of pressure on the urinary bladder through the abdominal wall brought about free flow of urine. The condition was tentatively diagnosed as "post-castration urinary incontinence" due to sudden fall in testosterone levels. Testosterone propionate (Testoviron Depot ®, German Remedies) was administered i.m. @ 1 mg/kg b.wt. Almost normal urinary flon was reported 3 days after the injection. A 2nd dose of testosterone was then administered following which there was progressive improvement urine flou. Further testosterone administration was not required and the condition was declared as cured after one month.

10.12 An unusual case of urethral calculus in a two months old pup

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A two month old male GSD pup was presented with a complaint of dribbling of blood mixed urine with severe straining. It was reported to have been passing urine normally till the previous evening. The pup was recumbent and weak, and on physical examination the abdomen was found enlarged. It was being fed with a commercial puppy feed *ad libitum* and milk. History revealed that the puppy did not have a free access to water. The urinary bladder was found to be distended and palpation of the caudal aspect of the os penis revealed a small moveable hard mass close to the os-penis. Plain radiography revealed a radio-opaque mass close to and behind the caudal end of the os-penis and no calculi was found in the urinary bladder. Catheterization of the penile urethra could not be performed beyond the caudal end of the os-penis. Attempts to flush saline into the bladder via the catheter were also futile. Urethrotomy was performed in a routine manner caudal to the os penis and a small calculus of 4 mm diameter was removed. The patient recovered under routine post-operative care.

10.13 Surgical treatment of tumorous growth at paw region in a dog

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A 2 year old dog was presented to the college polyclinic with the history of growth at paw region for 1 month. Clinical examination revealed ulcerated growths at paw region involving interdigital space. Radiograph examination revealed no abnormality in

the digital bones. The growths were excised surgically after aseptic preparation of the site under xylazine-ketamine anaesthesia. Post-operative treatment was given as usual. Injection Vincristine was given 0.025 mg /kg b.wt. i.v. Sections of excised growth revealed dark black appearance.

10.14 Treatment for tibiotarsal dislocation and Montegia's fracture in dogs

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Clinical cases of tibiotarsal dislocation and Montegia's fracture were successfully treated by internal fixation method. The dog presented for tibiotarsal dislocation showed instability of hock joint and inability to extend the limb. The radiograph showed complete, anterior and ventral displacement of distal end of tibia. Another Great Dane dog weighing 50 kg was showing swelling, instability and crepitus at the elbow joint. The radiograph showed complete, anterior and dorsal dislocation of head of the radius and complete fracture of proximal shaft of the ulna suggesting a Montegia's fracture. The distal fragment of fractured ulna was displaced anteriorly along with dislocated radius. This dog was treated by intramedullary pinning of ulna after correcting the dislocation of radius. The radius was fixed to ulna with cerclage wiring. Additional support was provided through Shroeder – Thomas splint. The dog with dislocated tibia was treated by passing two screws, one at the distal epiphysis of tibia and another at the tarsal bone and fixed by wiring in figure of 8 fashion. The animals made uneventful recovery.

10.15 Management of implant induced fibromatous epulis with rostral hemimandibulectomy in a dog

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A 9 year old male non-descript dog was presented with a reddish granulomatous growth in the left rostral mandible involving the gums in the area of premolars. The dog had a history of having undergone a mandibular wiring for stabilization of a fracture of the left horizontal ramus 3 years ago at a private clinic. The tumor was excised by standard procedure. However, the growth recurred within 2 months. A rostral hemimandibulectomy was performed and the mandibular bone from the left incisors to the junction between the premolars and molars was removed. Histopathology confirmed a fibromatous epulis. The dog made an uneventful recovery.

10.16 Clinical studies on bone tumours in dogs

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Twelve dogs with clinical signs of limp, unusual swelling and acute pain involving the extremities of long bones, weight loss, change in habits and radiological evidence of bone lysis/sclerosis or both were studied. One dog exhibited a bony lesion involving the cranium and one case showed involvement of the thoracic vertebrae. Histological evaluation of bone biopsies confirmed bone tumors. The cases recorded were osteosarcoma (n= 8), squamous cell carcinoma (n=1), myeloma (n=1), chondrosarcoma (n=1) and synovial sarcoma (n=1). Based on the advice and owners request, treatment was instituted with cisplatin in 3 cases of osteosarcoma and with cyclophosphamide in the case of myeloma.

Six cases were amputated. Two cases developed secondary pulmonary metastasis and were euthanized on request. Three cases did not report for further evaluation.

10.17 Surgical management of cystic calculi in a stallion

DB Patil, PV Parikh, NH Kelawala, SH Talekar, SS Patel, Poonam Gupta, VK Joshi and BM Patel
Department of Surgery and Radiology, College of Veterinary Science and A.H., AAU, Anand

A ten year old Kathi male horse was operated for cystic calculi through right flank incision. Animal had uneventful recovery.

10.18 Substitute materials for routine manoeuvres in clinical practice

PB Patil
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There are several easily available materials, which can be substituted, in routine practice because of their effectiveness and ready availability.

10.19 Intussusception in a GSD pup

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A two-month-old German Shephard (GSD) pup was presented with history of cessation of defaecation, colic and passing blood tinged mucous. Radiographic examination revealed gas filled intestinal loops; anastomosis was performed.

10.20 LC-DCP plating for the correction of radial malunion in a dog

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Department of Surgery and Radiology, College of Veterinary Science and A.H., AAU, Anand

A four-year-old Labrador dog was presented with history of not bearing weight on fractured leg though treated for the same 2 months ago. Radiograph examination revealed malunion of right radial diaphysis. The case was operated surgically by LC- DCP bone plating.

