



**XXIV ANNUAL CONGRESS  
INDIAN SOCIETY FOR VETERINARY SURGERY**

**NATIONAL SYMPOSIUM ON  
BIOPROSTHESIS-CURRENT STATUS IN  
SMALL ANIMAL SURGERY**

**SOUVENIR & ABSTRACTS**



**10<sup>th</sup>, 11<sup>th</sup> & 12<sup>th</sup> November 2000**

Department of Surgery and Radiology  
College of Veterinary and Animal Sciences  
Kerala Agricultural University  
Mannuthy, Thrissur-680651, Kerala



XXIV ANNUAL CONGRESS  
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AND  
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ON  
BIOPROSTHESIS – CURRENT STATUS IN SMALL ANIMAL SURGERY

10<sup>th</sup> , 11<sup>th</sup> & 12<sup>th</sup> NOVEMBER 2000

**SOUVENIR**  
&  
**ABSTRACTS**

DEPARTMENT OF SURGERY AND RADIOLOGY  
COLLEGE OF VETERINARY AND ANIMAL SCIENCES  
KERALA AGRICULTURAL UNIVERSITY  
MANNUTHY – 680 651, THRISSUR  
KERALA



## KERALA AGRICULTURAL UNIVERSITY

Dr. K. N. Shyamasundaran Nair  
Vice- Chancellor

25-10-2000

### Message



*I am happy to know that the Department of Surgery and Radiology, College of Veterinary and Animal Sciences, Mannuthy is organising the XXIV Annual Congress of the Indian Society for Veterinary Surgery and National Symposium on **Bio-prosthesis - Current Status in Small Animal Surgery** from 10<sup>th</sup> to 12<sup>th</sup> November, 2000. The theme of the symposium, I am sure, would initiate considerable discussion and enthusiasm.*

*Though surgery is not directly concerned with production, the surgical technology is involved in enhancing longevity of life and hence production of animals. More so with the introduction of new technologies the economic value of farm animal has enhanced significantly unlike in the past. Relatively expensive treatments involving surgical interventions have thus become economically worthwhile for the farmers to resort to. I am sure that in this context, the deliberations of the symposium will have definite contribution to the livestock industry in our nation.*

*I wish the delegates a pleasant time in the campus. I am sure that the discussions in the symposium will be fruitful and valuable for the professionals engaged in animal management.*

*I wish the XXIV Annual Congress and Symposium all success.*

K.N. Shyamasundaran Nair  
Vice-Chancellor



From the desk of Editor

I am pleased to present the Souvenir before the august assembly of Indian Society for Veterinary Surgery and I take this opportunity to thank the organisers for entrusting me this desk.

This is the second time the Department of Surgery and Radiology, College of Veterinary and Animal Sciences, Mannuthy, organising the Annual Congress of ISVS.

I have included the theme paper and all the abstract of various scientific papers of the symposium in this souvenir, so that it may be a useful record for future reference. I presume that this will enlighten our knowledge about the advances that our surgical speciality has made and I hope that this would be a blessing in the years to come.

My sincere thanks to Dr. G. Arthur Vijayan Lal, Veterinary Scientist (F), Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum for making it convenient to get the theme paper in time.

I take this opportunity to thank all the members of Souvenir Committee, all advertisers and our well wishers who have contributed generously to the Souvenir.

I will be failing in my duty if I do not mention Dr. K. N. Muraleedharan Nayar, Convenor and Organising Secretary for the immense help in guiding and advising me at various levels of its publication.

With warm regards,

Sd/-

Dr. C. B. Devanand  
Editor, Souvenir  
XXIV ISVS Annual Congress





From the desk of the  
Convenor & Organising Secretary



*I consider it as an honour bestowed on us that the Indian Society for Veterinary Surgery accepted the Department of Surgery, College of Veterinary and Animal Sciences, Mannuthy to host the XXIV Annual Congress. Being the first of this millennium, I am sure that all the members expected it to be grand and memorable. We were fully aware of the herculean task involved and the challenge was accepted with the help and goodwill of all my colleagues in the Faculty and authorities of Kerala Agricultural University.*

*The Annual Congress was always the most important event in our society as it provided a time and place for the professional colleagues to meet, exchange ideas, and carry back something new that could be put to use or practice. It generated a bond that strengthened the society in return. I am sure that the XXIV Annual Congress and Symposium would give us enough material and stimulation for a quantum jump.*

*The Vice-Chancellor, Kerala Agricultural University and the Dean, College of Veterinary and Animal Sciences have been very considerate and helpful in the organisation of the Annual Congress and Symposium. The encouragement has gone long way in making it possible for my colleagues to go ahead with it. The enthusiasm shown by delegates from other veterinary colleges has also been a booster for my colleagues and myself in this venture.*

*We have tried our level best to make your stay and participation comfortable. I know there are shortcomings but kindly bear with us.*

*I wish all the delegates a pleasant stay during the days that you spent with us and carry back memories worthy of the time.*

*With warm Regards,*

*Sd/-*

*Dr. K. N. Muraleedharan Nayar,  
Convenor & Organising Secretary,  
XXIV ISVS Annual Congress.*





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## XXIV ANNUAL CONGRESS OF ISVS AND NATIONAL SYMPOSIUM

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## ABOUT US

The Department of Surgery and Radiology came into existence along with the Government Veterinary College in 1955. The college and the Department became a part of the Kerala Agricultural University when the University came into being on 1-02-1972. Till 1973, the Department was involved only in undergraduate teaching and offering Training courses for field Veterinarians. M.V.Sc. programme was started in 1973 and Ph.D. programme in 1993. The staff of the Department are also responsible for maintaining the Surgery and Radiology units of the two hospitals of the college. The activities of the Department includes :

- Health care of animals of Thrissur Zoo, Devaswoms in Kerala and Forests
- Arranging and conducting Training programmes and
- Helping field Vets by functioning as a referral unit

The staff who have contributed in bringing up the Department to the present status are

Dr. M.N. Menon, Professor  
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## PROGRAMME

### 10 - 11 - 2000 : FRIDAY

8.00 a.m.	:	<b>Breakfast</b>
9.00 a.m.	:	<b>Registration</b>
9.30 a.m.	:	<b>Flag hoisting</b>
10.00 a.m.	:	<b>Inauguration</b>
11.30 a.m.	:	<b>Technical Session I - THEME PAPER</b> Dr. G. Arthur Vijayan Lal

Chairman	:	Dr. O. Ramakrishna
Rapporteur	:	Dr. Vasanth M. Shetty

12.45 p.m.	:	<b>Lunch</b>
2.00 p.m.	:	<b>Technical Session II - CLINICAL SURGERY</b>

Chairman	:	Dr. P.O. George
Rapporteur	:	Dr. V. Ramaswamy

3.00 p.m.	:	<b>Tea</b>
3.15 p.m.	:	<b>POSTER SESSION</b>
3.30 p.m.	:	<b>Panel Discussion - Clinical Surgery</b>
4.30 p.m.	:	<b>Interaction with the President, Veterinary Council of India</b>
6.00 p.m.	:	<b>Cultural programme</b>
7.30 p.m.	:	<b>Dinner</b>

### 11 - 11 - 2000 : SATURDAY

8.00 a.m.	:	<b>Breakfast</b>
9.00 am	:	<b>Technical Session III - ANAESTHESIOLOGY</b>

Chairman	:	Dr. W.P. Archibald David
Rapporteur	:	Dr. D.K. Patil

10.30 am	:	<b>Technical Session IV - RADIOLOGY &amp; IMAGING TECHNIQUES</b>
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Chairman	:	Dr. A.P. Singh
Rapporteur	:	Dr. Dilip Kumar

11.15 a.m.	:	<b>Tea Break</b>
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<b>11.30a.m.</b>	:	<b>Technical Session V – ORTHOPAEDIC SURGERY</b>
Chairman	:	Dr. S.K. Pandey
Rapporteur	:	Dr. Rishi Tayal
<b>12.30p.m.</b>	:	<b>Lunch Break</b>
<b>2.00p.m.</b>	:	<b>Technical Session VI – LARGE ANIMAL SURGERY</b>
Chairman	:	Dr. S.S. Hussain
Rapporteur	:	Dr. L. Ranganath
<b>3.30p.m.</b>	:	<b>Tea Break</b>
	:	<b>FIELD VISIT</b>
<b>8.00p.m.</b>	:	<b>Dinner</b>

**12 – 11 – 2000 : SUNDAY**

<b>8.00a.m.</b>	:	<b>Breakfast</b>
<b>9.00a.m.</b>	:	<b>Technical Session – VII – SMALL ANIMAL SURGERY</b>
Chairman	:	Dr. K.G. Avachat
Rapporteur	:	Dr. Kuldip Singh
<b>10.30a.m.</b>	:	<b>Tea Break</b>
<b>10.45a.m.</b>	:	<b>Technical Session – VIII – EXPERIMENTAL SURGERY</b>
Chairman	:	Dr. Gaj Raj Singh
Rapporteur	:	Dr. S.K. Tiwari
<b>11.30a.m.</b>	:	<b>Plenary Session</b>
<b>12.30p.m.</b>	:	<b>Lunch</b>
<b>2.00p.m.</b>	:	<b>General body meeting</b>





SESSION I

**THEME PAPER****Bio-prosthesis – Current status in Small animal Surgery**

*Dr. G. Arthur Vijayan Lal,*  
*Veterinary Scientist (F), Head, Vivarium,*  
*Sree Chitra Tirunal Institute for Medical Sciences*  
*and Technology (SCTIMST),*  
*Biomedical Technology Wing, Poojapura,*  
*Trivandrum, Kerala,*  
*India – 695 012*

**INTRODUCTION**

Virtually every medical advance has been made possible through the animal models in research. The dramatic increase in our life expectancy is largely due to advances in health care as a result of biomedical research. This life-saving research has depended heavily on animal studies. For over a billion population of India, the estimated current requirement of biomedical *devices* is more than Rs. 3000 crores, with an increase of 18% each year. For the animal population also, the requirement is mostly met from the general pool. Some may think this as a burden to humanity, but it is not so, since we owe much more to the animals for their "unmerited sacrifice". Thus, now we know animals and humans have over 250 diseases in common.

In North America more than 350 dogs a year undergo surgery of artificial hip prosthesis. Like wise dogs, cats and horses suffer from cataract problems and receive cataract surgery as well as lens replacements on their eyes to restore eyesight. Bio-prosthesis is widely used in orthopaedic surgery, dentistry, cardiovascular and thoracic surgery (cardiac valves, Oxygenators, vascular prosthesis) etc., the list goes very many. So every time we take our pet to a veterinarian, that animal invariably benefits out of a bio-prosthesis or totally from biomedical research. Thus to improve the quality of life and reduce suffering, for human beings and animals in all parts of the world, the *veterinarian* is an integral part.

It is high time that the research veterinarians, physicians, biologists, engineers, material scientists etc. and the R&D oriented industry set up to a single platform for the exchange of ideas in order to promote the development of biomedical devices and materials. In India, bulk of the demand for medical devices and materials is met by import. Surprisingly the industries are keeping quite even though the market potential is huge in India. This may be due to lack of availability of: -

- high purity materials
- well characterised indigenous raw materials/import substitutes
- required wide range of products.

**Current status of Bio-prosthesis/Biomedical devices**

Broadly biomedical devices are classified as diagnostic devices, therapeutic devices and monitoring instruments, altogether about 900 product groupings covering 50 clinical specialities.

- ❖ **Diagnostic devices** are designated to determine physical signs of disease and/or injury without alteration of the structure and function of the biological system and can be of image, biochemical or transducer based.
- ❖ **Therapeutic devices** lead to improved function or alteration in the course of the disease with minimal changes in structure and/or function of the biological system, which are either extracorporeal or implantable.
- ❖ **Monitoring instruments** are slightly different from diagnostic device, is to observe the trend in patient condition.



Our present interest of narration is on therapeutic devices, which means "*bio-prosthetic devices*", grown under artificial organs. The current use of the therapeutic devices are to replace or augment functionally impaired natural tissues and the bio-materials used are further classified as:-

\*\* *widely accepted clinically*

\*\* *experimental stage*

\*\* *accepted with reservations*

\*\* *conceptual stage*

\*\* *limited clinical application*

❖ **Widely accepted clinically**

- # Extracorporeal blood pumps
- # Large- joint prosthesis
- # Bone fixation systems
- # Cardiac pace makers
- # Implantable defibrillators
- # Large diameter vascular graft
- # Prosthetic cardiac valves
- # Intra-aortic balloon pump
- # Middle ear ossicle chain
- # Hydrocephalus shunts
- # Dental implants
- # Skin and tissue expander
- # Maintenance haemodialyser
- # Chronic ambulatory peritoneal dialysis

❖ **Accepted with reservations**

- # Breast implants
- # Sexual implants
- # Small joint prosthesis
- # Extracorporeal membrane oxygenation (ECMO) for children
- ❖ Limited clinical application
- # ECNI in adults
- # Ventricular assisted device
- # Cochlear prosthesis
- # Artificial tendons
- # Artificial skin
- # Artificial limbs

❖ **Experimental stage**

- # Artificial pancreas
- # Artificial blood
- # Intravenous oxygenation
- # Artificial oesophagus
- # Total artificial heart
- # Nerve guidance channels
- ❖ Conceptual stage
- # Artificial eye
- # Neurostimulator
- # Blood pressure regulator
- # Implantable lung
- # Artificial trachea
- # Artificial gut
- # Artificial fallopian tubes

**Unique features of materials for bio-prosthesis**

The uniqueness of the materials has bearings upon the stages of development manufacture, maintenance and use. These features include :

- Non-toxic raw materials
- Production/assembly under clean environment
- Packing, sterility and disposability aspect
- Labelling
- Traceability
- Radio-opacity/MRI compatibility



## Currently used Bio-prosthetic materials

The availability of biomaterials coupled with a design to suit functionally and processing capability are the basic requirements for successful development of artificial organ. Hence the basic biomaterial should not irritate or damage the tissues and body fluids. Moreover, the biological response also heavily depends on the overall shape and physiochemical nature of the surface. The current status of typical materials used in the bio-prosthesis devices development are broadly classified into metals and alloys, ceramics and glasses, biological materials, polymers and composites.

### Metal and alloys

#### ≡ Stainless steel-

Bone and joint replacement  
Spinal instrumentation  
Fracture fixation

#### ≡ Titanium and its alloys

Bone and joint replacement  
Fracture fixation  
Dental implants  
Pacemaker encapsulation

#### # Cobalt-chromium alloys

Bone and joint replacement  
Dental restoration  
Heart valves

#### # Gold and Mercury alloys

Dental restoration

### *Ceramics and glasses*

#### # Alumina

Joint replacement  
Dental implants

#### # Zirconia

Joint replacement

#### # Calcium phosphate and Bio-active glass

Bone repair and augmentation  
Surface coating on metals

#### # Carbons

Percutaneous device  
Coating for blood-contacting devices

#### # Porcelain

Dental restoration

### Biological materials

#### # Collagen

Suture

#### # Fibrin glue

Corneal shield

#### # Chitosan

Skin patches  
Wound dressing  
Drug delivery  
Tissue adhesive

### *Polymers*

#### # Acrylics

Haemostatic agents  
Bone replacement  
Facial prosthesis

#### # Polyacrylic acid

Dental cement

#### # Polyacrylonitrile (PAN)

Dialysis membrane

#### # Polyalkylsulphone

Syringes  
Blood transfusion sets  
Vascular implants

#### # Polycarbonate

Syringes  
Containers

#### # Polycyanoacrylate

Tissue adhesive

#### # Polyester

Vascular prosthesis

#### # Polyethylene

Tubing  
Syringes

#### # Polyethylene, ultrahigh molecular weight (UHMWPE)

Heart valve  
Hip and knee joints

#### # Polyglycolic/polylactic acid

Resorbable sutures

#### # Polymethylmethacrylate (PMMA)

IOL  
Dental restoration  
Joint replacement

#### # Polypropylene

Syringes  
Catheters  
Oxygenator membranes  
Sutures

#### # Polytetrafluoroethylene (Teflon)

Vascular grafts  
Guided Tissue Regeneration (GTR) membranes

#### # Polyurethane

Catheters  
Tubing  
Blood pump diaphragms

#### # Polyvinyl chloride (PVC)

Surgical tubing  
IV sets tubing  
Blood bag

#### # Silicone

Catheters  
Tissue substitutes,  
Artificial heart  
Lubricants/antifoaming agents

### Composites

#### # Dimethacrylate resin-Quartz glass

Dental restoration

### Development of bio-brosthesis

The development of the medical devices has to through a systematic procedure with appropriate res for the assurance of safety and effectiveness of the devices like,

#### # Problem definition

- Proactive/reactive

#### # Design for

- Function
- Convenience
- Aesthetic
- Reuse

#### # Material and surface

- Development
- Evaluation

#### # Devices functional evaluation through

- Simulation
- In vitro tests
- In vivo/ex vivo experiments

#### # Clinical evaluation

- Safety
- Effectiveness

#### # Manufacturing

- Market support

#### # Further development based on

- Feed back

### Material processing

For the fabrication of the devices, the material needs to be processed into definite shapes to fu design requirement. Some of the processing methods currently used is noted in the table shown below.

Form	Process	Product
Sheet, tube	Calendering, extrusion	Blood bag, catheters
Container	Injection moulding	Oxygenator
Metal contours	Machining	Valve cage
Diaphragm	Compression moulding	Hydrocephalus shunt
Porous tube	Weaving, knitting, stretching	Vascular graft
Hollow fibres	Melt spinning, Solution spinning	Oxygenators, Haemodialyse
Threads	Fiber spinning	Sutures
Porous shapes	Pressing and sintering, Treated bone, coral	Bone grafts
Spring	Wire drawing, coiling, welding	Stents, guidewire

Processing alone will not yield good products as the surface of the material plays an important n determining biocompatibility. Based upon the available knowledge on material-tissue interaction the surfac have to be modified by anodizing, chemical treatment, plasma polymerisation, ion beam techniques, plasma ing etc. At the same time these techniques should meet the different objectives like,

- Thromboresistance (preventing blood clotting)
- Friction and wear resistance
- Infection resistance
- Integration with tissue





## Unique requirements

There are certain unique requirements of medical devices that need to be taken into account while developing, manufacturing, maintenance and use. Availability of a non-toxic raw material does not mean that the production and assembly can be undertaken in an unsuitable environment. Give ample attention into the aspects of packing, sterilisability, disposability, labelling and traceability. Implants should preferably be radio-opaque/MRI compatible.

Packing and sterilisation are necessary to ensure sterility of medical devices. Commonly used sterilisation methods are steam, ethylene oxide, and gamma radiation. The type of sterilisation depends on the type of biomaterial involved which is applicable to the packing materials also. Recommended sterilisation processes for the Polymers are displayed in the table below.

Polymer	Autoclaving	Radiation	Ethylene oxide
Acrylic	Poor	Varies	Good
Polycarbonate	Varies	Good	Good
Polyester	Poor	Good	Good
Polyethylene	Poor	Poor	Good
Polypropylene	Good	Varies	Good
Polystyrene	Poor	Good	Good
Polyurethane	Poor	Good	Good
PVC(flexible)	Varies	Good	Good
Silicone	Good	Good	Good

## Biological evaluation

Depending on the duration of contact and the intended use as bio-prosthesis/biomedical device the material has to undergo a battery of biological tests. The effects of sterilisation on materials and potential leachables, as well as toxic by-products as a consequence of sterilisation need to be taken into account. It is hence imperative that the testing should be performed on the final sterilised product or on representative samples of the final sterilised product. The below noted list states the recommended biological tests that are normally carried out.

Test	Rationale
1. Cytotoxicity	With the use of cell culture techniques, this test determines the lysis of cells (cell death), inhibition of cell growth, and other toxic effects on cells caused by test materials and/or extracts from the materials.
2. Haemolysis	Determines the degree of red blood cell lysis and the separation of haemoglobin caused by test materials and/or extracts from the materials in vitro
3. Acute systemic toxicity	Estimates the harmful effects of either single or multiple exposures to test materials and/or extracts, in animal model, during a period of less than 24 hours.
4. Irritation / Intracutaneous reactivity	Estimates the irritation potential of test materials and their extracts using appropriate site or implant tissue such as skin and mucous membrane in an animal model and/or human
5. Haemocompatibility	Evaluate any effect of blood contacting materials on haemolysis, thrombosis, plasma proteins, enzymes, and the formed elements in an animal model

6. Sensitisation	Estimates the potential for sensitisation of a test material and/or the extract of material using it in an animal and/or human
7. Subchronic toxicity	Determines harmful effects from multiple exposure to test materials and/or extracts during a period of one day to less than 10% of the total life of the test animal (e.g. Up to 90 days in rats)
8. Chronic toxicity	Determines the harmful effects of multiple exposure to test materials and/or extracts during a period of 10% to the total life of the test animal
9. Implantation tests	Evaluates total toxic effects on living tissue, at the gross level and microscope levels, to a sample material that is surgically implanted into appropriate tissue (e.g. Muscle, bone; for 7-90 days)
10. Mutagenicity (Genotoxicity)	The application of mammalian or non-mammalian cell culture techniques for the determination of gene mutation changes in chromosome number, and other DNA genotoxicities caused by test materials and/or extracts from materials
11. Reproductive & developmental toxicity	Evaluates the potential effects of test materials and/or extracts on fertility, reproductive function, and parental and early postnatal development
12. Pharmacokinetics	Determines the metabolic processes of absorption, distribution, biotransformation and elimination of toxic leachables and biodegradation products of test material and/or extracts

In our country, there has so far been no device legislation. It is to be noted that drug control laws are directly applicable to devices, as the risk assessment methodology differs from drugs.

### Future Strategy

The future development and growth of the field of biomaterials and devices calls for a well structured multifaceted approach along the following lines –

- ❑ There is a need to develop industries that can supply well-characterised **biomaterial grade materials** may be a new industry or a diversification of the existing industry with technological upgradation.
- ❑ **Batch to batch variations** in raw materials, especially in polymers and natural products need to be taken care of. For this, the characterisation of raw materials with respect to relevant properties is to be addressed.
- ❑ **Drug/device combination**, especially the use of controlled drug delivery system needs to be developed.
- ❑ It would be worthwhile to organise and develop **biological materials** based on plants, animals and microorganisms.
- ❑ There is a need to initiate R&D programme on materials and devices endowed with biological structure and functions. This emerging field of **tissue engineering** combines principles of engineering, materials and biological sciences to construct skin, dentine, soft tissues, cornea, liver etc.
- ❑ Research on materials designed for **cell, drug and gene based therapies** needs to be initiated, as it can lead to the control of cell functions, thereby replacing many of the medical devices in current use.
- ❑ **Rapid prototyping** coupled with design based on our specialised requirements, articulated by medical designers to be pursued for cutting down the developmental cost and time.
- ❑ **Precision engineering** capability to design and manufacture specialised instruments for minimally invasive surgeries are to be strengthened.
- ❑ High quality **plastic processing** facilities under clean environment to improve the aesthetics and functionality of medical devices are to be established.



- ❑ **Computer related technologies** such as computer aided diagnosis, intelligent devices and integrated patient medical information system need to be developed.
- ❑ **Telemedicine** for home care, self monitoring and diagnosis are expected to come in vogue as a cost effective health care solution for large populations as well as for those living in remote areas.
- ❑ Biomedical device industrial personnel may need to go through special training programmes in **Good Manufacturing Practices (GMP)** protocols, that cover materials property qualification, process standardisation, clean room practice, sterilisation and its assurance, packing, labelling etc.
- ❑ There is a need to establish a regulatory mechanism to check the proliferation of substandard products through a product approval process, before widespread marketing of the product. Prior to this, there is a need to develop R&D based test houses to evaluate the safety and effectiveness of different biomedical devices.
- ❑ **Manpower development** in different aspects as required by the device industries is to be focussed through joint efforts between educational institutions, R& D laboratories and industries. There is a need for an inter disciplinary biomedical programme with emphasis on biomaterials and biomedical engineering at Masters/ Ph.D. level, which can motivate students to link principles and concepts from different disciplines for application to different situations.
- ❑ **Venture capital** funding for R&D, scale-up, state of the art manufacturing and improvements through a consortium approach between venture capitalists, industries, R&D institutions/individuals can become a major catalysing force.

## Conclusion

The driving force for the development of biomedical devices and implants is the perceived medical needs, leading to the requirement of **Materials, Methods and Design** to make prototypes. These have to undergo pre-clinical and clinical evaluation with a feedback calling for modifications in design and materials. The social implications of medical practice call for an assurance in safety and effectiveness leading to regulatory approval mechanism, before large-scale manufacturing and use.

This demands a professional approach. The natural question arises as to what a profession is. It calls for specialised knowledge and intensive preparation including instruction in skills and method as well as scientific, historical or scholarly principles underlying such skills. It also requires concerted opinion, high standards of achievements and conduct and committing its members for the same, whose primary purpose is rendering of a public service.

