3rd Proceedings *of the* Seminar *on* VETERINARY SCIENCES

3rd Proceedings of the Seminar on VETERINARY SCIENCES

Faculty of Veterinary Medicine ***UPM***

7 - 11 January 2008

RASEDEE ABDULLAH • ABDUL RANI BAHAMAN • ABDUL RAHIM MUTALIB
KALTHUM HASHIM • SALEHA ABDUL AZIZ • TENGKU AZMI TENGKU IBRAHIM

Penerbit Universiti Putra Malaysia
Serdang • 2008

Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

Seminar on Veterinary Science (3rd: 2008: Serdang, Selangor)
3rd proceedings of the Seminar on Veterinary Science, Faculty of Veterinary Medicine UPM, 7 - 11 January 2008/editors Rasedee Abdullah ... (et al.).
ISBN 978-967-344-003-0
1. Veterinary medicine--Congresses. 2. Animal--Diseases--Congresses.
3. Livestock--Diseases--Congresses. I. Rasedee Abdullah. II. Title.
636.089

Font: Times New Roman
Text font size : 11/13.2

Typeset and Printed by
Universiti Putra Malaysia Press
43400 UPM Serdang
Selangor Darul Ehsan
Tel:03-89468851/89468854
Fax: 03-89416172
Emel: penerbit@putra.upm.edu.my

Content

Preface

1. Correlation between Plasma Progesterone and Fecal Progesterone Metabolites in Established Estrous Cycles of Brangus Cows 1
Fazerin Azra Mohamed Azahar & Rosnina Hj. Yusoff

2. Retrospective Study on Traumatic Lesions in Dogs and Cats presented at University Veterinary Hospital, Universiti Putra Malaysia 4
Goh Kuan Lim & Sundararajan Thilagar

3. The Analgesic Effects of Tramadol in Dogs following Ovariohysterectomy 8
How Huey Shan, Chen Hui Cheng, Ravi Sundar George & Rasedee Abdullah

4. A Preliminary Study on Seroprevalance of *Toxoplasma* Infection in Goats and Dogs in Malaysia 12
Lai Shu Zhan, Amin Babjee & P. Chandrawathani

5. Seromuscular Extramucosal versus Seromuscular Mucosal Intestinal Anastomosis using Simple Interrupted Suture Pattern in Dogs 16
Navanithakumar Ballakrishnan, Sundararajan Thilagar & Md. Sabri Yusoff

6. The Anesthetic Effects of Intramuscular Ketamine-Xylazine in Cats undergoing Ovariohysterectomy and Castration in a Field Neutering Scenario 19
Patricia Kong Hie Sing, Chen Hui Cheng, Hazilawati Hamzah & Reuben Sunil Kumar Sharma

7. Efficacy of Omeprazole Paste plus Yogurt for the Treatment of Gastric Ulcers in Thoroughbreds 25
Tan Chai Har, Noraniza Mohd. Adzahan & Reza Singam

8. Re-evaluation of Flumethrin for *Rhipicephalus sanguineus* Control on Dogs in the Tropics 31
Voon Keh Li & Goh Yong Meng

9. A Review of Surgical Gastrointestinal Tract Emergencies in Dogs and Cats 35
Goh Tin Sin & Sundararajan Thilagar

10. Evaluation of the Efficacy of Various Antagonists on Peripheral Antinociception of Haruan (*Channa striatus*) Extract 39
Khoo Kah Ern & Arifah Abdul Kadir

11. Effects of Anaesthesia and Surgery on Cardiorespiratory and Blood Parameters in Horses 44
Lim Lay Hoon, Chen Hui Cheng & Reza Singam

12. A Retrospective Study on Common Disease and Conditions of Rabbits presented to Veterinary Clinics in the Klang Valley, Malaysia 50
Norziela Anuar, Rashid Ibrahim & Latiffah Hassan

13. Musculature of the Malayan Porcupine (*Hystrix brachyura*) 53
Rajeswary Raman, Shanthi Ganabadi & Mohd Hilmi Abdullah

14. History of Exercise-Induced Pulmonary Hemorrhage (EIPH) and its Influence on Cytology of Bronchoalveolar lavage of Thoroughbred Racehorses 57
Teh Chew Peng, Goh Yong Meng, Shri Kanth & Rebecca Tan

15. Morphological Description of the Malaysian Spotted Dove (*Streptopelia chinensis)* of Peninsular Malaysia 62
Goh Bee Yen, Shaik Mohamed Amin Babjee & Jalila Abu

16. Investigation of Trypanosomiasis at a Deer Farm in Lenggong, Perak, Malaysia 67
Adrian Syril Motiung & Rehana Abdullah Sani

17. Detection of Avian Metapneumovirus Field infection via Reverse Transcriptase Polymerase Chain Reaction and ELISA in two Layer Farms in Johor, Malaysia 68
Alfred Lim Aik Sunn, Jalila Abu, Choo Pow Yoon & Goh Yong Meng

18. Effect of Vitamin B12 (Mecobalamin) on Bone Loss in Adult Ovariectomised Osteoporosis Rats 69
Angeline Teh Ping Ping, Rashid Ibrahim & Tengku Azmi Tengku Ibrahim

19. Serological Prevalence of Leptospirosis in Cattle in Pahang, Malaysia 70
Azita Hanim Hashim Ghani, Siti Khairani Bejo & Abdul Rani Bahaman

20 Plasma Fatty Acid Profiles and Hair Coat Condition of Captive and Semi-captive Orangutans in Malaysia 71
Chan Lee Suan, Rasedee Abdullah & Goh Yong Meng

21. Parasite Fauna of Wild and Farmed Anurans in Selangor 72
Felix Wong Sze Jin & Reuben Sharma

22. Comparison of Blood Counts and Cell Morphology of Canine Capillary and Venous Blood 73
Goh Chan Foong, Habibah Arshad & Hazilawati Hamzah

23. Effect of Recombinant Human Erythropoietin on a Canine Mammary Tumour Cell Line under Normoxic and Hypoxic Conditions 74
Goh Shwu Hwei, Rasedee Abdullah & Teo Guan Young

24. A Retrospective Study of Feline Leukemia-tested Cats in a Private Veterinary Clinic in Shah Alam, Selangor, Malaysia 75
Hii Yi Yi, Nadzariah Cheng Abdullah & Goh Yong Meng

25. Sex Determination in African and Rockhopper Penguins by DNA Analysis and Morphometric Measurements 76
Hwang Chung Chew, Rosnina Yusoff, Jalila Abu & Tan Ching Giap

26. *Phyllanthus* spp. Attenuates Gentamicin-induced Renal Damage in Rats 77
Johaimi Johari, Hazilawati Hamzah, Mohd Rosly Shaari & Rasedee Abdullah

27. Detection Rate of *Staphyloccus aureus* and *Bacillus cereus* from Raw Milk Samples at Milk Collecting Centres in Selangor, Malaysia 78
Ketty Goh Siew Lin, Latiffah Hassan & Siti Khairani Bejo

28. Methicillin-resistant–*Staphylococcus aureus* in Pigs 79
Khairina Akmar Khalid, Zunita Zakaria & Ooi Peck Toung

29. Molecular Markers in Canine Mammary Gland Tumor and Their Prognostic and Therapeutic Values 80
Ku Chi Ling, Rasedee Abdullah & Teo Guan Young

30. Effect of *Lactobacillus casei* on Growth Performance, Faecal Enterobacteriaceae Count and Faecal pH in Growing Rats 81
Lee Kai Xin, Abdul Rahim Mutalib & Zunita Zakaria

31. Antibacterial Activity of *Azadirachta indica* on *Vibrio* spp. Isolated from Cultured Shrimp 82
Lee Mei Kim & Mohamed Shariff Mohamed Din

32. Screening for Microfilaricidal Effects of Selected Plant Extracts against *Dirofilaria immitis* 83
Leonora Tuah Merawin, Arifah Abdul Kadir & Rehana Abdullah Sani

33. Evaluation of Multiplex PCR for Rapid Detection and Differentiation of *Mycoplasma gallisepticum* Field and Vaccine Strains 84
Liew Pit Sze, Tan Ching Giap, Aini Ideris & Abdul Rahman Omar

34. Survival Determination among Canine Heart Failure Patients Presented to the University Veterinary Hospital, Universiti Putra Malaysia 85
Lim Siew Yin & Goh Yong Meng

35. Characterisation of the Malaysian Porcine Circovirus 2 Strains 86
Loh Sim Yean & Ooi Peck Toung

36. Cytopathic Features in Rat Tissue-inoculated Cell Culture 87
Lu Sin Chiew, Zeenathul Nazariah Allaudin, Loh Hwei San, Chan Poh Soon, Nazrina, Noraini, Tan Siok Shin, Tan Sing Giap & Mohd Azmi Mohd Lila

37. Effect of Extenders on Viability and Abnormality of Cryopreserved Goat Spermatozoa 88
Mark Hiew Wen Han, Abdul Wahid Haron, Rosnina Hj Yusoff & Mohd Azam Khan Goriman Khan

38. The Prevalence of Vancomycin-Resistant Enterococci in the Veterinary Students of the Faculty of Veterinary Medicine, Universiti Putra Malaysia 89
Mellissa Noraini Amiruddin, Latiffah Hassan & Zunita Zakaria

39. Antibiotic Residues in Chicken Meat Sold in Markets and Raw Milk from Milk Collecting Centres in Sepang and Banting, Selangor, Malaysia 90
Nazirah Abdullatad & Saleha Abdul Aziz

40. Occurrence of Antibiotic-resistant *Salmonella* spp in Tortoises and Turtles 91
Noorazrena Abdul Aziz & Saleha Abdul Aziz

41. Health and Reproduction Status of Dairy Cattle in Ladang 16, Universiti Putra Malaysia 92
Nor Natasha Mohd Sofian & Abdul Aziz Saharee

42. Plasmid Analysis of *Escherichia coli* Isolated from Animals 93
Nor Azlina Abdul Aziz & Zunita Zakaria

43. A Retrospective Study on the Management of Captive Malayan Sun Bears in Malaysian Zoos 94
Norhanita Jumali, Shaik Mohamed Amin Babjee & Abdul Rani Bahaman

44. Health and Reproductive Status of Beef Cattle in Field 16, Universiti Putra Malaysia 95
Nur Izni Mohd Zaharri, Abd Aziz Saharee & Rosnina Hj Yusoff

45. Protective Effects of *Phyllanthus* sp. on Gentamicin-induced Acute Renal Failure in Rats 96
Nurul Syakirah Mohammad Hatta, Hazilawati Hj. Hamzah, Rasedee Abdullah & Mohd Rosly Shaari

46. Diurnal Stereotypies and Physio-Behavioural Response to Enrichment in Captive Malayan Sun Bears (*Helarctos malayanus*) 97
Ong Siew Mei, Tan Hwee Mien, Grace Langat, Abdul Rani Bahaman, Sumita Sugnaseelan & Reuben Sharma

47. Isolation and Identification of Antimicrobial Resistant *Salmonella* and *Vibrio spp.* in Cultured Pacific White Shrimp (*Penaeus vannamei*) 98
Ooi Mei Chen, Mohamed Shariff Mohamed Din & Saleha Abdul Aziz

48. Detection and Isolation of Pathogenic Leptospires from Rats, Water Effluent and the Environment of Zoo Negara, Malaysia 99
Penny Hu Huong Niong, Abdul Rani Bahaman & Siti Khairani Bejo

49. Prevalence of Metarpophalangeal Joint Disease in Racing Thoroughbreds at Selangor Turf Club, Malaysia 100
Samsiah Harun, Bashir Ahmad, Goh Yong Meng & Shri Kanth

50. A Comparative Study between the Carcass Composition of Jungle Fowl (*Gallus gallus*), Malaysian Indigenous Chicken (*Gallus gallus domesticus*) and Broiler Chicken (*Gallus domesticus*) 101
Santhi Mutuviren, Shanthi Ganabadi & Halimatun Yaakub

51. Clinical Observation of Herpesvirus-infection in a Murine Model 102
Shahron Nawi, Zeenathul Nazariah Allaudin & Fuzina Husin

52. Hypothalamic-Pituitary-Adrenal Axis Response to Physical Restraint in the Green Iguana (*Iguana iguana)* 103
Sharmini Julita, Goh Yong Meng Reuben Sharma & Sumita Sugnaseelan

53. Parasites and Blood Parameters of the Spotted Dove 104
Syahril Anwar Zainal Abidin, Shaik Mohd Amin Babjee & Rasedee Abdullah

54. Assessment of Oregano Herbs (*Oreganum aetheroleum)* as Feed Supplement for Better Growth Performace in Catfish Juveniles (*Clarias macrocephalus,* Gunther, 1864*)* 105
Syuhada Ahmad Kamil & Hassan Mohd Daud

55. Determination of the Proliferation of a Canine Mammary Tumor Cell Line under Hypoxic Condition and Its Response to Chemotherapy 106
Tan Shin Yee, Rasedee Abdullah & Teo Guan Young

56. Gross Pathology and Histopathology of Post-weaning Multisystemic Wasting Syndrome in Pigs in Selangor and Perak, Malaysia 107
Teh Tong Ngee, Ooi Peck Toung, Sheikh Omar Abdul Rahman & Tan Do Yew

57. Serological Prevalence of Brucellosis in Cattle in Pahang, Malaysia 108
Wan Zarina Che Wan Mohamed Anuar, Siti Khairani Bejo & Abdul Rani Bahaman

58. Testicular Size and Semen Evaluation of Potential Breeder Bucks 109
Zamri Zainir, Abdul Wahid Haron, Rosnina Hj. Yusoff & Mohd Azam Khan Goriman Khan

Preface

Universiti Putra Malaysia is one of the four Research Universities in Malaysia. It is imperative that one of the criteria for the maintainance of Research Universiti status is publications, particularly in cited and high impact factor journals. We, at the Faculty of Veterinary Medicine, Universiti Putra Malaysia, subscribe to the efforts of the University to bring it to the world stage, through publications, discoveries, patents, and products. To that effect, currently most of the academic members of the Faculty have become principal researchers conducting good research in their respective fields. Many of these research studies were reported in reputable journals and have produced diagnostic kits and patents.

Our veterinary students before they graduate are required to conduct a small research project under the strict and expert supervision of the academic staff. More often than not these research projects are part of or reflect the current research activities of the academic staff. Because of the research conducted by the students are of good quality and publishable, the *'Proceedings of the Seminar of Veterinary Science'* has become of an avenue for publication of their short research studies. This is our third proceedings and contains 15 extended and 43 short abstracts. Although the proceeding is only a local publication with limited circulation, it still serves as reference material not only for the academic staff members and students of the Faculty, but also the veterinary fraternity of Malaysia.

The editors wish to thank the Faculty, particularly the Office of the Deputy Dean, Academic and Student Affairs, Faculty of Veterinary Medicine, Universiti Putra Malaysia for facilitating the publication of the proceedings. The editors also wish to express their deepest gratitude to students and staff of the Faculty for all the articles in the proceedings.

God bless.

The Editors
Rasedee Abdullah
Abdul Rani Bahaman
Abdul Rahim Mutalib
Kalthum Hashim
Saleha Abdul Aziz
Tengku Azmi Tengku Ibrahim

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 1-3

Correlation between Plasma Progesterone and Fecal Progesterone Metabolites in Established Estrous Cycles of Brangus Cows

Fazerin Azra Mohamed Azahar & [1]Rosnina Hj. Yusoff
Department of Veterinary Clinical Studies
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

The study was conducted on ten Brangus cows to determine the correlation between plasma progesterone and fecal progesterone metabolites. Blood and fecal samples were collected three times a week for five weeks. Plasma progesterone and fecal progesterone metabolites concentrations were measured by the radioimmunoassay technique. Five cows were pregnant, two cows had regular estrous cycles with the duration of 15 days, and two cows have irregular estrous cycles and one cow showed anestrus cycle. There was no significant ($p>0.05$) correlation between the plasma progesterone and fecal progesterone metabolites.

Keywords: Brangus, estrous cycle, plasma progesterone, fecal progesterone metabolites

Introduction

Brangus is a breed of cattle from a combination of highly successful parental breeds; 3/8 Brahman and 5/8 Angus. Brahman cattle are very popular for its disease resistance, hardiness and outstanding maternal instinct whereby Angus cattle are well-known for their superior carcass quality and extremely functional females which excel in fertility and producing milk. Brangus can be found in black or red in color. It has polled, sleek coat and pigmented skin and the ears are medium to large. A mature bull weighs about 910 kg whereas a mature cow weighs about 640 kg. The Brangus cattle were imported from Argentina to Malaysia in late 2003. The breed was then introduced into Universiti Putra Malaysia (UPM) in early January 2004 and kept under extensive grazing system. The production of Brangus cows brought to UPM was reported to be poor. The studies on the reproductive physiology of the Brangus cows have been relatively sparse, thus this study was carried out to assess the reproductive performance of the beef Brangus cows in the field by correlating the concentration of plasma progesterone and fecal progesterone metabolites.

Materials and Methods

Animals

Ten non-pregnant Brangus cows were selected for the study. The non-pregnant status was established through per rectal palpation. The animals were kept separately from the bull in their grazing paddock for 35 days.

Sampling Collection

Blood and fecal samples were collected between 8.30 to 11.30 am, thrice a week for five weeks.

Blood and Fecal Samples

About 8 mL of blood samples were taken from the jugular vein using the 18G needle attached to a vacutainer tube (lithium heparin). The site of withdrawal was initially swabbed with 70% alcohol. The fecal samples were collected per rectum using latex gloves.

Sample Processing

Blood

Blood samples were centrifuged in a refrigerated centrifuge at 2000 *g* for 20 min at 4°C. The plasma was collected and stored in a clean glass vial and labeled according to the animal identification number. The plasmas were stored in a freezer under -20°C until analysis.

Feces

Fecal samples were placed on aluminium foils and dried in an oven under 60°C for 48 hours. Then, they were ground into powder and kept in plastic vials and stored in a freezer under -20°C pending extraction. Fecal extraction was done following the method described by Wasser *et al*., (1988) with modifications.

Laboratory analysis

The plasmas and fecal extractants were analyzed for progesterone (P_4) and P_4 metabolites respectively, using Radioimmunoassay (RIA).

Statistical analysis

Data obtained were analyzed using Pearson Correlation Test using SPSS 13. Pearson correlation is a number between -1 and +1 that measures the degree of association between two variables. A positive value implies a positive association whereas a negative value for the correlation implies negative or inverse association. The correlation coefficient measures the strength of a linear relationship between two variables. The correlation coefficient is always between -1 and +1. The closer the correlation is to +/-1, the closer to a perfect line.

Results and Discussion

Two cows exhibited regular cycles where the estrous cycle length is 15 days, which lies within normal range (14 to 29 days). Two cows had irregular cycles based on the fluctuating level of plasma P_4 and fecal£P_4 metabolites that could be suggestive of cystic ovaries and/ or short luteal phase followed by ovulation. One cow was showing anestrus cycle because the plasma P_4 and fecal P_4 metabolites were below baseline values. Five of ten cows had high level of plasma P_4 throughout the study. The plasma P_4 exceeded baseline values of 1 µg/mL and fecal P_4 metabolites exceeded 50 µg/mL indicating pregnancy or embryonic

death. The correlation between plasma P_4 and fecal P_4 metabolites of five cows that were not pregnant was not significant ($p>0.05$) based on Pearson Correlation test. There was a very weak relation (regression square linear of 0.007) between these parameters.

References

1. Wasser, S.K. (1991). Rapid extraction of fecal steroids for measuring reproductive cycle and early pregnancy in free-ranging yellow baboons *(Papio cynocephalus cynocephalus)*. *J Reprod Fertil* **92**:415-423.

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 4-7

A Retrospective Study on Traumatic Lesions in Dogs and Cats Presented at University Veterinary Hospital, Universiti Putra Malaysia

Goh Kuan Lim & [1]Sundararajan Thilagar
[1]Department of Veterinary Clinical Studies
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

This retrospective study were done on 133 cat and 84 dog cases, which were brought to the University Veterinary Hospital between November 2003 and October 2007 with traumatic lesions of bones and joints diagnosed through clinical and radiographic examinations. There were a total of 85 and 149 cases of bone and joint lesions in dogs and cats respectively. In the dogs 48 (56.30%) were bone and 37 (43.70%) joint lesions, while for cats, 80 (53.60) were bone and 69 (43.70%) joint lesions. Transverse fracture cases recorded the highest occurrence of bone lesion with a total 32.91% for both dogs and cats, followed by oblique (18.80%) and comminuted (2.99%) fractures. Complete dislocation was recorded in 34.12% and 24.83% cases of traumatic joint lesions in dog and cats respectively, 80% of the traumatic lesions were caused by vehicle accidents in both species. Local dog breeds and domestic shorthairs were the most affected by traumatic bone and joint lesions. Intact male were most frequently affected with traumatic lesions which consisted of 62.39% for species together. Animals less than 3 years old showed the highest frequency of traumatic bone and joint lesions (209 cases). Dogs aged 6 mo to 2 yr old (21.18%) and cats 1 to 2 yr old (44.97%) were most affected. Approximately 80% of dogs with traumatic bone and joint lesions were <20 kg body weight. Cats weighing 2 - 4 kg made 106 of total cat cases. The most commonly broken bones were femur, followed by pelvic, tibia and fibula, radius and ulna and humerus. Hip joint was the most commonly affected joint, followed by sacroilliac, spinal, TMJ and stifle. Surgical treatment was the most popular treatment for dogs and cats which comprised of 57.65% and 40.12% cases respectively. The most common treatments applied on animal were intramedullary pining, excision arthroplasty and Robert-Jones bandage. Surgical treatment had higher success rates compared to other types of treatment. Surgical treatment achieved 34.69% and 52.24% success rate in dog and cats respectively. The common complication of treatments observed in this study included delayed union, nonunion, malunion, implant failure and osteomyelitis.