10.21 Ascites due to closed pyometra in a Great Dane bitch

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A nine-year-old Great Dane bitch weighing 35 kg was presented with symptoms of ascites and anuria. On radiographical and haematological examinations it was confirmed as a case of closed pyometra. Hysterectomy was performed. On 3rd postoperative day animal died due to rupture of urinary bladder as confirmed by postmortem examination.

10.22 Surgical management of chronic wound by transposition flap in a dog

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A 2-year-old German shepherd dog was brought with a maggot wound on the anterior aspect of the right elbow. The maggot wound was treated which left a 5 cm wide circular granulating wound. In spite of regular dressing and antibiotic therapy based on ABST the wound did not show any tendency to heal. Routine haematology and

biochemistry did not reveal any significant abnormality. A transposition flap was aligned over the wound taking skin from the axilla region.

10.23 Surgical management of an unusually large vaginal infiltrative lipoma in a bitch

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A 10-year-old female Spitz was brought with a huge perivaginal swelling existing for 2 months. Though, there was no apparent discomfort to the animal with regard to micturition and defecation, the huge mass was causing a lot of distress to the animal while sitting on the haunches. After routine haematology and survey radiography, excision of the mass was carried out, which was confirmed as infiltrative lipoma by histopathology.

10.24 Surgical management of hystiocytoma of uterus and vagina by hysterotmy and chemotherapy in a bitch

L Nagarajan, GD Rao, S Ayyappan, R Suresh Kumar and K Ameerjan
Department of Surgery and Radiology, Madras Veterinary College, Chennai

A 7 year-old bitch was presented with a distended bladder and straining for 2 days. Clinical examination revealed a palpable diffuse mass in the uterus and a growth in the vagina. The external urethral orifice was visualized but attempts to pass the catheter into the bladder failed. The bitch was apparently healthy and was prepared for immediate surgery. A midline laparotomy was carried out and the diffuse mass was occupying the body of the uterus and was pressing on the pelvic urethra. Since the uterine stump was large due to the presence of the tumour, a hysterotomy was done and debulking of the tumour was performed by scooping it out. Later hysterectomy was performed. Patency of the urethra was checked at this point. Routine abdominal closure was carried out and the animal recovered uneventfully following postoperative treatment. Histopathological examination revealed the uterine and vaginal tumour to be hystiocytoma. Hence, chemotherapy was instituted with Vincrysticin administered once in a week for 2 weeks and by the end of 2 weeks the vaginal mass regressed completely. Ultrasound and radiography did not demonstrate any uterine mass.

10.25 Surgical management of prostatic abscess and testicular tumour in a dog

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An 8 year-old male German shepherd dog was reported with a history of painful abdomen, dysuria and dyschezia. The dog shaved pyrexia and on clinical examination 2 large intra-abdominal masses were palpable, one in the cranial abdomen and the other at the pelvic inlet. The dog was a monorchid. Radiographs and ultrasound confirmed the involvement of prostate and a retained testicular mass. Routine haematology revealed neutrophilia. A ventral midline laparotomy was performed extending from the pubis to umbilicus. Torsion of the spermatic cord of the testicular mass was also detected. The mass was excised after ligating the spermatic vessels. The prostatic abscess was cleared off the peri-prostatic fat. A stab incision was made on the abscess and the purulent material from the cavity was suctioned out. The cavity was flushed with saline and omentalisation of the prostatic cavity was carried out. Routine abdominal closure was carried out. The animal recovered uneventfully following antibiotic therapy. Histopathological findings of the testicular tumour were that of sertoli cell tumour.

10.26 Squamous cell carcinoma of the penis and its surgical management by scrotal urethrostomy

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Department of Surgery and Radiology, Madras Veterinary College, Chennai-7

A 10 year-old non-descript dog was presented with a distended bladder and difficulty in passing urine since a month. Clinical examination revealed a small growth at the tip of the penis and a distorted appearance of the glans penis. Catheterization could be done with difficulty. Lots of pus flakes exuded through the external urethral orifice during catheterization. Fine needle aspiration of the growth suggested squamous cell carcinoma. Hence, amputation of the penis and scrotal urethrostomy was performed.

10.27 Surgical management of comminuted supracondylar fracture of femur in a cat

Md. Shafiuzama, N Dhanalakshmi, T Peter Nolosco, K Ramanujam and R Suresh Kumar
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A three and a half year old non-descript cat was presented with a history of accidental injury and non-weight bearing on right hind limb with open wound on stifle joint. Clinical and radiographic examinations revealed comminuted supra-condylar fracture extending up to distal third of the femur shaft with displaced fragments. Under xylazine, ketamine and diazepam anaesthesia, the fractured fragments were stabilized distally by 2 mm intra medullary pin and reinforced distally by cross pinning with K-wires of 1.4 mm diameter. Weight bearing on the operated limb was noticed on the 4th post-operative day and the cat started walking with slight limp by the end of 2nd week.

10.28 Arthroscopic evaluation of metacarpophalangeal joint in a horse

S Halder, RS Kumar, L Nagarajan, BJ William, A Ramanathan and K Ameerjan
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An 8 years old Indian thoroughbred horse was presented to the Large Animal Clinics, Madras Veterinary College Hospital with a complaint of left fore limb lameness. Clinical examination revealed pain at metacarpophalangeal joint. The case was treated initially with NSAID (Meloxicam 0.2 mg/kg i.m. b.wt.), application of Icthammol-glycerin externally and advised rest. Radiograph of the joint did not reveal any abnormalities. Condition improved to an extent (Grade-I) but animal was not fit for work even after 10 days. Hence, decided to explore the joint arthroscopically. Diagnostic arthroscopy revealed cartilage erosion with some pinkish hue due to the subchondral bone being nearly exposed.