It is time to promote scholarships of discovery, integration, application and teaching to generate, develop and propagate specialised knowledge in the field of biomaterials and devices. Preparation of a **database** on medical materials and available expertise in specific areas would accelerate innovative indigenous development. The importance of characterisation of the physical, chemical and biological properties of materials and correlating it to the performance is being increasingly realised and addressed in the standards. Hence, it is essential for professional societies, associations etc. to play an active role in the development of standards, as they set forth the principles for evaluation of materials and devices to ensure safety and effectiveness. With added knowledge of design review and risk assessment, the device testing can be moved from an empirical to a more scientific approach. It would lead to a better design of biocompatible materials and devices and thereby to an assured and predictable performance, fulfilling the needs of an important segment of health care.



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### Relevant Standards from the following organisations:

- BIS : Bureau of Indian Standards
- ISO : International Standards Organisation, Geneva.
- ASTM : American Society for Testing Materials, USA
- AAMI : Association for the advancement of Medical Instrumentation, USA
- USP : United States Pharmacopoeia
- FDA : Food and Drug Administration, USA

**SESSION II — CLINICAL SURGERY****SUPRACONDYLAR FRACTURE OF FEMUR IN DOGS: DISTRIBUTION AND SURGICAL MANAGEMENT OF 36 CLINICAL CASES***Simrat Sagar Singh, Shashi Kant Mahajan and Sukhmander Singh*

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Thirty six clinical cases involving epiphyseal plate and metaphysis of distal femur were studied in relation to age, sex, breed, leg involved, history of trauma and type of fracture. These fractures were treated using single Steinmann intramedullary pin or threaded pin (N=6), single oblique pin (N=5), cross pinning (two pins or more) (N=13), intramedullary cross pinning (6), retrograde intramedullary pinning (4) and a combination of techniques (N=2). Distribution of supracondylar fractures revealed that males had 62.5% and females 38.5%; left leg was involved in 55.5% dogs, right in 40% and both limbs were involved in 4.5% dogs. Spitz breed was involved in 45.5% cases followed by Alsatian (20%), Doberman (14%), Labrador and Cocker spaniel (6% each), Pointer, Dachshund and Grey hounds (3% each). Age group of 1.5-6 months had 55.5% fractures of distal femur followed by age group of 6-12 month (25.5%) and age group of more than one years (20%). Fractures were caused by automobile accidents in 51.5%, fall from height (37%) and from other causes (14.5%). Among fractures involving epiphyseal plate (N=16) Salter Harris type I constituted 25% and Type II 75%. Radiography was done at suitable intervals to evaluate suitability of each technique. The distal pin migration and fixation failure was observed in single intramedullary pinning. Dislodgement in oblique pinning was seen and is recommended only in very light/small dogs. Cross pinning and intramedullary cross pinning provided rigid fixation as compared to retrograde intramedullary pinning. Medial pin had tendency of migration in cross pinning (two pins), this problem was however not observed where three or four pins were used. No pin migration was seen in any case where intramedullary cross pinning was done. Distal migration was seen in retrograde intramedullary pinning. In growing dogs, pins got embedded in marrow in intramedullary cross pinning. External support in the form of modified Robert Jones bandaging to stabilize the stifle joint is desirable. Pin removal may not be mandatory. Intramedullary cross pinning should be preferred to cross pinning in growing dogs.

**FLANK COLOSTOMY FOR THE CORRECTION OF AGENESIS OF TERMINAL COLON IN A CALF***T.V. Jayamohan*

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Romson's colostomy kit used routinely in human beings was successfully employed to treat a case of agnesis of terminal colon in a crossbred female calf after performing flank colostomy. The calf was not passing dung since birth though anus and rectum were present. Anus and perineum were severely lacerated and oedematous. There was bilateral abdominal distension and respiratory distress. Exploratory laparotomy was performed through a right flank incision under xylazine-ketamine anaesthesia and, terminal colon was found to be absent. The blind end of the colon was resected from adhesions and sutured to the lower commissure of laparotomy wound. A Romson's colostomy fistula was fixed into the lumen of the colon and secured to the body of the animal with elastic straps. A disposable plastic collection bag with an opening on its lower aspect attached to the fistula facilitated easy evacuation of bowel contents. Postoperatively intravenous fluids, antibiotics and analgesics were administered along with regular dressing of the laparotomy wound. The calf had uneventful recovery.

**MANAGEMENT OF ACQUIRED MEGAOESOPHAGUS IN A DOG**  
*T. Sarada Amma, C.B. Devanand, T.P. Balagopalan, J. David Suresh and  
K.N. M. Nayar*

**Department of Surgery and Radiology  
College of Veterinary and Animal Sciences, Thrissur**

A 2 ½ year old female Doberman Pinscher was referred to the Department of Surgery with regurgitation for six months, inspite of treatment. The animal was weak and dehydrated. Megaoesophagus confirmed by radiography. The caudal oesophagus showed narrowing which delayed the emptying of oesophagus. The animal was subjected to oesophagomyotomy through abdominal approach. The myotomy edges were sutured to the diaphragm and the cranial most myotomy edge was sutured to the border of the diaphragm at the hiatus and the suture continued on either side to close the hiatal incision. The technique caused the exposed myotomy wound to be in an abdominal position and increased the width of the gastro-oesophageal region. The myotomy edges were sutured to the diaphragm above so that the diaphragm formed an outer covering for the exposed mucosa. The animal was maintained with fluid diet for 2 days and neostigmine injection 0.5 mg was given for 5 days. Regurgitation persisted for the first five post-operative days but gradually decreased in frequency. Neostigmine was continued for the next 3 weeks at a dose of 5 mg twice daily by oral route. By 15<sup>th</sup> day regurgitation was rare. After one month, dose of neostigmine was reduced to 5 mg daily for next 30 days. A review after 6 months revealed that the animal has almost become normal except for occasional vomiting.

**MEGAOESOPHAGUS IN DOGS – REVIEW OF 15 CASES**

*T.Sarada Amma, C.B. Devanand, T.P. Balagopalan, P.T. Dinesh, S. Sooryadas and  
K.N. Muraleedharan Nayar*

**Department of Surgery and Radiology  
College of Veterinary and Animal Sciences, Thrissur**

Fifteen dogs presented to the Department of Surgery with recurrent regurgitation were subjected to radiography and were diagnosed as megaoesophagus. Of these 15 animals the breeds affected were Doberman Pinscher (80%), German Shepherd (6.66%) Labrador (6.66%) and Dachshund (6.66%). All the affected animals were males except for Dachshund which was a female. The age ranged from 2 months to 4 ½ years. 26.6% were congenital, 73.4% of the cases were acquired. Out of the 15 animals, one died before treatment. Two were subjected to oesophagomyotomy, of which one animal with gastric dilation also died. The remaining animals were maintained on Neostigmine 0.5-1 mg/kg body weight, gravitational feeding with semisolid/liquid diet and vitamin B<sub>12</sub> complex. The operated animal showed improvement from 7<sup>th</sup> day onwards. In the other animals, improvement was observed from 30 days to 60 days. Improvement was earlier in animals where neostigmine was administered at 1 mg/kg body weight but complications like severe spasm and colic were observed in a few animals.

**CONGENITAL FOETAL ACEPHALIA ASSOCIATED WITH  
PROLONGED GESTATION IN COWS**

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Two cases of prolonged gestation in cows with congenital foetal acephalia were attended. One of the cases was in gestation for 540 days and the other 300 days. Treatment with Dexona and Epidosin was not successful because of foetal oversize. Caesarian section was resorted to in both the cases. In both the cases, the head of the foetus was found to have not developed. The animals, with routine post operative care, had uneventful recoveries.





**INCIDENCE OF VARIOUS SURGICAL AFFECTIONS IN WILD FAUNA**  
*Mohinder Singh, J.M. Nigam, S.K.Sharma, R.S. Kishwaria, Madhumeet Singh,*  
*A.C. Varshney, Adarsh Kumar & S.P. Tyagi.*

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 College of Vety. & Animal Sciences, HPKV, Palampur-176062(H.P.)

Incidence of various surgical affections in wild Fauna of Kangra Valley in captivity and free range was recorded during the period of 1992-2000. A total of 30 different species of carnivores and herbivores were attended and examined for various surgical ailments. These included Leopards(7), Asiatic lions(7), Lion cubs(3), Black bears(5), Sambar(1), Goral(3), Spotted deer (1) and birds-Falcon, Eagle, Peacock( one each). The surgical affections recorded among leopards were traumatic injuries and wounds of paws, cage wound, bilateral cataract and broken upper right canine. The Asiatic lions showed hindquarter paralysis, maggot wounds of face, withers and back whereas extensive traumatic wounds of forelimbs were observed in lion cubs. The herbivorous animals (Sambar, Goral, Spotted deer, Black bear) revealed gunshot wound, corneal opacity, tibial fracture, muscular cyst, dislocation of fetlock joint, hind quarter paralysis and traumatic wounds of abdomen, vulva and paw. Among birds, arthritis, tibial bone fracture and signs of shock were recorded. The diagnosis of these surgical ailments in the wild fauna was made on the basis of clinical and radiological examinations under physical and chemical restraint.

**SKELETAL SCURVY IN A PUP – A CASE REPORT**

*P.G. Baby, P. Ravindran, Usha Narayana Pillai and T. Sarada Amma*  
 Dept. of Clinical Medicine  
 College of Veterinary and Animal Sciences, Thrissur

A two month old male German Shepherd dog was admitted with a history of inappetance and limping for the past one week. Physical examination revealed painful and swollen distal extremities of long bones especially of the forelimb. The treatment with NSAIDs did not show any clinical improvement. Differential leucocyte count showed neutrophilia. Serum calcium and phosphorus were within normal limits although alkaline phosphatase showed slight elevation. Radiograph of the radius and ulna revealed a double epiphyseal line (scorbutic zone). Irregular elevations of the periosteum with calcification of these masses were seen on the shafts of radius and ulna more towards the distal end. Radiograph of the thorax was taken to rule out Maries disease. Based on the clinical, laboratory and radiographic evaluation a diagnosis of skeletal scurvy was made. The animal was treated with vitamin C, calcium and phosphorus supplements. After 10 days the animal showed marked clinical improvement and follow up radiograph showed marked reduction in the lesions.

**CONGENITAL VISCERAL EVENTRATION – CASE REPORTS**

*K.D. John Martin, P.T. Dinesh and K. Rajankutty*  
 Dept. of Surgery and Radiology  
 College of Veterinary and Animal Sciences, Thrissur

Six cases of congenital visceral eventration (two each in bovine, caprine and canine), were attended at University Veterinary Hospital, Kakkalai, during a period from June 1997 to June 2000. The intestine under the cover of a transparent peritoneal sac was found protruding through a congenital defect in the ventral abdominal wall in all the cases. The peritoneal bag was found ruptured in two cases. All the cases were presented on the day of birth. The visceral organs were replaced under local infiltration anaesthesia after dilating the abdominal defect. The defect in muscles and skin were apposed with sutures. Postoperative systemic antibiotic therapy was provided for seven days in all the cases. Both the cases in bovine and one in caprine recovered uneventfully.

**SURGICAL MANAGEMENT OF INTESTINAL INTUSSUSCEPTION IN  
DOGS – A REPORT OF TWO CASES**

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**Department of Surgery and Radiology  
College of Veterinary Science and Animal Husbandry  
Anjora, Durg**

Two dogs, one Doberman Pinscher (6 year old) and other German Shepherd (4 months old) were presented to the Department of Surgery and Radiology with complaint of acute vomiting and sparse diarrhoea for one week. Both had difficulty in defecation and a large amount of mucus mixed with blood was coming out during defecation. Plain radiograph revealed presence of large elongated mass in the abdomen. Suspecting intussusception, both animals were operated under xylazine (@ 1 mg/ Kg) I/M, atropine sulphate (0.6 mg) I/M premedication and ketamine (@5 mg/ Kg) IV anaesthesia. The ilio-caecal area was involved in both the cases with irreparable intussusception to the intestinal wall. Enterectomy followed by end to end anastomosis was performed as per "Parker Kerckhoffer technique". Postoperatively, intravenous fluid and Enrofloxacin (100 mg) were administered for 5 days, dexamethasone (10 mg) for 3 days and diclofenac sodium (50 mg) for 3 days. The dogs were kept on liquid diet for 5 days. The wound was dressed with povidone iodine solution and Wisprec cream. The skin sutures were removed on the first postoperative day. Both dogs had uneventful recovery.

**SUCCESSFUL MANAGEMENT OF ACHILLES TENDON RUPTURE  
IN A DOG - A CASE REPORT**

*L.Nagarajan, C.Ramani, and W.P.Archibald David*

**Department of Surgery  
Madras Veterinary College, Chennai.**

A two year old mongrel dog was presented with a history of an automobile accident. On examination the dog was found to have a ruptured Achilles tendon. It had no other orthopaedic involvement. The wound was cleaned with saline and was prepared for surgery. The cut and retracted edges of the tendon were freshened and brought together. Tenorrhaphy was performed using 1/0 Vetafil. The skin was closed routinely using silk sutures. The limb was immobilized for 10 days using a POP half splint. The dog recovered uneventfully and was able to use the limb normally once the sutures were removed.

**SPERMATIC CORD TORSION OF A RETAINED TESTICULAR TUMOUR  
IN A DOG- A CASE REPORT**

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A 7 year old unilateral cryptorchid German shepherd dog was brought with a history of severe abdominal colic and depression. Clinical examination revealed an intra abdominal mass on palpation. Ultrasonography revealed an intra abdominal mass. The dog was subjected to exploratory laparotomy after administration of Ringer lactate and 8 mg of Dexamethasone intravenously. On exploration an orange sized retained testis was found with 180° torsion of the spermatic cord. The testis was necrosed and was black in colour. The testis along with the twisted portion of the spermatic cord was removed and routine abdominal closure was performed. The dog recovered without complications following routine post operative care.



## A COMBINATION OF DIAZEPAM, XYLAZINE AND KETAMINE ANAESTHESIA FOR CASTRATION OF PIGS

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A study was conducted on two boars of 1 to 2 years of age and eight piglets of 1½ to 2 months of age using a combination of diazepam, ketamine and xylazine. A mixture of 2 ml. of diazepam (10mg/ml) and 10 ml of Ketamine (500 mg) was administered at the rate of 0.01ml/Kg bodyweight intravenously after premedication with Atropine sulphate (0.04 mg/Kg) intramuscularly. The animals were under control for surgical operation (Scrotal method) within 2 to 3 minutes. Lignocaine hydrochloride was infiltrated at the surgical site whenever necessary. The animals evinced no symptom of excitement, grunting, squealing and hypothermia. The post-anaesthetic recovery was smooth. This method of castration is found to be very useful and easy in pigs.

### SESSION III — ANAESTHESIOLOGY

#### ANAESTHESIA OF TIGERS IN NATURAL HABITAT FOR RADIO COLLARING

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College of Veterinary sciences, Jabalpur

Five tigers of Panna National Park were anaesthetised in order to install beacon radio (Radio Collar). The planning strategy is presented. The tigers were anaesthetised with Medetomidine and Ketamine.

#### DOSE DEPENDENT VARIATIONS IN THE BIOCHEMISTRY AND HAEMATOLOGY OF CSF AFTER SUBARACHNOID USE OF XYLAZINE HYDROCHLORIDE IN GOATS

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Xylazine was administered into the subarachnoid space through a polyethylene catheter placed at the lumbosacral space at 0.05, 0.07 and 0.1 mg /Kg body weight as groups I, II and III respectively. CSF was collected through the catheter immediately before xylazine administration and then at 24, 48, 72, 96 and 120 hours post anaesthesia to determine glucose, protein, chloride, sodium, potassium and neutrophils and lymphocytes. A significant ( $P < 0.5$ ) increase in CSF glucose, protein and chloride was noticed in all the three groups. The values in group I recorded at different time intervals did not differ significantly from the corresponding values of group II at specific time interval. However, the values recorded in group III differed significantly from the corresponding values of group I at specific time interval. Neutrophils and lymphocytes were seen in CSF sample after xylazine administration. The neutrophils were rare in group I, a few were seen in group II and were frequent in group III. Biochemical and haematological values returned to normal earlier in group I than in group III.



## STUDIES ON POTENTIATION OF EPIDURAL CENTBUCRIDINE HYDROCHLORIDE WITH ANALGESICS IN DOGS - BIOCHEMICAL ATTRIBUTES

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Jabalpur, (M.P.)

Six, healthy, non-descript adult dogs weighing 10 – 15 Kg were used for the experiment. Atropine sulphate was administered @ 0.05 mg/ Kg body weight IM to each animal. In treatment I atropine followed by centbucridine hydrochloride was administered @ 1.0 mg/ Kg body weight epidurally, whereas in treatments II and III centbucridine was followed by epidural administration of xylazine @ 0.75 mg and pentazocine @ 2.0 mg/ Kg body weight respectively. Blood samples for biochemical studies were collected prior to treatment and subsequently at 1, 3, 6, 12, 24, 72, 96 and 120 hours post treatment. Blood glucose and serum alkaline phosphatase revealed non-significant increase in all the three treatments. Serum protein level increased significantly in treatment II and III, whereas significant increase was observed in treatment I. Similarly significant rise in the values of blood urea nitrogen was recorded in all the three treatments. The serum glutamic pyruvic transaminase, icterus index and blood creatinine revealed non-significant variations in all the treatments.

## PROPOFOL WITH AND WITHOUT XYLAZINE AND MEDETOMIDINE FOR GENERAL ANAESTHESIA IN GOATS

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The study was conducted in 12 adult female goats weighing 15-23 kg., randomly divided into three groups A, B and C, of 4 animals each. In animals of group A, anaesthesia was induced by i.v. administration of Propofol, whereas in animals of groups B and C, Xylazine (0.05 mg/kg) and Medetomidine (10ug/kg), respectively, administered i.v., 5 min prior to induction of anaesthesia with Propofol. Animals were observed for total dose of Propofol required to induce anaesthesia, duration of surgical anaesthesia, duration of complete recovery, heart rate, respiration rate and rectal temperature at various intervals upto 1 hr. Dose of Propofol required to induce anaesthesia was  $5.65 \pm 0.39$  mg/kg in group A which reduced to  $4.0 \pm 0.56$  and  $3.73 \pm 0.46$  in animals of groups B and C respectively. Duration of anaesthesia and complete recovery time also increased in groups B and C compared to group A. HR and RR did not change in group A but slight decrease was recorded in groups B and C. Changes in HR and RR were significant in groups B and C at a few intervals. Changes in RT were not substantial in any of the groups. Results of the study indicated that Propofol is safe for short duration of anaesthesia in goats which could be improved by prior administration of Xylazine or Medetomidine.

## USE OF EPIDURAL BUPIVACAINE AND COMBINATION OF XYLAZINE-KETAMINE FOR PRE-EMPTIVE ANALGESIA IN GOATS

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The study was designed to evaluate the utility of epidural bupivacaine and a combination of xylazine and ketamine for pre-emptive analgesia for the management of post-traumatic pain in goats. Twelve healthy non-descript adult goats of either sex were divided in 3 equal groups. A, B and C. Turpentine oil (0.15 ml.) was injected



hock joint of all the goats which served as control. Bupivacaine HCl (1 mg/kg), xylazine + ketamine (0.05 mg/kg + 2 mg/kg) and normal saline (4 ml) were injected epidurally at lumbosacral space 30 min. after injection of turpentine in animals of groups A, B and C respectively. In addition, all the animals also received diclofenac sodium @ 1 mg/kg for 5 days. Status of post-traumatic pain was assessed for 7 days by recording changes in post-traumatic swelling, warmth, joint flexion and extension angles, hyperalgesia and movement associated pain scores. Significant ( $P < 0.01$ ) increase in girth of the affected joint was recorded throughout the period of observation in group C but swelling in groups A and B subsided remarkably by 3-4 days. Joint warmth followed the pattern of swelling. Increase in flexion angle was accompanied by decrease in extension angle in all the groups but changes were more pronounced in animals of group C. hyperalgesia subsided in group A and on 4<sup>th</sup> day but it persisted upto end in the group. Similarly pain score was more in animals of group C as compared to animals of group A and B. The changes between the groups A and B were not significant and both the drugs appeared to have induced pre-emptive analgesia in goats. The results of the study suggested that epidural bupivacaine and xylazine-ketamine if used before trauma/surgery may reduce pre-emptive post-traumatic pain and may, therefore, be useful in clinical cases of hindquarter surgery.

### **XYLAZINE AND KETAMINE FOR CAUDAL EPIDURAL ANALGESIA IN BUFFALO CALVES**

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The study was conducted in 10 buffalo calves of 8 to 12 months of age divided in two groups A and B. In group A, xylazine (0.1 mg/kg) and in group B, ketamine and xylazine (2.5 mg/kg and 0.1 mg/kg) was injected at sacrococcygeal epidural space. The drugs/combinations were evaluated on the basis of clinicophysiological, haematological and biochemical parameters at different intervals up to 120 min. The onset of analgesia at perineal region was 5 to 15 min. in group A and 2 to 5 min. in group B. Mild to moderate analgesia of tail, perineum and hind limbs was seen in the animals of group A. Whereas complete surgical analgesia of these regions was observed in the animals of group B. Flank, thorax and ventral abdomen showed mild to moderate analgesia in group B animals. Group A animals remained standing whereas, group B animals showed moderate ataxia and sternal recumbency at different intervals. No sedation was observed in group A animals and it was mild in group B. Duration of analgesia was 60 to 90 min. in group A and 160 to 180 min. in group B. Cardiovascular depression was seen in both groups throughout the period of observation. RR and RT did not show any significant change in both groups. Haematological parameters like Hb, PCV, TLC and TEC decreased in both groups at different intervals and started to recover at 24 hrs. The results of the study showed that ketamine and xylazine produced surgical analgesia of perineum and hind quarters with cardiovascular depression. Xylazine, on the other hand, produced mild to moderate analgesia of these regions.

### **COMPARISON OF XYLAZINE AND BUPIVACAINE FOR LUMBOSACRAL EPIDURAL ANALGESIA IN BUFFALO CALVES.**

*K. Pratap, Amarpal and P. Kinjavdekar*  
Division of Surgery, I.V.R.I., Izatnagar.

The study was conducted in 10 male buffalo calves of 8 to 12 months of age divided in two groups A and B. In group A, Xylazine (0.1 mg/kg) and in group B bupivacaine (0.125 mg/kg) were injected epidurally into the lumbosacral space. Both treatments were compared on the basis of clinical, physiological, haematological and biochemical parameters at different intervals up to 120 min. The onset of analgesia was recorded within 2 to 10 min. in group A and it was considerably delayed (10 to 40 min.) in group B. The animals of group A, remained standing but ataxia was seen after 15 min. post injection in group B and two animals assumed sternal recumbency. In group A, excellent analgesia of tail, perineum, hind limbs, flank and ventral abdomen was observed for 60 to 75 min.



in three animals and 90 to 120 min. in two animals. However, group B animals showed mild to moderate analgesia of tail, perineum and hind limbs from 10 min. onwards after injection. The duration of analgesia was 135 to 295 min. in group A and 490 to 530 min. in group B. Sedation was moderate in group A; group B animals remained alert. Cardiopulmonary depression was seen in group A and cardiovascular depression in group B was recorded. Hypothermia was noted for a longer period in group A. However, it did not show any significant change in group B. Haematological parameters like Hb, PCV, TLC and TEC decreased in both groups at different intervals and started to recover at 24 hrs. The results of the study showed that xylazine produced excellent analgesia of hind quarters and flank. Bupivacaine on the other hand, produced mild to moderate analgesia of these regions.

### **XYLAZINE AND ITS COMBINATION WITH KETAMINE AND BUPIVACAINE FOR LUMBOSACRAL EPIDURAL ANALGESIA IN BUFFALO CALVES**

*K. Pratap, P. Kinjavdekar and Amarpal*  
Division of Surgery, I.V.R.I., Izatnagar

The study was conducted in 10 male buffalo calves of 8 to 12 months of age divided in two groups A and B. In group A, ketamine and xylazine (2.5 mg/kg and 0.1 mg/kg) and in group B, bupivacaine and xylazine (0.5 mg/kg and 0.1 mg/kg) were injected into the lumbosacral epidural space. The treatments were compared on the basis of onset, extent, depth and duration of analgesia, recovery time, physiological, haematological and biochemical changes at different intervals up to 120 min. The onset of analgesia was 2 to 8 min in group A and 5 to 10 min in group B. Group A animals showed ataxia 5 min. after injection and three animals assumed sternal recumbency. However, ataxia was delayed in group B (15 to 20 min.) and four animals assumed sternal recumbency. Surgical analgesia of tail, perineum, hind limbs and flank was observed in group A animals. Group B animals showed surgical analgesia of tail, perineum and hind limbs. Mild to moderate analgesia of abdomen and thorax was observed in both groups. Sedation was mild in group A animals but group B animals remained alert. Duration of analgesia was 245 to 295 min. in group A and 320 to 410 min. in group B. Cardiopulmonary depression was seen in both the groups. Rectal temperature decreased after 45 min. in group A however, it did not show any significant change in group B. Haematological parameters like Hb, PCV, TLC and TEC decreased in both groups at different intervals and started to recover at 24 hrs. The results of the study showed that ketamine and xylazine produced excellent surgical analgesia of hind quarters and flank as compared to bupivacaine and xylazine which showed only analgesia of hind quarters only.