Keywords: retrospective study, traumatic lesions, vehicular accidents, surgical treatment, complication

Introduction

Trauma is the most common cause of bone and joint lesions in small animals and is usually due to vehicular accidents, firearms, fights and falls. Fracture and dislocation is the most common bone and joint lesions. Fractures may be classified several ways, all useful in

describing fractures. Traumatic bone lesions can be classified as type of fracture; complete, incomplete, transverse, oblique, spiral, comminuted, open and closed. Traumatic joint lesions also include complete dislocation, subluxation and symphyseal separation.

Diagnosis of traumatic bone and joint lesions must begin with an adequate history and general physical examination (Piermattei and Flo, 2006). The principle of treatment is to provide complete rehabilitation to patient as soon as possible for complete return of function. This is usually done in combination with conservative and surgical treatments to improve efficacy. Outcomes of treatment usually varies according to types of treatment. The outcome is highly dependent on age, breed, body weight, pre- and post-operative management (Scott and McLaughlin, 2007; Philip, 1979; Ness *et al*., 1996; Scarlett and Donoghue, 1998) Successful management of traumatic orthopaedic lesions requires organized treatment.

Material and Method

The clinical records of 217 cats and dogs presented to University Veterinary Hospital (UVH), Serdang, Selangor, Malaysia with traumatic lesion of bones and joint between November 2003 and October 2007 were reviewed. The information obtained from the medical records included species, sex, age, body weight, breed, aetiology (traumatic), history with presented clinical signs (as reported by the owner), physical examination findings such as weight bearing lameness (WBL), non-weight bearing lameness (NWBL), limping, pain, swelling, vomiting, mucous membrane, pyrexia, tenesmus, anorexia, depression, diarrhea, tachypnea, tachycardia, dehydration and weight loss, method of treatment such as surgical technique, post-surgical management and outcomes. Radiological findings were assessed for confirmation of bone and joint lesions, surgical techniques and post-surgical complication.

A descriptive analysis was done and the results recorded according to species, type of lesion, method of treatment and outcomes of treatment. In this study, failure was defined as either patient died during hospitalization or euthanized.

Results

There were a total of 85 and 149 cases of bone and joint lesions in dogs and cats respectively. In the dogs 48(56.30%) were bone and 37 (43.70%) joint lesions, while for cats, 80(53.60%) were bone and 69(43.70%) joint lesions. Transverse fracture cases recorded the highest occurrence of bone lesion with a total 32.91% for both dogs and cats, followed by oblique (18.80%) and comminuted (2.99%) fractures. Complete dislocation was recorded in 29(34.12%) and 37(24.83%) cases of traumatic joint lesions in dog and cats respectively followed by symphyseal separation (9.40%) and subluxation (7.69%). Aetiology of traumatic lesions of bones and joints in dogs and cats cases was identified as vehicular accidents, fall, animal fight and human abuse. A high percentage (80%) or 166 cases in the study were caused by vehicle accidents in both species.

Twenty-two breeds of dogs and five breeds of cat were involved in this study. Local dog breed and domestic short hair were most affected by traumatic bone and joint lesions.

Intact male were most frequently affected with traumatic lesions, 62.39% for both species, followed by intact female (25.64%), spayed females (6.41%) and castrated males (5.56%). Animals less than 3 yr old showed the highest frequency in traumatic bone and joint lesions with 209 clinical cases (89.34%). Dogs 6 mo to 2 yr old (21.18%) and cats 1 to 2 yr old age (44.97%) were most affected. Approximately 80% of dog with traumatic bone and joint lesions were less than 20 kg in body weight. Cats weighing between 2 to 4 kg comprised 106 (71.14%) cases.

Twenty-three types of clinical signs were shown in traumatic lesions of bones and joints in dogs and cats. Five most common clinical signs were non-weight bearing lameness (30.77%), weight bearing lameness (14.10%), pain (35.47%), swelling (27.78%) and pale mucous membrane (26.50%). The total number of traumatic lesions of bones was 178. The most common broken bones were femur (29.95%), followed by pelvic (13.82%), tibia and fibula (12.44%), radius and ulna (8.29%) and humerus (6.45%). Hip joint (16.59%) was most commonly affected joint, followed by sacroilliac (11.06%), spinal (8.29%), TMJ (4.61%) and stifle (4.15%).

Surgical treatment is a most popular treatment in dogs and cats which comprises of 49 (57.65%) cases and 67 (40.12%) cases, respectively. The treatments were intramedullary pining (IM pin), excision arthroplasty (EA) and Robert-Jones bandage. Surgical treatment had a higher success rate, 34.69% and 52.24% in dogs and cats respectively, compared to other types of treatment. The common complications of treatment observed in this study were delayed union, nonunion, malunion, implant failure and osteomyelitis.

Discussion

Throughout the study, cats were reported to have a higher frequency of traumatic lesions in bones and joints. This finding could be due to bone and joint formation of cats that can get easily damaged by trauma compared to dogs. Almost 80% of the cases were caused by vehicle accidents for both species. This could be due to the semi-roamer habit of these animals, making them susceptible to being knocked by vehicles. Active and aggressive nature of intact males was the cause of higher case numbers in males than females. Animals aged less than 3 years showed a higher frequency of traumatic bone and joint lesions, approximately 90% of the cases. This may be due to the playful and active nature of young animals. Approximately 80% of the dogs were less than 20 kg in body weight and 70% of the cats weighed 2 to 4 kg. High body weight may predispose animals to musculoskeletal diseases (Scott and McLaughlin, 2007; Scarlett and Donoghue, 1998).

The majority of dogs and cats in Malaysia are local breeds and semi-roamers. Local breed of dogs and cats were most affected by traumatic bone and joint lesions. The femur is most commonly affected at 29.95% of the cases in both species. Eccentric loading of the femur during weight bearing could the main cause of this finding. The femurs bear most of the weight of the hindquarters, thus making them prone to damage when external force is applied (Bone *et al*., 1984). Hip joints (16.59%) are also highly affected, the result of pressure of the massive weight of the hindquarters on the joints.

Surgical treatment had higher success rates than other types of treatment. This could be the result of good surgical intervention and post-surgical care, which had facilitated bone and joint healing.

References

1. Bone, D., Walker, M. and Cantwell, H.D. (1984). Traumatic coxofemoral luxation in dogs: Result of repair. *Vet Surg* **13:**263-270.

2. Ness, M.G., Abercromby, R.H., May, C., Turner, B.M. and Carmichael, S. (1996). A survey of orthopaedic conditions in small animal veterinary practice in Britain. *Vet Comp Orthop Traumatol* **9:**43-52.

3. Philip, I.R. (1979). A survey of bone fractures in the dog and cat. A survey of bone fractures in the dog and cat. *J Small Anim Prac* **20:** 661-674

4. Piermattei, D.L. and Flo, G.L. (1997). Handbook of Small Animal Orthopedics and Fracture Repair, 3rd Edition. Philadelphia: WB Saunders. pp469-499.

5. Scarlett, J.M. and Donoghue, S. (1998). Associations between body condition and disease in cats. *J Am Vet Med Assoc* **212:**1725-31.

6. Scott, H.W. and McLaughlin, R. (2007). Feline Orthopaedics. Manson Publishing. pp9-39.

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 8-11

The Analgesic Effects of Tramadol in Dogs following Ovariohysterectomy

How Huey Shan, Chen Hui Cheng, [1]Ravi Sundar George & [2]Rasedee Abdullah
[1]Department of Veterinary Clinical Studies
[2]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Twelve dogs were used in this study. Six dogs in the treatment group were given tramadol and tolfenamic acid, while, six dogs in the control group were given tolfenamic acid only. Non-invasive blood pressure, airways gases, temperature and visual analog scale for pain were taken by an observer blinded to the treatment. There was no difference in the respiratory and cardiovascular parameters between the two groups. Visual analog scale for pain in the control group tended to be higher than treatment group in most of the time points.

Keywords: dogs, tramadol, tolfenamic acid, ovariohysterectomy, post-operative pain

Introduction

Tramadol is a synthetic centrally-acting analgesic which acts at *mu*-opioid receptors. It also modifies the transmission of pain impulses by inhibiting of re-uptake of norepinephrine and serotonin (Raffa *et al*., 1993). In humans, it is a useful alternative to opioids for treatment of acute or chronic pain (Lee *et al*., 1993). Following oral or parenteral administration in human, tramadol at 100 mg exhibited an analgesic activity of 4 to 6 hours (Raffa, 1993; Lee *et al*., 1993) with minimal effective plasma concentration of around 200 to 300 ng/mL (Merslavic and Zupancic-kralj, 1997).

Isobolographic analysis revealed dual-site synergism in the systemic and intraplantar antinociceptive response of tramadol in the formalin test in rats (Pozos-Guillen *et al*., 2006). In dogs after oral administration, bioavailability is about 65%, but there is significant interpatient variability (Plumb, 2005). Total body clearance and half-life are about 55 mL/kg/min and 1.7 h, respectively. Visual analog scale for pain tended to be lower in most time points following ovariohysterectomy in cats premedicated with tramadol (Chen *et al*., 2007). Similar use of tramadol in dogs has not been described. Therefore, this study was undertaken to investigate the analgesic effects of tramadol in combination with tolfenamic acid after ovariohysterectomy in dogs. This study also determined cardiovascular, respiratory, renal and liver side-effects from the use of tramadol as a premedicant before general anaesthesia.

Material and Methods

Twelve female dogs were randomly assigned to either control or treatment group. Age and weight for controls (1.2 ± 0.9 y and 11.9 ± 3 kg) were not different from treatment group

(3.3 ± 2.7 y and 15.9 ± 7.5 kg). All dogs were premedicated with acepromazine (0.1 mg/kg, IM). Treatment group had tramadol (4 mg/kg, IM), while control had saline added to the acepromazine. Random assignment and premedicants were prepared by a colleague not involved in the pain assessment. Dogs were induced with 2.5% of thiopental (12.5 mg/kg, IV) and maintained on 2% halothane with 100% oxygen. All dogs received tolfenamic acid (4 mg/kg, SC) at the end of surgery and again, at 4 mg/kg, PO at 20 h post-surgery. Non-invasive blood pressure and airway gases were obtained during surgery.

Venous blood samples were collected from the cephalic vein before and after surgery for the measurement of the kidney and liver parameters. Pain was assessed by a blinded observer before surgery and at 1, 2, 3, 4, 6, 8, 12, 20, 24 hours after surgery. Visual analog scale (VAS) was used, with 0 indicating no pain while 100 indicating the worst pain a dog could experience following ovariohysterectomy.

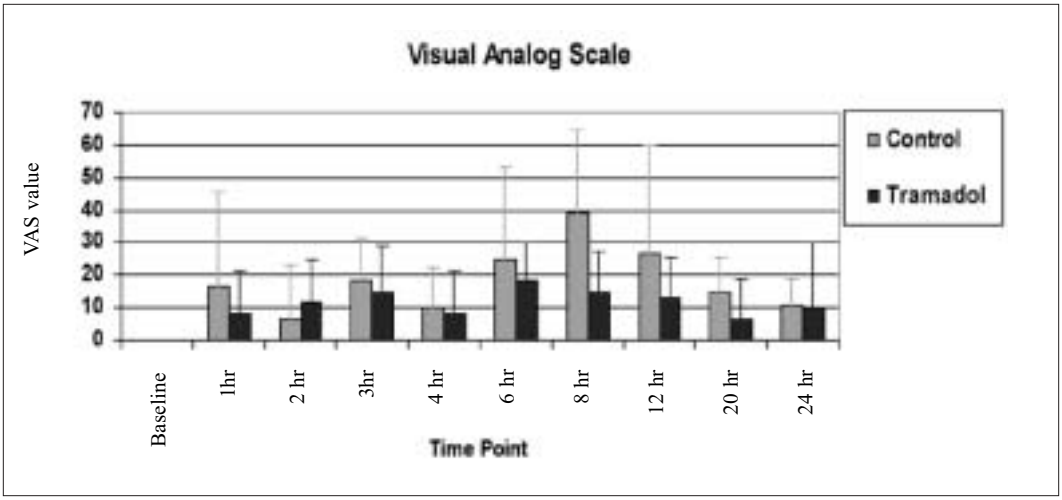
Parametric data were analyzed using ANOVA for repeated measure. Mann-Whitney U test and Kruskal-Wallis test were used for the analysis of the non-parametric data.

Results and Discussion

There were no difference in the body weight (p=0.260), age (p=0.107) or duration of surgery (p=0.076) between control and tramadol group. However, duration of anesthesia was longer in the tramadol group due to reasons unrelated to the addition of tramadol.

There were no difference between control and tramadol group in the respiratory rate and end tidal carbon dioxide (p=0.543 and p=0.995 respectively). Tramadol in the present study did not cause significant respiratory depression during surgery or post-operatively. The same findings were found by Lehmann (1994). Heart rates appeared to be higher in the control group but statistical difference were not detected (p=0.139). There were no difference in the systolic, diastolic and mean arterial pressure between groups (p=0.519, p= 0.138 and p= 0.091 respectively) and all parameters were within the normal range published for anesthetized dogs (Chalifoux *et al*., 1984).

Visual analog scale for pain increased following surgery in both groups, but tended to be higher in control group, especially at 8 and 12 h (p=0.051 and p=0.677) respectively, (Figure 1). In the control group, VAS fluctuated during the first 4 h but increased higher than baseline at 6 and 8 h, and decreased from 12 h onwards. In the tramadol group, VAS tended to increase post-surgery to peak at 6 h, and decreased thereafter. However, statistical difference from baseline could not be detected even at 6 h (p=0.224). Higher values in both of the groups were achieved during 6, 8 and 12 h after surgery. This may be related to higher sedation score during the first 3 h after surgery. Dogs were not truly responding and aware of the environment during these periods. The VAS values in the control group tended to be higher than treatment group in most of the time points. This suggests that the multimodal approach of using tramadol on top of tolfenamic acid may be better in controlling pain. As with other study using opioid, the use of tramadol does not abolish pain completely, neither does it prevent wound tenderness.



Data were expressed as mean ± standard deviation

Figure 1: Visual analogue scale for pain observation following ovariohyster ectomy in 6 dogs that received tramadol 4 mg/kg, IM (Tramadol) and 6 dogs that did not (Control)

There were no difference in the pre- and post-surgery alanine aminotransferase, creatinine, albumin, globulin and total protein values in both control and treatment groups. Creatine kinase increased following surgery in both groups (p=0.003). Blood biochemistry results suggested that the use of tramadol were safe and did not cause any clinically observable effects in the liver or kidney. Increase in creatine kinase following surgery were due to surgical tissue trauma and were not different between groups.

Conclusion

The addition of tramadol (4 mg/kg, IM) in the premedication appeared to provide better analgesic effect compared to the post-operative use of tolfenamic acid alone in dogs following routine ovariohysterectomy.

References

1. Chalifoux, A., Dallaire, A., Blais, D., Lariviere, N. and Pelletier, N. (1984). Evaluation of the arterial blood pressure of dogs by two noninvasive methods. *Can J Comp Med* **49**: 419-423.

2. Chen, H.C., Radzi, R., Rahman, N.A. and Lau, S.F. (2007). Analgesic effect of tramadol combined with tolfenamic acid in cats after ovariohysterectomy. In *Proceedings of the 13th IVECCS*. P971.

3. Lee, C.R., McTavish, D. and Sorkin, E.M. (1993). Tramadol: a preliminary review of its pharmacodynamic and pharmacokinetic properties, and therapeutic potential in acute and chronic pain states. *Drugs* **46**:313–340.

4. Lehmann, K.A. (1994). Tramadol for the management of acute pain. *Drugs* **47**:19–32.

5. Merslavi ć, M., Zupanvi ć-kralj, L. (1997). Determination of tramadol in human plasma by capillary gas chromatography-mass spectrometry using solid-phase extraction. *J Chromatogr B Biomed Sci Appl.* **693(1)**:222-227.

6. Plumb, D.C. (2005). Plumb's veterinary drug handbook, 5th Ed. Blackwell Publishing.

7. Pozos-Guillen, A.J., Aguirre-Banuelos, P., Arellano-Guerrero, A., Castanneda-Hernandez, G., Hoyo-Vadillo, C. and Perez-Urizar, J. (2006). Isobolographic analysis of the dual-site synergism in the antinociceptive response of tramadol in the formalin test in rats. *Life Sci* **79**: 2275–82.

8. Raffa, E., Friderichs, W., Reimann, R.P., Shank, E.E., Godd, J.Y., Vaught, H.I. and Jacoby, NS. (1993). Complementary and synergistic antinociceptive interaction between the enantiomers of tramadol. *J Pharmacol Exp Ther* **267**: 331.

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 12-15

A Preliminary Study on Seroprevalance of *Toxoplasma* Infection in Goats and Dogs in Malaysia

Lai Shu Zhan,[1] Amin Babjee & [2]P. Chandrawathani
[1] Department of Veterinary Microbiology and Parasitology
Faculty of Veterinary Medicine, Universiti Putra Malaysia
[2] Department of Parasitology and Haematology
Veterinary Research Insitute, Malaysia.

Abstract

This is a preliminary study on the seroprevalance of *Toxoplasma* infection in goats and dogs. The study in the dogs was limited to the town of Ipoh, Perak while in goats, the sera were from various states. *Toxoplasma gondii* is an important zoonotic protozoan with worldwide distribution. This organism is capable of infecting all warm-blooded animals and human. Severe diseases in human caused by *T. gondii* include embryonic death and resorption, fetal death and mummification, abortion, stillbirth and neonatal death. In the present study, *T. gondii* antibodies were detected in 71 of 200 (35.5%) goat sera with dilution 1:200. In dogs, 13 out of 135 samples (9.6%) were positive for the antibodies against *T. gondii* using IFAT.

Keywords: goat, dog, *Toxoplasma gondii*, indirect fluorescent antibody test (IFAT)

Introduction

Toxoplasma gondii is an important zoonotic protozoan parasite with worldwide distribution where the infection involves the felids as definitive hosts and other warm-blooded animals as intermediate hosts (Dubey and Lappin, 2006). All infected animals can shed or transport the parasite mechanically and contaminate the environment (Jittapalapong *et al.*, 2005 and Jittapalapong *et al.*, 2007). *Toxoplasma gondii* can be transmitted to man congenitally, by consumption of uncooked infected meat and exposure to fecal matter containing infective oocysts (Dubey, 2004). Toxoplasmosis in goats and sheep causes abortion, birth of weak lambs or may cause mummification of fetus (OIE, 2004). Fatal toxoplasmosis in dogs may occur when they are immunocomprised following infection with concurrent distemper virus (Dubey and Thuilliez, 1989). The clinical signs of toxoplasmosis in dogs are usually characterized by respiratory distress, diarrhoea and ataxia (Dubey and Hoover, 1977).

Materials and Methods

Goat sera were taken from the Serological Unit of the Veterinary Research Institute (VRI) which consisted of previously collected sera from various states in Malaysia. Dog blood samples were collected from 135 dogs that visited four private clinics and a government clinic in the Ipoh area between mid-November to mid-December 2007. Blood samples

were collected in EDTA and plain tubes. All the samples were processed at the Parasitology and Hematology Unit, VRI. The blood in the plain tubes was centrifuged at 250 *g* for 30 min to obtain sera. The sera samples were stored in deep freezer at -20°C until analysis.

Both sera samples were tested using the VRMD immunofluoroscent test kit. Sera were diluted 200 times with serum diluting buffer (pH 7.2) in a microtiter plate. Twenty microliter of diluted sera from each sample was placed into designated FA Substrate slide. Then, the slides were incubated at 37°C for 30 min in a humidified chamber. The slides were rinsed in FA rinse buffer (pH 9.0) and soaked for 10 min with the FA rinse buffer. The slides were drained and dried around the wells by pressing the blotter to front surface. Then, fluoresceinated anti-IgG conjugate were placed on the wells and incubated, then rinsed and soaked using the same procedure mentioned above. Then, the slides were drained, and the back surface and the edges of slides were dried using the paper towels. The slides were mounted using mounting fluid, a mixture of glycerol and FA rinse buffer. The slides were observed for presence of *Toxoplasma gondii* with a fluorescence microscope at 400 x magnification. Positive and negative controls were included in each test.

The results obtained were statistically analysed using the chi-square test with the level of significance set at $p<0.05$.

Results and Discussion

In this study, the overall percentage of positive cases for *Toxoplasma* infection in goats was 35.5% or 71 from the 200 sera were positive. It is an indication of high seroprevalence of *Toxoplasma* infection in goats in Malaysia. It was suggested that herbivores acquire *Toxoplasma* infection through feline oocysts shed on the grasses (Tizard, *et al.* 1977).