10.29 Surgical management of distal metaphyseal fracture of femur in a Persian cat

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A Persian cat of one and a half year age was reported to the Madras Veterinary College hospital with a history of accidental injury and the animal was unable to bear weight on hind limb thereafter. Clinical and radiographic examinations revealed complete unstable distal metaphyseal fracture of left femur. Under xylazine and ketamine anesthesia stifle arthrotomy was performed through cranio-lateral approach and the fracture was immobilized using 1.6 mm K-wires applied in a cross manner. The cat started bearing

weight on the limb from the 5th post-operative day. Complete limb ambulance without any joint stiffness or arthritis was observed by the end of 1 month.

10.30 Sublingual salivary cyst and its management in Deoni cattle (1992 to 2004)

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Sublingual salivary cyst is a rare condition in cattle. Five cases of sublingual salivary cyst were treated over a period of 13 years. The animals affected had swelling on either side of frenulum linguae with profuse salivation. The cysts were drained surgically by a special technique. The surgical wounds were dressed by tincture iodine for a period of 2 months. All the animals had shown uneventful recovery.

10.31 A rare case of myeloma (plasma cell tumour) and its chemotherapeutic and surgical management in a dog

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A 5 year old Doberman dog was brought to the Madras Veterinary College Teaching Hospital with the history of hard painful swelling at the right hock joint with grade-II lameness. Radiograph of the joint revealed moth eaten appearance of the calcaneus. Hence, biopsy of the bone was performed from the affected site under general anesthesia. The biopsy report revealed the presence of myeloma with scattered abnormal diffusion of plasma cells with hyperchromatic eccentric nuclei. Chemotherapy was resorted with cyclophosphamide 7 mg/kg i.v. followed with oral tapering dose of melphalan 0.1 mg/kg and prednisolone 0.5 mg/kg over a period of 2 months. However, no improvement was noticed. FNAB of the popliteal lymph node of the affected limb and radiograph of the chest did not suggest evidence of metastasis. Subsequent radiograph revealed severe osteolytic changes with sclerosis of calcaneus bone and osteopenic reaction of adjacent bones along with pathological fracture of distal tibia. Since, there was no response to chemotherapy, the animal was subjected to surgery. The affected limb was amputated at the level of mid femur following the routine surgical technique. The dog recovered uneventfully without any postoperative complication. Three months follow up did not show any evidence of tumor recurrence.

10.32 Rhabdomyosarcoma in a dog

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A ten year old, male dog was presented with history of off-feeding for 10 days, a large mass in the left hind limb and difficulty in walking. It was hit by some one at the hind limb 1 year back. Clinically there was a big size tumorous growth at the stifle region. Blood was collected and hemogram was done. The Hb % was 4.5 g, TLC was in the normal range, however, DLC showed P%=80 and L%=20. It was decided to remove the mass surgically. The animal was prepared aseptically and operation was done under surgical anaesthesia using atropine, xylazine and ketamine. Two to three stay sutures were applied at the base of the tumorous mass. The tumor was very soft and fragile and easy to cut through. Approximately 2 kg of mass was removed. Histopathology diagnosed it as rhabdomyosarcoma showing large giant cells. The animal was given broad spectrum

antibiotic, anti-inflammatory drug, multivitamins and injection of iron for 7 days. Good quality nutrition was provided and the animal recovered after 6 months of operation.

10.33 Surgical recovery of TV antenna wire from the stomach and intestine of a dog

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A male Pomeranian dog aged 8 years was brought to the Surgery Clinic with a history of inappetance and vomiting for 3 days. Owner suspected the dog to have chewed the TV antenna wire, as its unchewed piece was located in the house. A lateral radiograph of thoraco-abdominal region revealed presence of a metallic wire in the stomach and intestine. A left flank laparotomy was done and foreign body was palpated in the stomach and duodenum. The antenna wire was removed by performing gastrotomy and enterotomy, and laparotomy wound was closed in routine manner. Postoperatively, animal was maintained on fluid therapy for 5 days and thereafter-liquid diet was started. Semisolid diet was resumed after 10 days and sutures were removed. Animal made an uneventful recovery.

10.34 Prescrotal partial penectomy in a camel

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A male camel aged 8 years was presented to the Surgery Clinics with a history of urinary obstruction for the past 2 days. Animal lost general health and had inappetance. Clinical examination revealed an abscess in sheath with complete stenosis of opening of sheath. An exploratory puncture of the swelling revealed presence of pus. The abscess was opened and drained. It was revealed that cranial part of penis was also involved and was necrosed with a stricture of urethra leading to complete urinary obstruction. A prescrotal partial penectomy was carried out under xylazine sedation and epidural anaesthesia using 2% lignocaine hydrochloride. An indwelling catheter was placed into the urethra for a week. Skin wound was closed in routine manner. Postoperatively, animal was administered injection oxytetracycline hydrochloride 8 mg/kg b.wt. and injection phenylbutazone 10 mg/kg b.wt., i.m. The indwelling catheter was removed after 1 week and sutures were removed after 12 days. Animal recovered restored the general health within 2 weeks of operation.