### **CENTBUCRIDINE HYDROCHLORIDE ALONE AND IN COMBINATION WITH XYLAZINE AS AN EPIDURAL ANALGESIC IN COW CALVES : CLINICAL AND HAEMATOLOGICAL STUDIES**

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Six apparently healthy male calves aged 6–12 months and weighing 70–100 kg were used. Each calf was subjected to four treatments at an interval of 8 days. In treatment I and II centbucridine hydrochloride was administered @ 0.3 mg and 0.8 mg/kg body weight respectively at lumbosacral space, whereas in treatment III and IV xylazine was administered @ 0.05 mg/kg body weight, simultaneously after the administration of centbucridine in treatment I and II respectively. The rectal temperature, pulse and respiration rate were recorded prior to treatment and at 20, 40, 60 minutes and at one hour interval up to 6 hours post treatment. The blood samples for haematological studies were collected at 0, 1, 3, 6, 12, 24, 48, 72, 96 and 120 hours post treatment. The time for onset of analgesia was  $15.5 \pm 1.86$ ,  $14.66 \pm 2.0$ ,  $13.33 \pm 1.92$  and  $11.83 \pm 1.03$  minutes, whereas the duration of analgesia was  $97.66 \pm 14.48$ ,  $133.33 \pm 12.29$ ,  $163.33 \pm 6.14$  and  $172.33 \pm 14.69$  minutes in treatment I, II, III and IV respectively. The time for complete recovery from analgesia was  $200.00 \pm 14.48$ ,  $299.16 \pm 16.13$ ,  $352.5 \pm 8.64$  and  $374.16 \pm 20.39$  minutes in treatments I, II, III and IV respectively. Significant increase in rectal temperature, pulse and respiration rate





observed at different time interval. Increase in total erythrocyte and leukocyte count, decrease in haemoglobin concentration and variation in packed cell volume were not significant. Significant increase in neutrophil and eosinophil count was recorded at different intervals, whereas lymphocyte count showed significant decrease in all the four treatments.

### STUDIES ON DOSE DEPENDANT MIDAZOLAM—KETAMINE ANAESTHESIA IN DOGS

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Experiment was conducted on six adult dogs. Three successive treatments were given to each dog with an interval of 8 days. Atropine sulphate was give I/M @ 0.05 mg/kg body weight 10 min. prior to each treatment. Midazolam was given @ 0.2, 0.3 and 0.4 mg/kg body weight I/V in treatments I, II and III respectively followed by Ketamine hydrochloride I/V @ 20 mg/kg body weight after 5 min. Clinical, haematological and biochemical parameters were studied. Onset of anaesthesia recorded with treatment I, II and III was 54.66, 34.16 and 26.66 min respectively. Duration was 34.58, 44.24 and 47.99 min. with complete recovery by 146.83, 158.16 and 189.33 min respectively. The rectal temperature differed significantly between all the three treatments, though not significant at various intervals. Increase in pulse and respiration rate were highly significant at intervals but of transient nature. TEC, TLC, Hb, PCV, and DLC changes recorded were of transient nature. Serum GOT and ALP showed significant increase following all the three treatments, while serum icterus index changes were non significant. Blood urea nitrogen differed significantly in treatment I in comparison to II and III but increase within intervals were not significant. Blood creatinine changes were not significant between treatments and at intervals.

### EFFECT OF EPHEDRINE IN REVERSING KETAMINE-XYLAZINE ANAESTHESIA IN RABBITS

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A study was undertaken to assess the efficacy of ephedrine as a reversing agent in ketamine-xylazine anaesthesia in rabbits. Three groups of rabbits (8 each) were anaesthetised with 5 mg/kg xylazine and 50 mg/kg ketamine administered at 15 minutes interval. Group I served as control, group II and III were given ephedrine 10 mg and 20 mg/kg body weight respectively at the middle of anaesthesia. The anaesthetic parameters like sequence and time of disappearance and reappearance of righting, corneal, palpebral, ear twitch and hind limb pedal reflex. duration of anaesthesia, arousal and recovery time were observed. The temperature, pulse rate and respiration rate were recorded at specific intervals. Haemogram was also studied before, during and after anaesthesia. The sequence and time of disappearance of reflexes are as follows. Righting reflex was the first to disappear followed by hind limb pedal, corneal, palpebral, eartwitch and hind limb pedal reflex. The time of reappearance of reflexes of treated groups reduced significantly from controls. In treated groups, the anaesthetic duration was significantly reduced. Results of the study indicated that ephedrine can be used as a reversing agent in ketamine-xylazine anaesthesia.

### ANAESTHESIA USING KETAMINE AND XYLAZINE IN PIGEON AND QUAILS

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The present study was undertaken to assess the efficacy of ( i ) Xylazine (ii ) Ketamine hydrochloride and (iii) Xylazine followed by Ketamine hydrochloride, for anaesthetising pigeons (*Columba livia*) and quails (*Coturnix Coturnix japonica*). The drugs were administered intraperitoneally. During the onset of anaesthesia, loss of balance, ruffling of feathers, sitting posture, recumbency, abolition or sluggishness of pedal reflex were observed. Corneal reflex, palpebral reflex and third eyelid movement persisted during anaesthesia. Eyes remained

closed. The time for induction, the duration of anaesthesia and recovery were satisfactory. During anaesthesia significant reduction in the temperature and respiration rate were observed. Significant reduction in the total erythrocyte count, total leukocyte count, lymphocyte count and haemoglobin content were observed. Incising and drying the skin and the wall of the crop did not evince any response. Mild fatty changes in the liver and congestion of the surface of the kidneys were observed.

#### **DOSE SPARING EFFECT OF EPIDURAL KETAMINE ON THIOPENTAL ANAESTHESIA IN DOGS UNDERGOING REPAIR OF TIBIAL FRACTURE**

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Sixteen adult dogs were divided in four groups (I, II, III and IV) of four animals each. The creation and fixation of the tibial fracture was done under general anaesthesia induced using atropine-triflupromazine-thiopental sodium along with epidural analgesia induced by lignocaine HCl (@ 4 mg/kg), ketamine HCl (@ 3mg/kg) and pethidine HCl (@ 2 mg/kg) in groups II, III and IV respectively. In animals of group I, instead of epidural analgesia, 2 ml of placebo (normal saline) was injected. Atropine sulphate (@ 0.045 mg/kg) was administered subcutaneously followed ten minutes later by triflupromazine HCl and pethidine HCl were administered epidurally in groups I, II, III and IV respectively. After a gap of another ten minutes, anaesthesia was induced in all groups using 2.5% solution of thiopental sodium given "till effect" intravenously. Overall average dose required for induction was 15.37 mg/kg body weight. Mean duration of surgery in groups I, II, III and IV was 67.50 ± 8.89, 60.00 ± 5.40, 67.50 ± 12.50 and 68.75 ± 3.14 min respectively which didn't differ significantly. The frequency of administration of thiopental sodium for maintenance ranged from 1-3, 1-2, 1-3 and 2-3 in groups I, II, III and IV respectively. The total dose of thiopental required to induce and maintain the anaesthesia for entire duration of surgery was 40.31 ± 5.82, 30.50 ± 5.80, 32.18 ± 3.69 and 35.00 ± 3.49 mg/kg body weight in groups I, II, III and IV respectively. The total dose of thiopental to induce and maintain the anaesthesia also didn't differ significantly. The total dose of thiopental to induce and maintain the anaesthesia for each minute of surgery was found to be 0.60, 0.51, 0.48 and 0.50 mg/kg in groups I, II, III and IV respectively. The minimum dose of thiopental per kg/min of surgery was required in group III, followed by groups IV, II and I. Epidural ketamine (groups III) has maximum dose sparing effect on thiopental sodium.

#### **ANAESTHETIC MANAGEMENT OF TIGERS FOR SEMEN COLLECTION**

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Ten tigers of Nandankanan Zoo were subjected to electro ejaculation under Ketamine and Xylazine anaesthesia. The dose and anaesthetic management for control of Tigers were studied.

#### **ANAESTHETIC MANAGEMENT OF A LEOPARD FOR LIMB AMPUTATION**

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A Leopard aged about three years belonging to I.G. Park, Rourkela was suffering from haemangiopericytoma and self mutilated wound. The limb was amputated under Atropine, Xylazine and Ketamine anaesthesia. Mode of anaesthetic management for surgery is described.

#### **DISTAL PARAVERTEBRAL BLOCK FOR FLANK ANALGESIA IN GOATS**

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The 13<sup>th</sup> thoracic, first and second lumbar spinal nerves were blocked, on their course using 5ml. of 0.25% Bupivacaine hydrochloride solution in six Alpine - Malabari crossbred male goats. The site chosen was just above and below the anterolateral edges of the transverse processes of the first, second and third lumbar vertebrae and 13<sup>th</sup> thoracic, first and second lumbar spinal nerves respectively. The time for onset of analgesia was 3.5 ± 0.5



and the duration of analgesia was  $244.8 \pm 67.53$  min. Analgesia extended all over the flank, except for two triangular areas on the antero-dorsal and postero-ventral region of the flank and at the preputial orifice and the skin around it. Analgesia of all layers of abdominal wall was obtained with satisfactory muscle relaxation. Four animals showed limping and knuckling on the hind limbs on the side of infiltration until their recovery from analgesia.

### ANAESTHETIC REGIMEN FOR LAPAROSCOPIC SURGERY IN SWINES

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The study was conducted in 176 pigs in the age group of 4 to 6 months during the period of 1997 to 2000 for laparoscopic experimental surgery. All the animals were fasted for 12 hrs, premedicated with Atropine sulphate (0.04 mg/kg I/M), Pentazocine hydrochloride (2 ml I/M) and Ketamine hydrochloride (10 mg/kg I/V). The animals assumed lateral recumbency within 5 minutes after premedication. Anaesthesia was induced using 2.5% thiopentone sodium at the rate of 30 mg/kg body weight. For short laparoscopic surgeries like exploration of abdomen, suture techniques and cobra drill, the anaesthesia was maintained by giving incremental doses of thiopental. For long surgical procedures like cholecystectomy and ovariectomy, the anaesthesia was maintained with halothane 2.5%. All the animals showed satisfactory analgesia of longer duration with rapid induction, good muscle relaxation and smooth recovery. It was concluded that the above anaesthetic regimen proves to be safe in pigs for practising laparoscopic surgery.

### EFFECT OF KETAMINE-XYLAZINE ON THE VITAL ORGANS - AN EXPERIMENTAL STUDY

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The study was conducted on 18 apparently healthy bull calves of varying age and body weight. The animals were divided into three groups and the anaesthetics were administered for 7 consecutive days at the rate of 0.2 mg/kg of Xylazine in group I, 5 mg/kg of Ketamine in group II and 0.2 mg/kg of Xylazine and 2 mg/kg of Ketamine in group III. The calves were euthanised on the eighth day and the vital organs were subjected to gross and histopathology examination. In the Xylazine treated animals, the liver showed focal fatty changes and the brain revealed mild gliosis, whereas in the Ketamine treated group, the changes in the liver and brain were insignificant. However, the kidneys revealed hyperaemia and tubular cell swelling with erythrocytic extrusion in their lumina. In Ketamine-Xylazine combination group, no significant changes were noticed in the kidney, liver and brain. In all the three groups, the heart remained unaffected though the spleen showed some inconsistent changes. In the present study, histopathological changes observed in liver, brain and kidney of the animals of group I and group II were probably not severe enough to reflect a systemic change in the enzyme levels. Nevertheless, it was worth noticing that even these trivial changes were absent when ketamine was used in combination with Xylazine.



## SESSION IV — RADIOLOGY AND IMAGING TECHNIQUES

COMPARATIVE STUDY ON ULTRASONOGRAPHIC AND RADIOGRAPHIC FINDINGS FOR  
THE DIAGNOSIS OF PYOMETRA IN CANINES*Mahind, K.B., Sarkate, L.B and Lokhande, D.U.**Department of Surgery***Bombay Veterinary College, Parel, Mumbai**

A total of 16 clinical cases of pyometra were studied using ultrasound and radiography. Lateral and dorsoventral radiographs of each case were performed at the time of clinical examination. Transabdominal ultrasonography was performed by using a static B- scan instrument, and a 3.5/ 5.0 MHz curved array dual frequency transducer. Ultrasonography was performed either in dorsal or in right lateral recumbency. Routine plain radiography failed to diagnose three cases of pyometra. These cases did not show clear or distinct uterine distension on radiography. In all except one of the 16 cases, ultrasonography clearly visualised the uterus as a fluid filled structure. Distended uterus was not visible either on dorsal or lateral scanning in one case. However, scanning of the uterus in standing position revealed the mild distension of uterus. The size of the distended uterus ranged from 0.6 to 7.8 cm. Gross specimen collected following ovariohysterectomy agreed with the diameter of the uterus observed on ultrasonography. Distended uterine horns and body were easily identified cranial and dorsal to the urinary bladder. Most of the cases showed presence of echogenic internal debris that moved in response to the transducer pressure on real time scanning. Far enhancement was seen in most of the cases, suggesting the fluid nature of contents. Uterine horns were either linear or convoluted. Uterus appeared partitioned because of tortuous nature of uterine horns.

GELATINE, FIBRIN AND AMNION CASINGS FOR URETHRAL HEALING IN DOGS :  
A RADIOGRAPHIC STUDY*Makkeena Sreenu, T.P. Sastry and T.S. Chandrashekhara Rao**Department of Surgery and Radiology***College of Veterinary Science, A.N.G.R.A.U., Tirupati**

A total of 32 animals were randomly divided into two major groups, further divided into four subgroups. Prescrotal urethrotomy was performed in both the groups. The urethral incision was wrapped with gelatine, fibrin and amnion in treated subgroups, while one sub group from each group was kept as control with out applying any biomaterial. Retrograde urethrograms were taken at 7, 14, 30 and 60<sup>th</sup> postoperative day in both the groups to study the urethral healing. Early urethrograms of urethrotomy group showed no leakage at the operative site while urethrostomy group showed potential leakage of the contrast media into the periurethral space. In the later stages control and gelatine wrapped urethra showed mucosal irregularities and stricture formation. The fibrin and amnion wrapped animals showed patent urethral lumen. The control and gelatine treated animals of group II showed fistulation and mucosal irregularities while fibrin and gelatine treated animals of the same group showed widened urethral lumen at the operative site.

## OSTEOMEDULLOGRAPHY OF LONG BONES IN DOGS – AN EXPERIMENTAL STUDY

*Rajbir Singh, S.K. Chawla, A.P. Singh, Rishi Tayal and S.M. Behl**Department of Veterinary Surgery and Radiology***College of Veterinary Sciences, CCSHAU, Hissar**

Osteomedullography of the tibia and radius was conducted in both the limbs of 16 adult healthy dogs. The animals were divided into two groups of 4 and 12 dogs each. The dogs of first group were used to standardise the technique. The 12 dogs of second group were used to study the venous circulation using tourniquet and phlebocompression techniques. A total of 24 trials each in tibia and radius were conducted, using both techniques equally (12 each). In six trials, the contrast material (Sodium Iothalamate) was injected into distal metaphysis. Radiographic exposures obtained at the last phase of injection of contrast materials provided excellent osteomedullographic details and demonstrated most of intra and extra osseous venous channels of the



Phlebocompression technique demonstrated all the components of intrasosseous system more clearly, while tourniquet method visualised extraosseous vessels also. Introduction of the contrast material in the proximal metaphysis resulted in better filling of both ascending and descending medullary vessels, but failed to opacify the distal metaphyseo-epiphyseal venous system. The intra osseous venous system consisted of central medullary vein, metaphyseo-epiphyseal veins, venous sinusoids endosteal veins and nutrient vein. The contrast material quickly drained out of the bone.

### **RADIOGRAPHIC ANATOMY OF THE FEMORO-PATELLAR AND FEMORO- TIBIAL JOINTS IN CALVES**

*Sanjay Droya, S.M. Behl, Rishi Tayal, S.K. Chawla and A.P. Singh*  
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CCSHAU, Haryana

Radiographic anatomy of the femoro-patellar and femoro-tibial joints were studied in calves on plain medio-lateral (ML), flexed ML and caudo-cranial (CaCr) projections. The trochlea of the femur and patella were clearly discernible only on the ML and flexed ML views. The ridges of the trochlea and their relationship with patella at different degrees of flexion of the joint were observed. The caudo-cranial view seemed to be an ideal one for clear visualization of the femur, intercondyloid eminences.

### **SONOGRAM IN THE DETECTION OF AETIOPATHOLOGY : A CLINICAL APPLICATION IN CANINE ASCITES**

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A four year old, male Dachshund was presented with symptoms of anorexia, depression, vomiting, distended abdomen, reluctance to walk and dyspnoea. Clinical examination and exploratory abdominocentesis revealed accumulation of clear, watery fluid in the peritoneal sac with out any microscopical evidence of presence of any atypical cell confirming it as ascitic fluid. To find out the exact cause of the 'Hydras Ascites' ultrasonography was decided upon, and the sonographic scanning confirmed that liver cirrhosis with portal hypertension was the underlying aetiology.

### **COMPARISON OF ULTRASONOGRAPHIC AND AIR-TENDOGRAPHIC FINDINGS FOR EVALUATION OF SEVERED ACHILLES TENDON IN DOGS - A CLINICAL STUDY**

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Ultrasonography and air-tendography were performed in three clinical cases of severed Achilles tendon in dogs. In two dogs complete severing and in one partially severed Achilles tendon was diagnosed. Ultrasonography provided additional advantage of diagnosing the partial rupture of Achilles tendon as compared to air-tendography which showed only increase in soft tissue density i.e. tendon thickening. Sonography also helped in characterizing the architecture of the tissue filling the gap as a result of severing of the tendon. Completely severed Achilles tendon was diagnosed with help of ultrasonography and air-tendography.



## SESSION V — ORTHOPAEDIC SURGERY

**OSTEOINDUCTIVE PROPERTY OF FRESH AND PRESERVED FOETAL CORTICAL ALLOGRAFTS IN DOGS***Rajesh, K.U., Sharma, V.K., Kumar, A., Bhatt Vaishali and Jadon, N.S.*

Department of Surgery and Radiology

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Study was conducted in 27 clinically healthy adult mongrel dogs of either sex divided equally into groups A, B and C. In each animal a graft bed was created on the cranial mid-diaphysis of right radius by removing a 1 x 1 cm. thick cortical bone. The graft bed in group 'B' was filled with fresh and in group 'C', 20-25 days graft preserved in a medium containing dextrose saline and antibiotics at 4 degree Celsius temperature. The cortical long bone grafts were harvested from 40-45 days old fetuses obtained by hysterectomy performed within 30 minutes following death of bitches met with accident and brought to clinics for treatment. Graft bed in group A remained unfilled and served as control. The clinical, radiographic, angiographic, microangiographic, histological, histochemical and tetracycline labelling studies at 15<sup>th</sup>, 45<sup>th</sup> and 60<sup>th</sup> post-transplantation days revealed early vascularization of the graft at 15<sup>th</sup> day and complete host graft union at 45<sup>th</sup> day with fresh graft whereas preserved graft showed delayed vascularization of graft and complete union of host graft junction at 60<sup>th</sup> day. Based on this study it was concluded that both fresh and preserved foetal cortical bone allografts possessed osteogenic and osteoinductive properties, though the rate of osteogenesis was better in fresh grafts than the preserved grafts.

**A HISTOMORPHOLOGICAL STUDY OF INDUCED TRAUMATIC ARTHRITIS IN BUFFALO CALVES (*Bubalus bubalis*)**

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Acute traumatic arthritis was induced in left radiocarpal joint with intra articular injection of 1.0 ml turpentine oil in twenty clinically healthy male buffalo calves which were divided into four groups of five animals each. The histopathological study of control group (A) of animals showed marked inflammatory reaction, hyperplastic and proliferative changes in synovial lining cells, villus hyperplasia and hypertrophy, extensive proliferation of capillaries and haemorrhage in subintimal layer of synovial membrane. The articular cartilage showed denudation with moderate to severe fibrillation of tangential layer, degeneration of chondrocytes with decrease in their number and abnormal aggregation of chondrocytes in deeper layer with degeneration and necrosis. Response to treatment was better in group C in which autogenous synovial fluid was transfused in combination with prednisolone and gentamicin sulphate where synovial membrane and articular cartilage appeared near normal. In group B, fresh autogenous and fresh homogenous synovial fluid respectively were transfused. Similar histological changes were observed but it was comparatively more pronounced in group D.

**TREATMENT OF COMPOUND METACARPAL FRACTURE IN A WHITE TIGER CUB**

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One white tiger cub of Nanadankanan Zoo sustained compound fracture of right metacarpus. The cub was sedated with 50 mg. Xylazine and 100 mg. Ketamine hydrochloride. An additional 50 mg. of ketamine was administered intravenously in D.N.S. 5% during the course of treatment. X-ray of the region showed fracture of 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> metacarpal bones at proximal ends. The lacerated wound was sutured after cleaning the area with povidone iodine solution. A drainage tube was fixed subcutaneously. A PVC pipe of suitable diameter with fenestrations was sleeved to the limb and secured with gauze. The wound was dressed on alternate days with mild sedation with xylazine in a squeeze cage. Parenteral administration of Taxim 500 mg. B.D. was continued for 7 days. The cub had uneventful recovery and started bearing weight on the affected limb from 20<sup>th</sup> day.





## BIOCHEMICAL AND HISTOPATHOLOGICAL EVALUATION OF FRACTURE OF DISTAL THIRD OF RADIUS AND ULNA IN DOG

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The experiment was conducted in 15 adult mongrel dogs divided randomly into three equal groups. A transverse fracture of distal third of radius and ulna was created and repaired with stainless steel plating (Gr A), external skeletal fixation with transfixation pinning (Gr. B) and plaster of Paris gutter splint (Gr. C). All the animals were maintained upto 60 days after surgery. The different fixation techniques were evaluated on the basis of haematobiochemical and histopathological observations. Leukocytosis with neutrophilia was observed in the early post operative period in all the animals. Serum alkaline phosphatase activity showed an early increase from day 1 onwards which increase to significant level by day 7 in all the animals irrespective of groups. No significant variation was seen in total leukocyte counts, differential leukocyte count and serum alkaline phosphatase activities among different groups at any interval. Gross observation of the fracture site was done after euthanising the animals at the end of observation period. Soft tissue healing was complete with no signs of infection in all the animals except one in group C. In all the animals of group A, stainless steel plates were encapsulated in a fibrous covering. Primary bone union was noticed in radius, but ulna was not united in any of the animals. In group B primary bone healing without external callus was noticed in radius. Both radius and ulna united in this group, and architecture of the bone appeared near normal when compared to contralateral limb. In group C fracture united only in two animals with extensive external callus. In other 3 animals non union was evident as the fragments were easily movable. Healed bone appeared thick, shortened and architecture of the bone was lost when compared to contralateral limb. Histopathological studies revealed early fracture healing in animals of group A and B with the process of remodelling but in group C healing was relatively much slower. Classical secondary bone healing was seen in the animals of group C with evidence of cartilage filling the fracture gap and new bone replacing the cartilage of the fracture ends.

## REPAIR OF METACARPAL FRACTURE IN CALVES USING EXTERNAL SKELETAL FIXATOR AND TRANSFIXATION PINNING WITH CAST - AN EXPERIMENTAL STUDY

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Transverse, mid-shaft metacarpal osteotomy in twelve calves were treated : Six by transfixation pinning with cast (TPC) and the remaining six by transfixation using bilateral type II external skeletal fixator (ESF). ESF group calves bore weight and walked normally after recovery from anaesthesia while calves of TPC group showed perceptible lameness. Radiography revealed complete obliteration of the fracture gap by a compact callus in TPC group and direct cortical union with negligible callus in ESF group. A mean fracture healing time of 45 days and 30 days were observed in TPC and ESF group respectively. The morbidity score was significantly higher ( $p < 0.05$ ) in TPC group compared to ESF group. Histopathology revealed formation of cartilage and woven bone in TPC group and lamellar bone in ESF group. Transfixation cast technique was good as it provided adequate maintenance of reduction, joint mobility and early return to weight bearing status while transfixation with external skeletal fixator was superior as it offered precise anatomic alignment, absolute stability and consistently better bone healing.

## EVALUATION OF EFFECTS OF SODIUM IOTHALAMATE ON ARTICULAR TISSUES IN CALVES

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Effect of positive contrast medium on articular tissue was evaluated in calves by injecting 6 ml. of Sodium Iothalamate, 70% w/v (Sunray 420) and Ringer's Lactate Solution (control) respectively, in left and right tibio-tarsal joints. Clinical status, physical, cytological and biological observations of synovial fluid and histopathological studies

of synovial membrane and articular cartilages suggested that intra-articular injection of Sodium Iothalamate (70%) was no more irritating to the articular tissues of cow calves than the injection of equal amount of Lactated Ringer's solution.