The prevalence rate of *Toxoplasma* infection was 14 (46.7%) in the newly imported goats and 57 (33.5%) in goats that had been in Malaysia for more than 30 days. Those newly transported animals were prone to stresses and immunosupression where *Toxoplasma* infection can be reactivated by dissemination of bradyzoites and may show signs of clinical toxoplasmosis (Dubey and Lappin, 2006). However, there was no significant difference ($p>0.05$) between duration of goats in the country for *Toxoplasma* infection.

The results obtained from this study showed that 17 (25.4%) goats from commercial farms were positive for *Toxoplasma* infection. However, none of 10 goats of government farms were positive for *Toxoplasma* infection. It was also found that 54 from 123 (43.9%) goats from individual farms were positive for *Toxoplasma* infection. There were significant differences of prevalence of *Toxoplasma* infection between various farms. Goats that were kept in individual farms were about twice more likely to be infected with *Toxoplasma* than those in commercial farms. Most of these individual farms lack proper management and goats were usually given little supplementary feed. Cats around farms may shed oocysts and contaminate the farm environment and feed (Jittapalapong *et al.,* 2005).

The overall percentage of positive cases of *Toxoplasma* infection in dogs was 9.6% or 13 of 135 dogs. Eight of 73 (11.0%) female dogs were positive for *Toxoplasma* infection and 5 of 62 (8.06%) male dogs were positive. *Toxoplasma* infection was higher in the bitches as compared to the male dogs because bitches are more susceptible than male dogs to the protozoan infection.

In this study, two dogs (9.1%) aged less than 1-y old had higher seroprevalance compared to other age group probably because of transplacental transmission from dam to their puppies (Ahmed *et al.,* 1983). Moreover, generalised toxoplasmosis is often seen in younger dogs aged less than 1-year old. For the age group between 1- to 3-y old dogs, there were four (8.2%) cases positive for *Toxoplasma* infection. It was found that 6 out of 46 (13.0%) dogs aged more than 5 y were positive for *Toxoplasma* infection. Higher prevalence rate is found in older dogs compared to other age group is probably because of the longer period of environmental exposure and thus a greater chance of getting infected than the younger animals (Dubey and Lappin, 2006). There was however, no significant difference ($p>0.05$) of *Toxoplasma* infection among various dogs' ages.

It was found that there is no change in blood parameters in dogs that were infected with *Toxoplasma* infection. This is because the detection of IgG antibodies indicates the presence of *Toxoplasma* infection which maybe from past infections and previous exposures to the parasite (Dubey and Lappin, 2006).

References

1. Ahmed, BA, Gaafar, SM. Weirich, W.E. and Kantz, C.L. (1983) Relationship of *Toxoplasma* infections to other diseases in dogs. *Vet Parasitol* **12**:199-203.

2. Dubey, JP and Hoover, EA. (1977). Attempted transmission of *Toxoplasma gondii* infection from pregnant cats to kittens. *J Am Vet Med Assoc* **170**:538-540.

3. Dubey, JP and Thuilliez, P. (1989). Serological diagnosis of toxoplasmosis in cats fed *Toxoplasma gondii* tissue cysts. *J Am Vet Med Assoc* **194**:1297-1299.

4. Dubey, JP and Lappin, MR. (2006). *Toxoplasmosis* and *Neosporosis*. In: Infectious Diseases of the Dog and Cat (Ed), 3rd Edition, WB Saunders Co., Philadephia. pp.754-774.

5. Dubey, JP. (2004).Toxoplasmosis-a waterborne zoonosis. *Vet Parasitol* **126**:57-72.

6. Jittapalapong, S, Sangvaranond, A, Pinyopanuwat, Chimnoi, W, Khachaeram, Koizumi, S. and Maruyama, S. (2005). Seroprevalance of *Toxoplasma gondii* infection in domestic goats in Satun Province, Thailand. *Vet Parasitol* **127**:17-27.

7. Jittapalapong, S, Nimsupan, B, Pinyopanuwat, N, Chimnoi, W, Kabeya, H and Maruyama, S (2007). Seroprevalance of *Toxoplasma gondii* antibodies in stray cats and dogs in Bangkok metropolitan area, Thailand. *Vet Parasitol* **145**:138-141.

8. Tizard, IR, Carrington, M, Lai, CH. (1977).Toxoplasmosis in goats in Southern Ontario-A Public Health? *Canadian Vet J* **18**:274-277.

9. OIE. (2004). http://www.oie.int/eng/normes/mmanual/A_00138.htm

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 16-18

Seromuscular Extramucosal versus Seromuscular Mucosal Intestinal Anastomosis using Simple Interrupted Suture Pattern in Dogs

Navanithakumar Ballakrishnan, [1]Sundararajan Thilagar & [2]Md. Sabri Mohd. Yusoff

[1]*Department of Veterinary Clinical studies*
[2]*Department of Veterinary Pathology and Microbiology*
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Intestinal anastomosis is the common procedure of intestinal foreign body obstruction removal. This study was carried out to compare the healing pattern of seromuscular extramucosal with seromuscular mucosal intestinal anastomosis. A total of 6 female dogs were used. End to end anastomoses were performed at proximal and distal jejunum of each animal using seromuscular extramucosal or soromuscular mucosal suture techniques respectively. PDS II 2/0 Monofilament suture material with simple interrupted suture pattern were used for both techniques. All the animals were assessed throughout the post-surgical period and euthanized at day 10 and 21 post-surgery. Healing pattern of both techniques were assessed at necropsy and histological evaluation. The fibroblasts at the anastomosed site were counted using an image analyzer. On both post-surgical days seromuscular mucosal technique exhibited more intra-abdominal adhesions at necropsy. Muscular discontinuity and hollow structure of suture material were found in both techniques. However, mucosal herniation into submucosa was only noticed in the through and through technique at both post-surgery days. The fibroblast numbers were not significantly different ($p<0.05$) between both suture techniques at days 10 and 21 post-surgery. In conjunction to that, both seromuscular extramucosal and seromuscular mucosal techniques are suitable for intestinal anastomosis in dogs.

Keywords: intestinal anastomosis, seromuscular mucosal, seromuscular extramucosal, fibroblast, dogs

Introduction

Intestinal anastomosis is defined as the surgical connection of separation of severed tubular hollow organs to form a continuous channel, as between two parts of the intestine. Joining two segments of intestine plays an important role in the restoration of normal function without leakage of its contents.

There are a number of anastomotic techniques available, but none is perfect because all compromise healing. A simple, interrupted, single-layer, approximating technique in which absorbable monofilament is used is still currently the gold standard' for

intestinal anastomoses (Coolman *et al*., 2000). Interrupted serosubmucosal sutures allow accurate tissue apposition, using the strongest layer of the gut; causing minimal damage to the submucosal vascular plexus and to minimize the risk of implantation of malignant cells (Leslie and Steele, 2003). The common anastomotic method of end-to-end anastomosis is to unite the cut ends with two layers of sutures, the inner "all-coat" and outer "sero-muscular" Increase in vascularity at the anastomotic site is less severe and mucosal regeneration is more delayed in end-to-end anastomosis than the side-to-side anastomosis. The optimal method of intestinal anastomoses would promote primary healing by achieving accurate alignment of the separated bowel and contribute to minimal disruption of local vasculature.

The aim of this study is to compare the healing pattern of seromuscular extramucosal with seromuscular mucosa intestinal anastomosis.

Materials and Method

Six female stray dogs were used in the study. End to end anastomoses were performed at proximal and distal jejunum of each animal using seromuscular extramucosal or soromuscular mucosal suture techniques respectively. PDS II 2/0 Monofilament suture material with simple interrupted suture pattern were used for both techniques. All the animals were assessed throughout the post-surgical period and euthanized at day 10 and 21 post-surgery. Healing pattern of both techniques were assessed at necropsy and histological evaluation. The fibroblasts at anastomosed site counted using an image analyzer.

Results

Post-surgical Assessment

All dogs started to defecate by day 4 to 6 post-surgery and subsequently passed pasty to normal feces daily. Throughout the post-surgical periods, dog 1 experienced vomiting. Dogs 3 and 2 showed cramping from abdominal pain for 2 and 5 days respectively following surgery. Fatigue and reduced appetite were noticed in Dog 1 and 6; while others showed satisfactory appetite. All animals showed signs of pain and inflammation around the suture site.

Post-mortem Examination

At necropsy, there was no evidence of generalized peritonitis, abscess formation, extensive adhesions or free abdominal fluid in the dogs. The gross appearance of the extramucosal (group A) and through and through (group B) anastomoses were similar at 10 and 21 days after surgery, where through and through anastomotic portion exhibited mucosal eversion. On day 10 post-surgery, the extramucosal anastomotic portion showed omental adhesions surrounding the surgical sites. On day 21 post-surgery, serosal and omental adhesions were noticed. The 10-day-old anastomoses demonstrated more adhesions than the 21-day-old anastomoses. At the same time, the adhesions around the anastomoses at day 21 post-surgery were hard to be separated.

Histology Analysis

Histologic analyses showed quite similar changes in each intestinal layer between extramucosal and through and through techniques. Ten days after surgery, thickening and eversion of serosa were seen in both the extramucosal and through and through groups. Satisfactory continuity of serosa, submucosa and mucosa was observed in both groups. Both groups demonstrated thickening of serosa, muscularis and submucosal layers around the anastomosed zone. However, discontinuity of muscularis was noticed. On day 21 post-surgery, the inflammation was markedly decreased for both groups and tended to be more mononuclear than on day 10.

Thickening and eversion of serosa was evident in both groups. Continuous serosa, submucosa and mucosa were noticed in both groups, with various sizes of multiple neovascularization. However, discontinuity of muscularis layer occurred with the presence of intervening fibrosis. Mucosal herniation which is manifested by direct bridging of the anastomotic submucosal defect was observed in most of the anastomotic sites of the through and through anastomoses. The size of hollow structures was larger on day 10 than day 21 post-surgery.

The 10^{th} day post-surgery revealed no significant difference (t= 0.318, *P*=0.766) in fibroblast count between mucosal and external-mucosal suturing techniques. There was also no significant difference (t=-1.502, *P*=0.216) between the mucosal and extramucosal suturing techniques on day 21 post surgery.

Discussion

The faultless seal of the anastomosis is an important aspect in gastrointestinal surgery (Shomaf, 2003). When vomition occurred it was probably due to temporary stasis as a result of inflammation and edema at anastomosed intestinal segments. Additionally, cramping of abdominal pain can also be the sequelae to inflammation of anastomosed bowel. The mucosa of incised canine intestines tends to evert at the cut edge and the seromuscular layers tend to retract from the wound margin. Tissue ischaemia is believed to be the main factor causing adhesion. Some investigators recommended omental wrapping of anastomosed intestine because omentum provides an early anastomotic seal and additional blood supply for healing (Coolman *et al.*, 2000). Muscular layer discontinuity was constantly observed, irrespective of the duration and technique of anastomosis.

References

1. Coolman, B.R.I., Ehrhart, N.I., Pijanowski, G.I. and Ehrhart, E.J.I. (2000).Comparison of skin staples with sutures for anastomosis of small intestine in dogs. *Vet Surg* **29:**293-302.

2. Leslie, A. and Steele, R.J.C. (2003). The interrupted serosubmucosal anastomosis - still the gold standard. *Colorectal Disease* **5:** 362-366.

3. Shomaf, M. (2003). Histopathology of human intestinal anastomosis. *Eastern Mediterranean Health J* **9(3):** 413-421.

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 19-24

The Anesthetic Effects of Intramuscular Ketamine-Xylazine in Cats undergoing Ovariohysterectomy and Castration in a Field Neutering Scenario

Patricia Kong Hie Sing, [1]Chen Hui Cheng, [2]Hazilawati Hamzah & [2]Reuben Sunil Kumar Sharma

[1]Department of Veterinary Clinical Studies
[2]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Effects of intramuscular ketamine-xylazine (K-X) (20 mg/kg-2 mg/kg) on the duration of action, recovery time intervals, cardiopulmonary parameters, and blood parameters were documented in six female and six male cats undergoing ovariohysterectomy and castration in a field neutering scenario. Duration of action following a single dose of K-X was 40 ± 13 min, and repeated administration of ketamine did not significantly prolong the recovery intervals. The mean arterial pressure in female and male cats was 112 ± 14 and 114 ± 21 mm Hg respectively; heart rate was 119 ± 18 and 104 ± 20 bpm; end-tidal carbon dioxide was 12 ± 6 and 15 ± 7 mm Hg; and respiratory rates was 21 ± 5 and 20 ± 5 bpm. Hemoglobin saturation was 93 ± 2% in both females and males. Packed cell volume, total protein, globulin and albumin increased significantly in male cats after surgery. Creatine kinase was higher than normal before surgery and increased significantly after surgery in all the cats.

Keywords: ketamine-xylazine, cardiopulmonary, blood parameters, cats

Introduction

Ketamine-xylazine (K-X) is one of the most common anesthetic agents used in cats (McKelvey and Hollingshead, 2003). Its clinical utilities and cardiopulmonary effects has been described (Verstegen *et al.*, 1990; Allen *et al.*, 1986; Cullen and Jones, 1977). However, there were no reports on the effect of K-X blood parameters before and after surgery. There was no information on the comparison of effect of K-X on female and male cats or between intramuscular administration of single dose and additional top-up doses of ketamine. The objectives of this study were to document the effects of K-X on cardiopulmonary parameters during surgery, the duration of action of K-X and time intervals during recovery, effects of K-X on blood parameters and effect of additional doses of ketamine on recovery time.

Materials and Methods

This study was carried out on 12 cats (6 female and 6 male) that were free or semi-free roaming in and off campus residential area. All cats were premedicated with xylazine at 2

mg/kg, intramuscularly (IM), and induced with ketamine at 20 mg/kg, IM. Additional ketamine was given IM at 10 mg/kg to the cats that showed response to surgical stimulus. Cardiopulmonary parameters and reflexes were determined at several time points during surgery. Systolic arterial pressure (SAP), diastolic arterial pressure (DAP), mean pressure (MAP), heart rate (HR) and hemoglobin saturation (SpO_2) were determined non-invasively (B3 Plus Vet, Bionet Co., Ltd., Korea). End-tidal carbon dioxide ($EtCO_2$) and respiratory rate (RR) were measured using a capnometer (Datex-Ohmeda S/5TM Compact Anesthesia Monitor, GE Healthcare, Helsinki, Finland). The duration of action of K-X as well as the time intervals from induction to return of ear flick or tongue curl, righting reflex, sternal recumbency, and standing or walking were observed and recorded.

Two millilitres of blood samples were collected into plain tube following sedation with xylazine, and at 24 hours after surgery. Packed cell volume (PCV) was determined using microhematocrit method (Hawksley Micro-hematocrit Reader, Hawksley and Sons Limited, England), and total protein (TP) concentration measured by refractrometry (Atago T2-NE, Atago CO. LTD, Japan). Serum was aliquoted and analyzed for alanine aminotransferase (ALT), alkaline phosphatase (ALP), creatinine, creatine kinase (CK), β-glutamyltransferase (GGT), lipase, albumin, and globulin (A:G) using a biochemistry analyzer (Chemical Analyzer Automatic Hitachi 902, Hitachi LTD, Japan), and the albumin:globulin ratio calculated.

Results

The surgical procedure was completed in 6 cats within 40 ± 13 min following a single dose of K-X. The other 6 cats required additional top-up doses of ketamine (10 to 30 mg/kg) to complete surgery within 64 ± 14 min. Recovery time where the animal was able to stand or walk was 423 ± 908 min following multiple top-up doses of ketamine, and was not significantly ($p>0.198$) longer compared to single dose (366 ± 119 min).

During surgery, the average MAP was 112 ± 14 mm Hg in female, and 114 ± 21 mm Hg in male cats (Figures 1 and 2). The average HR was 119 ± 18 bpm in female and 104 ± 20 bpm in male cats. For the female cats, the HR increased significantly ($p=0.02$) after skin preparation and peaked during pedicle pulling ($p=0.003$). For the male cats, the HR did not changed significantly over time ($p=0.865$). The average SpO_2 for both female and male cats was 93 ± 2%, and was stable throughout surgery ($p=0.576$ and $p=0.567$ for female and male, respectively). End-tidal carbon dioxide ($EtCO_2$) averaged 21 ± 6 mm Hg in female cats and 15 ± 7 mm Hg in male cats; whereas RR averaged 21 ± 5 bpm in female cats and 20 ± 5 bpm in male cats (Figures 3 and 4). Comparison between pre- and post-surgery blood parameters is summarized in Table 1.

Table 1: Blood parameters before and after surgery in female and male cats

Parameters	Female (n = 6)			Male (n = 6)		
	pre-surgery	post-surgery	p-value	pre-surgery	post-surgery	p-value
PCV (%)	31.9 ± 6.2	34.8 ± 6.6	0.120	28.7 ± 5.9	37.3 ± 4.6	0.042*
TP (g/L)	76.2 ± 9.4	76.7 ± 7.6	0.813	73.2 ± 8.0	83.3 ± 8.5	0.000*
Globulin (g/L)	42.5 ± 11.4	45.9 ± 7.9	0.533	37.9 ± 8.3	45.3 ± 5.9	0.003*
Albumin (g/L)	33.7 ± 3.5	31.2 ± 3.0	0.065	35.3 ± 1.0	38 ± 3.0	0.109
A-G (Unit)	0.9 ± 0.4	0.7 ± 0.2	0.337	1.0 ± 0.2	0.8 ± 0.1	0.152
CK (U/L)	1588.0 ± 1696.0	5869.3 ± 1567.2	0.016*	536.5 ± 317.2	2838.8 ± 1674.4	0.020*

*significant difference between pre- and post-surgery ($p < 0.05$)

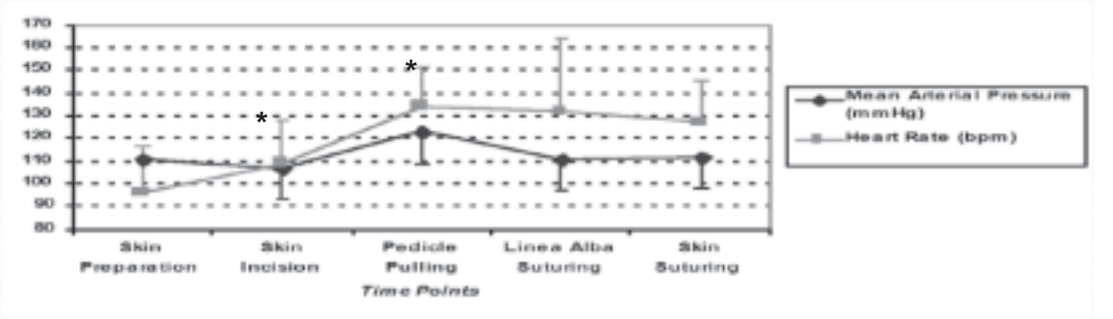


Figure 1: Changes in mean arterial pressure (MAP) and heart rate (HR) during surgery in female cats [*significantly different from previous time points ($p < 0.05$)]

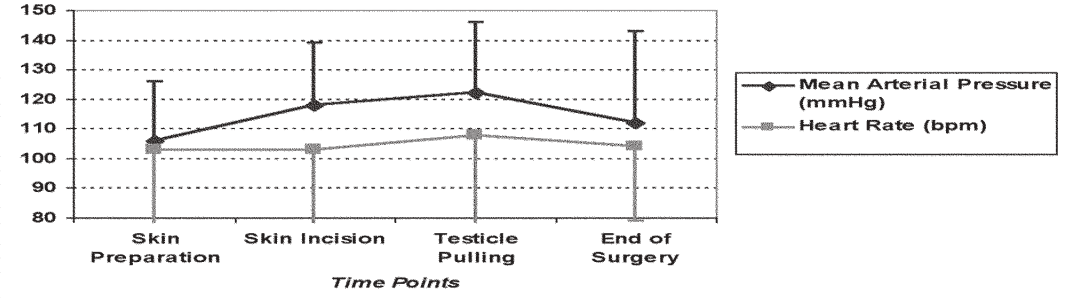


Figure 2: Changes in mean arterial pressure (MAP) and heart rate (HR) during surgery in male cats

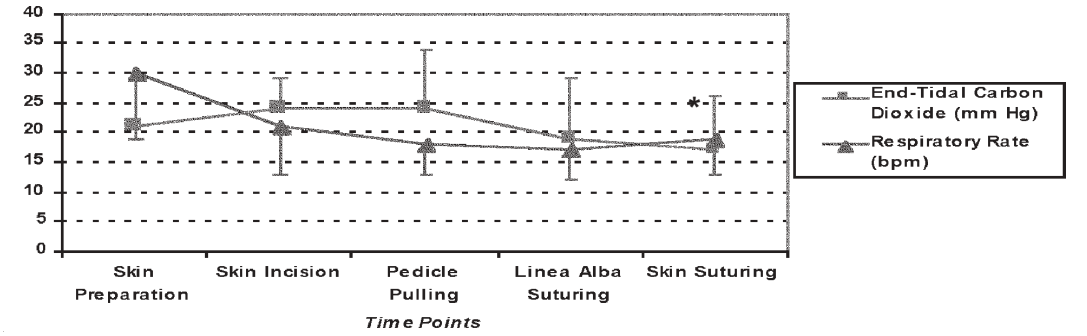


Figure 3: Changes in end-tidal carbon dioxide ($EtCO_2$) and respiratory rate (RR) during surgery in female cats [*significantly different from previous time points ($p < 0.05$)]

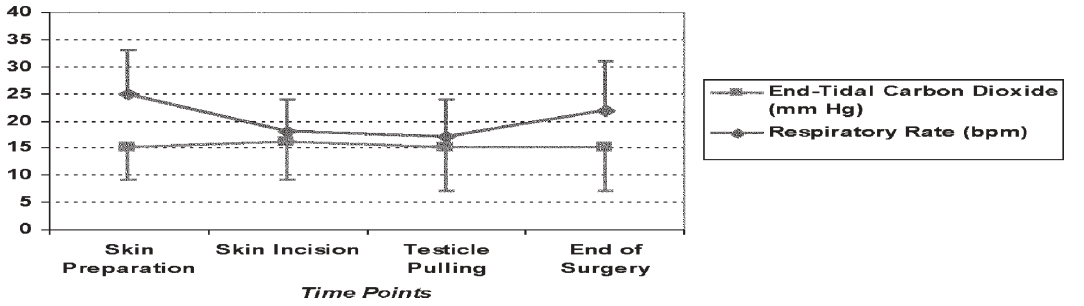


Figure 4: Changes in end-tidal carbon dioxide ($EtCO_2$) and respiratory rate (RR) during surgery in male cats

Discusssion

Variation in the duration of surgical anesthesia following single dose of K-X was likely related to the different health status of the cats, thus affecting the pharmacokinetic and pharmacodynamic of K-X. The full recovery to standing or walking from K-X in this study was approximately 6 hours. Recovery from ketamine anesthesia has been reported to occur within 2 to 6 hours in healthy patients (McKelvey and Hollingshead, 2003). The recovery time seemed to be more dependent on the health status as recovery time following single or multiple doses of ketamine did not differ significantly.