10.35 Surgical management of salivary fistula in a camel

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Department of Surgery and Radiology, College of Veterinary and Animal Science, RAU, Bikaner

A male camel aged 6 years was presented to the Surgery Clinics with a history of dribbling of fluid from an opening just below the right eye orbit. The hair below the opening were wet. Animal lost general health and had inappetance. It was diagnosed as a case of salivary fistula and Stenson's duct ligation was carried out under xylazine sedation and local anaesthesia. 20 ml Lugol's iodine was infused into the duct towards the gland before the ligation of Stenson's duct. Double ligation was done with the double threaded silk no. 3. Skin wound was closed in routine manner. Postoperatively, animal was administered injection oxytetracycline hydrochloride 8 mg/kg b.wt. and injection phenylbutazone 10 mg/ kg b.wt., i.m. Owner was advised for restricted feeding for a week, postoperatively. Animal restored the general health within 1 month of operation.

10.36 Surgical management of fibroma around pastern in a buffalo

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Department of Surgery and Radiology, College of Veterinary and Animal Science, RAU, Bikaner

A buffalo aged 5 years was brought to the Surgery Clinic with a history of development of a growth around the pastern joint of right hind leg. The growth measured 1.5 feet in diameter and covered the entire foot. It was a multi-lobed growth, which originated at pastern and touched the ground during standing. Animal had difficulty in locomotion because of heavy weight of growth and its interference with contra lateral limb. Animal was secured in lateral recumbency and growth was surgically resected under xylazine sedation and ring block at fetlock region. Bleeders were cauterized by red-hot iron rods. Skin was closed by simple interrupted sutures. The histopathological examination revealed growth to be a fibroma. A routine antiseptic dressing and broad-spectrum antibiotic led to uneventful recovery. Sutures were removed after 10 days. The foot was kept bandaged for 2 weeks.

10.37 Bilateral dermoid cysts in a German shepherd pup

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A two month old German shepherd pup was brought to the College Hospital with a complaint of abnormality noticed in both eyes. Gross examination revealed dermoid cysts in both the eyes. The left eye had less extensive involvement. There was slight opacification of the cornea in the left eye. Bilateral keratitis was evident.

Under halothane anaesthesia, the dermoid cysts were excised using no. 11 BP blade. Haemorrhage was controlled using haemocoagulase solution (Botroclotâ topical solution, Juggat pharma, Bangalore). Postoperatively the pup was treated with cephalexin at the rate of 20 mg/kg b.wt. (Sporidex syrup, 125 mg/5 ml, Ranbaxy laboratories, New Delhi) and polymixin B sulphate-neomycin sulphate-zinc bacitracin-hydrocortisone eye ointment (Neosporin-H eye ointment, Glaxo Smithkline, Mumbai.) for 10 days. The pup had an uneventful recovery with considerable restoration of vision as reported by the owner.

10.38 Adenocarcinoma of rectum in a dog

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An eight year-old black Pomeranian male dog was referred with a complaint of melena for the past 1 year, which was not responding to medical treatment. Per-rectal examination revealed a cauliflower-like growth originating from the distal third of lateral rectal wall. Surgical excision of the tumor was carried out by rectal pull-through technique under sedation and local analgesia. Rectal tumor was diagnosed as adenocarcinoma on histopathological examination.

10.39 A novel technique for the management of obstructive urolithiasis in a bullock

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An adult bullock of 5 years of age was brought to the IVRI polyclinic with the history of anuria and anorexia for 1 week. Clinical examination revealed severe dehydration,

increased HR and RR, normal body temperature and bilateral abdominal distension with fluid thrill. On the basis of clinical signs and Jet of fluid on abdominocentesis and inability to feel bladder on per rectal examination, the bullock was diagnosed to be suffering from obstructive molitniasin with rupture of bladder. A left flank laparotomy was performed under paravertebral block and the urine in abdominal cavity was siphoned out. Three litres of NSS was put in the abdominal cavity and the fluid was evacuated again as much as possible. Under candal epidurual analgesia a nick incision made in penianel fossa lateral to anal opening. A 10 mm K-wire was used to make a tunnel in the pelvic diaphragm. A Foley's catheter was then introduced through this tunnel in the pelvic vacity with the help of a 5 mm K-wire. The Foley's catheter was fixed in bladder on the lateral side near the apex of the bladder by inserting the hand through laparotomy incision. The balloon of the catheter was inflated and laparotomy incision was closed routinely. Postoperatively the bladder was flushed with 5% Ammonium chloride solution daily till recovery. Urine started to dribble through the urithral orifice on 4th day. The flow of urine increased gradually and free flow of urine was observed by 12th day. Foley's catheter was removed on 15th day by deflating the balloon and pulling it. Animal made uneventful recovery with normal urination.

10.40 The effects of ketamine, xylazine, acepromazine and two combinations of ketamine xylazine and ketamine/acepromazine on the electrocardiogram, respiratory rate and body temperature in pigeons

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The study was done on 90 healthy pigeons weighing 300-500 g, randomly divided into 6 groups, 15 pigeons each, and each group was further subdivided into 3 subgroups of 5 pigeon each. In group one, 1 ml of normal saline was injected intramuscularly as control in group 2 ketamine, 15 mg/kg, 30 mg/kg, 45 mg/kg was administered in subgroups A, B and C, respectively and group three xylazine 5 mg/kg, 10 mg/kg, 15 mg/kg, and group four acepromazine 0.5 mg/kg, 1 mg/kg, 2 mg/kg, and group five a combination of ketamine and xylazine (10 mg/kg+ 15 mg/kg), (15 mg/kg + 10 mg/kg), (20 mg/kg + 5 mg/kg) and group six a combination of ketamine and acepromazine (10 mg/kg + 0.4 mg/kg), (15 mg/kg + 0.3 mg/kg), (20 mg/kg + 0.2 mg/kg), were injected intramuscularly in subgroups A, B and C, respectively. Electrocardiograms (leads I, II, III, aVF, aVR, aVF) were taken in all groups and respiratory rate and heart rate were monitored before injection and 5, 10, 15, 30, 45 and 60 minutes after injection.