### **SURGICO-CHEMICAL TREATMENT OF A BILATERAL IDIOPATHIC SYNOVITIS (BOG SPAVIN) IN A STALLION**

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A stallion about 10 years old was admitted to the clinic with the history of Bog Spavin which was treated by Veterinarians with blisters, needle point firing, repeated aspirations of contents and injections of Tr. iodine, Corticosteroids and antibiotics to dispell the synovial distensions. The author tried synoviotomies on each distension after giving sedation and then evacuated the contents and applied finely ground copper sulphate in a thin layer on the interior of each distension and then the opening was plugged with absorbent cotton and applied pressure bandage around each hock. The bandage was removed on 8<sup>th</sup> day. The cotton plugs came out with denuded synovial mucous membrane. Then the wounds were dressed with Zinc Oxide every 4<sup>th</sup> day and by 3 dressings the wounds were healed and blemishes disappeared and the stallion was found sound. Recurrence of synovial distension was not noticed even after 1 year.

### **EVALUATION OF INTERNAL FIXATION TECHNIQUES IN THE MANAGEMENT OF COMMUNUTED FEMORAL FRACTURE IN DOGS**

*B. Sravanan, S.K. Maiti, M Hoque, G.R. Singh, Naveen Kumar and H.P. Aithal*

Division of Surgery

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The study was conducted in 15 clinically healthy adult mongrel dogs of either sex randomly divided into three equal groups (A, B and C). In all the animals, unilateral comminuted diaphyseal fracture was created under thiopental anaesthesia and immobilized with intramedullary pinning with cerclage wiring (Group A), dynamic compression bone plating (DCP) (Group B) and dynamic compression bone plating with cerclage wiring (Group C) respectively. Blood/serum was collected from each animal on days 0, 1, 3, 7, 15, 30, 45 and 60 postoperatively. From the collected blood was utilised for the determination of TLC and DLC, whereas, serum samples were used for the estimation of alkaline phosphatase, acid phosphatase, calcium and inorganic phosphorus. Leukocytosis with neutrophilia and monocytosis was observed in the different postoperative period in all the animals. No significant variation was seen in total leukocyte (TLC) and different leukocyte counts (DLC). Serum alkaline phosphatase activity was significantly increased in animals of groups A and B from day 7 onwards and reached maximum on days 60 and 45 respectively, whereas in group C, it was increased from day 3 onwards upto day 45 postoperatively and then decreased to normal by day 60. A significant increase of serum acid phosphatase values was noticed on day 14 in all the three groups and reached towards normal values by day 60. Serum calcium level slightly increased in the early post operative period in all the groups, then it decreased on day 30 (Group A) and on day 15 (Group B and C), there after it increased gradually to attain normal values by the end of observation period. Serum inorganic phosphorus values fluctuated within the normal range in all the three groups throughout the observation period.





## MANAGEMENT OF METATARSAL AND RADIAL FRACTURES IN BULL CALVES USING CIRCULAR RING FIXATORS: A PRELIMINARY STUDY

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Four bull calves were used in the study. Midshaft fractures of metatarsus (through lateral approach) and radius (through medial approach) were created in two animals each and immobilised using Ilizarov ring fixators under ketamine-xylazine anaesthesia. The ring fixators developed using mild steel consisted of eight half rings (4 full rings) and 12 threaded side bars (4-5 inch long, 8 mm diameter, 4 between rings). Each ring was made of 4 mm thick 2 mm wide M.S. strips, measuring 15-18 cm in diameter with 18-20 equidistant holes (10 mm diameter). Eight beaded wires (3.5 mm) were used as transfixation pins. Application of the fixator was easier in metatarsus than radius due to less soft tissue coverage. Good fracture reduction and alignment was achieved in both bones. All the animals tolerated the fixator well. Fixation was maintained until the end, no complications like bending of pins/side bars/rings was noticed indicating that four ring circular fixators could provide stable fixation of metatarsal and radial fractures. Common complications, however, included pin migration and pin tract infections in later stages.

## GROSS AND HISTOPATHOLOGICAL STUDIES FOLLOWING HOMOLOGOUS SYNOVIA TRANSFUSION IN TRAUMATIC ARTHRITIS IN EQUINES

*A.K. Gupta, A.C. Varshney, V.K. Gupta, M. Singh and S.K. Sharma.*

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Aseptic traumatic arthritis of tibiotarsal joint was induced by injecting 0.15 ml turpentine oil intra-articularly in 4 donkeys. Animal I was treated with 3 ml of fresh homogenous synovia intra-articularly, animal II with a combination of 1.5 ml of fresh homogenous synovia and 1.5 ml (37.5 mg) diclofenac sodium on 3rd post induction day, whereas animal III served as untreated control. Animal IV was sacrificed on 3rd day after induction of arthritis and its both affected and normal tibiotarsal joints were collected. On 20th post induction day all the remaining three animals were sacrificed and their test joints were collected. The joints were examined for gross lesions and thereafter processed for histological studies. Grossly the joints capsule on 20th post induction day approached normal appearance in animal II, remained slightly thickened in animal I and was congested, thickened and containing fibrinous exudate in animal III. The articular cartilage appeared normal in animal II, dull in animal I and pale, dull and dry in animal III with focal reddish patches. Histologically the joint capsule in animal II was recorded to almost normal and in animal I the intima was regenerating and thicker while the subintima contained immature fibrovascular tissue. Whereas in animal III there was complete loss of intima and some evidence of fibrovascular tissue coming up in subintima and in between the fibrous tissue bundles. The articular cartilage showed flaking of tangential zone in animal I and II and fibrillation extending unto transitional zone in animal III on 20th post induction day. Entire thickness of cartilage was devoid of chondrocytes in animal I and III, whereas the lower transitional and radiate zones had degenerating chondrocytes in animal II.



### MANAGEMENT OF MANDIBULAR SYMPHYSEAL FRACTURE IN A CALF - A CASE REPORT

*T.Sarada Amma, T.P. Balagopalan, S. Sooryadas, S. Anoop and S. SenthilKumar*  
Department of Surgery and Radiology  
College of Veterinary and Animal Sciences, Thrissur

A day-old Jersey cross bred calf was presented with dropping of the lower lip. Complete fracture of both mandibles at the symphysis was observed. Under mandibular nerve block the fractured fragments on each side were apposed with stainless steel wire passed through the drilled holes on the mandible, which corrected the position of lower lip. As a support to jaw bone an aluminium frame padded with cotton and bandage was applied. With the device in position the calf was able to suck milk and it was kept in position for 30 days. The wire sutures were removed on the 20<sup>th</sup> day. On 40<sup>th</sup> day, it was found that healing was complete.

### FRACTURE OF TUBERCALCIS IN A DOG - CASE REPORT

*Syam K. Venugopal, P.T. Dinesh, C.B. Devanand and T.P. Balagopalan*  
Department of Surgery and Radiology  
College of Veterinary and Animal Sciences, Mannuthy, Thrissur

A one year old German Shepherd male dog was presented to the Department of Surgery and Radiology with a complaint of not bearing weight on the left hind limb since one week. The animal had a fall from a height of 10 feet. Routine clinical examination revealed fracture of the tubercalcis of the left hind limb, which was later confirmed by radiography. The fractured os calcis was approached through a posterior curvilinear incision. Reduced the fracture and fixed with cortical screw of size 4.5mm X 45 mm and immobilised with a plaster of paris cast. Postoperatively the animal was administered a course of Ampicillin and Cloxacillin @ 10 mg/ kg body weight orally thrice daily. Radiograph taken after one month revealed complete healing of the fracture.

### CONGENITAL LUXATION OF PATELLA IN CANINES - CASE REPORTS

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Eight pups of different litters were presented with history of difficulty in walking and over extension of one or both limb(s). In one case, the pup was making unsuccessful attempts to get up. The age of the pups ranged from 2 weeks to 2 months. On anamnesis, it could be traced out that the dams of these pups were mated with a single stud dog. On examination of the affected limb, the patella was found to be luxated either medially or laterally from its normal position in the femoral trochlea. In six cases the condition was bilateral. On forceful flexion of the stifle joint, the patella was found to fall into its normal position. Radiography confirmed the clinical findings. In all the cases, the affected limb was immobilised in a flexed position (Stifle and hock) after correcting the luxation and injecting 0.1 ml of Tincture iodine on both sides of the patella. After immobilisation for one week, it was advised to give exercise for 15 minutes daily for two weeks with fixing the hock joints in a figure of '8' fashion using an elastic band. All the pups except one made uneventful recovery.



## COMPARATIVE EVALUATION OF OPEN AND CLOSED REDUCTION FOR THE MANAGEMENT OF HIP DISLOCATION IN CALVES

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A study was conducted to compare the efficacy of open and closed reduction along with external immobilisation in the management of coxofemoral luxation in calves. Coxofemoral luxation of the left hind limb was induced in 12 crossbred calves. Two methods of treatment were adopted. In one group, open reduction and fixation of the femoral head in acetabulum was effected by applying an extra articular sling using cortical screws and wires. In the other group, after closed reduction, immobilisation was effected by fixation of two Steinmann pins at the greater trochanter through the wing of Ilium and Tuber ischii and connecting the exposed end of the pins with an external fixation assembly. All the animals were able to get up and lie down with out assistance after correction and could bear weight partially on the operated limb from the day of surgery itself. Complete weight bearing while standing was noticed in two to four days time in all the animals. Dragging of toe was seen up to fourth postoperative day in animals in which open reduction was performed where as in the other group it was observed up to 23 days and disappeared after removal of the pins. Physiological parameters were within the normal range throughout the period of observation of 45 days. Variations in the haematological values were indicative of inflammation and stress after surgery. Radiographic studies confirmed the position of the femoral head and absence of recurrence. Gross morphological examinations revealed satisfactory healing and absence of local complications. The treatment was satisfactory, as correction effected in hip luxation was comparable in the two techniques.

## A SURVEY ON THE INCIDENCE OF BONE TUMOURS IN DOGS

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Department of Surgery, Madras Veterinary College, Chennai.

The data on the incidence of bone tumours were collected from the records of Radiological section and the out patient section of the Surgical Unit, Madras Veterinary College Hospital for a period of two years. German Shepherd (30%), Labrador (20%), Doberman (20%) and non-descript (30%) were the breeds of dogs reported with bone tumours. Among the 10 affected dogs six were females and four were males. The mean age of the affected dogs was 5.75 years with a range of 1.5 to 14 years. Humerus, Radius and tibia were the bones affected with bone tumours. The nature of the tumours was found to be osteosarcoma. Three dogs were subjected to surgery and the affected limbs were amputated. Others were euthenized owing to the extensive nature of the tumour.

## APPLICATION OF TRACING OF RADIOGRAPHS DURING SURGERY USING AO/ASIF PRINCIPLES

*S. Thilagar, S. Ayyappan, T.N. Ganesh, Ravi Sunder George and A. Kumaresan*

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The tracing of X-rays of three clinical and three experimental cases for measurement of screws and plate size were studied. The measured screw sizes were compared with screws applied. The difference between the measured screws and applied screws was  $\pm 2$ . The advantage of this method is to procure only required screws.

**OPEN REDUCTION AND INTERNAL FIXATION FOR BILATERAL RADIUS AND ULNA FRACTURES IN A DOG – A CASE REPORT**

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Peripheral Veterinary Hospital, Mahdavaram, Chennai.

A German Shepherd, 7 months old, bitch weighing 12 kg was referred to Peripheral Veterinary Hospital, Mahdavaram with the history of fallen from height. On physical examination, the animal was recumbent. Crepitus was heard on palpation at the midshaft radius and ulna bilaterally. The Radiographs revealed the presence of shaft fracture of left radius and ulna and colles fracture of right radius. Left radius fracture was treated with 8 hole 3.5 mm DCP and right radius with 8 hole 3.5 mm DCP. Postoperative radiographs showed perfect alignment with minimal callus without any fracture diseases. In both the limbs, implants were removed after one year. The condition of the animal was apparently normal.

**MANAGEMENT OF THE MIDSHAFT RADIUS FRACTURE IN A DOG USING AO/ASIF PRINCIPLE**

*S. Thilagar, K. Ameerjan, S. Ayyappan, C. Rahakrishnan, A. Kumaresan and L. Nagarajan*

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A female Rottweiler, aged one year was presented with history of a fall from a height. On physical examination, there was crepitus at the midshaft of the left radius and ulna. The radiograph revealed the presence of complete mid shaft transverse fracture of the left radius and ulna. Open reduction and internal fixation was performed with a 3.5mm DCP. The radiograph of immediate postoperative day revealed adequate reduction and immobilisation at fracture site. On 15<sup>th</sup> postoperative day, periosteal reaction was seen at the fracture site. On 30<sup>th</sup> postoperative day, radial and ulnar defect was filling up and no visible callus. After 4<sup>th</sup> month, the implant was removed. In the final position, fracture completely healed, with normal weight bearing and mild limping at times.

**MANAGEMENT OF AVULSION FRACTURES USING TENSION BAND WIRING IN TWO DOGS**

*S. Ayyappan, K. Ameerjan, S. Thilagar, C. Radhakrishnan, A. Kumaresan and L. Nagarajan*

Department of Surgery, Madras Veterinary College, Chennai.

**Case 1**

A female Spitz aged one year, was brought with a complaint of lameness of left hind limb. Flexion of the limb revealed intense pain. Radiograph revealed avulsion left tibial tuberosity. It was decided to repair the fracture with internal fixation. Under general anaesthesia, the fracture was reduced and immobilised by using 2 mm, K-wire numbers and 22 gauge orthopaedic wire by adopting tension band wiring principle. Postoperative check radiograph revealed normal alignment and the animal recovered uneventfully.

**Case 2**

A Spitz dog aged one year, was presented with history of an accident. On physical examination, crepitus was felt and radiograph revealed the presence of avulsion fracture of tuber calcis. Hence, tension band wiring method of internal fixation was carried out. Postoperative X-ray revealed complete reduction of the fracture. The animal was ambulatory. However, the animal became lame 20 days later and check X-ray revealed implant failure.





## APPLICATION OF AO/ASIF PRINCIPLES IN A CLINICAL CASE OF A DONKEY

*S. Thilagar, Ravi Sunder George, A. Kumaresan, T.N. Ganesh and S. Ayyappan*

Department of Clinics, Madras Veterinary College, Chennai.

A female donkey aged one year, weighing 40 kg was brought with the history of accident. On physical examination, there was crepitus at the midshaft of left metacarpus. Radiograph revealed the presence of transverse fracture. The case was subjected for open reduction and internal fixation using 10 hole 3.5 mm, narrow DCP with the cortical screws, size ranging from 22 mm – 32 mm. Postoperative check radiograph revealed normal alignment. Radiographs taken at periodical interval revealed satisfactory fracture healing. During postoperative period, there was normal weight bearing of the operated limb with moderate limping at times.

## FIXATION TECHNIQUES IN LONG BONE FRACTURES IN DOGS :

A REVIEW OF 150 CASES

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Efficiency of fixation techniques adopted in correcting 150 cases of fracture in long bones in dogs was studied. Incidence of fracture was recorded as that of femur (52%), tibia (25%), radius and ulna (12%) and humerus (11%). Commonly employed fixation techniques were application of intramedullary pins with plaster of Paris cast (42%) and plaster of Paris cast alone (39.33%) followed by modified Thomas Splint (6%), intramedullary pin and cerclage wiring with plaster of Paris cast (5.33%), adhesive plaster (4.67%) and cerclage wiring with plaster of Paris cast (2.67%). 61 percent of dogs recovered after corrective treatment without any complication. Inadequate immobilization was the main factor causing delayed union or non union. Failures were more encountered in small dogs. Instability, infection and early removal of the devices by the animal itself were the most common causes ended in complications.

## SESSION VI — LARGE ANIMAL SURGERY

### CASTRATION AFTER LAPAROTOMY FOR MONORCHID IN BOVINE - CLINICAL AND HISTOPATHOLOGICAL STUDIES

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Left flank laparotomy was done successfully in a 15 months old Haryana crossbred bovine Bull-calf for monorchidism with abdominal retention in which castration of right testicle was done previously in the rural area. The said animal was brought for surgery at Bihar Veterinary College Hospital (Case No. 230 (S) dated 13.8.99) as it was showing symptoms like uncastrated. On clinical examination, complete retention of the organ was observed and advised for surgery. Histopathological studies of the testicle revealed that the seminiferous tubules showed gradual stages of degenerating changes particularly in spermatogenic cell group except spermatogonia which remained at the basement membrane of the tubule. The sertoli cells comparatively failed to show such degree of degeneration. However, epididymal epithellium and testicular capsule i.e. tunica albuginea remained normal suggesting the effect of abdominal temperature over the spermatogenic cell layers of seminiferous tubules only.

## ASSESSMENT OF OXIDATIVE STRESS AND USE OF CERTAIN ANTIOXIDANTS IN BUFFALOES SUFFERING FROM DIAPHRAGMATIC HERNIA

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CCSHAU, Hissar

The present study was aimed at evaluation of anti-oxidant status and therapeutic effects of anti-oxidant treatments in diaphragmatic hernia in buffaloes (n=45). Evaluation of healthy animals (n=8) and untreated affected buffaloes was done. In affected animals, haemoglobin and haematocrit values, as well as concentration of malondialdehyde and reduced glutathione in blood were higher while erythrocyte sedimentation rate was low. On the other hand, concentrations of chloride, zinc, total plasma proteins, calcium and inorganic phosphorus were low but manganese concentration was higher. Almost 30% of the affected animals had functional disorders induced by high rumen fluid chloride concentration with low buffering capacity. In order to nullify the effect of extensive fluid therapy on haematocrit, malondialdehyde and reduced glutathione in blood, oxidative stress factor (OSF) was calculated as the product of malondialdehyde and reduced glutathione to packed cell volume. The base value of OSF was significantly higher in affected than in healthy animals. In untreated affected animals the OSF increased further by 50% at 48 hr. postoperatively. Administration of dexamethasone after laparotomy (@ 0.5 mg/kg im), just prior to diaphragmatic herniorrhaphy (1 mg/kg IV) and 24 and 48 hrs. post diaphragmatic herniorrhaphy (@ 0.5 mg/kg im) decreased the OSF factor by about 17% at 48 hrs. The administration of ascorbic acid (@ 7.5 gm/ one dextrose isotonic saline IV) at similar intervals, reduced the OSF by 20%. However, maximum reduction (28%) in OSF was obtained with commercially available vitamin E and selenium combination (10 ml.). Without zinc supplementation, animals receiving antioxidant therapy had increased zinc concentration in blood, and this increase was directly proportional to the reduction in OSF. Administration of manganese (@ 10 mg/kg iv in dextrose saline) in pre and post operative treatment schedule proved counter-productive as the treated animals did not recover from anaesthesia and succumbed soon after herniorrhaphy.

## ADENOMA OF THE CERUMINOUS GLANDS IN A MARE

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A mare aged about 12 years had a history of dark waxy and sticky discharge from the left ear. The discharge was first noticed 3 months back which became more frequent subsequently. The animal was kept in a stall with head twisted to the left side. Occasional shaking of head was also seen. Examination of ear with speculum revealed the presence of a nodular mass within the external auditory canal. Animal was sedated with xylazine (0.1 mg/kg body wt) and kept on right lateral recumbency. Attempt to remove the growth with the help of ear curette did not succeed. The external auditory canal was then opened by a 5 cm. long incision extending from the ear canal to the tympanic membrane. A nodular mass situated in the region of tympanic membrane became apparent. The mass was excised by electrocautery. The incised edges were then sutured with surgical silk. Neosporin-H ear ointment was applied in the ear for 15 days and cutaneous wound was dressed with nitrofurazone ointment. Streptopenin was used at 15 gm/day for 3 days and 2.5 gm/day for another 4 days. Sutures were removed on 8<sup>th</sup> day. The excised mass weighed 62 gm. The minimum and maximum circumference were 2.5 cm and 3.5 cm respectively. The histological characteristics of the growth included multiple acini and ducts lined by cuboidal epithelium. The epithelium had basilar nuclei. Number of dilated ducts were present having accumulation of secretions. The epithelium did not display metaplasia. The growth was diagnosed as adenoma of ceruminous glands.





## RUMINAL FISTULA IN A CROSS BRED COW – A CASE REPORT

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A 6 year old cross-bred cow with a small ruminal fistula in the centre of the 10<sup>th</sup> intercostal space and multiple fracture of 10-13 ribs, was referred to the polyclinic. The injury was inflicted by a bull during fighting. The case was managed by local veterinarian and few pieces of fractured ribs had been removed. After 15 days of treatment, animal developed ruminal fistula. Examination revealed a broken piece of 13<sup>th</sup> rib, 9" in length placed horizontally and persistently piercing the fistulous region. Left mid flank laparotomy was performed under regional anaesthesia and broken piece of rib was removed. Laparotomy site was sutured in a routine manner. The fistulous opening was slightly extended dorsally and ventrally. The ruminal wall was freed from skin and fistula was closed by lembert sutures using chromic catgut No. 2. Skin was closed in a routine manner. Recovery was uneventful.

## MANAGEMENT OF EXUBERANT GRANULOMA IN RACE HORSE

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A four year old, grey filly received an accidental lacerated injury at right ventro lateral aspect of the abdomen underneath twelfth to fourteenth rib involving skin and superficial muscles. It was conventionally repaired by aseptic surgical approach. But, within five days excessive skin tension in the region resulted in disruption of suture leaving behind an extensive full-thickness skin defect exceeding the capabilities of epithelization with subsequent development of an excessively proliferating, dense, granulating tissue mass beneath the upper skin flap. The lumpy mass was treated with local infiltration of enzyme hyaluronidase followed by glucocorticoid. The cicatrized open wound was dressed with oxidizing agent in conjunction with ointment containing anitbiotic and collagaenase enzyme. The wound was kept under compression with specially designed abdominal compression belt to prevent further exuberant granulation tissue formation and to keep the skin edges in approximate apposition. Subsequently the wound contracted and completely healed within a fortnight and the animal regained normal racing ability.

## SEGMENTAL AGENESIS OF TERMINAL COLON IN A CALF

*T. Sarada Amma, K.D. Johu Martin, P.T. Dinesh and*

*K.N. Muraleedharan Nayar*

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College of Veterinary and Animal Sciences, Mannuthy.

A case of segmental agensis of terminal colon and its successful surgical management in a calf is reported. A four days old crossbred female calf was presented to the Department with the history of straining for defecation without success since birth. On examination, the abdomen was found distended. Anal opening was present. The rectum was found as a cul-de-sac extending to a depth of 15cm and was confirmed by contrast radiography. On exploratory laparotomy through a right flank incision, colon and caecum were found distended with meconium. The terminal portion of colon ended as a blind sac with a cord like fibrous attachment with the rectum. Since it was not possible to perform colo-rectal anastamosis, caecostomy was performed and the caecum was fixed to the right flank. The animal was reported to be normal in habits except for passing faeces through the caecostomy wound after a period of two months.



### **OESOPHAGEAL OBSTRUCTION BY LEATHER IN BOVINES**

*V.D. Aher, V.M. Salunke, G.U. Yadav, A.U. Bhikane and A.P. Bhokre*

College of Veterinary and Animal Sciences, Udgir (M.S.)

Three buffaloes and one cow was suffering from cervical oesophageal obstruction. Clinical examination and typical symptoms confirmed the diagnosis. Cervical oesophagotomy under sedation and local infiltration general anaesthesia was performed for successful treatment of the animal.

### **BOVINE DIAPHRAGMATIC HERNIORRHAPHY: COMPARISON OF THREE VENTRO-ABDOMINAL INCISIONS**

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Three ventral abdominal incisions – linea-alba, paracostal and post-xiphoid were compared to herniorrhaphy in 35 buffaloes with diaphragmatic hernia. Comparison of these three ventral abdominal incisions was based on approachability, manoeuvrability, degree of haemorrhage and post-operative complications. Physiological, haematological and biochemical parameters were also studied to see the effect of herniorrhaphy on animal's health. None of the animals with diaphragmatic hernia showed any significant change in temperature, heart rate and respiration rate. However, transient increase in respiratory rate following herniorrhaphy was recorded. Haematological studies did not reveal any significant change, except slightly low ESR and neutrophilia indicating "stress" due to chronic and semi-starved condition of animals with diaphragmatic hernia. The ruminal motility was disturbed both in affected and animals following herniorrhaphy. Ruminal cud replacement from affected animals, correction of the ruminal pH during ruminal evacuation and supportive therapy are helpful to avoid operative indigestion problems. Amongst three ventral abdominal incisions to repair rent(s) in the diaphragm, linea-alba incision was found to be ideal because (i) it took minimum operative time (ii) no blood vessel laceration and musculature at surgical site and (iii) absence of post-operative complications. Out of 35 cases, 14 animals died due to reasons not related to surgical technique.

### **A MODIFIED GRAFT TECHNIQUE FOR REPAIR OF UMBILICAL HERNIA IN CALVES**

*D.M. Makhdoomi and Hussian, S.S.*

Faculty of Veterinary Sciences and Animal Husbandry, Shuhama, Srinagar

A modified autograft prepared out of hernial sac in two Jersey cross calves. The same material was used as on-lay graft in congenital hernia. The procedure was safe, inexpensive and less time consuming. The calves recovered uneventfully.