The MAP and HR values in this study reflected the sympathetic tone contributed by ketamine and surgical stimulation, as well as the vasoconstrictive effect of xylazine (McKelvey and Hollingshead, 2003). Although SpO_2 was low in all cats, the result was expected as the cats were breathing room air. End-tidal carbon dioxide was low as they were sampled at the nostrils of cats and not at the alveolar level.

Packed cell volume, total protein and globulin tended to increase in female cats, and increased significantly in male cats. The best explanation for these changes is dehydration, and was likely more pronounced in males than females. Albumin that tended to decrease in females may be due to higher albumin loss through blood loss following ovariohysterectomy. Creatine kinase that was higher than normal before surgery in all cats is likely reflecting some degree of muscle injury during capturing and transportation.

In conclusion, K-X at 20 mg/kg-2 mg/kg was safe to be used in cats for neutering surgeries under field scenario. All the cats in this study recovered well without significant complications other than possible mild dehydration.

References

1. Allen, D.G., Dyson, D.H., Pascoe, P.J. and O'Grady, M.R. (1986). Evaluation of a xylazine-ketamine hydrochloride combination in the cat. *Can J Vet Rec* **50**:23-26.

2. Cullen, L.A. and Jones, R.S. (1977). Clinical observations on xylazine/ketamine anesthesia in the cats. *Vet Rec* **101**:115-116.

3. McKelvey, D. and Hollingshead, K.W. (2003). Veterinary Anesthesia and Analgesia. 3rd Edition, Mosby-Year Book, Inc. pp135.

4. Verstegen, J., Fargetton, X., Donnay, I. and Ectors, F. (1990). Comparison of the clinical utility of medetomidine/ketamine and xylazine/ketamine combinations for the ovariectomy of cats. *Vet Rec* **127**:424-426.

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 25-30

Efficacy of Omeprazole Paste Plus Yogurt for the Treatment of Gastric Ulcers in Thoroughbreds

Tan Chai Har, [1]Noraniza Mohd. Adzahan & [2]Reza Singam
[1]Department of Veterinary Clinical Studies
Faculty of Veterinary Medicine, Universiti Putra Malaysia
[2]Perak Turf Club Equine Hospital, Ipoh, Perak

Abstract

Horses are susceptible to gastric ulcers, which may be due the aggressive and protective factors imbalance in the stomach. Apart from that, damage caused by reactive oxygen species and apoptosis can also contribute to gastric ulceration in horses. Seven Thoroughbred horses from Perak Turf Club showing weight loss, poor appetite and poor performance were selected. Gastroendoscope was performed at days 0, 10 and 21 of the treatment. Six horses were treated with 4 mg/kg body weight omeprazole, SID plus yogurt drench 3 times weekly. The horses were then divided into 3 groups, based on different feeding frequencies i.e., twice daily (BID), trice daily (TID) and four times daily (QID). One horse was treated with 4 mg/kg body weight omeprazole paste, once daily (SID) without yogurt drench. Among 6 horses treated with omeprazole plus yogurt, only one horse was completely healed by day 10 of treatment. There was an improvement in gastric ulcer score for horses treated with omeprazole plus yogurt. Higher feeding frequency showed better improvement than lower feeding frequency in gastric ulcer scores.

Keywords: omeprazole paste, yogurt, gastric ulcer score, feeding frequency

Introduction

Studies in Thoroughbred race horses and show horses in active training showed a prevalence of gastric ulceration from 80% to 90% and 60% on the other performance horses (Murray *et al.*, 1994; Vatistas *et al.*, 1999). Horses have two types of linings in the stomach, which are non-glandular (squamous mucosa) and glandular. The linings are demarcated by the margo plicatus. In mature horses gastric ulcers are most often found within the squamous mucosa next to the margo plicatus. The presence of gastric ulceration has been associated with clinical signs such as poor appetite, attitude changes, colic and poor performance

Gastric ulcers results from disequilibrium between mucosal aggressive factors and mucosal protective factors. Apart from the damaging role of acid, reactive oxygen species (ROS) especially the hydroxyl radical and apoptotic cell death also play a significant role in mucosal damage during ulceration. Gastric ulceration in horses can be confirmed with endoscopic examination.

Studies had been shown that omeprazole has some antiulcer activities either through acid suppression by inactivation the H^+-K^+ - ATPase or by controlling oxidative damage and apoptotic cell death of gastric mucosa during ulceration (Biswas *et al.*, 2003).

Yogurt is an example of probiotics. It is a coagulated milk product resulting from the fermentation of lactic acid in milk by *Lactobacillus spp* and *Streptococcus thermophilus*. It is generally suggested that yogurt possesses gastroprotective activity or therapeutic value in gastric ulcers in humans.

Many studies of gastric ulceration in horses focused on the treatment rather than the factors that can affect the treatment on gastric ulcer. Therefore, in this study the objectives were:

1. to assess the gastric ulcer scores in Thoroughbred hroses treated with omeprazole plus yogurt within 3 weeks of treatment.
2. to compare improvements in gastric ulcers between horses treated with omeprazole plus yogurt and horses treated with omeprazole only.
3. to compare the gastric ulcer scores in Thoroughbred horses treated with omeprazole plus yogurt in relation to different feeding frequencies.

Materials and Methods

Study Design

This is a cross-sectional study of Thoroughbred in active race-training. Seven horses were routinely given omeprazole paste 4 mg/kg, SID and were monitored for 21 days. Six horses were given 500 g of yogurt mix with 1 L water, 3 times a week. Horses were fed with regular racehorse diet. Two horses were fed twice daily, three horses fed trice daily and the other 2 horses were fed 4 times daily based on their owner's feeding regime. Animals were housed in stalls and remained in active race-training throughout the study.

Endoscopic Examination

Endoscopies were performed on days 0, 10, and 21 of the treatment and the gastric lesions scored according to the classification below. Food was withheld for at least 8 to 12 h prior to endoscopic examination and water was withheld for 2 to 4 h prior to endoscopy. Approximately 5 min prior to endoscopy, horses were sedated with xylazine (0.5mg/kg bwt i.v.). A 3 m flexible video gastroendoscope was passed via the right nostril into the stomach. Feed or bedding material was removed from the surface of the stomach by a stream of water. The stomach was searched systematically to detect any lesions in the stomach.

Classification of Gastric Ulcers

The gastric ulcer was graded from 0 to 6 using the following grading system.

0. Normal mucosa; No ulcer
1. Non-erosive mucosal changes; either hyperaemia (reddening without any apparent defect) or yellowing (hyperkeratosis)
2. Mucosal erosions; Apparent mucosal erosions
3. Mild ulceration; Multifocal or generalised areas appear to be superficial ulceration with or wihout hyperaemia and mild/moderate hyperkeratosis
4. Moderate ulceration; Extensive superficial lesions of deeper focal lesions with or without some mucosal proliferation along lesion margins and active haemorrhage
5. Severe ulceration; Deep appearing multifocal or generalised ulceration with or without moderate mucosal proliferation along lesion margins and active haemorrhage
6. Extensive severe ulceration; Extensive areas of deep ulceration with or wihtout extensive mucosal proliferation along margins and active haemorrhage

Statistical Analysis

Ulceration was analysed as ordinal (score) outcomes. Kruskal-Wallis H-test was used to determine whether feeding frequency had effect on improvement of gastric ulcer score of horses treated with omeprazole paste plus yogurt drench treatment and to assess the significance differences between means ulcer scores of different treatments on improvement of gastric ulcer scores. The significant level used was $p< 0.05$.

Results and Discussion

The result of the frequency distribution of endoscopic gastric lesion scores on days 0, 10 and 21 of horses treated with omeprazole paste and horses treated with omeprazole paste plus yogurt drench 3 times/week in regard to different feeding frequency are shown in Table 1. Horses treated with 4.0 mg/kg body weight omeprazole paste plus yogurt drench showed better improvement in gastric ulcer scores than horses treated with omeprazole paste only (Figure 1). However, there was insignificant ($p>0.05$) improvement in gastric ulcer scores between horses treated with omeprazole paste only and horses treated with omeprazole paste plus yogurt drench.

Yogurt is generally suggested to possess many beneficial and therapeutic effects on humans. Lactobacillus cell wall, for example may possess a gastroprotective effect. Furthermore, one recent study (Uchida and Kurakazu, 2004) report that *Lactobacillus gasseri* OLL2716 can dose-dependently inhibit acute gastric lesion through prostaglandin inhibition of acute gastric lesions, by increasing gastric mucosal blood flow or bicarbonate secretion. This seems to be evident in the present study, where omeprazole-plus-yogurt-drench-treated horses showed better improvement in ulcer scores than horse treated with omeprazole only. However, complete healing of gastric lesions was found in only one case, suggesting that dosage of yogurt used in this study may only be sufficient for certain horses only.

Table 1: Frequency distribution of endoscopic gastric lesion scores on Day 0, 10 and 21 of horse treated with 4.0mg/kg omeprazole paste and horses treated with 4.0mg/kg omeprazole paste plus yogurt drench 3x/week.

Day	Treatment	Gastric lesion scores							No. of horses	Mean ulcer score
		0	1	2	3	4	5	6		
0	O only	0	0	0	0	0	1	0	1	5
	O + Y	0	0	1	1	1	3	0	6	4
10	O only	0	0	0	1	0	0	0	1	3
	O + Y	1	0	2	2	1	0	0	6	2.3
21	O only	0	0	0	0	1	0	0	1	4
	O + Y	1	0	1	2	2	0	0	6	2.6

O = Omeprazole; Y = Yogurt

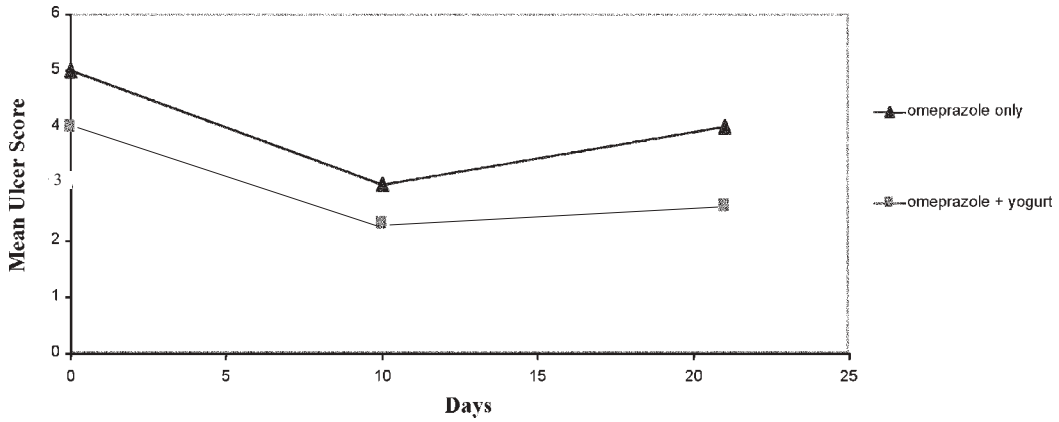


Figure 1: Mean ulcer scores for horses receiving omeprazole paste only and omeprazole paste plus yogurt drench

The frequency distribution of endoscopic gastric lesion scores on days 0, 10 and 21 of horses treated with 4.0 mg/kg body weight omeprazole paste plus yogurt drench 3 times/ week with different feeding frequency of twice/day, trice/day and 4 times/day are shown in Table 2. There was greater improvement in gastric ulcer scores in horses with feeding frequency trice/day and 4 times/day compare to horse fed twice/day (Figure 2). Trice/day feeding frequency showed better improvement than feeding frequency of 4 times/day (Figure 2). However, there was insignificant ($p>0.05$) improvement in gastric ulcer scores throughout the study in horses with different feeding frequencies. It may be attributed to the small sample size and short duration of the study.

Table 2: Frequency distribution of endoscopic gastric lesion scores of horses treated with omeprazole plus yogurt

Day	Feeding frequencies	Gastric lesion scores							No. of horses	Mean ulcer score
		0	1	2	3	4	5	6		
0	BID	0	0	1	0	0	0	0	1	2
	TID	0	0	0	1	1	1	0	3	4
	QID	0	0	0	0	2	0	0	2	4
10	BID	0	0	1	0	0	0	0	1	2
	TID	1	0	1	1	0	0		3	1.6
	QID	0	0	0	1	1	0	0	2	3.5
21	BID	0	0	0	0	1	0	0	1	4
	TID	1	0	1	0	1	0	0	3	2
	QID	0	0	0	2	0	0	0	2	3

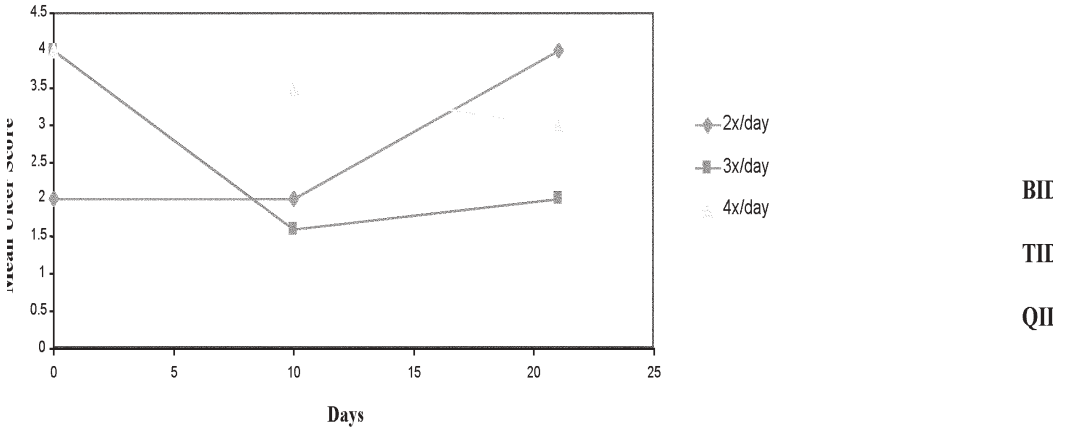


Figure 2: Mean ulcer scores for horses treated with omeprazole paste plus yogurt (2x/day = BID; 3x/day = TID; 4x/day = TID)

Alternating period of fasting and refeeding also have been shown to induce gastric ulcers in the horse (Murray, 1994). Moreover, it is possible that continuous eating may reduce incidence of squamous ulcer. The improvement of mean ulcer score with feeding frequency trice/day and 4 times/day were better than with twice/day feeding frequency. It is postulated that with the increase in feeding frequency there is frequent flow of saliva and ingesta to buffer the stomach acid. Thus, horses fed 4 times/day should show better improvement in gastric ulcers than horses fed twice/day.

However, mean ulcer score for horses fed trice/day showed better improvement than horses fed 4 times/day in this study. This inconsistency may be due to the unequal size of the group of horses in this study. Besides that, only one horse fed trice/day had complete healing of gastric ulcer in day 10 of treatment, which may have also affected the results. In this study, complete healing of gastric ulcer score was seen in horses fed trice/day instead of horses fed 4 times/day, which suggests individual differences in response to the treatment.

References

1. Biswas, K., Bandyopadhyay, U., Chattopadhyay, I., Varadaraj, A., Ali, E., and Banerjee, R.K. (2003). A novel antioxidant and antiapoptotic role of omeprazole to block gastric ulcer through scavenging of hydroxyl radical. *J Biol Chem* **278(13)**:10993-11001.

2. Uchida, M. and Kurakazu, K. (2004). Yogurt containing *Lactobacullus gasseri* OLL2716 exerts gastroprotective action against acute gastric lesion and antral ulcer in rats. *J Pharmacol Sci* **96**:84-90.

3. Murray, M.J. (1994) Equine model of inducing ulceration in alimentary squamous epithelial mucosa. *Dig Dis Sci* **12**:2530-2535.

4. Vatistas, N.J., Nieto, J.E., Snyder, J.R. and Thompson, D. (1999) Clinical trial to determine the effect of omeprazole given once or twice daily on gastric ulceration. *Equine Vet J (Suppl)* **29**:87-90.

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 31-34

Re-evaluation of Flumethrin for *Rhipicephalus sanguineus* Control on Dogs in the Tropics

Voon keh Li & [1]Goh Yong Meng
[1]Department of Veterinary Preclinical Sciences
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

This study re-evaluated the efficacy of flumethrin (Bayticol™ EC 6.0%) used as dipwash at 40 ppm for tick (*Rhipicephalus sanguineus*) control on dogs 10 yr after its initial introduction. The experiment also aimed to study the probable synergistic effects of amitraz when used in conjunction with flumethrin. A total of 13 dogs with natural tick infestation were used as experimental subjects. Three of the subjects were bathed with flumethrin (FLU); 7 dogs were bathed with amitraz plus flumethrin (FLU+AMI); and another 3 bathed with amitraz (AMI) alone. This was to compare the killing rate of the various treatment groups and to determine the synergetic effect of amitraz plus flumethrin. The results showed that the kill percentage of flumethrin in 1997, flumethrin in 2007 and flumethrin plus amitraz were not significantly different from each other. All treatment groups were tick-free 8 h post-treatment although amitraz (AMI) received 0 tick kill. All animals continue to be tick-free for between 10 to 14 d when amitraz only was used, and more than 3 wk if amitraz (AMI) was used in conjunction of flumethrin. The results showed that flumethrin still has satisfactory efficacy 10 yr after its introduction. Although amitraz has virtually lost its acaricidal activity, it remained a potent tick repellent agent. The study also showed that optimal and synergistic ticks kill and tick repellent effects were obtained when FLU+AMI were used in conjunction with each other.

Keywords: ticks, dogs, amitraz, flumethrin, resistance

Introduction

Rhipicephalus sanguineus, is a 3-host tick and infects dogs of all ages. The *Rhipicephalus sanguineus* feeds on host's blood. It can cause skin wounds and irritation at attachment sites and blood loss anaemia. Besides, *Rhipicephalus sanguineus* is also an important vector for diseases, for examples babesiosis and ehrlichiosis in dogs (Schoeman and Leisewitz, 2006). These blood protozoal diseases can lead to serious medical complications in the host such as haemolytic anaemia.

Resistance to acaricide occurs as a result of prolonged growth of the organism in sublethal concentrations of the agent and the survival of the organisms which have the least innate susceptibility to the agent (Blood and Studdert, 1999). In cattle, *Boophilus microplus* has developed resistance to many classes of acaricide including chlorinated hydrocarbons, organophosphates, formamidines and pyrethroids (Foil *et al.*, 2004). Ticks are known to be resistant to amitraz, their resistance profile against flumethrin remained to be investigated.

This study attempted to compare the efficacy of flumethrin 10 years after its initial introduction in Malaysia, and attempted to document possible synergistic effects of amitraz and flumethrin when these agents are used in conjunction to each other. Therefore, the objectives of this study were:

1. To compare the current and previous (Goh, 1997) acaricidal activity of flumethrin against *Rhipicephalus sanguineus* in dogs.
2. To determine the killing rate of flumethrin versus amitraz against *Rhipicephalus sanguineus* in dogs.

Materials and Methods

General Overview

This study used 13 dogs of various breeds, ages (3 mo to 8 yr), hair length, body weights and both sexes, to investigate the efficacy of flumethrin, amitraz as well as flumethrin plus amitraz treatments in tick control.

Selection of Dogs

Only dogs over 3 mo of age, weighing more than 4 kg, which were positive for at least 5 ticks, were admitted into the study. No other acaricide were to be used on the dogs during the study. The dogs had to be tolerant of frequent human handling.

Drugs and Application

Flumethrin was available as a 6% emulsifiable concentrate (EC) (Bayer Malaysia Sdn. Bhd.) to be diluted in water to yield 40 ppm concentrations as dipwash. Amitraz was available as a 12.5% solution (Intervet Sdn. Bhd.) to be diluted in water to yield 187.5 ppm concentrations as dipwash. Flumethrin or Amitraz were applied on selected dogs by soaking the entire dog. The dog was then left to dry and was not washed with water after the flumethrin or amitraz treatment.