The P wave in groups two, three and five, were significantly increased, and in groups two, four, and six, PR interval, were increased ($P<0.05$). QRS complex in any groups, did not show significant changes. But in comparison between group five and groups two and three it decreased ($P<0.05$). The mean of TP interval, in groups two, five and three were increased. RR interval in groups three and five were increased significantly ($P<0.05$). However, in group four it decreased. Heart rate in groups three, and five was decreased, and in groups four and six was increased, respiratory rate increased in groups two, four, and six, and in group five, it decreased ($P<0.05$). Comparison between groups five and six showed that P wave, PR interval, QRS complex, TP interval, and RR interval, in group five increased significantly ($P<0.05$). Heart rate, respiratory rate, and rectal temperature, decreased ($P<0.05$). Comparison between groups five and six revealed that TP, RR, PR, and QRS, increased more in dose No 2, (ketamine/xylazine, 15 mg/kg + 10 mg/kg). TP

solution was instilled inside to move the lens material towards incision. By less loop and counter digital pressure on the eye cataractous lens was removed with its remnants adhered to the capsule. The eye was irrigated and fluid was aspirated by two-way canula. Methylcellulose solution was instilled and corneal incision was sutured by 10/0 mersilk in simple interrupted pattern. The palpebral conjuctival flap was sutured in simple interrupted manner using 1/0 monofilament nylon. The eye was covered with a gauge and bandaged. The operation was performed with nacked eye. Postoperative care included cefataxime 250 mg twice IM for 5 days, oral acetazolamide 250 mg, ibuprofen 200 mg, prednisolone 5 mg and B complex twice for 3-5 days with chloramphenicol-polymyxin, atropine and ofloxacin eye ointments twice and tobramycin eye drops 6 hourly for 10-15 days. Conjunctival sutures were removed on 8th day and corneal sutures on 40th postoperative day. No complication was noticed. Opacity was not visible in the operated eye and animal started moving in and out the house with out striking to any object.

10.43 Surgical removal of lipoma in a pomeranian dog

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A Pomeranian dog-aged 17 yr was brought to the college veterinary hospital. The dog was having huge pendulous growth originating just above the scapular blade on right fore limb. The growth was touching to the floor that is up to the paws. On history owner informed that dog was suffering for last 5 years. The growth was so huge that the dog was unable to walk. For diagnosis a fine needle aspirate was taken on to a glass silde for analysis. The slide was evaluated microscopically and there was evidence of adipose cells. Excision of the lipoma was planned under atropine Sulphate 0.04 mg/kg diazilpam 1 mg/kg anaesthesia long elliptical incision was given on the base of growth, saving the skin to oppose later on. With the help of straight scissor blunt dissection was done to remove the growth from the base and ligation of few blood vessels supplying to this growth. Cauterization of the area was done with the help of 0.1% $AgNO_3$ in an attempt to check the reoccurrence. Skin wound was sutured with interrupted mattress suture and an antibiotic was given for 7 days. Sample of the growth was sent to the department of pathology for histopathological study, and was confirmed to be a lipoma. In the reported case there were no signs of recurrence after 6-months of the operation.

10.44 Congenital meningeal herniation and meningocoele in a calf: Its surgical correction

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A cross-bred calf was born with a large fluctuating swelling on the forehead. Examination revealed a hernial ring under the swelling. It was diagnosed as congenital non-closure of the frontal bones and meningocoele. Under ketamine-xylazine anaesthesia the condition was corrected surgically on the fourth day. There was no complication and a good recovery.

10.45 Mixed cell sarcoma in a dog

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A five year-old female German shepherd dog was referred to the Department with the history of a gradually developed growth on the lower aspect of neck. The examination

and RR intervals increased in dose No 3 (ketamine/xylazine 10 mg/kg + 5 mg/kg). Heart rate, respiratory rate and rectal temperature decreased in dose No 2 and 3 for combination group (ketamine/xylazine). Respiratory rate dose No 1 (ketamine/acepromazine, 10 mg/kg + 0.4 mg/kg) in comparison to dose No 2 (ketamine/acperomazine, 15 mg/kg + 0.3 mg/kg) showed an significant increase ($P<0.05$). Temperature too diminished in dose No 3 of group six (20 mg/kg + 0.2 mg/kg). The results showed that ketamine/xylazine combination at 15 mg/kg ketamine + 10 mg/kg xylazine may be used for major surgeries in pigeons and ketamine/acepromazine combination at 20 mg/kg ketamine + 0.2 mg/kg acepromazine for minor surgeries in pigeons.

10.41 Healing of transverse femoral fractures in pigeons treated with intramedullary pins made of canine and ovine cortical bone: An experimental study

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The purpose of this study was to compare conventional pins with xenograft pins made from canine and ovine cortical bone. The long bones of a young dog and sheep were collected from a market and carcase dog, cut into longitudinal section, and shaped similar to conventional metal pins. They were then processed through oxidizing, degreasing, hydration, drying and sterilization by ethylene oxide. Sample population were forty mature pigeons (*Columba livia*). Birds were randomly assigned to 4 groups. Transverse middle-diaphyseal femoral fractures were created in 1 femur in each bird. Fractures were stabilized by inlay method with intramedullary canine or ovine xenograft cortical bone pins or Kirschner wire and without treated (respectively groups D, C, B, A). The pigeons were monitored and evalutated clinically daily and radiographically at two weeks interval for 26 week. Radiographic assessment was performed based on the scores given to various radiographic signs and a total score calculated for each radiograph. Comparison of the total radiographic score showed significant differences ($P<0.05$) between all the groups. All the xenograft bone pins were absorbed on 26 postoperative week while showing a complete healing at the fracture site on the pigeon in the C and D groups. Bone stabilized with intramedullary cortical bone pins had more periosteal callus at the fracture site than bones stabilized with stainless steel Kirschner wires. Intramedullary xenograft cortical bone pins, derived from mammalian sources, may be used an alternative of K-wire for the repair of avian femoral fractures.