### **FOREIGN BODY IN TONGUE OF BOVINE**

*V.D. Aher, G.U. Yadav, A.U. Bhikane and A.P. Bhokre*

College of Veterinary and Animal Sciences, Udgir

An 8 year old buffalo and 7 year old bullock was presented with history of salivation, reduced food intake and difficulty in prehension and mastication. On examination of oral cavity foreign bodies in the tongue were revealed. Foreign bodies were removed under sedation with diazepam.



## EXPERIMENTAL INDUCTION AND SURGICAL TREATMENT OF CATARACT IN A BUFFALO CALF

*V.D. Aher, G.U. Yadav, and A.P. Bhokre*

College of Veterinary and Animal Sciences, Udgir (M.S.)

Induction of cataract was performed in a one-and-half year old buffalo calf by producing trauma to lens. On 26<sup>th</sup> day of induction, the surgical extraction of lens was performed under general anaesthesia and retrobulbar nerve block. Conjunctivoplasty was performed and post operative care was taken. There was 80% transparency of cornea. Slight opacity was observed at the sutured line. The animal was examined for restoration of vision by obstacle test. The animal restored vision completely without any post operative complication.

## STRENGTH OF CLINICAL SIGNS IN PREDICTING DIAGNOSIS OF BOVINE TRAUMATIC-RETICULO-PERITONITIS (TRP) – A CASE REPORT

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A Jersey cross-bred aged seven to eight years weighing about 300 kgs., was presented to State Veterinary Hospital, Agartala with a history of recurrent tympany, anorexia, staggering gait, difficulty in urination and defecation. The animal was on conservative treatment of last two weeks without any improvement. Clinically jugular pulsation, temperature  $-103^{\circ}$  F, brisket oedema and dyspnoea were observed. Considering the emergency the animal was prepared for exploratory rumenotomy as per standard technique under linear infiltration with 2% Lignocaine HCl. on the left flank. After opening of rumen approximately 8-10 kg. of plastic materials impregnated with stones were recovered and piercing foreign bodies like nails, pins, wires were retrieved from reticulum along with huge quantity of sand. Surgical wound was closed in routine manner and the animal made uneventful recovery. Although radiological examination (Gold Standard Test) is the only possible way to detect TRP, unfortunately, as facility is not available under field condition, symptoms/clinical signs generate far more powerful test of diagnostic hypothesis than the laboratory test. A good sign must have sensitivity and specificity between 0.8 to 1.0. In relation to this, recurrent tympany was found to have highest sensitivity and specificity followed by brisket oedema, anorexia, abdominal pain. Thus appraisal of clinical signs have immense predictive value in diagnosing TRP under field condition.

## FROATHY BLOAT DUE TO NON PENETRATING FOREIGN BODIES IN A PANDHARPURI BUFFALO

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A 7 year old buffalo was presented to Veterinary Polyclinic, Udgir with the history of pica followed by frothy bloat for 4 days. Other symptoms included scanty faeces, reduced feed and water intake. The animal was pregnant. The case was treated by local Veterinarian with liver tonics and rumenotomics for 3 days. The physiological parameters were in the normal range. After performing rumenotomy, about 13 kg of cotton clothes and some stones were recovered from rumen and reticulum. All the non penetrating foreign bodies were removed. Rumen muscles and skin was sutured in routine manner. The animal recovered uneventfully.

## SURGICAL MANAGEMENT OF PYLORIC OBSTRUCTION DUE TO PHYTOBEZOAR IN A CROSSBRED COW

V. Ramaswamy, C. Venkatesan and S. Dharmaceelan

Veterinary College and Research Institute, Namakkal - 637 001

A four-year-old crossbred cow was referred to Veterinary College Hospital, Namakkal with the history of complete anorexia, reduction in milk yield, bilateral distension of abdomen and cessation of defecation. Rectal examination showed severe ruminal impaction and empty rectum. Exploratory laparotomy was advised. After removing ruminal contents, the reticulum was explored and no foreign body was noticed. After closing the abdominal wall through the same incision site the right abdominal cavity was explored, which revealed, empty intestine and distended abomasum. On careful examination, a freely moving, hard mass was noticed at the pyloric region. The pyloric region was approached by right paracostal incision, opened and a hard phytobezoar was removed. The surgical wounds were closed routinely. The animal passed dung on the next day uneventfully.

## PERI-ESOPHAGEAL ABSCESS IN CATTLE: REVIEW OF 16 CLINICAL CASES

Under Singh, J.M.Nigam, S.K.Sharma, A.C.Varshney & Arvind Sharma

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16 cattle (9 heifers, 5 cows and 2 bullocks) in the age group of 2-8 years were referred to the hospital during the period of 1993-99. The exhibited included anorexia, colic (initially), complete cessation of defecation, pasty faeces tinged with blood and thick mucous. Clinical evaluation confirmed the diagnosis of peri-oesophageal abscess. Involvement of jejunum (3 cases), twist/adhesions, faecolith, rupture of intestine, intussusception. In most of the affected cases, the site of obstruction was jejunum, proximal to the pylorus. In all the animals were subjected to right flank laparotomy under general anaesthesia. In 13 cases had uneventful recovery following the surgical intervention.

## PERI-ESOPHAGEAL ABSCESS DUE TO A PERI-OESOPHAGEAL ABSCESS IN A COW

D. John Martin and K.V. Shibu

Deptt. of Surgery and Radiology

College of Veterinary and Animal Sciences, Thrissur

A cow was referred to the University Veterinary Hospital, Kozhikode with a history of anorexia. On palpation, a hard mass was palpated at the middle of the cervical region and the animal was unable to consume liquid and semisolid food material. A surgical approach was made to the abscess peripheral to the oesophagus at its dorso-median aspect. The abscess was incised and the contents were evacuated. The animal recovered well. Treatment for abscess was continued until complete resolution.

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An 8 year old bullock  
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## **SURGICAL MANAGEMENT OF PYLORIC OBSTRUCTION DUE TO PHYTOBEZOAR IN A CROSSBRED COW**

*V. Ramaswamy, C. Venkatesan and S. Dharmaceelan*  
Veterinary College and Research Institute, Namakkal - 637 001

A four-year-old crossbred cow was referred to Veterinary College Hospital, Namakkal with the history of complete anorexia, reduction in milk yield, bilateral distension of abdomen and cessation of defecation. Physical examination showed severe ruminal impaction and empty rectum. Exploratory laparorumenotomy was performed. After removing ruminal contents, the reticulum was explored and no foreign body was noticed. After closing the rumen, through the same incision site the right abdominal cavity was explored, which revealed, empty intestinal segments and distended abomasum. On careful examination, a freely moving, hard mass was noticed at the pyloric part of abomasum. The pyloric region was approached by right paracostal incision, opened and a hard phytobezoar mass was removed. The surgical wounds were closed routinely. The animal passed dung on the next day and recovered uneventfully.

## **INTESTINAL OBSTRUCTION IN CATTLE: REVIEW OF 16 CLINICAL CASES**

*Mohinder Singh, J.M.Nigam, S.K.Sharma, A.C.Varshney & Arvind Sharma*  
Deptt. of Surgery & Radiology  
College of Vety. & Animal Sciences, HPKV, Palampur (H.P.)

Sixteen cross-bred cattle (9 heifers, 5 cows and 2 bullocks) in the age group of 2-8 years were referred to the College Clinic during the period of 1993-99. The exhibited included anorexia, colic (initially), complete cessation of defecation or passing of scanty pasty faeces tinged with blood and thick mucous. Clinical evaluation confirmed them as intussusception (8 cases), volvulus (3 cases), twist/adhesions, faecolith, rupture of intestine, intestinal fistula and rectal tear (one case each). In most of the affected cases, the site of obstruction was jejunum, proximal ileum, and ileocaecal/caecocolic junction. In all the animals were subjected to right flank laparotomy under general anaesthesia to relieve the obstruction. Ten cases had uneventful recovery following the surgical intervention.

## **OESOPHAGEAL OBSTRUCTION DUE TO A PERI-OESOPHAGEAL ABSCESS IN A COW**

*P.T. Dinesh, K.D. John Martin and K.V. Shibu*  
Dept. of Surgery and Radiology  
College of Veterinary and Animal Sciences, Thrissur

A cross bred cow aged 5 years was referred to the University Veterinary Hospital, Kokkalai with a history of quidding immediately after feeding. A swelling could be palpated at the middle of the cervical region and a probang could not be passed beyond the region. Animal was able to consume liquid and semisolid food material. The mass was explored surgically and was found to be an abscess peripheral to the oesophagus at its dorso-median aspect, compressing the oesophagus and trachea. The abscess was incised and the contents were evacuated. The capsule of the abscess brought to the skin incision and fixed on to it. Treatment for abscess was continued until complete healing.



## SUCCESSFUL MANAGEMENT OF TEMPORAL ABSCESS AND FRONTAL SINUSITIS IN AN ELEPHANT

*V. Ramaswamy, C. Venkatesan, S. Dharmacelan and R. Suresh Kumar*  
Veterinary College and Research Institute, Namakkal

A cow elephant aged about 45 years was admitted in the Veterinary College Hospital, with a history of road accident two months back. The clinical signs reported by the owner were anorexia, giddiness, depression and reluctance to walk. Physical examination revealed large swelling behind the left ear. Flakes of suppurative material came out from the left side of the trunk during sneezing. Pus was oozing through the left ear canal continuously. Animal evinced severe pain on palpation of left ear. Under xylazine sedation, the abscess behind the left ear was opened and about three litres of watery pus along with necrotic muscles and pieces of cartilage. The abscess cavity extended upto the frontal sinus. Samples were collected for culture and sensitivity test and seven different species of organism were identified and isolated. Antibiotic treatment was given based on the sensitivity test and in addition regular cleaning and dressing was done for about a month. Animal made uneventful recovery.

## ATRESIA ANI ET RECTI ASSOCIATED COLOVESICAL FISTULA IN A CALF: A CASE REPORT

*B. Ramesh Kumar, N. Aruljothi and R.M.D. Alphonse*  
Department of Surgery and Radiology  
Rajiv Gandhi College of Veterinary and Animal Sciences, Pondicherry

A new born male calf was brought to the Teaching Hospital, RAGACOVAS, with the history of absence of anal opening and passing dung through the urethral opening since birth. The case was operated for correction of atresia ani at the anal region under epidural anaesthesia. On exploration, the rectum could not be located. Hence exploratory right flank laparotomy was performed and an unusual union of the terminal colon with the urinary bladder was identified. The attachment was separated and colostomy and colopexy was performed on the right flank region. The bladder was repaired. The animal was maintained under fluid therapy and parenteral antibiotics for one week and the patient owner was advised suitably about the prognosis.

## AN EXTENSIVE CASE OF SEMINOMA IN A BUFFALO BULL AND ITS SURGICAL MANAGEMENT

*S.K. Tiwari and M.K. Awasthi*  
Department of Surgery and Radiology  
College of Veterinary Science and Animal Husbandry, Anjora, Durg

A nine year old uncastrated buffalo bull was presented to the Department of Surgery and Radiology with the complaint of testicular swelling. On clinical examination, the swelling was very hard, ulcerated with irregular bulges on its surfaces. The physical condition of the animal otherwise was good. Therefore, considering it to be a tumour, it was decided to perform radical operation. The animal was premedicated with atropine sulphate @ 0.66 mg/ Kg IM and Xylazine hydrochloride (30 mg). Anterior epidural anaesthesia was given using lignocaine hydrochloride to achieve analgesia. Under all aseptic precautions, the tumour was excised and the operation was completed as per standard procedure. The tumour was preserved in 10% formalin for histopathological examination. Postoperatively, dextrose saline (4 litres) along with dexamethasone (25 mg) IV Enrofloxacin (15 ml) IM for six days and diclofenac sodium (20 ml) IM for three days were given. Antiseptic dressing was done with povidone iodine and Wisprec cream for 12 days. Sutures were removed on 12<sup>th</sup> postoperative day. There was complete recovery with out any complications. Histopathological examination of the tissue confirmed it as seminoma of the testicle.

**VENTRAL HERNIOPLASTY IN A CROSSBRED COW***C. Venkatesan, V. Ramaswamy and S. Dharmaceelan*  
*Veterinary College and Research Institute, Namakkal*

A seven year old HF crossbred lactating cow was presented to the Veterinary College Hospital with a history of large swelling on the cranio-ventral abdomen. On examination, it was diagnosed as ventral hernia behind the Xiphoid. An elliptical incision was made over the hernial sac. On clearing the adhesions, the hernial content was found to be abomasum. Since the hernial ring was about 7 inches in diameter hernioplasty with 'Marlex' mesh was performed. The skin suture was removed on the 10<sup>th</sup> postoperative day and the animal was discharged. No recurrence was noticed after a period of six months.

**A RETROSPECTIVE ANALYSIS OF NON-SURVIVOR BUFFALOES AFFLICTED WITH DIAPHRAGMATIC HERNIA - A REPORT OF 80 CLINICAL CASES***N.S. Saini, V.K. Sobti, K.K. Mirakhur, S.S. Singh, K.I. Singh, P.S. Bansal, P. Singh and R. Bhatia***Department of Surgery and Radiology**  
**Punjab Agricultural University, Ludhiana**

Retrospective evaluation of 80 non-survivor cases of diaphragmatic hernia (DH) was done. This constituted 28% of the total (285) cases of diaphragmatic herniorrhaphy during 1980-1994. Maximum number of cases (76.25%) were in the age group of 5-8 years. 54.3% buffaloes were non-pregnant and 8.8% were heifers. Most of the cases had recurrent tympany and partial anorexia for more than one month. Brisket oedema was noticed in 3.75% cases. 10.3% of the animals had haemoglobin less than 7 g/dl. In 62.2% cases, foreign bodies were recovered during rumenotomy. Out of these, in 27.7% animals, sharp foreign bodies were actually penetrating into the reticulum. In 61.5% of the buffaloes the DH was confirmed on the basis of radiography. In 50% animals 2/3 reticulum had herniated in the thorax. During anaesthesia 12.5% buffaloes showed regurgitation. 13.8% animals showed respiratory problem and 11.2% showed cardiac problem during anaesthesia. 6.3% animals were unable to get up after surgery. 11.2% buffaloes had adhesions with pericardium, 17.5% had excessive adhesions with diaphragm and 11.2% had tough adhesions in thorax. In 8.8% animals, foreign bodies were recovered during DH repair. In 17.5% animals, nodules/abscesses were present, 8.8% of the nodules were present in the reticulum, 7.5% in thorax and 1.2% were extra-reticular. 5% of animals died during induction of anaesthesia, 26.2% died during surgery, 25% died during recovery from anaesthesia and 19.5% died within 24 hours of surgery. Post-mortem findings indicated that in addition to DH, 11.5% of buffaloes had fibrinous pericarditis and 12.5% had aspiration pneumonia and 5.5% had internal haemorrhage.

**THORACIC OESOPHAGOTOMY FOR THE REMOVAL OF AN UNUSUAL FOREIGN BODY IN A BUFFALO CALF***S. Dharmaceelan, C. Venkatesan, N. Rajendran and V. Ramaswamy*  
*Veterinary College and Research Institute, Namakkal*

A two month old nondescript buffalo calf was referred to the Veterinary College Hospital with a complaint of anorexia, regurgitation and distended rumen. Stomach tube could not be passed beyond the thoracic region. Barium contrast radiograph of the thoracic region revealed dilated oesophagus between the aortic arch and the cardia indicative of oesophageal choke. Thoracic oesophagotomy was performed by the sixth rib resection. The mass was removed. It was round, hard and consisted of half meter length of plastic bag with feed material. The oesophagotomy wound was closed. The animal made an uneventful recovery.





## SUCCESSFUL MANAGEMENT OF VENTRAL HYSTEROCELE IN A COW

*S. Dharmaceelan, V. Ramaswamy, C. Venkatesan and S. Umarani*  
 Veterinary College and Research Institute, Namakkal

A five year old, six months pregnant HF cow was admitted in the University Hospital, Namakkal with a history of a large swelling on the right ventro-lateral side of the abdomen. The animal had a fall into a 50 feet well and was rescued. Animal showed symptoms of discomfort while getting up, partial anorexia and mild dehydration. On palpation, the right ventral side revealed ventral hysterocele with a live calf. Since the animal responded to the conservative treatment, herniorrhaphy was advised after parturition. On completion of full term pregnancy, the animal was presented with the complaint of not exhibiting any signs of parturition. Caesarean section was performed to remove a live calf. Herniorrhaphy was performed at the time of closure of laparotomy wound. The animal recovered uneventfully and was discharged on the 10<sup>th</sup> postoperative day.

## CYSTORRHESIS DUE TO OBSTRUCTIVE UROLITHIASIS IN A BULL CALF AND ITS SUCCESSFUL SURGICAL MANAGEMENT

*T.V. Jayamohan*  
 Veterinary Surgeon, Veterinary Dispensary, Chengalayi, Kannur, Kerala

A case of urinary bladder rupture due to obstructive urolithiasis in a 26 days old crossbred bull calf and its successful surgical management by ischial urethrotomy cystorrhaphy and subtotal cystectomy has been discussed. A calculus about one cm in diameter located at the level of bladder neck could be dislodged and removed. Urinary bladder had two points of rupture at the level of the neck and there was a circumscribed necrotic area at the level of vertex which necessitated subtotal cystectomy. Postoperatively antibiotics, fluids and analgesics were administered. Urine started dribbling from the natural orifice by the 12<sup>th</sup> day after surgery and catheter was removed on the 14<sup>th</sup> postoperative day. The calf made uneventful recovery.

**DERMOID ON THIRD EYELID OF A COW CALF**  
*P.T. Jadhav, G.U. Yadav, A.U. Bhinkane, R.R. Mugale and L.G. Anantwar*  
 College of Veterinary & Animal Sciences, Udgir, Maharashtra

A 5 day old cow calf was presented to clinics of Veterinary College, Udgir with a history of epiphora and corneal opacity of right eye. Clinical examination revealed dermoid on third eyelid. Hair present on the dermoid caused continuous irritation to cornea. The dermoid was completely removed under local infiltration anaesthesia. The surgical wound was cauterised with a electro-cautery. It was treated by daily flushing of eye with 1% silver nitrate solution, injection Gentamicin 0.25 ml sub conjunctival and 4 ml i/m and injection Diclofenac sodium 3 ml i/m daily for 5 days. Animal recovered uneventfully.

## A CASE OF SQUAMOUS CELL CARCINOMA OF CONJUNCTIVA IN A COW

*K.D. John Martin, K. Rajankutty and P.T. Dinesh*  
 Department of Surgery and Radiology  
 College of Veterinary and Animal Sciences, Thrissur

A 6 year old cross bred cow was presented to University Veterinary Hospital, Kozhikode with the history of reddish mass protruding out month. Examination revealed red mass of about 4 cm in diameter with irregular surface originating from extensive areas of palpebral conjunctiva and the third eyelid, protruding out through the palpebral fissure in both eyes. The mass was completely removed taking care of the haemorrhage. On histopathological examination, it was identified as a well differentiated squamous cell carcinoma.

### CANCER CHEMOTHERAPY IN A PREGNANT CROSS BRED COW

*Das, A.K., Ashwani Kumar, Agarwa, D.K. and A. Kumar*

College of Veterinary Science, Pantnagar

A six year old cross bred pregnant (60 days) cow having squamous cell carcinoma in the right eye obliterating the structures of palpebral, palpebral border, conjunctiva and orbital tissue was treated successfully with intravenous injections of vincristin sulphate (@ 0.025 mg/kg IV) at weekly interval and extirpation of the eye ball. The cow delivered a healthy male calf on full term.

### MANAGEMENT OF OBSTRUCTIVE COLIC IN SEVEN EQUIDS

*Ashwani Kumar, Chaudhary, M., Das, A.K., Sharma, V.K. and Amresh Kumar*

College of Veterinary Science, Pantnagar

During the summer months, seven equids were brought from Nainital with primary complaint of colic. Four of them were diagnosed to be polythene inflicted obstructive colic, two with cecal impaction and one with enterolith. Four of them were successfully treated.

### FUNGAL GRANULOMA IN A HORSE

*Jaiswa, S., Ashwani Kumar, Das, A.K., Sharma, V.K. and Sharma, S.N.*

College of Veterinary Science, Pantnagar

A horse, with a tumorous growth between the fore limbs was successfully treated surgically followed by systemic antifungal therapy. The histomorphological and mycobial culture study revealed *Aspergillus* infection.

## SESSION VII - SMALL ANIMAL SURGERY

### TONSILLAR ADENOCARCINOMA IN A BITCH

*V.P. Chandrapuria and N.K. Jain*

College of Veterinary Science & AH, Jabalpur (M.P.)

A Dobermann CRPF bitch aged 9 years was presented for the treatment of anorexia and debility. Clinical examination revealed, firm swelling on lower jaw and neck, copious salivation, dullness, shrunken eyes and pyrexia. The bitch was operated for gingival tumour about two months back and since then was on liquid diet. Examination of oral cavity, a pendulous, blackish ulcerative tissue mass was seen on right tonsil, partially obstructing the lumen. Case was diagnosed as tonsillar tumour and pre operative treatment was started to make the animal fit for surgery. Bitch died after a week. On post mortem examination 2-3 long fragile tumour mass was removed from right tonsil and pharynx. Larynx also showed few foci of similar growth. Mandibular and prescapular lymph nodes were enlarged. Tumour mass was found to consist of irregularly arranged anaplastic epithelial cells with distorted acinar structures histologically. The acini were separated from each other by thin connective tissue stroma. The tumour was confirmed as adeno-carcinoma of tonsil.



### UNUSUAL CASE OF SUPERNUMERARY LUMBAR VERTEBRA IN A DOG - A REPORT

*L. Ranganath, Ayesha Sidiga and S.M. Jayadevappa*  
Department of Surgery, Veterinary College, Bangalore

A five year old Dachshund bitch was presented with a history of hindquarter weakness and urinary incontinence for last five days. On physical examination there was no skeletal abnormalities. Lateral and ventro dorsal radiograph of lumbosacral spine revealed additional lumbar vertebra apart from the normal seven number. In spite of treatment with epidural corticosteroids and nervine tonics, the condition of the animal did not show any improvement.

### CHOLANGIOCELLULAR CARCINOMA IN A DOG - A CASE REPORT

*L. Ranganath, N. Madhu Rao and S.M. Jayadevappa*  
Department of Surgery, Veterinary College, Bangalore.

Primary hepatic tumours are uncommon in dogs. They constitute 0.6 to 1.3% of all tumours. A 10 year old non descript bitch was presented with a history of distended abdomen. Abdominal palpation revealed hard mass in cranial abdominal region. Lateral radiography demonstrated radiodense shadow in cranial abdomen. On exploratory laparotomy it was found to be a extensive tumour involving all the lobes with metastasis on mesentery and peritoneal wall. The animal was euthanised. On histopathological examination it was diagnosed as cholangiocellular carcinoma.

### INTESTINAL OBSTRUCTION IN A DOG

*P.R. Vinodkumar*

Veterinary Surgeon, District Veterinary Centre, Ernakulam, Kerala

A three year old male Dachshund dog was presented with history of vomiting and anorexia lasting for a month. History and clinical examination revealed it to be a case of intestinal obstruction. Laparotomy was performed to relieve the obstruction caused by a foreign body.

### AN UNUSUAL OSTEOPROLIFERATIVE CONDITION IN A DOG

*P.R. Vinodkumar*

Veterinary Surgeon, District Veterinary Centre, Ernakulam, Kerala

A five year old male dog was presented with the history of swelling of whole right hind limb. The animal was in pain and a radiograph revealed periosteal proliferation of the femur with subperiosteal ossification. There was no other lesion and hence was suspected as osteosarcoma.

### USE OF DIATHERMY IN CANINE GINGIVAL OSTEOCHONDROMA- A CASE REPORT

*Nandi, S.K., Halder, S., Hazra, S., Ghosh, D., Datta Gupta, B., Sanki, S.  
and Saha, S.*

Dept. of Surgery and Radiology

West Bengal University of Animal and Fishery Sciences, Calcutta

A spitz dog aged about 7 years was brought for treatment with the history of a growth on the gum region. The lesion was hard on palpation. The mass was removed under sedation with Xylazine and local infiltration of 2%



Lignocaine HCl. The area was cauterized with surgical diathermy and dressed with povidone iodine. The surgical wound had an uneventful healing. Histopathological examination confirmed it to be a case of osteochondroma.