Tick Count Method

The pre-treatment tick count was performed before the treatment and at 1, 4, 8, and 24 h post-treatment. The live and dead tick count was recorded. The hair of the dog was parted to expose the underlying skin across the entire body following the same sequence every time, i.e. the face, nape of neck, dorsum of the body, the tail, the limbs, the ventrum of the body, the interdigital area and the paws.

The Field Trial

Among the 13 samples, 3 dogs were bathed with flumethrin. Another 7 dogs were bathed with amitraz then flumethrin 7 days later. The third batch of 3 dogs was bathed with amitraz only.

Data Analysis

The kill percentage was calculated as total count of dead tick over total pretreatment tick count. The data obtained from the formula above were then analyzed using Kruskal- Wallis H- test to investigate the effects of drugs on the kill percentage. Significantly different values were elucidated using Q- Statistics. All statistical analysis was conducted at 95% confidence level.

Results and Discussion

The study showed that the kill percentage of flumethrin in 1997, flumethrin in 2007 and flumethrin plus amitraz were not significant different ($p>0.05$). While the amitraz showed zero tick kill percentage in the study. Tick kill percentage for FLU, FLU+AMI and reported values for flumethrin trial in 1997 (FLU 97) were more than 95% 4 hours past treatment. Although amitraz did not cause any tick mortality, nevertheless all animals were tick free 8 hours post treatment.

It was also noted that dogs treated with AMI only had a residual protective period of 10 days, while those treated with flumethrin has at least 3 weeks. In this study, the kill percentage of flumethrin did not differ significantly from the flumethrin study done in 1997 (Goh, 1997). This showed that the flumethrin is still effective against *Rhipicephalus sanguineus* when used according to the manufacturer's instructions. The correct usage of the flumethrin as an effective tickicide is important.

The amitraz had a zero tick kill percentage in the study but showed excellent tick repellent activity. These results reinforced the fact that amitraz have a good repellent effect but virtually no tick killed at all. And, according to Harrison and Palmer (1981), amitraz has been found to modify tick behavior by inducing detachment and hyperactivity, a large proportion of tick population was expelled alive from the treated host animal. Ticks become resistant to amitraz by producing more monoamine oxidase at the synapse than amitraz can inhibit. The uninhibited monoamine oxidase is able to continue conduction of synaptic transmission. This rendered the dose of amitraz used becoming insufficient or useless to kill the ticks. In this study, the amitraz has a residual protective effect of 10 to 14 days, while Flumethrin plus amitraz provide at least 3 weeks of protection. This suggested synergistic effects of amitraz plus flumethrin (Beugnet and Chardonnet, 1995). Synergic effect of amitraz plus flumethrin was reported however the mechanism of action was unknown (Bill, 1997).

Although the amitraz has lost its acaricidal effects against tick, increasing its dosage in the hope of gaining back the acaricide effects is not advisable. This is because at high dosage, amitraz is not only toxic to the tick but to the animals and the handler as well (Osweiler, 1996). Ocular exposure to amitraz can lead to mild irritation. Ingestion of amitraz can lead to toxicosis. Signs of amitraz toxicity included depression, ataxia, bradycardia, mydriasis, hypothermia, vomiting, polyuria, or diarrhea. A lethal dose of amitraz is estimated to be around 100 mg/kg PO, with toxic dose reported to be as low as 10 to 20 mg/kg for dogs

(Peterson and Talcott, 2006). Besides, amitraz also carries carcinogenic risk (Osweiler, 1996)). The half-life for flumethrin is 30 days but for amitraz it is longer than 50 days (Peterson and Talcott, 2006). This effectively showed that amitraz pose a greater risk to the environment compared to flumethrin. Tick is reported able to metabolize the amitraz but mammals are unable to do that (Woodward, 2005). A perfect acaricide must be safe to the pet, human handler and the environment.

Conclusion

There is no significant difference in the killing rate of Flumethrin in 1997 (Goh 1977) and 2007. Flumethrin is still an effective tickticide 10 years after its initial introduction. Amitraz is a poor acaricide but a good tick repellent. The residual activity of amitraz is shown to be 10 to 14 days, while the residual activity of flumethrin plus amitraz is at least 3 weeks.

References

1. Beugnet, F. and Chardonnet, L. (1995). Tick resistance to pyrethroids in New Caledonia. *Vet Parasitol* **56**:325-338.

2. Bill, R.L. (ed) (1997). Pharmacology for Veterinary Technicians. 2nd Edition, Mosby. pp259-264.

3. Blood, D.C. and Studdert, V.P. (1999). Saunders Comprehensive Veterinary Dictionary. 2nd Edition, WB Saunders.

4. Foil, L.D., Coleman, P., Eisler, M., Jonsson, N.N., Torr, S. and Pruett, J.H. (2004). Factors that influence the prevalence of acaricide resistance and tick-borne disease. *Vet Parasitol* **125**:163-181.

5. Osweiler, G.D. (ed) (1996). Toxicology. Philadelphia. Williams & Wilkins.

6. Goh, Y.M. (1997). Evaluation of flumethrin for *Rhipicephalus sanguineus* control on dogs in the tropics. DVM Thesis. UPM Serdang, Malaysia.

7. Harrison, I.R. and Palmer, B.H. (1981) Further Study on Amitraz as A Veterinary Acaricide. *Pestic Sci* **12**:467-474.

8. Peterson, M.E. and Talcott, P.A. (ed) (2006). Small Animal Toxicology. 2nd Edition, Elsevier (Saunders), St Louis, Missouri, USA.

9. Schoeman, J. and Leisewitz, A. (2006). Disease risks for traveling pet: Babesiosis. *In Practice* **38**:384-391.

10. Woodward, K.N. (2005). Veterinary pharmacovigilance. Part 3. Adverse effects of veterinary medicinal products in animals and on the environment. *J Vet Pharmacol Ther* **28**:171-184.

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 35-38

A Review of Surgical Gastrointestinal Tract Emergencies in Dogs and Cats

Goh Tin Sin & [1]Sundararajan Thilagar
[1]Department of Veterinary Clinical Studies
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Surgical gastrointestinal tract emergency is a condition that needs immediate exploratory surgery. This study reviewed medical records of dogs and cats presented to UVH with surgical gastrointestinal emergency lesions over a five-year period (January 2003 to December 2007). Eight types of lesions were encountered, which were foreign body (FB) obstruction 45.7%, rectal prolapse 27.1%, gastric dilatation volvulus (GDV) 8.6%, colon impaction 8.6%, intestinal pseudo-obstruction 4.3%, abdominal hernia 2.7%, intestinal intussusception 1.4%, and gastrointestinal neoplasia 1.4%. Common clinical signs of gastrointestinal lesions included inappetance/anorexia, vomiting, depression/weak, dehydration, pale mucous membranes, constipation, abdominal distension and diarrhea. Neutrophilia is the most consistent finding. Foreign bodies can be identified by survey radiograph and contrast study based on their radiodensity. Stomach and/or intestine filled with gas or fluid was commonly seen in intestinal obstruction cases. Unusual foreign bodies, such as steel wire and durian seed, were also found. Major surgeries included enterotomy 13.3%, colopexy 13.3%, gastrotomy 12%, intestinal anastomosis 9.6%, gastrotomy and gastropexy 7.2%, colotomy 6%, subtotal colectomy 3.6% esophagotomy 2.4% and multiple enterotomies 2.4%. Minor surgeries included manual reduction of rectum using purse string suture 22.8% and manual removal of FB under general anesthesia 7.2%. The recurrence rate of purse string suture reached 52%. Successful treatment outcome was achieved in 92.8% of patients.

Keywords: Foreign body obstruction, gastric dilatation volvulus (GDV), intestinal pseudo-obstruction, colon impaction, rectal prolapse

Introduction

Gastrointestinal (GI) problem is a challenging task for veterinarian to solve, because it is often ill-defined. It is clearly recognized in veterinary practices throughout the world that digestive system disorders are among the common reasons for pet owners to seek veterinary consultation. Patients that present with acute GI signs have a potentially life-threatening disorder, and failure by the clinician to recognize important historical and physical finding may lead to crucial errors in patient management. It is also very important that the clinician make a timely diagnostic evaluation, regarding patients with seemingly mild intermittent or chronic persistent signs, to define the problem accurately. Patients with periods of discomfort could often have their problem resolved or controlled much earlier only if an accurate diagnosis is established (Tams, 2003).

The aims of this study were to: (i) summarize the presenting complaint and clinical signs, etiology, clinicopathologic, radiographic and ultrasonographic findings of surgical gastrointestinal tract emergency lesions, (ii) evaluate the various surgical techniques based on the treatment outcome, and (iii) classify the surgical gastrointestinal tract emergency lesions based on the prevalence of cases in the UVH.

Materials and Methods

Medical records of dogs and cats with surgical gastrointestinal emergency lesions over a five year period in UVH (January 2003 to December 2007) were reviewed. Information obtained regarding patient signalments, physical examination, blood parameter results, radiographic and ultrasonograhic findings were noted. Etiologies, surgical findings, post-surgical data recorded, including treatment administered, complications experienced and hospital outcomes, were analyzed and tabulated.

Results

Eight types of lesions were encountered (Table 1); foreign body obstruction (FBO) 45.7% (32/70), rectal prolapse 27.1% (19/70), gastric dilatation volvulus (GDV) 8.6% (6/70), colon impaction 8.6% (6/70), intestinal pseudo-obstruction 4.3% (2/70), abdominal hernia 2.7% (2/70), intestinal intussusception 1.4% (1/70), and gastrointestinal neoplasia 1.4% (1/70). Common clinical signs of GIT lesions included inappetance/anorexia, vomiting, depression/weak, dehydration, pale mucous membrane, constipation, abdominal distension and diarrhea. Neutrophilia is the most consistent finding.

Foreign body obstruction cases were mostly found in Mongrels and Bull mastiffs. Fish and chicken bones, needles and thread, steel wire, fish hook and nylon strings, socks, sponge, fruit (durian) seed, staple, rubber bands, small plastic, table cloths, pebbles, balls, strings, cotton threads, and hairball were foreign objects found in the GIT. Foreign bodies can be identified by survey radiograph and contrast study based on their radiodensity. Stomach and intestine filled with gas/fluid was commonly seen in intestinal obstruction cases.

The result showed that 79.3% (46/58) of the major surgeries were successful without any complication, 6.9% (4/58) with problems of recurrence, 3.4% (2/58) with mild complications and 8.6% (5/58) were unsuccessful and the patients died (Table 2). However, in minor surgeries only 48% (12/25) were successful while in 52% (13/25) the problems recurred due mostly to the failure of the purse string suture. Twenty-five percent of the intestinal anastomosis had mild complication in which short bowel syndrome developed. Recurrence occurred in 18.2% of the enterotomy. In cecal impaction, there was a recurrence rate of 40% after colotomy surgery, but subtotal colectomy was 100% successful. There was a 90.9% success rate in colonpexy surgery for rectal prolapse. Successful treatment outcome was achieved in 92.8% of patients.

Table 1: Distribution of 70 cases with surgical GIT emergencies

Lesion	Dog No	%	Cat No	%	Tot No	Tot %	Gender ratio M : F	Dogs Age (month) Median(range)	Cats
FBO	21	63.6	11	36.7	32	45.7	15:15	48(7-96)	5(5-96)
GDV	5	15.2	1	3.33	6	8.6	5:1	72(24-72)	84
Intuss	0	0	1	3.33	1	1.4	1:0	0	5
Ab her	1	3.03	1	3.33	2	2.9	1:1	12	5
P-obs	2	6.06	1	3.33	3	4.3	3:0	72	24
C imp	1	3.03	5	16.7	6	8.6	4: 2	48	36(2-72)
R pro	4	12.1	15	50	19	27.1	8:11	3(2-12)	3(2-84)
Neo	1	3.03	0	0	1	1.4	1:0	24	0
Total	35	100	35	100	70	100.0	70		

FBO = foreign body obstruction; GDV = gastric dilatation volvulus; Intuss = intussesseption;
Ab her = abdominal hernia; P-obs = pseudo-obstruction; C imp = cecal impaction;
R pro = rectal prolapsed; Neo = neoplasia.

Table 2: Surgical methods and outcomes

Surgical method	Outcome								
	Total	1	%	2	%	3	%	4	%
Minor surgery									
Manual removal of F.B under GA	6	6	100.0						
Rectal prolapse (purse string suture)	19	6	31.6			13	68.4		
Total	25	12	48.0			13	52.0		
Major surgery									
Transthoracic esophagotomy	2	2	100.0						
Gastrotomy	10	10	100.0						
Gastrotomy + Gastropexy	6	5	83.3					1	16.7
Enterotomy	11	8	72.7			2	18.2	1	9.1
Multiple enterotomy (+colotomy)	2	2	100.0						
Intestinal anastomosis	8	3	37.5	2	25.0			3	37.5
Colotomy	5	3	60.0			2	40.0		
Subtotal colectomy	3	3	100.0						
Colonpexy	11	10	90.9			1	9.1		
Total	58	46	79.3	2	3.4	4	6.9	5	8.6

Outcome: 1 - Successful without any complication; 2 - Partially success with mild complication;
3 - Partially success, problem recurrence; 4 - Unsuccessful, patient died

Discussion

Foreign body obstruction cases did not necessarily present the same clinical signs. The clinical signs depend on where the obstruction is located and whether the obstruction is partial or complete. The outcome of surgery depends largely on whether or not bowel perforation had occurred. The prognosis is actually poor in perforated lesion. Although intestinal pseudo-obstruction is a rare disorder, but it was encountered in the cases present to UVH. According to many veterinary and human medicine researchers, primary pseudo-obstruction is considered idiopathic, and the prognosis of this disorder is poor with no effective treatment available. Interestingly, these cases had good treatment outcomes. Subtotal colectomy will be the first surgical option instead of colotomy in cecal impaction problem. The recurrence rate of rectal prolase was high in purse string suture; conversely, colonpexy was effective in preventing recurrent rectal prolapsed (Popovitch, 1994).

References

1. Tams, T.R. DeNovo, R.C., Sherding, R.G. and Triolo, A. (2003). Handbook of Small Animal Gastroentrology, 2nd edition, Saunders. pp 159-251.
2. Popovitch, C.A., Holt, D., Bright, R. (1994). Colopexy as a treatment for rectal prolapse in dogs and cats: a retrospective study of 14 cases. *Vet Surg* **23(2)**:115-118.

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 39-43

Evaluation of the Efficacy of Various Antagonists on Peripheral Antinociception of Haruan (*Channa striatus*) Extract

Khoo Kah Ern & [1]Arifah Abdul Kadir
[1]Department of Veterinary Preclinical Sciences
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Previous studies have shown that the *Channa striatus* (haruan) extract has anti-inflammatory and analgesic properties. This study aims to determine the receptor systems involved in haruan extract peripheral nociception activity. The effects of haruan extract on various antinociception receptor system activities were examined using a mouse abdominal-constriction model. Nine groups of mice were pretreated with thioperamide (10 mg/kg), pindolol (10 mg/kg), methysergide (5 mg/kg), theophylline (25 mg/kg), haloperidol (1 mg/kg), propanolol (4 mg/kg), yohimbine (5 mg/kg), reserpine (2 mg/kg) and atropine sulfate (1 mg/kg), respectively. After 10 min, haruan extract at the dose rate of 480 mg/kg was administered to all mice. Thirty minutes later, acute peritoneovisceral pain was induced in all mice using the writhing test. The number of writhing response was counted cumulatively for 30 min and percentage inhibition for each of the antagonists was compared. The lower the inhibition percentage, the higher the reversal percentage of *C. striatus* effect by the antagonists. From this study, the haruan extract is suggested to contain different types of bioactive compounds that act synergistically on adenosine, α-2 adrenergic, muscarinic and serotonergic receptor systems to produce the observed antinociception.

Keywords: *Channa striatus*, antinociceptive, antagonist, writhing test, receptor system

Introduction

Numerous researches have been carried out over the years to discover the ideal analgesic drug. Drugs possessing the antinociceptive activity have in fact been discovered and produced, with variable efficacy and potency. These drugs originating from various sources, either extracted from the treasures of nature or chemically produced, have been successfully used.

With the growing interest of people to use naturally-originated products, pharmacologists, biotechnologists, herbalists and other researchers have spent their time studying on the possible pharmaceutical benefits possibly gained from nature. In local scenario, among the natural sources are *Channa* species fishes; namely the *Channa striatus*, also known locally as ikan haruan.

C. striatus, is a snakehead fish consumed in many parts of the South East Asian region. It is believed to promote wound healing, as well as reduce post-operative pain. Mat Jais *et al.* (1994) studied the antinociceptive effects of whole fillet and mucus extracts from haruan

in the mice using the abdominal constriction and tail flick tests. Collectively, their results suggest a scientific basis for the folklore practice of eating haruan fish in the post-operative period of pain relief.

Zakaria *et al.* (2004) have studied on the effects of an aqueous supernatant of haruan (ASH) (*C. striatus*) fillet extract on various antinociception receptor system activities using a mouse abdominal-constriction model. The ASH is suggested to contain different types of bioactive compounds that act synergistically on muscarinic, $GABA_A$, α-adrenergic, and serotonergic receptor systems to produce the observed antinociception. However, there were only few antagonists being tested in the experiment.

Therefore, the aim of this investigation is to determine the involvement of receptor systems in the peripheral antinociceptive activity of *C. striatus* extract.

Materials and Methods

Animals

Sixty Swiss albino mice, 25 to 30g body weight, 5 to 7 weeks old, were used in this study. The animals were obtained from the Veterinary Animal Unit, UPM, Serdang and kept under standard conditions in animal house. The animals were maintained on standard pellet diet and water *ad libitum*. Each animal was used only once.

Chemical

The acetic acid (J.T. Baker, USA) was prepared as 0.6% (*v/v*) solution in distilled water.

Haruan Extracts

The freeze-dried fillet was obtained from the pharmacology laboratory. The amount of freeze-dried fillet to be used was weighed according to the dosage of fish extracts to be prepared; 480 mg/kg. The extract was prepared by adding distilled water to the weighed freeze-dried fillet. The distilled water was added so that the volume of extract to be injected into the peritoneum of the mice does not exceed 0.3 mL per mice.

Treatment

The mice were divided into 10 groups, with 6 animals per group. All of the mice were weighed and their tail marked for identification before any procedure was done. Nine groups of mice were pretreated subcutaneously with antagonists; thioperamide (10 mg/kg), pindolol (10 mg/kg), methysergide (5 mg/kg), theophylline (25 mg/kg), haloperidol (1 mg/kg), propanolol (4 mg/kg), yohimbine (5 mg/kg), reserpine (2 mg/kg) and atropine sulfate (1 mg/kg), respectively. After 10 min, the above groups were given the extract of *C. striatus* at the dosage of 480 mg/kg, which is the effective dose. Treatment with extract was administered intraperitoneally at the right side of the peritoneum, in a volume of 10 mL/kg, 30 min prior to the antinociceptive assay. Another group of mice was served as the control group, which was given 0.6% acetic acid only.

Antinociceptive Assay

The writhing test was used, as described by Dambisya *et al.* (1999), to study the antinociceptive activity of *C. striatus* fillet extract. The acetic acid (0.6%; *v/v*) (J.T. Baker, USA), was used to induce pain in the peritoneal cavities of the mice. The acetic acid was administered intraperitoneally into the left area, in a volume of 10 mL/kg, 30 min after the mice were treated with *C. striatus* extract. The injection of acetic acid intraperitoneally will cause the mice to feel pain within the peritoneum and is exhibited by the writhing response. The writhing response is the contraction of the abdomen together with the stretching of the hindlimbs. The number of writhing response was counted cumulatively over a period of 30 min, after a 5 min of latency period post-acetic acid injection. Analgesia was calculated as the percentage of inhibition of abdominal constrictions using the following formula (Mat Jais *et al.,* 1997):

$$\frac{\text{Saline control group mean} - \text{Treated group mean}}{\text{Saline control group mean}} \times 100$$

Statistical Analysis

The results are presented as mean ± S.E.M. The data obtained from the different treatments given to the animals were compared by the One-Way Analysis of Variance (ANOVA), followed by Duncan's Test.

Results and Discussion

All the groups receiving different antagonist produced variable results in the writhing test. The variability was related to the ability of the antagonist to prevent the analgesic activity of *C. striatus* extract *in vivo*. In order to get the reversal percentage, we assumed that mice given only acetic acid as complete reversal of *C. striatus* effect which equals 100%. The reversal percentages of various antagonists were acquired by hundred minus the inhibition percentage of writhing response as shown in Table 1.

Table 1: Reversal of *Channa striatus* effect

Group	Percentage inhibition of writhing response (x%)	Reversal of *Channa striatus* effect (100-x%)
Theophylline (25 mg/kg)	3.61	96.39
Atropine sulfate (1 mg/kg)	17.81	82.19
Yohimbine (5 mg/kg)	22.19	77.81
Reserpine (2 mg/kg)	37.67	62.33
Methysergide (5 mg/kg)	43.23	56.77
Propanolol (4 mg/kg)	73.16	26.84
Thioperamide (10 mg/kg)	82.58	17.42
Pindolol (10 mg/kg)	82.84	17.16
Haloperidol (1 mg/kg)	92.26	7.74

Writhing test was chosen in this study was similar to that described previously, to investigate the analgesic activity of *C. striatus* extract in mice. One of the reasons will be based on the fact that the antinociceptive activity of *C. striatus* is mediated by a peripheral rather than a central mechanism (Bentley *et al.,* 1981; Mat Jais *et al.,* 1997) and that writhing test involved the peripheral receptors within the peritoneal cavity (Bentley *et al.,* 1981).