10.42 Surgical management of cataract in a dog

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An eleven year-old male Pomeranian dog was brought to the TVCSC for the treatment of total opacity of the left eye. The clinical examination revealed it as a case of mature cataract with corneal opacity. It was decided to operate the dog by extracapsular lens extraction. The pupil was dilated with 1% Tropicamet and 5% povidone iodine solution applied locally. The operation was performed under triflupromazine i.v. sedation followed by retrobulbar block of the affected eye with 2% lignocaine hydrochloride with adrenaline.

The eyeball was kept open by placing a lid retractor. A small incision was given over cornea near the limbus on 10 to 2 O' clock position. The corneal edge was reflected down and anterior capsule was punctured and opened. The lens was freed by inserting a bent tip two-way hypodermic needle and moving it around the lens material. Ringers lactate

and palpation of growth revealed hard, kidney shape mass below the ramus of the mandible. The case was tentatively diagnosed as a tumour. After all aseptic preparation, surgery was performed under diazepam-ketamine anaesthesia. The growth was removed surgically. Post-operatively Intamox 500 mg was administered daily for 5 days with alternate day dressing. The sutures were removed on 10th postoperative day. Histopathological examination of the tissue revealed it as mixed cell sarcoma.

10.46 Intestinal obstruction due to rubber latex scraps in a cat

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A four month aged non-descript cat weighing less than one kg. body was brought to the dispensary with complaints of not passing faeces for past few days, vomiting after taking little quantity of food or milk, and constant crying. The owner reported that he often noticed the cat biting at rubber latex scrap piled in his rubber-sheet pressing shed. The cat appeared dehydrated and abdominal palpation revealed a small-finger length sausage shaped mass inside the abdomen. Correlating the history, symptoms and the findings, laparotomy at the mid ventral site under ketamine anaesthesia was performed, which revealed intraluminal obstruction of the intestine. Enterotomy revealed rubber latex scrap as the obstructive mass. Enterotomy was closed by eversion (horizontal mattress) followed by inversion (Cushings) suture and laparotomy incision was closed routinely. Post-operative antibiotic was given for 7 days; and the cat made an uneventful recovery.

10.47 Traction induced mandible fracture during dystocia in a calf: Immobilization and oesophagostomy

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District Veterinary Centre, Kollam Dist., Kerala

Dystocia in a downer cow, recumbent during the last three weeks of her gestation, was attended. Dystocia was due to the lateral deviation of neck of the foetus. Several attempts were made by the local livestock personnel to deliver the calf. The fore limbs were out of the vagina, and the fluids were almost completely drained out, and there was not much manipulative space inside. Obstetric manipulation to correct the neck flexion ended up in fracture of the mandible of the calf. Caesarian was then performed deliver the calf. Intravenous fluids and antibiotics were given both for the dam and the calf. Correction of the fractured mandible was attempted the next day. The fractured mandible was immobilized by adhesive tape in a "head collar pattern" of a horse. Under ketamine anaesthesia, oesophagostomy was performed and an endotracheal tube was placed inside, and the adaptor end of the tube was fixed by sutures to the edges of the skin incision for feeding the calf. Intra-operative fluid therapy and post-operative antibiotics were done in the routine manner. But, the calf survived only for five days after surgery.

10.48 Anal et vulval atresia in a calf and its surgical correction

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A day-old female calf was referred with complaint of a large swelling at the perineum with intermittent straining as if to pass dung and urine. Examination revealed hemispherical swelling at the perineal region with absence of anus and vulvo-vaginal opening. Swelling on pressure yielded with a fluid filled appearance. Aspiration of the contents revealed

a fluid substance similar to meconium. Under ketamine-diazepam anaesthesia and local infiltration analgesia, the swelling was incised from the anal region to the vulval end. Accumulated fluid and meconium was completely drained out and cleaned. The mucosa of the vulvo-vaginal vestibule was found confluent with the mucosa of the rectal floor forming a single cul-de-sac. The vagina and urethral opening were found normal. The mucosa of the cul-de-sac was incised horizontally, mid way between the anus and the vagina to separate a rectal and a vulval mucosal flap for construction of rectum and vulval vestibule. Anal opening was done in routine manner and the rectal mucosa sutured to the skin edges of the constructed anal opening. Mucosa of the vestibule was sutured to the skin edges of the vulval incision to construct the vulva. The incised mucosal edge was converged dorsally to form the dorsal commissure of the vulva. The dead space in between the anus and dorsal commissure was obliterated by suturing and the skin incision edges sutured together to complete the interspace of anus and vulva. Routine post-operative therapy was done for one week and the calf made an uneventful recovery.