### UNILATERAL SEMINOMA AN ITS COMPLICATIONS IN AN AGED DOG - CASE REPORT

*Syam K.V. and Saradamma T.*

Dept. of Surgery and Radiology

College of Veterinary and Animal Sciences, Thrissur

A male German Shepherd dog of nine years of age was presented with the history of dysuria, haematuria and cachexia. On examination of abdomen, urinary bladder was found distended and on compression, few drops of blood tinged urine dribbled out. Left testicle was grossly enlarged in size and the right one was very small in size. Per rectal digital exploration, a lemon sized swelling was felt at the neck of the bladder suggestive of prostatic enlargement. Since the condition of the animal was very poor, it was decided to perform orchietomy before performing other procedure. On bilateral orchietomy, the left testicle was very large in size weighing 60 g and the right one was very small weighing 5 g. histopathological examination revealed the presence of seminoma of left testis and non specific orchitis of the right one. The animal was treated with routine supportive therapy along with antibiotics, ethamsylate and dicyclomine. The blood stain of the urine disappeared by the third day and the animal started urinating normally by fifth day. Animal made steady progress in feeding and improved the condition.

### TOPICURE - A HERBAL SPRAY FOR POST-OPERATIVE WOUND DRESSING IN CANINE

*S.K. Tiwari*

Dept. of Surgery & Radiology

College of Veterinary Science & A.H., Anjora, Durg (M.P.)

"Topicure", a herbal spray from Natural Remedies Pvt. Ltd. Bangalore was used as post operative wound dressing material in 24 dogs of different breeds which were operated for various ailments. The operations performed were laparotomy (6), aural haematoma (5), castration (4), ovariohysterectomy (4), docking (3) and urethrotomy (2). Systemic antibiotic (Streptopenicillin (500 mg)) was given for 5 days in all the animals. There was uneventful recovery in the animals by 7 to 12 days.

### BILATERAL DERMOID OF CORNEA IN A DOG - A CASE REPORT

*P.T. Dinesh, T. Sarada Amma, K.V. Shyam, C.B. Devanand and*

*K.N. Muraleedharan Nayar*

Dept. of Surgery and Radiology

College of Veterinary and Animal Sciences, Thrissur

A Dalmatian pup aged 3½ months was presented to the Veterinary College Hospital with a complaint of mucopurulent discharge from both eyes and blepharospasm. On examination, there was cutaneous growths with tuft of hair covering the entire cornea of both eyes. The animal was prepared for routine surgical procedure. The dermoid attached to the cornea was removed by performing superficial keratectomy. Post operatively, the animal was treated with topical application of Pychlor. Complete corneal clearance was reported in 45 days time.



### AN UNUSUAL CASE OF INTESTINAL OBSTRUCTION IN A DOG

*K.D. John Martin, P.T. Dinesh and K. Rajankutty*

*Department of Surgery & Radiology*

*College of Veterinary & Animal Sciences, Mannuthy.*

A one and a half-year-old female Doberman Pinscher dog was presented with a history of reduced food intake and vomiting. A freely movable hard mass was palpable in the abdomen. Plane radiograph revealed gas filled intestinal loops. Contrast radiography with Barium sulphate revealed movement of the contrast material through the bowel, but at a slow rate. Exploratory laparotomy revealed that a portion of the duodenal segment was enlarged and congested. On incising the area, a rubber cork of Dextrose bottle was found lodged vertically facilitating the drainage of the food material and the contrast agent through the sides. Closure of the enterotomy and laparotomy was performed in the routine manner. Post operatively the animal was maintained on fluids and antibiotics. Animal made an uneventful recovery.

### MANAGEMENT OF CORNEAL NECROSIS IN CALVES BY SUPERFICIAL KERATECTOMY

*T. Sarada Amma, J. David Suraesh and K.N.Muraleedharan Nayar*

*Dept. of Surgery and Radiology*

*College of Veterinary and Animal Sciences, Thrissur*

Two calves aged 6 months and 8 months of the University Livestock farm and one calf (3 months) brought to the Veterinary Hospital, Mannuthy, were suffering from bilateral whitish discolouration of cornea. On examination, the centre of the cornea for a width of 4mm was necrotic in two males and the entire cornea except at the limbus were necrotic. After thoroughly flushing the eye with normal saline. Under xylazine sedation and topical application of xylocaine, superficial keratectomy was performed on the affected eye. Soframycin was applied for one week. After irrigating the eye with normal saline. After one week Sofracort eye drops was applied until complete healing. The eye showed signs of healing by about one week and healing was gradual and completed in about 50 days but haziness was persisted which was gradually reduced and eye became almost clear by 90 days.

### AN ALTERNATE ABDOMINAL APPROACH TO THE GASTRO- OESOPHAGEAL REGION IN DOGS

*T. Sarada Amma, K.Rajankutty, J.David Suresh and K.N. Muraleedharan Nayar*

*Department of Surgery and Radiology*

*College of Veterinary and Animal Sciences, Thrissur*

In 18 adult mongrel dogs a left side 12<sup>th</sup> intercostal abdominal approach along with resection of the 12<sup>th</sup> rib was carried out to expose the gastro-oesophageal region. In all the animals the 12<sup>th</sup> rib was resected from 4cm distal to its vertebral articulation and disarticulated at the costochondral junction. The incision was extended to the intercostal space and laparotomy was performed. The oesophageal hiatus and lower oesophageal region were exposed by traction applied at the greater curvature of the stomach. The hiatus was incised to expose the thoracic part of lower oesophageal sphincter. Myotomy of the region was performed. In one group, simple myotomy and in other two groups after myotomy, diaphragm/omental grafting were carried out. The only complication encountered during surgery was accidental penetration of thoracic cavity in 3 animals. All the animals were observed for 21 days and no complication was encountered.



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## AN ALTERNATE TECHNIQUE OF CARDIOPLASTY USING DIAPHRAGM IN DOGS

*T. Sarada Amma and K.N. Muraleedharan Nayar*

Department of Surgery and Radiology  
College of Veterinary and Animal Sciences, Thrissur

The study was carried out in six adult dogs of either sex. In all the animals, myotomy of the cardia and lower oesophageal sphincter was performed through the 12<sup>th</sup> intercostal abdominal approach. Myotomy was performed for a length of 4 cm starting from the cardia cranially into the oesophagus. After undermining the myotomy edges, the apex of the myotomy incision was sutured to the border of diaphragm at the hiatus and the suturing was continued on either side between the myotomy edge and border of diaphragm to close the hiatus. The exposed myotomy wound, which became abdominal in position was then sutured to the overlying diaphragm using silk. Physiological, clinical and haematological observations at weekly intervals upto 21<sup>st</sup> day were within normal range. Radiographic evaluation at weekly intervals revealed normal emptying of oesophagus into the stomach. Autopsy revealed firm union of diaphragm at the myotomy site and intact hiatus.

## CAESAREAN SECTION IN A CAT - A CASE REPORT

*Reni K. Oommen*

Veterinary Surgeon, Veterinary Dispensary, Kuttoor, Kerala.

A non descript queen cat aged one year was presented at full term pregnancy showing signs of impending parturition. Pervaginal examination revealed the position of foetus with downward flexion of the neck. Caesarean section was performed under Ketamine hydrochloride anaesthesia (22 mg/kg i.m.). Extracted two kittens of which one was alive. Postoperatively the animal was maintained under a course of ampicillin at the rate of 20 mg/kg thrice daily for 5 days. Skin sutures were removed on the 8<sup>th</sup> postoperative day. Animal made uneventful recovery.

## A RARE CASE OF INTESTINAL OBSTRUCTION IN A DOG

*N.S. Saini, V.K. Sobti, P.S. Bansal, S.K. Mahajan and A. Anand*

Punjab Agricultural University, Ludhiana

A dog with the history of not passing faeces for more than two months was presented for treatment at Punjab Agricultural University hospital. However, appetite, liquid feed intake and urination was normal, animal was passing fluid like material through rectum. On palpation it was found that a hard mass like a stone was present in the abdomen. Upon ultrasonographic examination it exhibited only reverberation indicating hard mass or gas interface. Radiography revealed enormously enlarged intestinal loops filled with constipated mass covering entire abdomen. Animal had severe metabolic acidosis. Exploratory laparotomy was performed under general anaesthesia. Enormously distended intestinal loops of 8-10 cms. diameter that were filled with stone like material was exposed. By multiple enterotomy incisions about 4-5 kg of faecal mass was removed. But the animal died at the end of the operation.

## AURICULAR FIBRO-CHONDROMA IN CAPRINE - A CASE REPORT

*Ghosh, D., Hazra, S., Halder, S., Nandi, S., Dass, S., Saha, S.,*

*Chakraborty, A. and Chakraborty, C.*

Dept. of Surgery and Radiology

West Bengal University of Animal and Fishery Sciences, Calcutta

A nondescript she goat aged about 3 years was presented with a hard swelling at the level of apex of the ear. Clinical examination revealed a mass of 3 cm diameter beneath the skin. The tumour was removed under sedation with xylazine hcl. and local infiltration of 2% lignocaine. The mass weighed about 60 g and was firm in



consistency. Histopathological examination of the removed mass indicated it to be fibrochondroma. The surgical wound had an uneventful healing.

### **SUBURETHRAL DIVERTICULUM IN KIDS – CASE REPORTS**

*P.T. Dinesh, K.D. John Martin, Shejo Jose and K. Rajankutty*

**Department of Surgery & Radiology**

**College of Veterinary and Animal Sciences, Mannuthy, Thrissur**

Cases of Suburethral diverticulum and its successful surgical management are reported. Six male kids of age group ranging from one day to fourteen days were presented with history of difficulty in urination and swelling at the ventral aspect of the penis. On examination, the Urethral pouch (diverticulum) with accumulation of urine inside was detected in the course of the urethra. These were of varying sizes and at different locations. In all the six cases, condition was associated with hypospadias. Surgical removal of the diverticulum and suturing the submucosal layer and the skin with out including the mucosal layer was resorted to. Routine postoperative management with Tetanus toxoid and antibiotics along with local wound dressing resulted in normal healing of the wound. All the animals made uneventful recovery.

### **FOREIGN MATERIAL IN OESOPHAGUS OF DUCK – A CASE REPORT**

*Datta Gupta, B., Sanki, S. and Datta Gupta, A.*

**Dept. of Surgery and Radiology**

**West Bengal University of Animal and Fishery Sciences, Calcutta**

A one year old duck, weighing about 1.5 kg was brought to the Veterinary Hospital, Abhoynagar, Agartala with a history of swallowing a few foreign bodies. The duck evinced signs of pain on palpation of the neck. The site was prepared for aseptic surgery after local infiltration with 2% lignocaine hcl. The skin was incised and the oesophagus was exteriorized by blunt dissection. Following a longitudinal incision, five pieces of oyster were detected and they were removed by gentle traction from the oesophagus. The area was flushed with normal saline and the surgical wound was closed in routine manner. Routine surgical dressing, antibiotic therapy and liquid diet, rendered the duck to normal feeding habit and health.

### **GASTRIC ATONY AND DILATATION ASSOCIATED WITH MEGAOESOPHAGUS IN A DOG**

*T. Sarada Amma, C.B. Devanand, T.P. Balagopalan and*

*K.N. Muraleedharan Nayar*

**Department of Surgery and Radiology**

**College of Veterinary and Animal Sciences, Thrissur.**

A five month old German Shepherd pup was presented with recurrent regurgitation inspite of treatment for two months. The animal was weak and debilitated. Contrast radiography revealed dilation of oesophagus and absence of emptying into the stomach. Hence myotomy of the gastro-oesophageal region was decided. On laparotomy, the stomach was found empty and flaccid. Gastro-oesophageal myotomy was performed through abdominal approach. The animal was maintained on fluid diet. No improvement was noticed after operation except for emptying into stomach. But there was no emptying of the stomach, which resulted in distension of the stomach. Hence, pyloromyotomy was decided but the animal died before surgery. On postmortem, myotomy site was found dilated, stomach was thin and flaccid and pyloric sphincter was normal.



### MEGACOLON IN DOGS - A REVIEW OF FOUR CASES

*K.N.Muraleedharan Nayar, T. Sarada Anma, C.B. Devanand, Shejo Jose,  
S. Senthil Kumar and S. Sooryadas*

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Four canine cases were attended at the Department of Surgery. The history was off-feed, debility, weakness and difficulty in defecation. The symptoms were more or less same in all and they were not responding to medical therapy with digestive stimulants, laxatives, tonics and antibiotics. The animals were debilitated, dull and dehydrated. Temperature was normal with increased heart rate, pulse rate and respiratory rate. Examination of blood revealed low Hb, high PCV and normal leucocyte counts. Physical examination of the abdomen revealed distended intestinal loop. Radiograph revealed distended, gas-filled colon. On enema, only small quantity of the scanty faeces could be evacuated. Hence exploratory laparotomy was performed. It was found that the large intestine and the caecum were uniformly distended and reddish-blue in colour. No palpable hard mass could be detected. Since the caecum was found impacted with faecal matter, an incision was made in the anterior aspect of the colon and the caecum was emptied. The colon was also emptied by squeezing, but it was very difficult since the contents were pasty/tarry in nature. The enterotomy wound was closed and animal was maintained on fluid for the next few days along with antibiotics (Ampicillin-Cloxacillin 500 mg i.m.) and vitamins. All the animals showed improvement for one week, but when fluid administration was stopped, the condition worsened. Two animals which were maintained on neostigmine @ 1 mg/kg body weight showed slight improvement in condition.

### CRANIOVENTRAL ABDOMINAL DEFECT AND ASSOCIATED HERNIA IN A DOG

*T. Sarada Anma, C.B. Devanand, S. Sooryadas, Shejo Jose, S. Senthilkumar,  
Joshi George and K.N.M. Nayar*

Department of Surgery and Radiology

College of Veterinary and Animal Sciences, Thrissur

A 3 year old male non descript dog was presented with large reducible hernia anterior to the umbilicus. The sac showed some ulceration due to rubbing on the floor. On dorsal recumbency the swelling could be completely reduced into the abdominal cavity which revealed a 7 cm x 2 cm gap between the xiphoid and umbilicus. The owner reported that the swelling was present from birth itself but it increased in size gradually. Radiograph revealed normal diaphragmatic contour. Hence diaphragmatic hernia was not suspected. The swelling was reduced in routine manner after incising the skin. Peritoneal lining was not present in the hernial sac. On exploration, it was found that there was defect in the diaphragm just above its attachment at the xiphisternum, but was covered with an adhered portion of omentum. The defect was reduced by suturing the two edges with the omentum in position. The abdominal defect was apposed using braided silk.

### SURGICAL MANAGEMENT OF SQUAMOUS CELL CARCINOMA OF THE GUM IN A DOG

*D.K.De, C.K.Chakborty, P.Jha and Dr.S.Kundu*

Dept. of Surgery & Radiology, W.B.U.A.F.S., Calcutta

A female Spitz aged about 9 years was presented in the Department with history of of a tumorous growth in the left lateral aspect of Gum of upper jaw. Surgical intervention of the growth was advised. Routine clinico-pathological examinations were done for preparation of the animal for surgery. The surgical resection of the mass was done using Diathermy technique without using any suture material for the same. The patient recovered without any complication. The growth was sent for the histopathological examination and it was found that the growth showed typical characters of squamous cell carcinoma.





## SUCCESSFUL SURGICAL CORRECTION OF OS-PENIS FRACTURE IN A DOG

*L.Ranganath, T. Venketa Suresh and S.M. Jayadevappa*

Dept. of Surgery, Veterinary College, Bangalore

Fracture of os penis in dogs is a rare condition, which constitutes 2% of total lesions of canine penis. A male stud dog was presented with a history of dysuria, which was observed three days after mating. On physical and radiological examination, it was found to be a case of fracture of Os penis and it was surgically corrected by stabilising the fracture fragments with four hole stainless steel fingerplate. The dog had an uneventful recovery.

## REMOVAL OF FISH NETTING HOOK FROM THE STOMACH OF CROCODILE

*R.M. Tripathi*

Veterinary Assistant Surgeon, Divisional Veterinary Hospital, Bilaspur (M.P.)

An injured crocodile was presented with a three to four feet long nylon thread hanging out of the mouth. An attempt to remove the nylon thread by pulling indicated that the other end was embedded in soft tissue. The jerky movement on the free end of the thread indicated that the embedded end was posterior to the xiphoid and most probably in the stomach. The crocodile was sedated with 100 mg of xylazine hydrochloride. A laparotomy was performed by midline incision 10-cm posterior to the xiphoid. Careful manipulation of the stomach indicated the presence of a pointed hook embedded in the stomach wall and was connected with nylon thread hanging out of the buccal cavity. Gastrotomy was performed and the embedded hooks were removed. The hooks were embedded in the submucosa. The gastrotomy and laparotomy wounds were sutured by routine methods. Antiseptic dressing of cutaneous wound was done with soframycin skin ointment and Neosporin dusting powder. Streptopenicillin (2.5 G), Vitamin B complex 5 ml. and Diclofenac sodium 5 ml. were given intramuscularly for seven, five and three days respectively. However, the cutaneous wound became disrupted after eight days but the muscles were intact. The crocodile was left thereafter in the river on the advice of wild life experts.

## UNUSUAL CASE OF OESOPHAGEAL FISTULA IN A CAT - A CASE REPORT

*N. Aruljothi, R.M.D. Alphonse*

Department of Surgery and Radiology

Rajiv Gandhi College of Veterinary and Animal Sciences, Pondicherry

A queen cat aged about 1 year was brought with the history of partial anorexia for one month and milk leaking through a wound in the cervical region since one week. On examination, the oesophageal fistula was detected. Under general anaesthesia, an infant feeding tube was passed through the pharynx but it could not go freely into the lumen. Cervical oesophagotomy was performed and putrefied, foul smelling biological foreign body was removed from the cervical oesophagus cranial to the fistulous wound. After necessary debridement of the necrosed oesophageal wall, the oesophagus was sutured with 3 / 0 synthetic absorbable suture material and the animal was maintained on fluids and parenteral antibiotics for one week. Recovery was uneventful.

## AN UNUSUAL CASE OF MANDIBULAR LYMPHOCELE, CYSTOLITH AND PYOMETRA IN A BITCH

*V.P. Chandrapuria*

Dept. of Surgery and Radiology,

College of Veterinary Sciences and Animal Husbandry, J.N.K.V.V. Jabalpur

A Pomeranian bitch aged approximately six years was brought for treatment of swelling below the lower jaw and infrequent urination. Clinical and radiological examination revealed a calculus in the urinary bladder and lymphatic fluid in the mandibular swelling. Cystotomy was performed under Diazepam - Ketamine anaesthesia. A

small hen's egg sized calculi was removed from the bladder. Ovario-hysterectomy was performed with routine procedure since there was pyometra. The abdomen was closed in the usual manner. The mandibular swelling was incised and gel like whitish fluid was drained. On the centre of angle of vertical and horizontal rami, a perforation was detected. The site was curetted, freshened and sutured with surgical silk. Skin pouch was trimmed and edges were approximated by silk sutures with provision for drainage. All supportive therapy was given. The animal made an uneventful recovery and is perfectly normal up to date.

### COMPARATIVE STUDY OF SUBMUCOSAL RESECTION AND REMOVAL OF TUMOUR ENMASS FOR THE TREATMENT OF CANINE TRANSMISSIBLE VENEREAL TUMOUR.

*Almeida, A. G., Vishwasrao, S. V. and Sarkate, L. B.*

Department of Surgery,  
Bombay Veterinary College, Parel, Mumbai

28 clinical cases of Canine Transmissible Venereal Tumour in dogs (15 males and 13 females) were studied. The cases were randomly divided in two equal groups, viz. Group I - Submucosal resection and Group II - Removal of tumour enmass. Efficacy of the two techniques were evaluated based on, hemorrhage at the site, ease of excision of the tumour, tissue handling and post-operative complications. In submucosal resection procedure slight bleeding was observed in 10 cases. The 4 cases, which had wide spread tumour, showed moderate bleeding. In enmass procedure, moderate bleeding was observed in 9 cases and excess bleeding in 5 cases. These 5 cases had extensive involvement of the mucous membrane and surrounding tissue. Evaluation in terms of ease of tumour excision indicated that tumour less than or equal to 13 gm weight covering smaller surface area were graded as easy, while those with more than 13 gm weight and spread over wider surface area were graded as difficult in submucosal resection. For tumour weighing more than 13 gm, removal of tumour enmass was graded as easy in 9 out of 14 cases, while tumours weighing above 126 gm, it was graded as difficult. In case of submucosal resection procedure, there was minimum tissue handling; while moderate to excess tissue handling was there while removing tissue enmass. Excess handling was there in 8 cases of group II, where tumour size was big involving a greater surface area. Evaluation of the two techniques on the basis of post-operative complications indicated that minimal complications occurred in submucosal resection (8 out of 14) as compared to removal of tumour enmass (4 out of 14). Sero-sanguinous discharge was observed in 5 out of 14 dogs in group I, while in 6 out of 14 in group II. Wound dehiscence was observed in 1 out of 14 in submucosal resection while in 4 out of 14 in enmass group.

### SURGICAL MANAGEMENT OF MELANOMA IN THE FOREHEAD OF AN ALSATIAN DOG.

*Chakraborty, C., Kundu, S., Jha, P., Sahoo, S., De, D.K.,*

Department of Veterinary Surgery and Radiology, W.B.U.A.F.S., Calcutta

An Alsatian dog aged about 4.5 years was presented in the department with a cutaneous growth on the forehead, with gradual increase in its size. There was no sign of irritation and pain. Routine hematological evaluation and clinical laboratory tests were performed. After a week, the animal was subjected to operation for excision of the growth using surgical diathermy and excised tissue mass on histopathological examination revealed it to be melanoma. The animal made an uneventful recovery.

### A TYPICAL CASE OF ADENOMA OF SEBACEOUS GLAND ON THE CHEST SKIN OF A DACHSHUND DOG

*Chakraborty, C., Kundu, S., Jha, P., Sahoo, S., De, D.K.,*

Dept. of Veterinary Surgery and Radiology, W.B.U.A.F.S., Calcutta

A Dachshund male dog aged about 5 yrs was presented in the department with the complaint of a cutaneous growth on the chest just anterior to the right forelimb. Gradual development was noticed over a period of 1-1.5





months and the animal did not show signs of pain. Routine haematological, clinical and laboratory examinations were performed before surgical intervention. After 7 days, excision of the growth was done by using surgical diathermy. The mass sent for histopathological investigation revealed it as an adenoma of Sebaceous gland. A thorough post-operative care and broad spectrum medicinal coverage for next 7 days helped in an uneventful recovery.

### COMPARATIVE STUDY OF TWO CHEMOTHERAPEUTIC REGIMENS FOR TREATMENT OF CANINE TRANSMISSIBLE VENEREAL TUMOUR

*Almeida, A. G., Vishwasrao, S. V. and Sarkate, L. B.*

Department of Surgery,  
Bombay Veterinary College, Parel, Mumbai

42 clinical cases of Canine Transmissible Venereal Tumour in dogs (18 males and 24 females) formed the basis of this study. The cases were randomly divided in three equal groups, viz. Group I - Submucosal resection and Group II Removal of tumour enmass and Group III. Chemotherapy. Further each group was subdivided into 2 equal subgroups, viz. Group A. Chemotherapy with Vincristine sulphate (at the dose rate of 0.5 mg/m<sup>2</sup> body surface area) and Group B Chemotherapy with Vincristine sulphate (at the dose rate of 0.25 mg/m<sup>2</sup> body surface area) in combination with Cyclophosphamide (at the dose rate of 160 mg/m<sup>2</sup>). Chemotherapy was done at weekly intervals. Both the chemotherapeutic regimens were evaluated and compared for their efficacy in preventing the regression of tumour. The pet owners were contacted on 60th and 90th day after chemotherapy to know the response to the chemotherapy in different groups. In groups I A and II A (Vincristine sulphate), out of 14 dogs pyrexia was observed in 5 dogs, anorexia in 9 dogs and vomiting in 1 dog. In group III A, out of 7 dogs treated with only Vincristine sulphate, pyrexia was observed in 4 dogs, anorexia in all 7 dogs, vomiting in 6 dogs and diarrhea in 3 dogs. In group I B, II B (Vincristine and Cyclophosphamide combination), pyrexia was observed in 4 dogs, anorexia in 12, vomiting in 2 dogs, diarrhea in 1 dog and hematuria in one dog. In group III B all dogs showed signs of anorexia. Vomiting was observed in 4 dogs and diarrhoea in one dog. Alopecia (thinning of hair coat) was observed in 4 dogs and hemorrhagic cystitis in two dogs. In group III A (Vincristine sulphate), complete regression was observed in 3 out of the 7 cases, partial regression in three cases and minimal response in one case. In group III B (combination of Vincristine sulphate and Cyclophosphamide), complete regression of tumour was obtained in 3 out of 7 cases after 2, 3 and 4 doses respectively. Partial response was obtained in 2 out of 7 cases after 4 doses, while minimum response was obtained in 1 out of 7 cases even after 4 doses. Surgery followed by chemotherapy helped combat micrometastases, thus it could prevent recurrence. Hence this method could be used for treating bigger and extensive CTVT. Vincristine sulphate alone has better effects as compared to its combination with Cyclophosphamide. Faster regression and fewer side effects were seen with the use of Vincristine.