Theophylline (10 mg/kg) has produced the highest reversal percentage of *C. striatus* effect which was 96.39%. This proved that theophylline has the highest antagonist effect to the efficacy of *C. striatus* extract as analgesia. Atropine sulfate (1 mg/kg) and yohimbine (5 mg/kg) had the second highest antagonist effects producing 82.19% and 77.81% of reversal percentage for *C. striatus* effect, respectively. Reserpine (2 mg/kg) and methysergide (5 mg/kg) had produced 62.33% and 56.77% of reversal percentage for *C. striatus* effect, respectively. They can be considered as having partial antagonist effect against the efficacy of *C. striatus* extract on antinociception. Meanwhile, propanolol (4 mg/kg), thioperamide (10 mg/kg), pindolol (10 mg/kg) and haloperidol (1 mg/kg), which produced 26.84%, 17.42%, 17.16% and 7.74% reversal percentage for *C. striatus* effect, respectively have no significant ($p>0.05$) antagonist effect on *C. striatus* extract antinociception properties.

Clinically, these results suggested that the *C. striatus* extract effects various antinociception receptor system activities. Haruan extract most probably has the constituents that mostly act on the adenosine receptor, just like theophylline, which is an adenosine receptor antagonist. The bioactive compounds in haruan extract also acts on the muscarinic receptor and like atropine sulfate is an antimuscarinic agent. α-adrenergic receptor was again proven to be involved in haruan extract antinociception receptor activities (Zakaria *et al.,* 2004). Haruan extract also contains some bioactive compounds which like reserpin acts via disruption of norepinepherine, serotonin, and dopamine presynaptic vesicles, and like methysergide acts as serotonin antagonist.

However, haruan extract have shown no inhibition when tested with thioperamide, a histamine receptor antagonist, pindolol and propanolol, which are are non-selective β-blockers, and haloperidol, an antidopaminergic agent. Therefore, it can be concluded that haruan extract do not have any bioactive compounds which act on the histamine, β-adrenergic and dopaminergic receptors.

References

1. Bentley GA, Newton SH and Starr J. (1981). Evidence for an action of morphine and the enkephalins on sensory nerve endings in the mouse peritoneum. *Br J Pharmacol* **73(2)**:325-332.

2. Dambisya YM, Lee TL, Sathivulu V and Mat Jais AM. (1999). Influence of temperature, pH and naloxone on the antinociceptive activity of *Channa striatus* (haruan) extracts in mice. *J Ethnoparmacol* **66**:181-186.

3. Mat Jais, A.M., McCulloch, R. and Croft, K. (1994). Fatty acid and amino acid composition in haruan as a potential role in wound healing. *J Gen Pharmacol* **5**: 947-950.

4. Mat Jais, A.M., Dambisya, Y.M., Lee, T.L. (1997). Antinociceptive activity of *Channa striatus* (haruan) extracts in mice. *J Ethnopharmacol* **57:**125-130.

5. Zakaria, Z.A., Somchit, M.N., Sulaiman, M.R. and Mat Jais, A.M. (2004). Preliminary investigation on the antinociceptive properties of haruan (*Channa striatus*) fillet extracted with various solvent system. *Pak J Biol Sci* **7(10)**:1706-1710.

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 44-49

Effects of Anaesthesia and Surgery on Cardiorespiratory and Blood Parameters in Horses

Lim Lay Hoon, [1]Chen Hui Cheng, and [2]Reza Singam
[1]Department of Veterinary Clinical Studies,
Faculty of Veterinary Medicine, Universiti Putra Malaysia
[2]Perak Racing Turf Club, Ipoh, Perak, Malaysia

Abstract

Changes in cardiorespiratory and blood parameters following halothane or ketamine-xylazine anaesthesia in orthopaedic or soft tissue surgery were determined in 8 horses presented for surgical intervention at Central Equine Hospital, Perak Racecourse Tuft Club, Malaysia. Heart rate was constant during anaesthesia. Respiratory rate in halothane group was lower than ketamine-xylazine group, and correlated with end-tidal carbon dioxide in an opposite way. The Ketamine-xylazine group had lower SpO_2 level (SpO_2<90%) than the halothane group. The mean blood pressure in halothane group decreased to as low as 68 mm Hg. In general, packed cell volume, plasma protein and γ-glutamyl transferase changed in a similar pattern. Increase in creatinine was transient and reversed rapidly after 24 h. Creatine kinase (CK) and aspartate aminotransferase (AST) in the ketamine-xylazine group were constant. Two horses in the halothane group showed marked increases in plasma CK and AST concentrations, which is likely related to longer anaesthesia time, nature of surgical procedures as well as rough induction and recovery. Changes in cardiorespiratory and blood parameters during anaesthesia and surgery in horse merit further study to establish reliable reference values.

Keywords: horse, anaesthesia, surgery, cardiorespiratory, blood parameters

Introduction

In horses, the mortality rate in the perioperative period was reported to be 1:100 compared to 1:700 in small animals (Clarke and Hall, 1990). Thus it is crucial to monitor and evaluate the anaesthetic depth, hemodynamic functions, oxygenation and ventilation as well as blood parameters in horse in this period. In order to interpret the monitored parameters accurately, a set of reference values from horses following specific anaesthetic or surgical procedures are needed. Most of the published reference values are for awake and normal horses. This study was undertaken to document the changes in the cardiorespiratory and blood parameters following typical anaesthesia and surgical procedures in athletic horses.

Materials and Methods

Horses

Eight thoroughbred horses aged 3.88 ± 1.6 (mean ± SD) years old, weighing 463 ± 43.5 kg, presented for surgical intervention at Central Equine Hospital, Perak Racecourse Tuft Club,

Malaysia were recruited in this study. Pre-anaesthetic evaluation was performed. All eight horses were systemically healthy apart from musculoskeletal or upper airway disorders. Pre-operative medication consisted of intramuscular (IM) procaine penicillin, 20,000 IU; intravenous (IV) gentamycin, 6.6 mg/kg and phenylbutazone, 8 mg/kg. All horses were premedicated with acepromazine, 0.04 mg/kg, IV and were further sedated with xylazine, 1.1 mg/kg, IV. Following induction, four horses were maintained on inhalant (Group A) and four on injectable anaesthetics (Group B). Group A was induced using diazepam 0.05 mg/kg, IV and ketamine 2.2 mg/kg, IV. A standard large animal anaesthetic machine (Surgivet®) was used to deliver halothane and oxygen. Group B was induced with ketamine, 2.2 mg/kg and topped-up with ketamine-xylazine (2:1) at 3 mL. Two of the horses on injectables were infused with guaiphenesin, 100 mg/mL at approximately 10 mL/kg/h.

Physiological Parameters

Heart rate (HR), respiratory rate (RR), oxihaemoglobin saturation level (SpO_2), mucous membrane colour, capillary refill time and response to surgical stimuli were monitored and recorded every 10 min. Oxihaemoglobin saturation level was measured via a tongue probe. In horses maintained on halothane, mean arterial pressure (MAP) was measured using the oscillometric technique.

Blood Parameters

Blood samples were collected before premedication, 15 min following premedication with acepromazine, 30 mins intra-operatively, post-standing after recovery, 24, 48, and 72 h post-operatively. One mL of blood was transferred into ethylenediaminetetraacetic acid tube for packed cell volume (PCV), and plasma protein (PP) analysis. Three millilitres of blood was transferred into a plain tube for blood biochemistry estimation. These blood samples were kept in room temperature for at least 30 min before storing at -4^{o}C. Packed cell volume and PP were determined within 4 h of blood collection. Serum was harvested and stored at -20^{o}C before analysis. Packed cell volume was determined using the microhaematocrit method (Haematokrit 20, Hettick zentrifugen, Germane) and read on a Hawsley Micro-haematocrit Reader. Plasma protein concentration was measured using a refractometer (Atago T2-NE, Atago CO. LTD, Japan). Serum creatine kinase (CK), aspartate aminotransferase (AST), γ-glutamyl transferase (GGT) and creatinine (CREA) were determined using standard biochemical test kitd (Roche Diagnostica) on a chemistry analyzer (Hitachi 902, Hitachi LTD, Japan).

Statistics

A repeated measure for parametric data was performed for changes overtime between and within groups. The significant difference overtime was determined using test within-subject contrasts. For all tests, a p-value of less than 0.05 was considered significant.

Results and Discussion

During anaesthesia and surgery, there were no difference in HR between Groups A and B and no significant changes over time in either group. Changes in anaesthetic depth did not appear to influence heart rate and this agreed with a previous study (Steffey and Howland, 1978).

Following induction, RR in Group A dropped lower than Group B (Table 1). Respiratory rate in Group A ranged from 3 to 6 bpm and had great potential for hypoventilation. However, none of the horses suffered from hypoxaemia as they were breathing 100% oxygen. End-tidal carbon dioxide ($EtCO_2$) in Group A tended to change in opposite direction from RR at corresponding time points. The corresponding decreased of $EtCO_2$ with increased RR in Group A was likely related to changes in anaesthetic depth and surgical stimulation.

The hemoglobin saturation during anaesthesia and surgery in Group A was higher than Group B. Changes over time were not significant in Group A, while in Group B, SpO_2 tended to increase towards skin closure and lightening of anaesthesia Yet, mean SpO_2 in Group B remained lower than 90% and the horses were prone to hypoxemia because they were breathing spontaneously in room air. The recommended maintenance SpO_2 is above 90% (Colin, 1995). Since duration of total anaesthesia was less than 40 minutes in Group B, none of them developed complication. Should anaesthesia period be prolonged, efforts should be made to supplement horses with oxygen to prevent prolonged hypoxemia that may produce undesirable outcomes.

In Group A, MAP was 66 ± 14 mm Hg and tended to increase during first surgical stimulation but decreased thereafter. Increase in MAP in this study corresponded to the noxious stimulation at light plane of anaesthesia. Two horses were maintained at less than 60 mm Hg for as long as 25 minutes. No complication was observed despite the low MAP in this study. However, if anaesthesia and surgery was prolonged, action should be taken to maintain MAP above 70 mm Hg.

Packed cell volume, PP and GGT showed similar trends during anaesthesia and surgery in both group. No significant difference in these parameters was observed between groups except for the observed higher PCV in Group B. Significant changes over time were occurred within Group A in PCV, GGT and CREA values while in Group B there were significant changes in PCV and PP values (Table 2). Packed cell volume and PP concentration in both groups decreased significantly post-standing after the anaesthesia and surgery. This observation is in agreement with previous findings where, plasma volume increased in response to reduced arterial blood pressure during anaesthesia, resulting in a relative haemodilution (Steffey and Howland, 1977). There was transient increase in CK immediately after anaesthesia. Aspartate aminotransferase increased at day 1 and remained elevated till day 3 after a transient decrease. The mark increases in CK and AST in Group A were contributed only by 2 horses, resulting in high standard deviation. Both GGT and of CREA were transiently affected by halothane anaesthesia. Increase in CREA reversed rapidly when

Table 1: Cardiorespiratory parameters in horses maintained on halothane (A, n=4) or ketamine-xylazine (B, n=4)

Parameter	p-value between groups	Group	Baseline	Skin Incision (SI)	1st Surgical Stimulant (SS1)	2nd Surgical Stimulant (S22)	Skin Closure	p-value within group
HR (bpm)	0.75	A	32 ± 7	32±3	32±3	33±4	33±5	0.74
		B	38 ± 4	31±7	33±4	33±5	32±5	0.794
RR (bpm)	0.13	A	15 ± 2	3±2*	5±2*	4±2*	4±3	SI-0.001*; SS1-0.01*; SS2-0.006*
		B	14 ±2	7±3	8±3	8±4	8±3	0.67
SpO_2 (%)	0.025**	A	NA	9±1.73	93±6	95±3	95±2	0.429
		B	84 ± 5	84±5	82±9	82±9	89±5*	0.014*
MAP (mm Hg)		A	NA	^66±15	^76±25	72±27	68±22	0.188
EtCO2 (mm Hg)		A	NA	56±5	43±6	60±7	61±7	0.081

Data are expressed as mean ±standard deviation; *differ from baseline ($p < 0.05$); **Group A differ from B ($p < 0.05$);
NA- reading was not available at the particular time point; ^ n=3

Table 2: Peri-operative blood parameters in horses maintained on halothane (A, n=4) or ketamine-xylazine (B, n=4)

Parameter	p- value between groups	Group	Baseline	After ACP	Intra-30	P-S	P-24	P-48	P-72	p-value within group
PCV** (%)	0.008**	A	40±5	^34±5	^36±8	33±6*	^40±1	^40±5	^43±5	0.047*
		B	46±2	^43±2	NA	37±4*	47±4	41±3	44±3	0.011*
PP (g/L)	0.072	A	66±6	^58±8	^55±8	63±7	^63±4	^63±1	^63±2	0.855
		B	70±3	^67±2	NA	67±4	70±0	65±3*	67±5	0.03*
CK (U/L)	0.083	A	273±165	NE	NE	994±808	^874±713	^223±95	^244±79	0.08
		B	172±35	NE	NE	186±31	227±23	210±71	234±150	0.577
AST (U/L)	0.087	A	313±45	NE	NE	330±41	^614±325	^386±160	^597±308	0.176
		B	297±25	NE	NE	284±32	311±24	287±41	301±52	0.201
GGT (U/L)	0.186	A	20±3	NE	NE	18±5*	^17±3	^17±3	^17±2	0.035*
		B	25±8	NE	NE	22±6	24±8	21±5	21±6	0.088
Creatinine (mol/L)	0.088	A	141±12	NE	NE	161±17*	^165±18	^163±10	^155±12	0.038*
		B	170±9	NE	NE	174±18	194±26	177±28	167±20	0.373

Blood samples were collected before premedication (Baseline), 15 minutes following premedication with acepromazine (After ACP), 30 minutes intra-operatively (Intra-30), post standing after recovery (P-S), 24 (P-24), 48 (P-48), and 72 P-72) hours post-operatively.
Data are expressed as mean ±standard deviation; *differ from baseline ($p < 0.05$); **Group A differ from B ($p < 0.05$); NE- parameter was not evaluated at the particular time point; NA- reading was not available at the particular time point; ^ n=3

anaesthesia was discontinued. Horses in Group B showed higher increase in CREA at 24 hours, suggesting haemoconcentration as probably the result of decreased water intake.

References

1. Clarke, KW and Hall, LW. (1990). A survey of anaesthesia in small animal practice: AVA/ BSAVA report. *J Assoc Vet Anaesth* **17**:4-10.

2. Colin, ID. (1995). What should we monitor in anaeshetised horses? What can the monitoring equipment tell us? In: *Proceeding of the American Association of Equine Practitioners*. **41**:121-124.

3. Steffey, EP and Howland, D. (1977). Enflurane, halothane and isoflurane potency in horses. *Am J Vet Res* **38**:1037-1039.

4. Steffey, EP and Howland, D. (1978). Cardiovascular effects of halothane in the horse. *Am J Vet Res* **39**:611-615.

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 50-52

A Retrospective Study on Common Diseases and Conditions of Rabbits presented to Veterinary Clinics in the Klang Valley, Malaysia

Norziela Anuar, [1]Rashid Ibrahim & [2]Latiffah Hassan
[1]Department of Veterinary Clinical Studies
[2]Department of Veterinary Pathology & Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

This retrospective study investigates common diseases or conditions of rabbits presented to six veterinary clinics in the Klang Valley from January 2002 to December 2006. All records of rabbit cases at these clinics in the Klang Valley [University Veterinary Hospital (UVH-UPM and UVH-Petaling Jaya), Healing Room Subang Jaya, Brickfields Veterinary Clinic, PetWell Cheras and Klinik Haiwan Wawasan Puchong] were reviewed. A total of 1,273 rabbit cases were recorded and information on signalment which included case number, breed, sex and age, diet and housing management, reason for presentation, diagnosis and treatment were obtained. The most common cases in the rabbits presented to the veterinary clinics were integument problems particularly mange. Others included problems/ disorders of the gastrointestinal, generalised body, respiratory, musculoskeletal, urogenital and nervous systems, and the eyes and ears.

Keywords: Rabbits, body condition, diseases, veterinary clinics, cases

Introduction

Domestic rabbits (*Oryctolagus cuniculus*) belong to the order Lagomorpha, family Leporidae. The lagomorphs, including pikas, hares, and cotton-tail rabbits, differ from rodents by the presence of a second set of upper incisors (the “peg teeth” or “wolf teeth”) found caudal to the larger, principal pair.

Rabbit is referred to as small mammal or exotic animal and are truly domestic animals. Rabbits have been domesticated since the Middle Ages; they are descendents of the wild rabbits of Western Europe and Northern Africa. There are over fifty breeds of domestic rabbit, ranging in size from dwarf breeds (0.9 to 1.8 kg) to the giant breeds, which may weigh from 6.4 to over 9 kg (Hillyer, 1994). The rabbit breeds that were presented to veterinary clinics surveyed included New Zealand Whites, Lion Heads, Angoras, Dwarfs, Jersey Wooly, Holland Lop, Spotted Rex, Australian Hare, and mixed breeds.

Knowledge on common problems, peculiarities and general personality of pet rabbits will facilitate treatments of these animals.

This project was carried out to investigate the common conditions or diseases of rabbits presented to six veterinary clinics in the Klang Valley from January 2002 to December 2006.

Materials and Methods

Place of Study

This study was done over five weeks and case records were obtained from the following veterinary clinics: University Veterinary Hospital, UVH-UPM Serdang (Clinic 1); University Veterinary Hospital, UVH-Petaling Jaya (Clinic 2); Healing Room Veterinary Clinic, Subang Jaya (Clinic 3); Brickfields Veterinary Clinic, Brickfields (Clinic 4); Klinik Haiwan Wawasan, Puchong (Clinic 5) and Petwel Veterinary Clinic, Cheras (Clinic 6). These cases were thoroughly reviewed.

Medical Records

All medicals records of the rabbit cases were reviewed. The information and data were obtained and signalments included were case number, breed, sex and age, diet and housing management, reason for presentation, diagnosis and treatment.

Diagnosis and treatment were categorized and coded according to the Coding Supplement to Standard Nomenclature of Veterinary Diseases and Operations 1977. Data were recorded as written texts, chart and diagram, and digital pictures. Interviews and discussions with various personnel to include veterinarians, rabbit farmers and rabbit owners were conducted.

Results and Discussion

Trends of Rabbit Cases

From year 2002 to 2004, there was a gradual increase in rabbit cases presented to the veterinary clinics; however the number cases decreased slightly during the next two years. The total numbers of rabbit cases were 155, 232, 299, 253, and 161 in the years 2002 to 2006 respectively.

The reason behind the increase is probably due to a sudden increase in interest towards pet rabbits. This could also be attributed to the opening of franchised pet stores in shopping complexes in Mid-Valley, Bangsar in 2001 and One Utama, Petaling Jaya in 2003, which provided greater access to pet rabbits.

Number of Rabbit Cases Presented to Veterinary Clinics

The total number of rabbit cases presented to the six veterinary clinics during the five year period was 1273. Clinic 3 which is situated in Subang Jaya recorded 663 cases. This is followed by veterinary Clinic 1 located in Serdang (255 cases), Clinic 2 in Petaling Jaya (172 cases), Clinic 4 in Brickfields, Kuala Lumpur (105 cases), Clinic 5 in Puchong (57 cases) and the least of all, Clinic 6 in Cheras (19 cases).

Clinic 3 which is situated in Subang Jaya had the most number of rabbit cases in this study. This could be due to greater interest of Subang Jaya residents in keeping rabbits as pets. The Subang Jaya residents also represent a high-income community. In addition Clinic 3 is situated next to a well-known pet shop. It would seem that, household income, the urban locality of the clinics, and easy access to pet shops played a part in this outcome of this survey.

Common Cases of Rabbits Presented to Veterinary Clinics in the Klang Valley

Fig. 1 shows that integument conditions represent highest number of cases reported with (42%), followed by digestive tract (14%), well-care procedure/protocol (13%), eye and ear (8%), generalized body system (6%), respiratory, musculoskeletal and urogenital systems share the same percentage of 5% each, and the least number of cases reported was nervous disorder (2%).

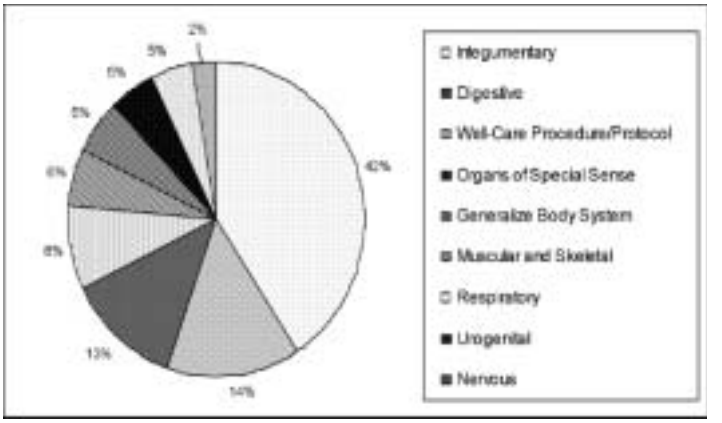


Figure 1: Common rabbits cases presented to veterinary clinics in the Klang Valley (2002-2006)

Among the 42% of integument problems, ectoparasitic infestation was the most common dermatologic condition which comprised 92% of the total number of cases. The other 8% of the cases were wounds, abscesses, and fungal infections. The finding may be due to the effect of the hot and humid climate of the tropics, which provide a conducive environment for ectoparasites to grow, as well as causing environmental stress on the rabbits.