10.49 An unusually large adenocarcinoma of epididymal origin in a spitz

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A 12 year old male Spitz was referred with history of an about 3 month progressive swelling of the scrotum. The swelling was very large and turgid, of the size of a football, when the animal was presented for examination. Because of this large swelling, the left hind limb did not reach the ground while it was standing. It had occupied the subcutis on the left side of the penis, extending from the umbilicus to the stifle. Right testes had atrophied, while the left testes could not be palpated. Aspiration of the swelling revealed a serous fluid. Under atropine-xylazine-ketamine anaesthesia, the skin overlying the mass was incised in an inverted 'T' manner, the arm of the 'T' extending from near the stifle, going over the swelling, to near the umbilicus. Major part of the swelling comprised of serous fluid, which rushed out during incision. The testicular tumour mass was removed and the skin pouch was trimmed to body size and opposed. The testicular mass measured 16 x 9 x 9 cm and was multinodular and with bosselated surface showing solid and cystic areas and with numerous dilated veins. Sectional surface showed a nodular appearance with areas of necrosis and cysts of varying sizes containing turbid fluid. Histopathology revealed poorly differentiated adenocarcinoma of epididymal origin. The animal made a good recovery.

10.50 Traumatic proptosis of the globe and buccal wall laceration in a dog: Its surgical correction

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A 3 year old non-descript dog was presented with traumatic protrusion of the left eyeball along with laceration of the left buccal wall. There was no extrusion or destruction of the intra-ocular contents. Palpebral conjunctiva appeared severely inflamed. A good area of the buccal wall, extending from the left commissure was lacerated exposing the corresponding submucosal layers. Under general anaesthesia, the protruded eyeball was replaced in the orbit and retained by temporary tarsorrhaphy. Laceration of the buccal muscular wall was corrected by application of sutures starting from within and continuing outwards. Post-operative treatment was done accordingly, and the animal made an uneventful recovery.

10.51 Ileo-colic intussusception as sequelae to chronic colitis in a Dobermann pup

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A 3 month old Dobermann male pup weighing 7 kg was referred from a peripheral Veterinary Dispensary to the District Veterinary Centre with complaint of recurrent rectal prolapse for past 2 weeks and a history of blood tinged diarrhoea for the past 2 months. The animal had already undergone several courses of anthelmintic and antidiarrhoeal therapy, which had not found much success. Correction of the rectal prolapse had been attempted by applying purse string suture around the anus. Intussusception was diagnosed through proper history taking and examination. Surgical correction of intussusception was done after laparotomy. The animal again became diarrhoeic from the third post-operative day, which did not respond to therapy. Chronic colitis was then suspected and was treated accordingly. The animal made a stable recovery.

10.52 Urine bypass surgery in a buffalo male calf: A simple novel technique for urethral calculi

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A five-month old buffalo male calf was presented with urethral calculi. A simple novel technique of urine bypass was attempted. Under sedation urine was bypassed from the bladder to the exterior using a Folley's catheter; and kept in place for two weeks under antibiotic coverage. After the end of two weeks, when urine started dribbling through the penis, the catheter bulb was deflated and pulled off under empty bladder; and the wound was scarified and sutured. The technique found successful.

10.53 Management of supracondylar femoral fracture in a dog

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A case of simple supracondylar fracture of the femur and its successful surgical management is reported in this. An 8 month old non-descript female dog was presented with supracondylar (Salter Harris Type I) fracture of the right femur with the distal fragment displaced caudally.

The right stifle joint was prepared aseptically. General anaesthesia was induced by using 150 mg of ketamine hydrochloride given i.m. along with atropine sulphate @ 0.045 mg/kg and xylazine hydrochloride @ 1 mg/kg given i.m. as pre-anaesthetics. Anaesthesia was maintained by using Diazepam given intravenous as and when required during the course of procedure. Under standard surgical approach, proximal fractured fragment was exteriorized. Two holes were drilled 1 cm apart, proximal being 1cm above the fractured end of the femur using a drill bit of size 2.7mm. Distal fractured fragment was exteriorized and two sets of holes similar to the ones made on the proximal fragments were drilled on the distal fragment also. The fracture was then reduced and 2 sets of steel wires (24 gauge) were passed through the drilled holes, one set being through the nearer holes and the other through the farther holes. Two sets of wire were tightened separately to affect proper immobilization. Joint capsule was reconstructed by simple interrupted sutures using catgut (1/0). Skin wound was closed in routine manner using monofilament nylon. Postoperatively the animal was put under antibiotics and anti-inflammatory drugs for 7 days. POP cast was also applied. Animal started weight bearing slightly from day 3

onwards. Sutures were removed on 8th day and POP cast was retained for 5 more weeks. The gait of the animal became normal when the POP cast was removed after 5 weeks and the affected limb regained full function.

30.54 Surgical management of inguinal hernia in a bitch

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A six-year-old female Lhasa Apso was presented with the history of swelling in the right inguinal region since last 5 months. Clinical examination confirmed the swelling to be an inguinal hernia due to its reducible contents and obvious hernial ring. The animal was operated under xylazine-ketamine anesthesia. An elliptical skin incision was given over the swelling and on exploration it was observed that the right uterine horn had migrated into the hernial sac through the hernial ring (inguinal canal). The uterine horn was reduced into the abdominal cavity and the ring was repaired using nylon suture by overlapping technique. Skin incision was repaired by subcuticular pattern using 3-0 chromic catgut. Animal made an uneventful recovery in about 8 days.