### HISTOPATHOLOGICAL FEATURES OF ORAL TUMOURS IN CANINES

*Shekarappa, C., M. S. Vasanth, B.N. Ranganath and S. M. Jayadevappa*

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Veterinary College, UAS, Hebbal, Bangalore

Biopsy samples were collected from 36 cases of oral tumours in canines and subjected to histopathological studies using H&E and Massons Trichrome staining. Oral tumours were evaluated as 75% benign and 25% malignant. Histogenesis of 36 oral tumours was Squamous papillomas 15 (42%), Squamous cell carcinoma 3 (9%), Melanogenic tumours 4 (11%), Mesenchymal tumours 14 (39%); which included Fibromatosis 3 (9%), Ossifying epulis 9 (25%), Lymphosarcoma 1 (3%), and combined Sarcoma 1 (3%).



**VENTRAL HERNIA OF GRAVID UTERUS AND FOETAL  
MACERATION IN A GOAT - CASE REPORT**

*K.D. John Martin and K.V. Syam*

**Department of Surgery and Radiology**

**College of Veterinary and Animal Sciences, Mannuthy, Thrissur**

A nondescript she goat aged one year was presented with a swelling on the ventral abdominal wall extending on either side of the ventral mid line, pushing the udder backwards. On palpation of the swelling, foetal bones were felt. Exact breeding history or clinical history of the case was not available as it was left out for grazing in a forestland. An incision on the ventral midline gave access into a cavity containing one full term dead foetus covered with putrefied pasty placenta. The ventral wall of the uterus was found closely adherent to the ventral abdominal skin and dorsal uterine wall to the ventral abdominal wall. The mammary gland was also necrosed. The uterus continued in a narrow tortuous course, up to the cervix. The skin wound along with the adherent uterine wall was apposed by a series of apposition sutures. The goat was maintained on fluids and antibiotic for three days and later it was not presented.

**LAPAROSCOPIC SALPINGECTOMY USING OTOSCOPE IN PUPS**

*Ashwani Kumar, Das, A.K. and Amresh Kumar*

**College of Veterinary Sciences, Pantnagar**

Twelve clinically healthy mongrel female pups, aged between six and eight weeks, were sterilised by ligating the salpinx with rodger's loop and excising the small portion of the salpinx (fallopian tube), through bilateral flank approach, using otoscope. It is a very safe, economical, and painless method and requires minimal laparoscopic instrumentation.

**TELOMERASE ASSAY AS AN AID TO DIAGNOSE TUMOUR IN ANIMALS**

*A.M. Pawde, R.K. Singh, S. Sivakumar and O.P. Gupta*

**Division of Surgery**

**Indian Veterinary Research Institute, Izatnagar, Bareilly (UP)**

Telomerase - a ribonucleoprotein enzyme is essential for rapidly growing immortal cells and telomerase activation is a critical step for malignant progression. A semi-quantitative assay for detection of telomerase activity called TRAP assay was employed as tumour marker. There was an objective correlation between telomerase status and malignant activity as detected by histopathology. Carcinoma and other rapidly growing tumours showed high level of telomerase activity where as non-cancerous lesion showed no telomerase activity.

**A SURVEY OF TUMOURS IN DOMESTIC ANIMALS**

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**Division of Surgery**

**Indian Veterinary Research Institute, Izatnagar**

Out of 1138 surgical cases presented to IVRI polyclinic during the period of one year, 66 cases (5.8%) were tumour bearing patients. Dogs had higher incidence of tumours 57 (86.4%) followed by buffaloes 4 (6.1%) and horses 3 (4.5%) and cattle 2 (3%). Transmissible venereal tumour (TVT) involving external genitalia of both the sex was the most common tumour encountered in dogs. Next to TVT, mammary tumour was preponderant among dogs. Skin tumours were equally common in dogs. Other not so frequently occurring tumour in dogs were oral papilloma, salivary gland adenoma, osteosarcoma and fibrosarcoma of kidney. In large animals, squamous ce



carcinoma and fibroma were common. Rare tumours recorded in this study were myxofibroma of lower incisive gingiva and histocytic cell sarcoma of shoulder region in cattle.

### **COMPARISON OF MONOCHEMOTHERAPY AND COMBINATION CHEMOTHERAPY FOR THE TREATMENT OF CANINE TRANSMISSIBLE VENEREAL TUMOUR**

*S. Sivakumar, A.M. Pawde, G.R. Singh, O.P. Gupta, Kalicharan and S.K. Tandon*

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Indian Veterinary Research Institute, Izatnagar

Thirty one dogs naturally affected with CTVT were divided into two treatment groups, viz mono chemotherapy group comprising 23 dogs and combination chemotherapy group comprising 8 dogs. The monochemotherapy with Vincristine treatment showed complete regression after 4-6 injections at weekly intervals. The side effects were at acceptable range. The protracted cases of CTVT responded well for combination chemotherapy with Vincristine, Cyclophosphamide and Methotrexate but adverse effects were severe. Prolonged and non-responsive cases can be treated with combination chemotherapy regimen with desirable results.

### **SCORES FOR PROGNOSTIC EVALUATION OF VETERINARY CANCER CASES**

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In the field of veterinary clinical oncology and oncotherapy, in light of accountability the prognosis is questioned. Grading and scoring such tumour patients explaining the prognosis to the owner on different variables was discussed herewith.

### **PYOMETRA IN CATS- A REPORT ON TWO CASES**

*C.Ramani, L.Nagarajan, R.Suresh Kumar, W.P.Archibald David and K.Ameerjan.*

Department of Surgery, Madras Veterinary College, Chennai.

Two queen cats aged 3 years and 4 years were brought with symptoms of anorexia and distended abdomen. On examination the cats were dehydrated and moderately anaemic. Radiographic picture was suggestive of pyometra. Both the cases were operated and panhysterectomy was performed. Both the cats recovered uneventfully after the surgery.

### **CATARACT IN CATS – A REPORT ON THREE CASES**

*C.Ramani, L.Nagarajan, W.P.Archibald David and K.Ameerjan*

Department of Surgery, Madras Veterinary College, Chennai.

The incidence of Cataract is reported to be much less in cats than in dogs. Three Cats were presented with cataract. One was a male and the other two were queen cats. The cats were subjected to complete ophthalmic examination after which extracapsular cataract extraction was performed. All the three cats that were operated regained vision. The corneal sutures were removed after 2 weeks. One cat had iris prolapse on the 5<sup>th</sup> day which was reduced and the cornea was resutured.

**UNUSUALLY LARGE SPLENIC TUMOUR IN A DOG - A CASE REPORT***C.Ramani, L.Nagarajan, R.Suresh kumar, W.P.Archibald David*

Department of Surgery, Madras Veterinary College, Chennai.

Various surgical conditions affecting the spleen like splenic abscess, splenic tumour and splenic haematoma have been reported. This paper places on record a case of splenic tumour in a dog which was unusually large. A male German shepherd of five-year-old was presented to the Hospital with a history of abdominal distension and anorexia. A hard mass was palpable in the abdomen and the dog had intermittent vomiting. A check X-ray revealed a hard radio dense mass in the mid abdominal region. An exploratory laparotomy was undertaken and a huge mass in the spleen was excised along with splenectomy. The dog recovered well with out postoperative complications following routine post operative treatment. Histo pathological examination of the tumour mass was carried out and it was found to be lymphosarcoma.

**CAECAL IMPACTION IN DOGS - A REPORT ON SIX CASES***L.Nagarajan, C.Ramani, K.Ameerjan and W.P.Archibald David*

Department of Surgery, Madras Veterinary College, Chennai.

Six dogs brought with a history of abdominal distension and anorexia were subjected to routine clinical examination. All the dogs had intermittent vomiting and had severe colic on abdominal palpation. Percussion of the abdomen revealed tympanic resonance. Survey radiograph showed gas filled intestinal loops suggestive of intestinal obstruction. Barium meal investigation also confirmed intestinal obstruction but no foreign body could be visualized. Exploratory laparotomy was carried out. Caecal impaction was found in all the cases with hard fecal mass and typhlectomy was performed in all the animals. The dogs were given routine post operative therapy and recovered uneventfully. Out of the six cases that were presented five were Doberman and one was a Labrador. There were four male dogs and two female dogs with the age group between 2 - 4 years.

**COCCYGEAL OSTEOMYELITIS SECONDARY TO MYIASIS IN A DOG***S. Ayyappan, S. Thilagar and A. Kumaresan*

Peripheral veterinary Hospital, Madhavaram, Chennai.

A German Shepherd, 8 year old male dog was referred to the Peripheral Veterinary Hospital, Madhavaram, Chennai with the history of maggot wound just caudal to the base of the tail since one month. The same was treated with oil of turpentine and Lorexane cream and oral antibiotics (Cephalexin) for 7 days. The case was presented one month later with the history of oozing of pus through several sinus tracts at the same area. The radiograph revealed the presence of coccygeal osteomyelitis and the case was subjected for tail amputation.

**SURGICAL MANAGEMENT OF INTESTINAL LINEAR FOREIGN BODY IN A DOG***S. Thilagar, K. Ameerjan, C. Ramani and A. Kumaresan*

Department of Clinics, Madras Veterinary College, Chennai.

A Spitz bitch aged 2 years was brought with dullness, vomiting (food and milk) and yellowish watery foetid diarrhoea for the past two days. The case was treated symptomatically with tentative diagnosis of enteritis. Concurrent laboratory examination in early days revealed no radiographic evidence of foreign body. On 45<sup>th</sup> day contrast radiograph revealed signs of partial obstruction and gas filled intestinal loops and hence subjected for exploratory laparotomy. The linear foreign body (cotton thread) to the length of 2 m was removed from the intestinal loops by multiple enterotomies at the mesenteric and antimesenteric borders during the course of Surgery. The animal made an uneventful recovery.



**SESSION VIII — EXPERIMENTAL SURGERY****DESIGNING AND USE OF METHYLMETHACRYLATE ORBITAL PROSTHESIS IN CLINICAL CASES OF CATTLE AND BUFFALOES**

*Ghonasgi, A.S., Usturge, S. M. and Shivaprakash B.V.*

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Veterinary College, Bidar.

To prevent sunken appearance of eye following extirpation, orbital prosthesis was tried in clinical cases in cattle and buffaloes. One part of liquid monomer of methylmethacrylate was mixed with 2 parts of polymer and was moulded as a hollow hemisphere. Two such hollow hemispheres were joined to make a complete, hollow sphere, for insertion in orbital cavity. It was tried in 5 clinical cases. The case I was a buffalo heifer with complete rupture of cornea and loss of ocular contents. After extirpation, the orbital prosthesis was implanted and the eyelids were closed covering the implant. It was observed for 60 days. The implant remained in situ with good cosmetic appearance. In cases 2 and 3 there was neoplastic growth and the eyelids were closed over the implant following extirpation. No complication was seen upto day 30 and cosmetic appearance was good, but implant extrusion was noticed in one of the cases subsequently. Following antibiotic therapy for 10 days, extirpation was performed in case no. 4 and methylmethacrylate implant was placed in the cavity with eyelids kept open. Due to wound dehiscence and fibrous tissue ingrowth, extrusion and loss of implant was noticed. The case 5 was a bullock with severe periorbital infection, panophthalmitis and fistula formation. Following extirpation and orbital implantation with eyelids kept open, the implant extruded within 4 days. Following the control of infection, the implant was reinserted on day 27 but again extrusion was noticed.

**EFFICACY OF GLUTARALDEHYDE PROCESSED AORTIC ALLOGRAFT FOR CERVICAL OESOPHAGOPLASTY IN DOGS**

*T.P. Balagopalan and K.N. Muraleedharan Nayar*

Department of Surgery and Radiology  
College of Veterinary and Animal Sciences, Thrissur

Experimental study was conducted in 12 dogs of either sex weighing 9-13 kg randomly divided into groups A and B. Thoracic aorta harvested from dogs, processed with glutaraldehyde and preserved in isopropanol was used as graft material. Hyperalimentation intravenously and through pharyngostomy tube was employed post-operatively in 6 animals each. Morphological, histological and bio-mechanical studies were performed to assess the healing process. Proliferative changes in the vicinity of the graft material and in the perioesophageal tissues were minimum. The grafted site showed a gradual increase in tensile strength, breaking strength, extensibility and energy absorption upto 60<sup>th</sup> day post-operatively. But total dilatation capacity showed a marginal decrease on 30<sup>th</sup> day. The pattern of healing at the site was similar to that of normal first intention characterised by early infiltration of polymorphs and macrophages followed by fibroplasia. Epithelization was almost complete by 30<sup>th</sup> day. Epithelial lining was slightly hyperplastic by 60<sup>th</sup> day and lamina propria was devoid of oesophageal glands. Presence of pharyngostomy tube did not affect the healing process.

## EFFECT OF *Terminalia chebula* AND *Tinospora cordifolia* IN HEPATITIS IN BUFFALO CALVES

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Hepatitis was experimentally produced by intraruminal administration of carbon tetrachloride at a dose rate of 0.15 ml per kg body weight in 16, 1 to 1½ year old male buffalo calves. Carbon tetrachloride administration was repeated at same dose rate at an interval of 3 days. These animals were divided into four groups viz., 1, 2, 3 and 4 comprising of four animals each. The treatment was started 48 hrs after the administration of second dose of carbon tetrachloride. The animals of group 1 were kept as control and no treatment was given. The animals of group 2 were treated with *Terminalia chebula* powder given 1 g/kg body weight orally daily for 20 days. The animals of group 3 were given *Tinospora cordifolia* (1 g/kg body weight) orally daily for 20 days. The efficacy of treatment was assessed by determination of physiological, various haematological and biochemical parameters upto 25 days. The haematological parameters included estimation of haemoglobin, PCV, blood clotting time, TLC, DLC and TEC and biochemical studies of serum glucose, total protein, albumin, bilirubin, AST and ALT. The heart rate, respiration rate and rectal temperature decreased in all the groups of animals upto 5 day after induction of hepatitis and has returned to normal level between 8 to 10 days in all the groups of animals. A significant increase in blood coagulation time, total leukocyte count and decrease in haemoglobin level, packed cell volume and total erythrocyte count was observed in all the groups of animals as compared to normal value upto 8<sup>th</sup> day after induction of hepatitis. The early return of these parameters was observed in all the animals of group 4 treated with the combination of *Terminalia chebula* powder and *Tinospora cordifolia* extract as compared to groups 2 and 3 treated with *Terminalia chebula* powder and *Tinospora cordifolia* extract alone respectively. A gradual and significant increase in bilirubin contents, aspartate amino transferase and alanine amino transferase and the significant decrease in serum glucose and protein level was observed upto 10<sup>th</sup> day after the carbon tetrachloride administration. The values of these parameters returned to normal level earlier in the animals of treated groups as compared to control. The changes in these parameters were significant in the animals of group 4 as compared to groups 2 and 3 at respective time intervals. Thus, *Terminalia chebula* powder and *Tinospora cordifolia* extract has proved to be effective in the treatment of hepatitis. However, the combination of *Tinospora cordifolia* and *Terminalia chebula* has been found more effective and provided complete and early recovery in hepatitis.

## EFFECT OF *Convolvulus pluricaulis* IN NEPHRITIS IN DOGS

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Nephritis was created by administration of ethylene glycol @ 2ml/kg body weight orally in 2-3 years old dogs. These animals were divided into two groups of 6 animals each. The first group of 6 animals was kept as control. In second group, *Convolvulus pluricaulis* powder @ 10 g/animal was given orally daily for 20 days. The treatment was initiated 48 hours after administration of ethylene glycol. The efficacy of treatment was assessed by determining heart rate, respiration rate, rectal temperature, haemoglobin, PCV, TLC, TEC, plasma glucose, plasma total proteins, plasma creatinine, plasma urea nitrogen and urinary gamma glutamyl transferase (GGT) at various time intervals. A non significant increase in heart rate and respiration rate and significant decrease in rectal temperature in both the groups of animals upto 5<sup>th</sup> day after induction of nephritis has returned to normal level between 8 to 10 days in both the groups of animals. A significant ( $P < 0.05$ ) increase in haemoglobin, packed cell volume, total leukocyte count and total erythrocyte count was observed in both the groups of animals as compared to normal values upto 5<sup>th</sup> day after induction of nephritis. The early return of these parameters was observed in all the animals of group 2 treated with *Convolvulus pluricaulis* powder as compared to group 1 kept as control. A significant





( $P < 0.05$ ) decrease in plasma glucose and increase in total protein, creatinine, blood-urea nitrogen and urinary gamma glutamyl transferase was observed upto 5<sup>th</sup> day after ethylene glycol administration. The values of these parameters returned to normal level earlier in the animals of treated group as compared to control. Thus, *Convolvulus pluricaulis* powder was found effective in the management of nephritis in dogs.

### EXPERIMENTAL STUDIES ON FRESH AND FROZEN FULL THICKNESS SKIN ALLOGRAFTING IN BOVINE: CLINICAL AND HISTOMORPHOLOGICAL STUDIES

*Md. Asagar, V.P. Chandrapuria, S.K. Pandey and A.B. Srivastava*

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The experiment was conducted using 64 fresh and frozen allografts on eight male calves aged about six to eight months. Animals were equally divided into two groups. Eight full thickness skin grafts of 2 x 4 cm size were collected from either side of dorso-lateral aspect of thoraco-lumbar region from one animal of the pair and at the same time implanted on identical site of the second animal of the pair. In the second group, 32 full thickness skin grafts were collected from two donor calves and preserved in 1% Ampicillin-saline solution at 4<sup>th</sup> C in refrigerator for a month. These grafts were implanted as allografts on four animals of the second group. Clinical and histomorphological observations were conducted in graft tissue collected on 10<sup>th</sup>, 20<sup>th</sup>, 30<sup>th</sup> and 40<sup>th</sup> post implantation days. Clinical observations on 10<sup>th</sup> post implantation day revealed leathery, pale, elevated epidermis in frozen group while leathery black with moribund appearance in fresh group. On 20<sup>th</sup> day, observations showed pronounced sloughing of the epidermis, which completed by 30<sup>th</sup> day in fresh allografting in comparison to nearly 40<sup>th</sup> day in frozen group. A new growth of epithelium was visualised on 30<sup>th</sup> day over fresh allografts and 20<sup>th</sup> day from the margins of the frozen allografts. Dark brownish colouration, dryness with pale white junction and dermal erosion was evident on 40<sup>th</sup> day in fresh allografts, however marginal vascularisation with contraction of the pad was noticeable in the frozen allograft group. Histomorphological changes in fresh allografts included keratinization and sloughing of epidermis with cellular infiltration in the initial phase followed by degeneration and necrosis of the graft after 20<sup>th</sup> day. Dermal congestion and cellular infiltration were pronounced on 30<sup>th</sup> and 40<sup>th</sup> day. In frozen group, these changes were slow and progressive with evidences of neovascularisation near the junction commencing from 10<sup>th</sup> day. This study revealed that frozen allografts stimulate growth of marginal epithelium over the graft pad earlier than fresh allografts. Clinically, frozen allografts resist their absorption more than the fresh allografts.

### EFFICACY OF SURGERY AND CRYOSURGERY FOR TREATMENT OF ORAL TUMOURS IN CANINES

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Twelve clinical cases of oral tumours in canines were subjected to surgery and cryosurgery respectively in two groups of six animals each. Surgery was performed by conventional method and cryosurgery was performed using cryosurgical apparatus with interchangeable cryoprobe (BOSCOS CRYO - AA4, Chennai) having carbondioxide as refrigerant. Double freeze thaw cycle of one minute duration each was used and treatment was repeated at weekly interval for four weeks. No other medication was used in cryosurgery group. Surgical excision was found to be the most effective treatment for oral tumours in dogs with a success rate of 83.3 percent. Cryosurgery was found to be a reasonable alternative with a success rate of 66.6% recovery over a observation period of one year.





( $P < 0.05$ ) decrease in plasma glucose and increase in total protein, creatinine, blood urea nitrogen and urinary gamma glutamyl transferase was observed upto 5<sup>th</sup> day after ethylene glycol administration. The values of these parameters returned to normal level earlier in the animals of treated group as compared to control. Thus, *Convolvulus pluricaulis* powder was found effective in the management of nephritis in dogs.

### EXPERIMENTAL STUDIES ON FRESH AND FROZEN FULL THICKNESS SKIN ALLOGRAFTING IN BOVINE: CLINICAL AND HISTOMORPHOLOGICAL STUDIES

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## EXPERIMENTAL STUDIES ON BIOAVAILABILITY OF CIPROFLOXACIN IN COW CALVES AND ITS PROPHYLACTIC EFFICACY AGAINST *Staphylococcus aureus* BONE INFECTION

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Studies were conducted to evaluate the prophylactic efficacy of a short course of Ciprofloxacin in experimental bone infections in cow calves after its pharmacokinetic studies. Experimental osteomyelitis was produced in metatarsus bone by injecting ( $7 \times 10^9$  organisms per ml) haemolytic strain of *Staphylococcus aureus* directly into the marrow cavity using sterile saw dust as foreign nidus. The minimum inhibitory concentration (MIC) of Ciprofloxacin in vitro against *Staphylococcus aureus* was calculated to be  $0.25 \mu\text{g/ml}$ . The animals were divided into three groups of four animals each. In group I, (Control group) single dose of Ciprofloxacin @  $5 \text{ mg/kg}$  body weight was administered intravenously and its serum and bone marrow concentrations were measured at varying intervals. A peak serum concentration of  $2.912 \pm 2.56 \mu\text{g/ml}$  was recorded at 10 minutes of its administration. Its concentration was minimum at 360 minutes and could not be detected thereafter. In group II (Osteomyelitic group) single dose of Ciprofloxacin @  $5 \text{ mg/kg}$  intravenously was administered to find out its concentration both in serum and bone marrow following establishment of osteomyelitis at varying intervals. Its concentration in serum was much higher at 10 minutes of administration when compared to the same interval in group I. The concentration in bone marrow of normal animal was slightly higher as compared to those with osteomyelitis. After 720 minutes of administration, there was no evidence of its presence both in normal and osteomyelitic animals. The peak concentration both in serum and bone marrow in normal and infected animals were more than MIC value and remained so up to 6 hours. In group III (Prophylactic group) Ciprofloxacin @  $5.1 \text{ mg/Kg}$  as loading dose was administered intravenously 60 minutes before inoculation of *Staphylococcus aureus*. Thereafter, it was followed by maintenance dose @  $5 \text{ mg/kg}$  intravenously twice in a day (12 hours interval) for three consecutive days. The onset of osteomyelitis could not be prevented.

## COMPARATIVE EFFICACY OF SURGERY AND CHEMOTHERAPY FOR TREATMENT OF ORAL TUMOURS IN CANINES

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Twelve clinical cases of oral tumours were subjected to surgery and chemotherapy respectively in six animals each. Surgery was performed by conventional procedure. Chemotherapy was performed using Cyclophosphamide (Endoxon-ASTA German Remedies, Mumbai) at  $5 \text{ mg/kg}$  body weight, at weekly interval for four weeks. Surgical excision was found to be the most effective with a success rate of 83.3%, while chemotherapy using Cyclophosphamide showed only 33.3% recovery, with recurrence in two cases (33.3%) over an observation period of one year.

## EXPERIMENTAL STUDIES ON FRESH AND FROZEN FULL THICKNESS SKIN ALLOGRAFTING IN BOVINE: BIOCHEMICAL AND HISTOCHEMICAL STUDIES

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The experiment was conducted using total 64 fresh and frozen allografts on eight male calves aged about six to eight months. Animals were divided equally into two groups. Eight full thickness skin grafts of  $2 \times 4 \text{ cm}$  size





were collected from either side of dorso-lateral aspect of thoraco-lumbar region from one animal of the pair and at the same time implanted on identical site of the second animal of the pair. In the second group, 32 full thickness skin grafts were collected from two donor calves and preserved in 1% Ampicillin-saline solution at 4° C in refrigerator for a month. These grafts were implanted as allografts on four animals of the second group. Biochemical and histochemical observations were conducted in graft tissue collected on 10<sup>th</sup>, 20<sup>th</sup>, 30<sup>th</sup> and 40<sup>th</sup> post implantation days. Biochemical estimations revealed a parallel trend of tissue alkaline phosphatase (AP) with tissue collagen and elastin in both the groups. AP levels differed significantly amongst fresh and frozen groups. Collagen and Elastin values were minimum at the initial stage and maximum on 20<sup>th</sup> day in fresh allografts, while their level declined gradually in frozen allografts up to 30<sup>th</sup> day. Hexosamine followed nearly reciprocal trend to collagen and elastin values and differed significantly between groups. Histochemical study of fresh allograft revealed minimum concentration of collagen on 10<sup>th</sup> day and maximum on 20<sup>th</sup> day, which declined in later observations. In frozen group a gradual decreasing trend was noticed which raised to near 10<sup>th</sup> day value on 40<sup>th</sup> day of observation. The junction in both the groups showed increasing trend of collagen on 10<sup>th</sup> and 20<sup>th</sup> day. Acidmucopolysaccharides followed a reciprocal trend to the collagen in both the groups. It was concluded that in fresh allografting, degeneration of collagen and elastin remains faster than the frozen group. Frozen allografts resist their absorption more than fresh allografts.