Mite infestation/mange is the major case presented to these veterinary clinics. From the records, the mites identified were mostly *Psoroptes, Cheyletiella* and *Sarcoptes sp.*

The treatment for mite infestation is ivermectin at the dosage of 0.03 mg/kg, subcutaneously 3 times, 2 weeks apart.

References

1. Hillyer, EV. (1994). Pet Rabbits. *Vet Clin North Am, Small Anim Prac* **24** (1):25-66.

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 53-56

Musculature of the Malayan Porcupine (*Hystrix brachyura*)

Rajeswary Raman, [1]Shanthi Ganabadi & [2]Mohd Hilmi Abdullah
[1]Department of Veterinary Preclinical Sciences, Faculty of Veterinary Medicine
[2]Department of Animal Sciences, Faculty of Agriculture
Universiti Putra Malaysia

Abstract

The Malayan Porcupine (*Hystrix brachyura*) belongs to the family *Hystricidae*. *Hystrix brachyura* are generally black, has long quills with white and black bands and also short blackish spines on front part of the body. Four adult porcupine carcasses (3 males and 1 female) were used in this study. The muscles of the porcupines were dissected accordingly from the neck, thoracic limbs, abdominal region and pelvic limbs. The origin, insertion, relevant shape and relation of the muscles with the adjacent muscles were identified, recorded and described. Most of the muscles of the trunk, abdomen and limbs in the rodents and Malayan Porcupine are similar in position with other animals such as the dog and cat. However, there are some exceptions, such as the muscles differ in shape, size and coverage area (either wider or narrower). The differences were observed in the cutaneous, pectoral, sartorius, coracobrachialis and teres minor muscles.

Keywords: porcupine, muscle, origin, insertion

Introduction

Porcupines are rodents with sharp spines or quills. These quills are used in the defense against predators. The name 'porcupine' derived from middle France *porc d'epine* 'thorny pork', hence the nickname 'quill pig' is given for the animal. Porcupines are herbivores that feed on fruits, roots and stems. There are two types of porcupine's families, which are the *Hystricidae* (Old World Porcupines) and *Erethizontidae* (New World Porcupines). The difference between *Hystricidae* and *Erethizontidae* groups of porcupines are the quills. There are about 12 Old World Porcupines and they are almost exclusively terrestrial. They tend to be fairly large and have quills that are grouped in clusters. There are about 13 New World Porcupines that are mostly smaller (although the North American Porcupine reaches about 85cm in lengths and 18 kg in weight). The New World Porcupines have quills that are attached singly rather than grouped in cluster. They are also excellent climbers and spending most of their time in trees (http: //en. wikipedia.org/wiki/ Porcupine).

The Malayan Porcupine (*Hystrix brachyura*) used in this study belongs to the family *Hystricidae. Hystrix brachyura* are generally black, has long quills with white and black band and also short blackish spines on front part of the body (Malayan porcupine).

Studies have shown that the tender red meat of porcupine has a protein level comparable to beef and mutton but with a lower fat content. Apart from this, the levels of amino acids and

essential fatty acids in the porcupine meat are also very high (Zainuddin as cited by John, 2007).

Thus, the objective of this project was to evaluate the potential of the Malayan Porcupine as a source of meat by identification and description of the porcupine musculature. The information in this study will serve as a reference to future porcupine muscle studies, particularly pertaining to muscle weight distribution in different cuts and muscles, bone, and fat ratio.

Materials and Methods

Four adult porcupine carcasses (3 males and 1 female) were used in this study. The frozen carcasses were courtesy of Department of Wildlife and National Parks Peninsular Malaysia (PERHILITAN). The muscles of the porcupines were dissected accordingly from the neck, thoracic limbs, thoracic and abdominal region and pelvic limbs with the aid of scalpel blades and forceps. The origin, insertion, and relevant shape of muscle and its relationship with the adjacent muscles were identified, recorded and described.

Results and Discussion

Most of the muscles of the trunk, abdomen and limbs in the rodents and Malayan Porcupine are similar in position with other animals such as the dogs and cats. Since the Malayan Porcupine belongs to the rodent family, the muscles were compared with those of the rat, dogs, and cats only that they differ in shape, size, and coverage area (either wider or narrower).

The pectoral muscle (Figure 1) of the Malayan Porcupine that lie on the ventral part of the thoracic and abdomen region which creates a 'v'-shaped structure is much bigger and more extensive in than in the cat. It covers the ventral portion of the thoracic and abdomen until the inguinal region. This muscle blends with the cutaneous muscle on the ventral abdominal portion. However in the cat, this muscle only covers the ventral thoracic region (Hudson and Hamilton, 1993).

The extensive cutaneous muscle is a thick superficial muscle that covers a wide area of the body (Figure 2). The function of the cutaneous muscle is to twitch itself and the skin. This twitching is a defense mechanism against annoying insects. The rapid cutaneous muscle contractions are also responsible for the shivering movement of the skin promoting a flow of warm blood to the body surface which is important when the animal is cold. The shivering movement of the skin raises the local temperature (Goody, 2005).

The dorsal and lateral part of M. cutaneus trunci contains attachment of cluster of quills. This explains why the cutaneous muscle is thick on the proximal part of the body. The thickness of the muscles is important for quill attachment. The thickness of the cutaneous muscle are about 2 mm on neck area, 4 mm on the thoracic area and 6 mm at the sacrum area and this muscle gets thinner at the extremities (muscular to membranous). This muscle

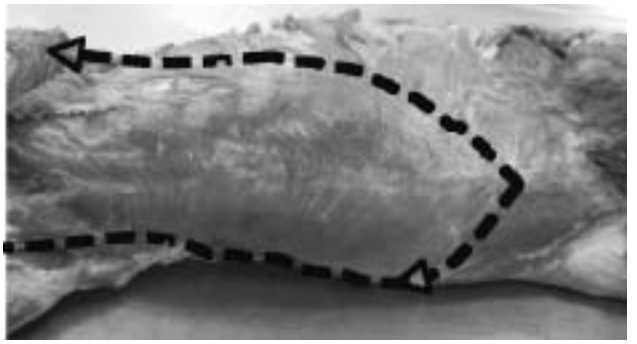


Figure 1: Ventral view of the extensive pectoral muscles of the Malayan Porcupine (Demarcated by broken line)

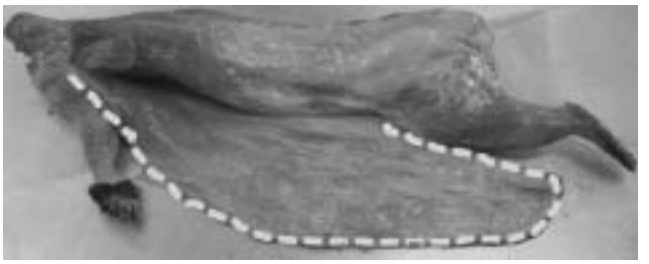


Figure 2: Dorso-lateral view of the cutaneous muscle that covers the whole body of the Porcupine (Demarcated by broken line)

Figure 3: Medial view of the coracobrachialis muscle at the thoracic limb in the Malayan Porcupine (Demarcated by broken line)

blends together with M. pectoral on the ventral abdomen and also with the second branch of M. latissimus dorsi.

The coracobrachialis muscle (Figure 3) in this Malayan Porcupine is elongated, thin and flat strand, whereas in the dog this muscle is short and fusiform in shape (Boyd, 2001). It originates from the coracoid process of scapula, runs along the distal third of the medial body of humerus and insert to the medial epicondyle. In rat (*Rattus norvegicus*), the M. coracobrachialis is thick and elongated. It originates from the coracoid process of the scapula, short head of biceps and insert to the medial humerus (Yu and Panduro, 2004).

Teres minor is a small muscle which lies deep to the deltoideus, but caudal to the infraspinatus muscle at the shoulder joint in dog (Getty, 1975). However, this muscle is absent in the Malayan Porcupine. There is a probability that this muscle has been attached to M. deltoideus or the M. infraspinatus which is the superficial layer of the M. teres minor. However, there is evidence of presence of the M. teres minor in the rat (*Rattus norvegicus*). Yu and Panduro (2004) showed that this muscle in rat originates from the axillary border of scapula and insert to the greater tubercle of humerus.

The sartorius muscle of porcupine is a thin, fleshy muscle lying anteriorly to the M. vastus lateralis. This muscle is closely attached to M. tensor fascia latae anteriorly and joint with the aponeurosis of the M. tensor fascia latae itself. There is no clear demarcation between the M. tensor facia latae and M. sartorius. However, this muscle still can be identified with the thin membranous aponeurosis of M. tensor fascia latae grossly.

Most mammals have the same basic muscular structure. However, the difference that occurs is respective to the posture and functional use in the animal. The differences in these muscles could be in the shape, size, and coverage area of the muscle and the muscular or membranous type of the muscles.

References

1. Boyd, J.S. and Peterson, C. (2001). Color Atlas of Clinical Anatomy of the Dog and Cat. 2nd Edition, Mosby International Ltd., pp15-212.

2. Getty, R. (1975). The Anatomy of the Domestics Animals. 5th Edition. Vol 2. W. B. Saunders Co., pp1523.

3. Goody, P.C. (2005). Dog Anatomy (A pictorial approach to canine structure). 1st Edition, Midas Printing International Ltd., pp 28-55.

4. Hudson, L.C. and Hamilton, W.P. (1993). Musculoskeletal system. In *Atlas of Feline Anatomy for Veterinarians*. 1st Edition, W.B. Saunders Co., Philadelphia. pp 24-75.

5. John, E. (2007). Out to promote meat. Spiky, cute…and on the menu soon. *News Strait Times Press*, 7 Oct 2007 (http://www.jphpk.gov.my/English/ Oct07%207a.htm). Accessed on 23.11.2007.

6. http://www.forestry.gov.my/forweb/wildlife/mgm/pa/3porc.htm)Malayan Porcupine. Accessed on 23.11.2007.

7. http://en.wikipedia.org/wiki/Porcupine. Porcupine, Accessed on 27.11.2007.

8. Yu, J.K. and Panduro, A. (2004). Shoulder and brachium of the rat (*Rattus norvegicus*) http://www.baa.duke.edu/companat/BAA_289L_2004/ Brachium /Rat /ratbrachium.htm. Accessed on 3.1.2008.

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 57-61

History of Exercise-Induced Pulmonary Hemorrhage (EIPH) and its Influence on Cytology of Bronchoalveolar lavage of Thoroughbred Racehorses

Teh Chew Peng, [1]Goh Yong Meng, [2]Shri Kanth & [2]Rebecca Tan
[1]Department of Veterinary Preclinical Sciences
Faculty of Veterinary Medicine, Universiti Putra Malaysia
[2]Equine Hospital Selangor Turf Club, Kuala Lumpur

Abstract

Exercise-Induced Pulmonary Hemorrhage (EIPH) represents a major problem in the horse-racing industry. Blood was observed to have originated from the lungs, especially the dorsocaudal portion of lung regions. This has severe financial implications in the horse-racing industry resulting from decreased performance, lost training days and banning of horses from racing. Seventeen Thoroughbred racehorses aged between 2 and 8 years in training underwent bronchoalveolar lavage (BAL) procedure. Samples collected for cytological examination of total and differential cell counts. Patient histories obtained included the horse's prior bleeding histories and the three most recent race placements which were obtained from their respective trainers and the Selangor Turf Club's medical records. Free erythrocytes and hemosiderophages were found in all the BAL samples, indicating a possibility of EIPH occurrence among the horses in the study. BAL fluid from horses with known bleeding histories (1790 ± 2539 x 10^{12}cells/L) contained significantly more hemosiderophages than samples from horses with unknown bleeding histories (237.5 ± 158.3 x 10^{12} cells/L). Horses with known bleeding histories had a higher percentage of neutrophils (28.6 ± 4.4%) and different macrophage counts (36.2 ± 5.1%) from those horses with unknown bleeding histories which were 20.4 ± 4.1% and 44.00 ± 8.23% respectively. In the present study, prior episodes of EIPH did affect the race performance of horses. Both the blood smear technique and "swirl" preparation are comparable and highly repeatable for neutrophil, eosinophil and macrophage counts but not for lymphocyte counts.

Keywords: EIPH, thoroughbred, BAL, cytology

Introduction

Respiratory diseases are the second most common diseases in the equine industry after musculoskeletal diseases (Hodgson, 2004). They are the common cause of poor performance, interruption of training, and premature retirement among racehorses.

Exercise-induced pulmonary hemorrhage (EIPH) represents a major problem in the horse-racing industry and horses that bled are usually known as "bleeder". It has major financial implications to the racing industry resulting from decreased performance, lost training days, necessity for prerace medication and banning of horses from racing (Smith, 1992). Blood was observed to have originated from the lungs, especially the dorsocaudal portion of lung

(O'Callaghan *et al*., 1987). Close to 100% of racehorses experienced at least one episode of pulmonary hemorrhage (Harkins and Tobin, 1995).

Exercise-induced pulmonary hemorrhage is commonly detected by fibreoptic endoscopy. Examination of tracheal wash and bronchoalveolar lavage (BAL) can help to support the occurrence of EIPH. Studies on the BAL have been described by Meyer *et al*., (1998), Fogarty (1990), McKane *et al*., (1993) and Sweeney *et al*., (1994). Fogarty and Buckley (1991) described that BAL provided a more accurate indication of the incidence and extent of EIPH than visual inspection.

In view of the importance and the lack of published reports on EIPH and its effects in horses in Malaysia, this study was formulated to: (i) investigate the BAL characteristics in horses with known and unknown bleeding histories, (ii) compare the racing performance between horses with known and unknown bleeding histories and (iii) compare the repeatability and conformance of blood smear technique and "swirl" preparation in differential cell counts of BAL samples.

Materials and Methods

Seventeen Thoroughbred horses from the Selangor Turf Club aged 2 to 8 years old were randomly selected and included in this trial. Histories obtained included the horse's age, gender, bleeding histories and race performance of the horses for the last six months. Out of 17 horses, five were known bleeders. All the horses underwent an incremental treadmill exercise test from 5 km/hr up to a maximum of 36 km/hr, which were then maintained for 10 min. Within 2 h post-exercise, BAL procedure was performed, where the horses were sedated using acepromazine (0.03 - 0.05 mg/kg bodyweight) and xylazine (0.88 - 1.1 mg/kg bodyweight) intravenously.

Bronchoalveolar lavage samples were processed on the day of collection. Total free erythrocytes and hemosiderophages were enumerated using the haemocytometer technique utilizing improved Neubauer Counting Grids. For differential cell counts, two different smear preparation techniques, the blood smear technique and "Swirl" preparation, were used and 200 cells from a representative area of Wright stained preparation were examined for neutrophils, eosinophils, lymphocytes and macrophages.

Datasets were compared across bleeding histories for possible differences in neutrophils, eosinophils, lymphocytes and macrophages percentage composition, as well as total free erythrocytes and hemosiderophages. The agreement, conformance and bias between the blood smear technique and "Swirl" preparation used for differential cell counts were compared using the Passing-Bablok regression technique. All statistical tests were conducted at 95% confidence level.

Results

The statistical differences in results from histories obtained from the trainers regarding the horse's three most recent race placements are shown in Table 1.

Table 1: Results of three most recent race placements

Bleeding Histories	Placement
Yes (n=5)	9.7 ± 3.9
No (n=12)	7.7 ± 3.7

All values are expressed as mean ± Std Dev.

The results of total cell counts and the differential cell counts using two different smear preparation techniques are presented in Tables 2, 3 and 4 respectively.

Table 2: Total cell counts for free erythrocytes and hemosiderophages

Bleeding Histories	Total free erythrocytes (10^{12}cells/L)	Total hemosiderophages (10^{12} cells/L)
Yes (n=5)	5580.0 ± 5534.6	1790.0 ± 2539.0
No (n=12)	1216.7 ± 940.6	237.5 ± 158.3

All values are expressed as mean ± Std Dev.

Table 3: Differential cell counts using Blood Smear technique

Bleeding Histories	Blood Smear Technique			
	Neutrophils	Lymphocytes	Eosinophils	Macrophages
Yes (n=5)	28.6 ± 4.4%	33.2 ± 6.0%	9.8 ± 2.6%	36.2 ± 5.1%
No (n=12)	20.4 ± 4.1%	26.4 ± 5.2%	10.2 ± 6.0%	44.0 ± 8.2%

All values are expressed as mean ± Std Dev.

Table 4: Differential cell counts using "Swirl" preparation

Bleeding History	"Swirl" preparation			
	Neutrophils	Lymphocytes	Eosinophils	Macrophages
Yes (n=5)	31.0 ± 8.9%	31.0 ± 11.3%	10.6 ± 3.5%	34.2 ± 4.9%
No (n=12)	20.3 ± 6.2%	25.0 ± 7.4%	8.7 ± 6.3%	45.4 ± 8.6%

All values are expressed as mean ± Std Dev.

Both the swirl preparation and blood smear technique used are comparable and highly repeatable for neutrophil, eosinophil and macrophage counts but not for lymphocyte counts.

Discussion

All the BAL samples from the seventeen horses in the study were found to contain free erythrocytes and hemosiderophages, indicating a possibility of EIPH occurrence among them. Horses will have episodes of EIPH if they are exercised fast and the effect of low-grade EIPH on performance is not readily detectable (McKane *et al*., 1993).

If a horse has bled, alveolar macrophages were involved in engulfing erythrocytes in order to clear the blood from the lungs and most horses clear the alveolar macrophages very slowly from the lungs. Thus, hemosiderophages fraction in BAL fluid is an important indicator of pulmonary hemorrhage (McKane *et al*., 1993)

Increased percentages of neutrophils and macrophages are indicators of significant lung damage. Intrapulmonary blood may cause adverse changes in the health of the lung in several ways. The most obvious is that blood provides an excellent medium for the growth of bacteria within the lower airways, perhaps predisposing racehorses to lower airways diseases and subsequent episodes of EIPH

Exercise-induced pulmonary hemorrhage impacted the racing performance of horses in the present study negatively. Blood itself causes a modest but long standing inflammatory reaction within alveoli and small bronchi, which can impair pulmonary gas-exchange (Slocombe and McKane, 2000). As healing occurs, scar tissues formed will interfere with the expansion and contraction of lungs, thus reduce the aerobic capacity of horses during intense exercise and decreasing the likelihood of winning races.

Bias has been detected only in lymphocyte counts whereby the "Swirl" preparation underestimates the number of cell counts compared to blood smear technique. This is likely due to inherent features of the technique itself.

Conclusion

In conclusion, horses with known bleeding histories had different BAL findings with high neutrophil and hemosiderophages counts and different macrophage counts from those with unknown bleeding histories. In the present study, prior episodes of EIPH did affect the racing performance of horses. Both swirl preparation and blood smear technique used are comparable and highly repeatable for neutrophil, eosinophil and macrophage counts but not for lymphocyte counts.

References

1. Hodgson, D.R. (2004). Equine Exercise Physiology. Distance Education Program. Post Graduate Foundation. The University of Sydney.

2. Harkins, J.D. and Tobin, T. (1995). Racing horses, nitroglycerin and exercise induced pulmonary hemorrhage (EIPH). *Equine Vet J* **27**:240-241.

3. O'Callaghan, M.W., Pascoe, J.R. and Tyler, W.S. (1987). Exercise-induced pulmonary hemorrhage in he horse: results of detailed clinical, post mortem and imaging study. V. Microscopic observations. *Equine Vet J* **19**: 411-418.

4. McKane, S.A., Canfield, P.J. and Rose, R.J. (1993). Equine bronchoalveolar lavage cytology: survey of Thoroughbred racehorses in training. *Australian Vet J* **70**:401-404.

5. Meyer, T.S., Fedde, M.R., Gaughan, E.M., Langsetmo, I. and Erickson, H.H. (1998). Quantification of exercise-induced pulmonary haemorrhages with bronchoalveolar lavage. *Equine Vet J* **30**:284-288.

6. Smith, J.D. (1992). Exercise-induced pulmonary hemorrhage findings, part 1. *Equine Pract* **14**:19-25.

7. Fogarty, U. (1990). Evaluation of a bronchoalveolar lavage technique. *Equine Vet J* **22**:174-176.

8. Fogarty, U. and Buckley, T. (1991). Bronchoalveolar lavage findings in horses with exercise intolerance. *Equine Vet J* **23**:434-437.

9. Sweeney, C.R., Rossier, Y., Ziemer, E.L. and Lindborg, S.R. (1994). Effect of prior lavage on bronchoalveolar lavage fluid cell population of lavaged and unlavaged lung segments in horses. *Am J Vet Res* **55**:1501-1504.

10. Slocombe, R.F. and McKane, S. (2000). Bleeding in Racehorses. Rural Industries Research and Development Corporation Publication No 99/168.