30.55 Crazy ball in a Labrador retriever dog

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A 7 year old black male Labrador was presented to the hospital with a history that the dog had accidentally swallowed a crazy ball during the retrieval exercise and since then the dog was restless. Hematemesis started in the morning, respiration was labored. Careful palpation of cervical region revealed the presence of a round hard swelling in the distal cervical part of the esophagus. An emergency esophagotomy was performed immediately under general anaesthesia using combination of xylazine and ketamine. An incision was made just cranial to the ball. After few gentle attempts the ball could be grasped by the forceps and carefully removed. The esophageal incision was closed by suturing using monofilament nylon by eversion suture pattern. Skin was closed using chromic catgut 3-0 by subcutis suture pattern as done in cosmetic surgery. The animal was kept on parenteral fluid therapy for 5 days with restricted oral intake. The recovery was uneventful.

30.56 Standardization of safe degree of intraperitoneal pressure for laparoscopic examination in dogs

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In this study effect of variable intraperitoneal pressure on clinical parameters in dogs was studied. Twelve adult dogs of either sex were randomly divided into 3 equal groups (I, II and III) consisting of 4 animals each. Under xylazine-ketamine anaesthesia pneumo-peritoneum was created at pressure of 6, 10 and 14 mm of Hg in groups I, II and III, respectively, using carbon dioxide gas. After establishment of pneumo-peritoneum, 5 mm zero degree laparoscope and corresponding trocar-cannula unit was used for visualization of abdominal organs. Heart rate, respiration rate and rectal temperature were recorded before insufflation, creation of pneumo-peritoneum under anaesthesia 30, 60 120 min and 24 hr. post-deflation. Poor visualization of some abdominal organs was observed in group I, whereas, visualization of abdominal organs was better in groups II and III. No significant changes in clinical parameters were recorded in any group.

10.57 Typhlectomy in adult White Leghorn cockerels

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Ten adult White Leghorn cockerels, 25 weeks of age with body weight ranging between 1.50 and 1.75 kgs were selected for caecectomy. Birds were starved of solid food for 24 h before surgery. A 5:1 mixture of ketamine (100 mg/ml) and xylazine (20 mg/ml) 7.5 mg ketamine /kg b.wt. and 1.5 mg xylazine /kg b.wt. was progressively administered into the wing vein by using a tuberculin syringe (Dosage : 0.15 ml of mixture /kg b.wt.) to effect complete anaesthesia. After 75-90 sec, the feathers from the abdomen were gently removed. The area approximately midway between the pelvis and the distal end of the breastbone was disinfected with povidone-iodine solution. A laparotomy was performed to a length of 40 mm in the body wall. Each caecum was localised and gently detached from the mesentery by hand. This was performed as close as possible to the caeca and the detachment was made in a proximal direction along the sides of the caeca upto the ileocecocolic junction. Each caecum was transected near to the junction and the cut surfaces sutured as near as possible to the junctions of the caeca and the intestine by catgut (No "O").

After removing the caeca, the blind sutured ends were cleaned with an antibiotic solution (oxytetracycline). The exposed intestine was then returned to the peritoneal cavity and the peritoneal and muscular layers were sutured by using catgut (No. 0) whereas, skin sutured with silk 2\0. The operated birds were withheld from feeding for the following 24 h, but water was supplied *ad libitum*. After 10 day the skin sutures were removed. The postoperative care included an injection of enrofloxacin antibiotics and meloxicam anti-inflammatory and analgesic for 3 days.

10.58 Surgical management of tracheal rupture in a cow

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A cross bred cow aged about 5 years brought to the Teaching veterinary hospital, Pondicherry with the history of a sudden fall into a irrigation canal and development of generalized subcutaneous swelling in the fore quarters of the animal and anorexia since then. Clinical examination of the animal revealed slight rise in body temperature and generalized subcutaneous emphysema was felt in the neck, shoulders and brisket region. The animal showed signs of inspiratory dysponea and abdominal type of breathing. Radiographic examination of the cervical region revealed the seepage of air from the tracheal lumen into the subcutaneous region. It was suspected for tracheal rupture. The animal was sedated with xylazine @ 0.05 mg/kg i.v. and controlled on lateral recumbency. The site behind the larynx was prepared for aseptic surgery. Local infiltration analgesia with 2% Lignocaine Hcl was performed and a linear skin incision made on the ventral border of the proximal annular rings of the trachea. Exposure of the surgical site revealed a serial rupture on the dorsal aspect of the proximal annular rings with seepage of air around the area. The tracheal cartilages were debrided and repaired at the ruptured site by simple interrupted pattern using No.1 polygalactin suture material. The muscle and skin wounds were closed by routine manner. The animal was administered with antibiotics and parentral fluids for next 7 days with antiseptic wound dressing at the site of surgery. The animal made a slow progress and showed signs of recovery after 10 days. However the owner disposed off the animal for the best of its value.

10.59 Occurrence of tumors in animals and birds in and around Kolkata: A review of 134 cases

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A review of 134 cases of tumors in different species of animals referred to the Department of Veterinary Surgery and Radiology during March 1997 to March 2005 is presented here. Occurrence of tumors in canines was highest (89.55%) followed by avian (5.22%) and ovine (2.23%), whereas incidence of tumors was considerably low in bovines (1.49%), caprines (0.77%) and rabbits (0.73%). In all the species, females (65.67%) were affected more than the males (34.33%). In canine, incidence of tumor was more in cultured Pomeranian breed (51.7%) followed by German shepherd (12%), Labrador retriever (8.2%), Doberman (6.7%) and other breeds accounted for 21.4%. Amongst all tumors occurrence of mammary tumor was 27.61%, tumors affecting ear 8.96%, gum tumor 8.21%, tumors affecting eye and perianal region 4.48% each and other types of tumors accounted for 35.07%. In canine the most common tumor was mammary tumor (30.83%) followed by veneral granuloma (11.19%).