### **EFFECT OF BONE WAX ON FRACTURE HEALING: AN EXPERIMENTAL STUDY**

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The effect of bone wax (Ethicon) on fracture healing was studied experimentally. In eight clinically healthy adult New Zealand White rabbits of either sex divided equally into two groups (A and B), midshaft transverse fracture of both the ulnae were created under thiopental (2.5%) anaesthesia. In animals of group A, bone wax was implanted in between two fractured ends, whereas in animals of group B, fracture site was left as such. Radiographic examination on days 0, 10, 20, 30 and 40 post fracture were suggestive of retarded fracture healing in bone wax applied group (A) than normal (B). In the bone wax group, no sign of periosteal proliferation was observed up to day 30 postoperative. On day 40, very little periosteal reaction was observed from both the ends and extending towards the adjacent radius but the defect was clearly visible at this stage. In group B, periosteal proliferation was seen started on 30<sup>th</sup> day postoperative and the bridging callus well developed on day 40, reducing the fracture gap. H and E stained decalcified bone sections, prepared after euthanasia on day 40 postoperative, showed incomplete union at the fracture site and the fracture gap and the newly formed osteoid tissue were well distinguished from that of normal bone. In group B, fracture healing was relatively faster as evidenced by newly laid down trabecular bone crossing over on either ends at the periosteal and endosteal side and were consolidated and thickened.

### **GROSS AND HISTOPATHOLOGICAL STUDIES FOLLOWING THE APPLICATION OF BIOCASINGS FOR URETHRAL HEALING IN DOGS**

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Forty eight mongrel dogs were randomly divided into group I and II to perform urethrotomy and urethrostomy respectively. Each group was further divided in four sub groups. A prescrotal urethrotomy was performed in all the animals. The urethral incision was left unsutured (urethrotomy group) and sutured to the corpus cavernosum penis (urethrostomy group) in control animals by keeping catheter in situ. Gelatine, fibrin and amnion were wrapped around urethrotomy/ urethrostomy sites in respective subgroups to study the gross and histopathological lesions



following application of bio-casings for urethral healing. Grossly, all the dogs showed swelling, congestion and oedema at the operative site in early postoperative days. As the time advanced, these changes were minimal. Thick to filamentous adhesions at the operative site with the surrounding tissues were evident in both the groups. Microscopically, all the sections showed inflammatory reactions in the early postoperative days. The inflammatory reaction was severe in control and gelatine wrapped animals compared to fibrin and amnion treated group of animals. Urethrostomy group showed stenosis of urethral lumen, whereas, urethrostomy group depicted widening of urethral lumen at the operated site. Epithelization was completed by 14 to 30 days in both the groups. Fibrin and amnion casings proved to be better for the urethral healing in dogs.

### ACELLULAR AND GLUTARALDEHYDE PRESERVED TENDON ALLOGRAFTS FOR GAP REPAIR OF FLEXOR TENDON IN BUFFALO CALVES: GROSS, MICROSCOPIC AND SCANNING ELECTRON MICROSCOPIC OBSERVATIONS

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Twelve tenorrhaphy were performed at the mid metatarsal region in six buffalo calves of eight to twelve months of age (body weight 80 to 120 Kg), divided into two equal groups (A and B). A defect 2 cm long was created in superficial digital flexor tendon under lignocaine hydrochloride (@ 0.3 mg/ Kg) epidural analgesia. The defect was repaired with acellular tendon graft (group A) and 1% glutaraldehyde preserved tendon graft (group B) with polyglactin 910 No. 1 suture using Lange's technique. Contralateral limb was operated after a gap of 60 days. The animals were euthanised on day 90 postoperative and after gross examination, tissue was collected for scanning electron microscopic observations. Gross observations on day 30 in both the groups revealed that the graft was surrounded by a layer of connective tissue and appeared thicker in comparison to the adjacent normal tendon. Increased vascularity was observed in animals of group A whereas thickening of the tendon was more marked in group B. On day 90, resorption of the graft was observed in group A whereas it was partial in group B. Microscopic observations showed increased vascularity in group A. The granulation tissue formed at the host tendon graft junction was more organised on day 90 in both the groups. The acellular graft was completely reabsorbed by day 90 whereas it was partially absorbed in group B. The tissue reaction around polyglactin 910 suture material was fibroblastic in nature. Scanning electron microscopic observations on day 30 showed invasion of newly formed tissue into the graft. Hydrolysing and fragmentation of polyglactin 910 suture was observed. On day 90, resorption of graft with cavity formation between thick collagen fibrils and dissolution of ground substance was observed.

### EVALUATION OF METHYLMETHACRYLATE ORBITAL PROSTHESIS IN EXPERIMENTAL BUFFALO CALVES

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The study was conducted in twelve buffalo calves divided into two groups of 6 animals each. In group 1 hollow hemisphere of the implants were placed in orbital cavity after extirpation of eye with eyelids left unsutured and in group 2, full hollow spheres were placed and the eyelids were sutured together. The animals were observed postoperatively for 60 days and clinical, physical, haematological, biochemical and histopathological observations were recorded. Clinically, cosmetic appearance of group 1 animals was excellent in the early postoperative days. However, implant extrusion was noticed in all the animals of group 1 by 30 to 35 days with subsequent cicatricial contraction. In group 2, infection or extrusion was not noticed and the implants were accepted. There was no significant difference between respiration rate and heart rate between the groups. There was no significant difference in heart rate at few intervals in group 1 animals. Significantly higher total leukocyte count, lymphocyte count and monocyte count was observed in group 1 animals up to day 60. Serum protein levels were higher in both groups.



groups postoperatively and the values were significantly higher in group 1 animals up to day 30. Albumin and globulin levels were significantly higher at all postoperative intervals in group 1 animals and albumin and globulin ratio was decreased up to 15<sup>th</sup> postoperative day. Radiologically, implant extrusion was noticed by day 30 in group 1 animals. Histologically, extensive fibrous tissue proliferation, capillary growth and monocytic infiltration were seen in group 1 animals and monocytic infiltration in group 2 animals on day 60.

### QUALITATIVE AND QUANTITATIVE EVALUATION OF NEUROMUSCULAR FUNCTIONAL STUDIES BEFORE AND AFTER FEMORAL ARTERIAL OCCLUSION IN DOGS

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Twelve mongrel dogs of either sex weighing between 10 to 12 Kg were used in the study. Femoral artery was occluded and examinations of neuro-muscular activity from evoked muscle responses to the per cutaneous peroneal nerve stimulation of the occluded hindlimbs was done before and at 0, 10<sup>th</sup>, 20<sup>th</sup>, 30<sup>th</sup>, 60<sup>th</sup> and 90<sup>th</sup> days after occlusion. The mean of the baseline values in experimental and control series of experiments were  $137 \pm 7.5$  gm. wt and  $134 \pm 5.8$  gm. wt respectively. The sham operated contralateral hindlimbs remained statistically unaltered from 0<sup>th</sup> day to 90<sup>th</sup> days of occlusion. In experimental limbs, the values decreased significantly at 10<sup>th</sup> day ( $P < 0.001$ ), 20<sup>th</sup> day ( $P < 0.01$ ) and 30<sup>th</sup> day ( $P < 0.05$ ) but, there was no significant changes in other post-occlusion days. The values of the evoked muscle responses started to increase between 20<sup>th</sup> and 30<sup>th</sup> day and reached close to the baseline observation gradually between 60 to 90 days of occlusion. The variation of twitch height of evoked muscle responses on 10<sup>th</sup> and 20<sup>th</sup> day post occlusion indicated an alteration of neuro-muscular status of thigh muscles due to sudden reduction of local circulation.

### CHEMOSTERILIZATION IN GOAT AND SHEEP BY CALCIUM CHLORIDE

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Experiments were designed for chemical castration of 30 Bucks and 24 Rams by Intratesticular injection of Calcium Chloride solution. Dosages ranged from 2.0-2.5 ml. of calcium chloride solution per testis depending on testicular mass. Care was exercised to prevent leakage outside the tunica vaginalis. After injection, the testis gradually became very firm to palpate and of much turgid than could be ascribed to the volume introduced. Swelling and progressive induration persisted for 4 to 5 days. Atrophy was apparent gradually from 2 weeks onwards and after 30-40 days only a small testicular remnant was palpable. Level of testosterone reduced significantly from pre-treatment value  $3.74 (\pm) 0.039$ ,  $3.778 (\pm) 0.02$  and  $3.75 (\pm) 0.019$  to  $0.87 (\pm) 0.025$ ,  $0.57 (\pm) 0.02$  and  $0.29 (\pm) 0.01$  at 15, 30 and 45 days after injection in 5%, 10% and 20% calcium chloride solution treated cases respectively on an average in both Bucks and Rams. Histomorphological finding showed extensive coagulative necrosis in 5% and 10% groups and in 20% treated groups it showed complete necrosis of seminiferous tubules and interstitial tissues, which were replaced by fibrocollagenous bands. In Bucks and Rams, results so far indicate that the dosage of 2-2.5 ml. of 20% calcium chloride solutions per testis of Buck or Ram are effective and is a convenient rapid chemosterilization technique.



### CHEMICAL CASTRATION IN PIGLETS BY CALCIUM CHLORIDE

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Experimental intratesticular 1 ml. injections of 10 %, 15 % and 20 % solutions prepared in equal volume of normal saline solution (0.9%) and 2% lignocaine hydrochloride solution produced necrosis of parenchyma of the testes with subsequent atrophy of the testes in the age group of 10-12 weeks piglets after 30-45 days of injections. Most animals responded slightly to the prick of the needle and reacted to excessive injection pressure. The evidence of pain during injection may be comparable to that caused by the injection of local anaesthetic agent. There was no severe inflammatory reaction and any other unfavourable complications in post injection cases. Haematological picture reflected mild degree of inflammatory changes for a period of 3- 5 days. The testes reduced in size and volume gradually within a period of about 30-45 days. Histomorphological findings exhibited extensive coagulative necrosis in 10 and 15 % treated groups, but in 20 % treated group, it showed complete necrosis of testicular parenchyma.

### STUDIES ON THE USE OF OMENTAL AND AMNION GRAFT IN INTESTINAL ANASTOMOSIS IN DOGS

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The efficacy of fresh omental grafts, preserved in natural honey and amnion grafts were assessed in 36 dogs by macroscopic examination of anastomosis for the extent of adhesions with other abdominal organs and stenosis of intestine, mechanical properties viz. breaking strength, tensile strength, energy absorption, extensibility of the tissue and histopathological and histochemical examination of biopsy specimens. The clinical parameters did not reveal any significant changes. Breaking strength, tensile strength, energy absorption and extensibility in fresh omentum grafted intestinal anastomotic site were significantly ( $P < 0.01$ ) higher from 3<sup>rd</sup> day onwards than in animals where amnion and preserved omentum was used. There was a gradual but significant increase in the values of breaking and tensile strength, extensibility and energy absorption at the grafted site in all the animals. The extent of stenosis of the intestinal lumen significantly ( $P < 0.01$ ) increased in all the groups of animals from 3<sup>rd</sup> day onwards. It, however, significantly ( $P < 0.01$ ) decreased by 7<sup>th</sup> day onwards in all the animals except animals of the control group. The extent of adhesions were more in order of amnion, preserved omentum grafted anastomosis and control animals and were least in the animals grafted with fresh omentum. Macroscopic examination also revealed complete healing by 30<sup>th</sup> day in all the animals without any signs of complications. Histopathological and histochemical studies of healed tissue revealed complete healing at the anastomotic site by 30<sup>th</sup> day. The grafts were accepted well in all the groups of animals and helped in the healing process. On the basis of clinical, macroscopic, mechanical, histopathological and histochemical studies it can be concluded that fresh omentum, amnion and honey preserved omentum grafts helped in enhancing healing of the anastomotic site and prevented adhesion formation. However, prevention of adhesions and healing was faster in fresh omentum treated anastomotic site followed by amnion and preserved omentum.





## EVALUATION OF ULTRASOUND THERAPY FOLLOWING AUTOGENOUS CORTICAL FRAGMENTED BONE GRAFTING IN DOG

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A study on the effect of ultrasound therapy following fragmented autogenous cortical bone grafting was conducted on 5 clinically healthy dogs and compared with other 5 dogs where no ultrasound therapy was given. A 2cm. midshaft defect in right radius under haloperidol-thiopental anaesthesia was created and maintained by bone plating in all the dogs. The gap was filled with autogenous cortical bone fragments (2-5 mm in diameter) made from the cortical piece of radius removed from the same animal. In 5 dogs, pulsed ultrasound therapy @ 0.5 watt/cm<sup>2</sup> was given from day 4 after operation for 10 minutes daily for 10 days. The surgical wound healed by first intention in 6 days in all the treated animals. The swelling of operated limb was reduced in all the animals after first ultrasound treatment was given. Pain was absent on day 7 after operation in all the treated animals. There was full weight bearing on standing from day 20 onwards and after day 30 during progression. At 60<sup>th</sup> day, radiographs revealed good amount of radiodense callus invading the graft area in the fracture gap in the treated animals. Angiography on 60<sup>th</sup> day showed less extraosseous supply in the grafted area in the treated animals. At necropsy on 60<sup>th</sup> day, operated limb did not show any significant change in thickness. After plate removal, movement along the graft site was absent in the treated dog. Histomorphologically there was an advanced stage of maturation of cancellous bone and less alcianophilic chondroblastic tissue which represented more neutral polysaccharides. Overall results of the study demonstrates that U.S. therapy @ 0.5 W/cm<sup>2</sup> enhances osteoinduction and osteoconduction following autogenous cortical fragmented bone grafting in dogs.

## PATHOPHYSIOLOGICAL CHANGE DURING INDUCED SIMPLE AND STRANGULATED INTESTINAL OBSTRUCTION IN CANINES

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The study was conducted on 18 healthy dogs aged one to two years old and weighing between 20 to 30 kg. They were randomly divided into three equal groups: A, B and C. The animals of groups A and B were subjected to simple and strangulated jejunal obstruction, respectively. In animals of group C, a strangulated isolated loop of jejunum was created and the patency of the intestinal tract maintained. All the operations were performed under balanced anaesthesia comprising of premedication with atropine sulphate and lorazepam followed by intravenous thiopentone sodium. The parameters investigated included clinical, haematological, blood plasma and peritoneal fluid biochemical tests. Rectal temperature, heart rate, respiratory rate and capillary refill time showed an increase in animals of all the groups. Total leucocyte count (TLC), Erythrocyte sedimentation rate (ESR), Packed cell volume (PCV) and haemoglobin values showed increase. The increase was more in animals of group B and C. decrease in total proteins plasma but simultaneous increase in their values was evident in peritoneal fluid was observed. The increase was maximum in group B followed by group C and A, respectively. The concentration of sodium, potassium and chloride in plasma and peritoneal fluid showed a decreasing trend in all the groups, The decrease being more severe in animals of group B followed by group C and A respectively. The inorganic phosphorus in plasma increase significantly ( $P < 0.05$ ) but that in peritoneal fluid did not show any significant change in any group. The necropsy lesions were severe in strangulated isolated loop group. Followed by strangulated obstruction and simple obstruction group. The results of this study indicate that cessation of food ingesta through the alimentary tract is an important factor in causing the death of the animal. But if vascular supply of intestinal segment is compromise, almost similar changes can occur and when both the conditions are met simultaneously, the clinical condition is much more fatal. Additionally, toxemia seems to play a dominant role in aggravating the clinical status of the animal.

## MYOTOMY AND OMENTAL GRAFTING AT THE GASTRO-OESOPHAGEAL REGION IN DOGS

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Gastro-oesophageal myotomy was performed in six adult dogs through the 12<sup>th</sup> intercostal abdominal approach with resection of 12<sup>th</sup> rib. After laparotomy, the gastro-oesophageal region was exposed and oesophageal hiatus was incised to expose the lower oesophageal sphincter. The myotomy was performed from the cardia cranially into the oesophagus for a length of 4 cm. The hiatus was closed by suturing the cranial edge of myotomy edge to the border of diaphragm at the hiatus. An omental pedicle graft of 4cm x 3 cm size was prepared from the cranial edge of omental attachment at the greater curvature of the stomach and was drawn over the site and fixed in position. The abdominal wound was sutured. Observation for 21 days revealed no abnormality on the physiological and clinical parameters. Slight leukocytosis was noticed on the 7<sup>th</sup> and 14<sup>th</sup> day. Radiography on 14<sup>th</sup> day revealed narrowing of caudal thoracic oesophagus in one animal and dilated stomach in two animals. On autopsy on 22<sup>nd</sup> day, the omentum was indistinguishable at the myotomy site. The region was thin and dilation of stomach was noticed in two animals. Histopathological study revealed healing of myotomy site with fibrovascular connective tissue. Cellular infiltration was observed upto the stroma and lamina propria, indicating the probable chance of subsequent fibrosis at the site.

## BIOCOMPATIBILITY EVALUATION OF SILICONE SCLERAL BUCKLING DEVICE

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Silicone scleral buckling device is used for the surgical treatment of retinal detachment. A detached retina can be reattached to the choroid by indenting the sclera from outside at the site of detachment by means of suitable scleral implant like donor eye, fascia lata, polyvinyl alcohol, hydrogels, gelatin, polyethylene and silicone rubber. In this study, medical grade silicone rubber (poly dimethyl siloxane) was evaluated as scleral buckling device. Adult New Zealand white rabbits (16 numbers) of either sex was used for the study, divided into control (imported device), test (test device) and sham groups (surgical procedure done without implant). Each group contained two durations of study – three months and six months, in one eye of each animal. Under general anaesthesia one 3 x 5 mm size implant was placed on the sclera circumferentially about 3 mm behind the muscle insertion in the superior temporal quadrant of the globe and fixed with 7-0 monofilament polypropylene suture. For implantation, the site was assessed by a lateral canthotomy and a 180° conjunctival periotomy. Another 3 x 5 mm implant was placed sub sclerally on the superior nasal quadrant of the globe using an "H" shaped half to 2/3<sup>rd</sup> thickness incision on the sclera and fixed with 7-0 monofilament polypropylene suture. The implanted globe of all the groups did not have any evidence of erosion of pressure necrosis, haemorrhage, necrosis or inflammation at the implant site. Histopathologically both scleral and subcleral test implants showed presence of macrophages, fibroblasts, fibrocytes and occasional foreign body giant cells at one month. At three months a few macrophages and fibroblasts were noticed.





## EVALUATION OF FIBRIN GLUE FOR NUERO-SURGICAL APPLICATION IN A RABBIT MODEL

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Two component fibrin glue developed at S.C.T.I.M.S.T. was evaluated for its neuro-surgical application. Component one was cryoprecipitated single donor screened human plasma reconstituted in distilled water to get a fibrinogen concentration of 70 mg/ml. Component two was lyophilised bovine thrombin reconstituted in 25 mmol CaCl<sub>2</sub> solution to get an enzyme activity of 250 IU/ml. Three adult New Zealand white rabbits of either sex was used. Under general anaesthesia, bilateral fronto-parietal craniotomy defects of 7mm x 12mm size was created aseptically. A 10 mm linear (anterio-posterior) incision was made under magnification on the dura on both left and right craniotomy sites and a single apposition suture of 7/0 prolene was put. On the left craniotomy site, over the dural incision, test fibrin glue was applied and on the right craniotomy site control sample was applied. The incision was closed using 4/0 silk sutures. The animals were sacrificed on 15<sup>th</sup> day, and histopathological evaluation was done. Gross examination was done. Gross examination showed thin white soft tissue over both left and right craniotomy sites. Histopathological examination showed granulation tissue in the gap between trabecular bone on both test and control sites. Numerous macrophages, foreign body giant cells and foreign body granulomas were seen on both test and control sites. The control side showed a much pronounced macrophage response than the test side. The evaluation clearly indicated that the test fibrin glue is comparable to control in biocompatibility.

## EVALUATION OF BIOMEDICAL IMPLANTS, DEVICES AND ARTIFICIAL ORGANS

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The development and improvement of any biomedical device or artificial organ require a careful consideration of the tissue response induced by these devices and organs in the host species. Tissue response has been found to be influenced by both implant characteristics as well as the type of tissue in which it is implanted. As far as the implant material or 'the whole device/organ' is concerned, the physical and chemical characteristics are of prime importance and can elicit tissue response to a variable degree. On the other hand, the ability of living body to respond to various kinds of injury and foreign body is also important, which could be an inflammation, tissue regeneration and repair or a complex reaction involving immunopathological and carcinogenic changes.

## MODIFIED PHARYNGOSTOMY TUBE FEEDING METHOD IN DOGS: AN EXPERIMENTAL STUDY

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Modified method of pharyngostomy tube placement was studied in 15 dogs. Three of them were healthy and conditioned dogs and 12 have undergone oesophageal surgery. Siliconised catheter made up of modified polyvinyl chloride with an attached X-ray opaque line was used as pharyngostomy tube. Liquid feeding through the tube was continued for 15 days post-operatively and was removed later on. The animals tolerated the tube well. Feeding through the tube and management were relatively uncomplicated. Hyperalimentation through pharyngostomy tube reduced the period of convalescence post-operatively. There was no behavioural or structural changes affected by placement of pharyngostomy tube by this method in dogs.



## PROCESSED OESOPHAGEAL ALLOGRAFTS FOR HERNIOPLASTY IN PIGS

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The study was conducted on six clinical cases of umbilical hernia in pigs with hernial ring of size  $8.25 \pm 0.42$  cm x  $6.80 \pm 0.47$  cm. Fresh pieces of oesophagus collected from slaughtered pigs were processed and cross-linked with glutaraldehyde to prepare the graft. The processed oesophageal allograft was used as an onlay graft after primary suturing of the hernial ring. The animals were kept under observation for a period of six months after surgery. Rejection of graft or recurrence of hernia was not observed in any of the animals. Junctional histology at slaughter revealed connective tissue proliferation with neovascularisation. The results of the present study indicated that allogeneous oesophageal collagen could be processed and used as graft for surgical correction of hernia in pigs.

## POSTER SESSION

1. **SURGICAL MANAGEMENT OF CONGENITAL ABNORMALITIES IN CALVES AND KIDS – HEAD TO TAIL**  
*C. Venkatesan, S. Dharmaceelan, V. Ramasamy*  
Veterinary College and Research Institute, Namakkal
2. **CORRECTION OF CLEFT PALATE IN A KID**  
*Syan, K. V., Sooryadas, S., Joshy George and Sarada Amma, T.*  
Dept. of Surgery and Radiology, College of Veterinary and Animal Sciences, Thrissur.
3. **FABRICATION AND CLINICAL TESTING OF NEW SURGICAL CHUTE (FLEX-OP-CAGE) FOR LARGE ANIMAL CONTROL**  
*B.V. Shivaprakash., K. Chandrakanth and S.M. Usturge*  
Department of Surgery and Radiology, Veterinary College, Bidar.
4. **UTERINE RUPTURE AND FOETAL HYDROPSY IN A BUFFALO – A CASE REPORT**  
*D. Dilip Kumar, S.M. Usturge, Prakash and Pomsingh*  
Department of Surgery and Radiology, Veterinary College, Bidar.
5. **CASEOUS LYMPHADENITIS IN A SHE BUFFALO**  
*D. Dilip Kumar, S.M. Usturge, Prakash and Pom Singh*  
Department of Surgery and Radiology, Veterinary College, Bidar.
6. **EYE CANCER MANAGEMENT BY SURGERY AND AUTOVACCINE IN A DEONI BULLOCK**  
*D. Dilip Kumar, S.M. Usturge, Prakash and Pom Singh*  
Department of Surgery and Radiology, Veterinary College, Bidar.
7. **RADIOGRAPHIC REPRESENTATION OF RARE EXTRAINTESTINAL LESIONS IN DOGS**  
*T. Sarada Amma, P.T. Dinesh and S. Sooryadas*  
Dept. of Surgery and Radiology, College of Veterinary and Animal Sciences, Thrissur.



8. RADIOGRAPHIC REPRESENTATION OF RARE CASES OF ALIMENTARY TRACT DISORDERS IN ANIMALS  
*T. Sarada Amma, S. Sooryadas and P.T. Dinesh*  
Dept. of Surgery and Radiology, College of Veterinary and Animal Sciences, Thrissur
9. INCIDENCE OF ORAL TUMOURS IN CANINES  
*M.S. Vasanth and Shekarappa, C.*  
Dept. of Surgery and Radiology, Veterinary College, UAS, Hebbal, Bangalore.
10. PYOMETRA ASSOCIATED WITH AN UNUSUAL VENTRAL CERVICO-VAGINAL RIDGE IN A NULLIPAROUS BITCH  
*G. Ajithkumar, K.D. John Martin, P.T. Dinesh, Premni Alias, S. Ajithkumar*  
S. Suraj, N. Divakaran Nair, K. Rajankutty and T. Sreekumaran  
College of Veterinary and Animal Sciences, Mannuthy, Thrissur.
11. UNUSUALLY LARGE MAMMARY TUMOUR IN DOGS—A REPORT ON TWO CASES  
*L.Nagarajan, C.Ramani and K.Ameerjan.*  
Department of Surgery, Madras Veterinary College, Chennai.