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 62-66

Morphological Description of the Malaysian Spotted Dove (*Streptopelia chinensis)* of Peninsular Malaysia

Goh Bee Yen, [1]Shaik Mohamed Amin Babjee & [2]Jalila Abu
[1]Department of Veterinary Pathology and Microbiology
[2]Department of Veterinary Clinical Studies
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Fifty trapped wild adult spotted doves from the state of Pahang, Malaysia were used to study the external morphology and the subspecies in Malaysia. The body measurements included the body weight, wingspan, body length, tail length, bill length and tarsus length. Plumage color description included the description of color of various parts, pattern of plumage and the number of tail and wing feathers of fully-feathered birds. The subspecies of spotted dove was confirmed to be *Streptopelia chinensis tigrina,* based on its brown with black streak wing covert and white or grayish-yellow undertail covert. The dove has a small purplish-grey head, strong orange iris, basally black and white spotted patch at the neck, brownish upper part, pale purple underpart, 12 long tail-feather, short deep red feet, short black bill and claws. The body weight is 128.12 ± 7.9 g, body length is 298.52 ± 11 mm, and wing span is 188.12 ± 17.62 mm. The color of the trunk, wing and tail feather seemed to vary among to the birds studied.

Keywords: spotted dove, *Streptopelia chinensis trigrina*, external morphology, plumage color, body measurement.

Introduction

The spotted dove (*Streptopelia chinensis*), also known as the spotted turtle dove, is a pigeon of the tropical southern Asia from India and Sri Lanka east to south China and Southeast Asia. In Malay, the spotted dove is known as tekukur
or balam.

The spotted dove is a long-tailed, slim pigeon, weighing about 128 g with body length of about 27 to 30 cm. The white spot patch on the neck is the distinctive feature of the adult. The back and the wing are brown in color. The feet are anisodactyl. The underpart is pinkish in color (del Hoyo *et al*., 1997). Sexes are similar. The call of the dove is a low and gentle *coo-coo-croo,* with the emphasis on last note. The call is occasionally "*coo-coo krroo, krook!"*

There are three recognized subspecies, which is *Streptopelia chinensis suratensis, Streptopelia chinensis chinensis* and *Streptopelia chinensis tigrina.* The subspecies *Streptopelia chinensis chinensis* are mainly found in Taiwan, Hainan, China and Southeast Asia. This subspecies also had been introduced to Australia, New Zealand and USA. The

subspecies *Streptopelia chinensis tigrina* originated from Southeast Asia, and it had been introduced to USA, New Zealand and Australia.

Most studies on the spotted dove were done in Australia, negligible in Malaysia and Southeast Asia. These studies were only on the morphology and breeding habits on the bird. Currently, it is not very clear as to which subspecies the Malaysia spotted dove belongs to, since detailed description of this bird has never been attempted.

Thus, the main objectives of this study are to determine the subspecies of the spotted dove of Penisular Malaysia and to describe the morphology of the spotted dove.

Materials and Methods

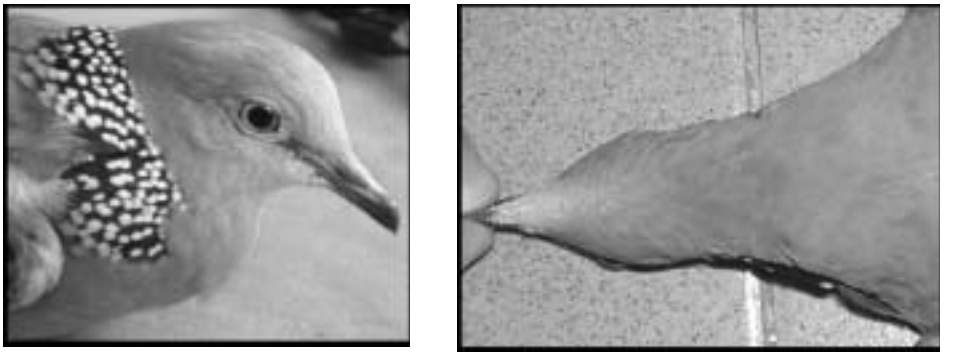
Fifty trapped wild adult spotted doves from the Pahang, Malaysia were used in this study. Each bird was subjected to plumage color determination and body measurement. The plumage color description of the spotted dove includes 6 body parts; head, neck, trunk, wing, tail, leg and feet. The color and pattern of the feathers and the number of the feathers of the wing and tail were determined in the fully-feathered birds. The color descriptions of the each part of the birds were referred to the 267 NBS centroid colors charts. The body measurements included the body weight, body length, wing span, bill length, tarsus length and tail length. To weigh the bird, it was placed into a small net sack, and weigh on the digital balance scale using the following formula:

Weight = total weight – weight of net sack

The body length is the length from the tip of the bill to the tip of the longest tail feather. The body length was obtained by placing the bird flat on its back and gently stretching, while making the measurement. The tail length is from the tip of the longest rectrix to the point between the middle retrices where they emerged from the skin. The bill length is from the end-edge of the bill to tip of upper mandible. The tarsus length is from the point of the joint between the tibia metarsus to the point of the joint at the base of the middle toe in front. Both measurements were made with a digital caliper. The wing span is the distance between the body and the outer tips of the wing and determined using a measuring tape.

Results and Discussion

All birds show relatively small purplish-grey head, strong orange iris, purplish-red at the eyelid and narrow bare orbital patch, grayish white chin, and short black bill. All birds show pale purple neck covered with a patch basally black and small white spot. This is a typical and characteristic morphological feature for spotted dove (Figure 1).



(a) (b)

Figure 1: The head of spotted dove

From the upper part of the trunk, the back is dark grayish-brown. Twenty birds have black streak as shown in Figure 1 (a). Four birds have feather tipped with light olive color [Figure 1 (b)]. Sixteen birds have black streak and feather tipped with light olive color. The rump is dark grayish-brown. Thirty-five birds showed black streaks, while fifteen did not. At the under part, the breast is pale purple. Thirty-eight birds had grayish-yellow abdomen, but in 12 birds the abdomen are pale purple anteriorly, grayish-yellow posteriorly. The side of body and flank dark bluish-grey. The vent is grayish-yellow (Figure 2).

Figure 2: The body of the spotted dove

The spotted dove has 10 primary with 10 to 12 secondary and 3 alular feathers. The primary feather is brownish-black. The secondary feather is brownish-black laterally and yellowish-brown medially. The secondary and alular feather showed color variations, which is brownish-black with or without a narrow white line at the outer edge of feathers. The

crown is yellowish-brown with black streak and tipped with light olive color. The greater primary wing covert is brownish-black. The outer half of the greater secondary wing covert feathers is white and the dull brownish-black and yellowish-brown medially. The outer side of the median and lesser wing covert is white, and tends to become yellowish-brown with black streaks medially. On the underside of wing, the greater covert is brownish-black. The median wing covert is black. The lesser covert and axillaries are dark bluish-grey (Figure 3).

Figure 3: The wing of the spotted dove

The spotted dove has 12 tail feathers. They show 3 black feathers tipped with white patches, 1 black feather tipped with moderate gray patch, 1 black feather and 1 dark grayish brown feather at the both lateral side. The upper tail covert is dark grayish-brown. For under tail covert, 11 birds show white, 11 birds show grayish-yellow and 28 of birds show white and grayish-yellow color (Figure 4).

Figure 4: The tail of the spotted dove

Figure 5: The legs and feet of the spotted dove

The spotted dove's feet are of anisodactyl type. The tarsus and toes are deep red and the claws are black (Figure 5).

The body measurement of the birds (mean ± SD) - the body length was 298.52 ± 11 mm; body weight was 128.12 ± 7.9 g, bill length was 16.19 ±1.98 mm, wing span was 188.12 ± 17.62 mm, tail length is 133.56 ± 10.03 mm and tarsus length is 22.53 ± 1.97 mm. The results are generally similar to that obtained in a previous study (Frith, 1982). However, the tarsus length in the present study is slight smaller than that reported earlier. Currently, there is no report on the wingspan, body, and tail and bill lengths of the spotted dove. This study is a first record of these data. The range for the body length, wing span, tail length and tarsus length of the spotted dove showed great variation.

The spotted doves of the Peninsular Malaysia are of the subspecies *Streptopelia chinensis tigrina*. This subspecies *Streptopelia chinensis chinensis* shows dark blue-grey color on the front of wing, grey to dark grey on undertail covert and brown wing covert with no black streak. The subspecies *Streptopelia chinensis chinensis* is larger than subspecies *Streptopelia chinensis tigrinas.* The subspecies tigrinas show light grey in the front of the wing, white or light yellowish grey undertail covert and yellowish-brown wing covert with a black streak on the center of the feathers. The subspecies *Streptopelia chinensis suratensis* is smaller than subspecies *Streptopelia chinensis tigrina*. This subspecies differs from other 2 subspecies in shading, that is cream on the back and wing coverts are spotted with black and mauve-pink.

References

1. Del Hoyo, J., Elliot, A. and Sargatal, A. (eds) (1997). Family Columbidae (pigeon) In Handbook of the Birds of the World. Vol 4. Lynx Ediciones.

2. Frith, H.J. (1982). Pigeon and Doves of Australia. 1st Edition, Rigby Publishers.

Investigation of Trypanosomiasis at a Deer Farm in Lenggong, Perak, Malaysia

Adrian Syril Motiung & [1]Rehana Abdullah Sani
[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

In March 2006, a deer farm in Lenggong, Perak reported the death of 17 adult female *Cervus timorensis russa* deer, aged between 12 to 13 years old, which occurred within a week. During that period, 8 out of 28 blood samples were found positive for *Trypanosoma evansi*. Therefore, an investigation on trypanosomiasis outbreak that could have occurred during the period of March 2006 to October 2007 was conducted to determine the prevalence of trypanosomes in that farm. The outbreak investigation was done by communicating with farm personnel and also examination of farm records. Blood samples were collected from the jugular vein of 100 Timorensis deer comprising 30 adult males, 30 young males and 40 young female deer. The blood samples were then subjected to thin blood film, wet blood mount and haematocrit centrifugation technique (HCT). The presence of antibody against *T. evansi* was detected in serum using the *CATT/T.evansi* test kit. The farm records showed that trypanosomiasis outbreaks had occurred in the farm during the period of March 2006 to October 2007. Mortality among females was three times higher than males. Deer aged more than 2 years old were 18 times more likely to die due to trypanosomiasis compared to deer aged less than 6 months. However, deer of all ages and sex were equally susceptible to trypanosomiasis. Trypanosomes prevalence in the farm based on the HCT was 23% and seroprevalence was 78%. Males were three times more likely to have antibodies against *T. evansi* compared to females. Animals positive for antibodies against *T. evansi* showed significantly ($p<0.05$) lower PCV than animals negative for antibodies against *T. evansi*. The HCT employed in this study detected the most number of samples with trypanosomes. The CATT/*T.evansi* test kit was reliable and had shown that 22 out of 23 animals were positive for trypanosomes.

Key words: outbreak, prevalence, *Trypanosoma evansi*, trypanosomiasis

Detection of Avian Metapneumovirus Field infection via Reverse Transcriptase Polymerase Chain Reaction and ELISA in two Layer Farms in Johor, Malaysia

Alfred Lim Aik Sunn,
[1]Jalila Abu, [3]Choo Pow Yoon & [2]Goh Yong Meng
[1] Department of Veterinary Clinical Studies
[2]Department of Preclinical Sciences
Faculty of Veterinary Medicine, Universiti Putra Malaysia
[3]Vet Food Agro Diagnostics (M) Sdn. Bhd.

Abstract

Avian Metapneumovirus (AMPV) infection, which is often related to 'swollen head syndrome', has been shown to be prevalent in poultry farms in Malaysia. Two layer farms in Johor, denoted as Farm A and Farm B with previous histories of AMPV disease outbreaks were the subjects used for the AMPV field investigation in this study. Thirty chicks from respective treatment groups were monitored at day old, two, four and six weeks of age for AMPV antibody and antigen detection. AMPV field infection was observed to occur at 2 weeks of age in Farm A by RT-PCR. In Farm B, ELISA serology and RT-PCR for AMPV showed that at two weeks of age, field AMPV infection or lateral spread of AMPV vaccine virus, which requires confirmation by gene sequencing, had occurred. AMPV seroconversion was generally observed at four weeks of age and AMPV subtypes A and B were detected via RT-PCR from both farms in this study. This is the first report of AMPV Subtypes A and B by RT-PCR detection in Malaysia.

Keywords: AMPV Subtypes A and B, ELISA, RT-PCR, layer farm

Effect of Vitamin B12 (Mecobalamin) on Bone Loss in Adult Ovariectomised Osteoporosis Rats

Angeline Teh Ping Ping, [1]Rashid Bin Ibrahim & [2]Tengku Azmi Tengku Ibrahim
[1]Department of Veterinary Clinical Studies
[2]Department of Preclinical Science
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

This study was designed to assess the effect of vitamin B_{12} (mecobalamin) on bone morphology of ovariectomised (OVX) rat model with postmenopausal osteoporosis. Fifteen 7- to 8-month old female Sprague-Dawley rats were randomly divided into 3 groups (n=5): (1) OVX (control), (2) OVX plus 155 μg/kg of B_{12} (normal dose) and (3) OVX plus 310 μg/kg of B_{12} (high dose). Five weeks after treatment, the rats were euthanized and their long bones (tibia and femur) collected and processed for light and scanning electron microscope. The histology of the proximal end of the tibiae was observed under light microscope and histomorphometry was done to measure the trabecular bone thickness using the image analyzer. The left distal end of femur was examined under the scanning electron microscope. Restoration of bone trabeculae both in the epiphysis and metaphysis in treated groups were most pronounced. Trabeculae bone length and width were significantly ($p<0.05$) reduced in the control. There was no significant difference ($p>0.05$) in the extend of restoration of bone trabeculae at normal or high dose. The light microscopic observation were further augmented when restoration of bone trabecular were observed under the scanning electron microscope. From the present morphological and morphometric studies, there is evidence to prove that B_{12} supplementation could alleviate osteoporosis in rats.

Keywords: ovariectomy, osteoporosis, vitamin $B_{12,}$ mecobalamin, scanning electron microscopy, trabeculae bone

Serological Prevalence of Leptospirosis in Cattle in Pahang, Malaysia

Azita Hanim Hashim Ghani, [1]Siti Khairani Bejo & Abdul Rani Bahaman
[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

This study was conducted to determine the prevalence of leptospirosis in cattle in Pahang, Malaysia. Leptospirosis is recognized as an important zoonosis in Malaysia and also the cause of losses in animal production. Pahang is the largest state in peninsular Malaysia and known to be the highest cattle producer in Malaysia. There are about 151,000 cattle in Pahang. This study was aimed to reveal the current serological prevalence of leptospirosis in cattle in Pahang. One hundred blood samples were randomly collected by coccygeal venipunture from 2-year old cattle in several districts. The sera were examined for leptospiral antibodies based on two standard serological methods, namely Microscopic Agglutination Test (MAT) and Enzyme-Linked immunosorbent Assay (ELISA). All 662 serum samples tested negative with MAT and ELISA. Results from this study indicated that cattle in Pahang were probably free from leptospirosis. This may be due to good management of the herd and good biosecurity in the farm which helped to eliminate the disease and the source of infection. However, there are several factors that may have also affected the result of the study such as the interpretation of serological data, including the technique employed, serogroup involved, chronological order of the samples taken during the illness and the antibiotic treatment given, age and stage of infection.

Keywords: MAT, ELISA, Leptospirosis, cattle, Pahang

Plasma Fatty Acid Profiles and Hair Coat Condition of Captive and Semi-captive Orangutans in Malaysia

Chan Lee Suan, [1] Rasedee Abdullah & [2]Goh Yong Meng
[1]Department of Veterinary Pathology and Microbiology,
[2]Department of Veterinary Preclinical Sciences,
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

This study was conducted on 14 Borneon orangutans *(Pongo pygmaeus)* and 1 Sumatran orangutan *(Pongo abelii)* of both sexes and various ages at the National Zoo of Malaysia (NZM), Kuala Lumpur, and the Sepilok Orangutan Rehabilitation Center (SOURC), Sandakan. Blood samples were collected from these orangutans for plasma fatty acid analysis while feed samples from each location were collected for dietary fatty acid determination. The total lipids were extracted using the Folch method and methylated using 14% boron triflouride. The fatty acid methyl esters were separated by capillary column gas-liquid chromatography and the fatty acid quantified both as absolute amounts and as percentage of total fatty acids. Hair coat condition were scored using a four-point scoring system (1 = worst hair coat condition; 4 = best hair coat condition). It was found that the blood fatty acid composition of orangutans in this study comprised predominantly of even-chained fatty acids. Oleic acid and palmitic acid were the predominant fatty acids in plasma and feed samples. The plasma linolenic acid (18:3, n-3) or omega-3 concentration in captive orangutans was significantly lower ($p<0.05$) than in semi-captive orangutans. The lower plasma omega-3 fatty acids concentration in the captive orantutans is thought to be the result of restricted access to the dietary sources of omega-3 fatty acid. Feeds offered to the orangutans under captivity were higher in saturated fatty acid content. This may "potentially" increase the cholesterol level in the body, increasing the risk of coronary artery disease among the captive orangutans. Omega-3 fatty acid levels were observed to be inversely related to the average hair coat scores whereas the ratio of omega-6: omega-3 had direct correlation with the average hair coat scores.

Keywords: Orangutan, fatty acids, hair coat score

Parasite Fauna of Wild and Farmed Anurans in Selangor

Felix Wong Sze Jin & [1]Reuben Sharma
[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Fifty-three anurans were collected from various locations in the state of Selangor and examined for helminth and protozoan parasites. The samples included two species of wild frogs (*Fejervarya limnocharis* and *Fejervarya cancrivora*), one species of farmed frog (*Lithobates catesbeianus*) and two species of wild toads (*Bufo melanostictus* and *Kaloula pulchra*). A total of 10 species of nematodes, three species of trematodes, one cestodes, one pentastomid, one acathoncephala and four species of protozoa were retrieved from the anurans collectively. The helminth component community comprised one Cosmocercidae sp. (gastrointestinal tract), three *Rhabdias* spp. (lungs), *Falcaustra* sp. (stomach and small intestine), *Amplicaecum* sp. (small intestine), two *Oswaldocruzia* spp. (small intestine), an unidentified encysted nematode larva (outer wall of the stomach), *Glypthelmins* sp (large intestine), digenean sp. 1 (small intestine), digenean sp. 2 (large intestine), an unidentified cestode (large intestine), *Raillietiella rileyi* (lungs), and one acanthocephala (small intestine). The protozoan fauna infecting the anurans include *Opalina* sp. (large intestine), *Haemogregarina* sp. (blood), *Hemoproteus* sp. (blood) and *Hepatozoon* sp. (blood). The farmed frog (*L. catesbeianus*) was free from most parasites except for the commensal intestinal protozoa (*Opalina* sp.) with a prevalence rate of 22%. In contrast, *B. melanostictus* had the highest diversity (6 species) of parasites. All the anurans examined were free of the zoonotic Spargana cestode (*Spirometra* sp.). The highest overall prevalence was exhibited by the intestinal protozoa, *Opalina* sp. (64%) which infected all *F. cancrivora*, followed by Cosmocercidae sp. (32.8%) which established infection in 73.3% of *K. pulchra.* The least prevalent parasite was *Falcaustra* sp (6.6%) and the unidentified nematode larva encysted in the outer stomach walls (6.6%). The diversity and prevalence of parasites in the anurans examined were related to host ecology and habitat. Host species which exhibited plasticity in habitat and dietary preferences like *B. melanostictus* and *F. limnocharis* had the richest parasite assemblages.

Keywords: Anurans, parasites, protozoa, helminthes, diversity, prevalence, Selangor

Comparison of Blood Counts and Cell Morphology of Canine Capillary and Venous Blood

Goh Chan Foong, [1]Habibah Arshad & [2]Hazilawati Hamzah
[1]Department of Veterinary Clinical Studies
[2]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

The main objective of this study was to compare canine capillary and venous blood hematology parameters by investigating the similarities and/or differences in terms of blood counts [pack cell volume (PCV), estimated total leucocyte, relative differential leucocyte and platelet counts] and cell morphology (anisocytosis and polychromasia in erythrocytes; degenerative neutrophils). Fifty-five dogs were sampled from UVH of UPM, DBKL, PAWS and SPCA. For each dog, capillary blood samples (heparinized microhematocrit and blood smear) were collected from ear prick. Venous blood obtained from cephalic venipuncture was first preserved in ethylenediaminetetraacetic acid (EDTA) tube. No significant differences were found in platelet count, relative segmented and band neutrophils, relative lymphocytes, polychromasia and degenerative neutrophils between capillary and venous blood. However, the PCV (47.3%, 40.7%), relative monocytes (2.3%, 3.6%) and eosinophils (4.6%, 6.9%), estimated total leucocyte count (15.8 10^9/L, 13.3 10^9/L) and anisosytosis (0.51, 0.36) showed significant differences between blood obtained from the capillaries and veins. Precaution should be taken in interpreting peripheral blood film using capillary blood or ear tip smear (ETS). It is still recommended to be used in evaluating patient's health status as it is vital in detecting cell morphology changes.

Keywords: canine, capillary and venous blood, blood counts, cell morphology, blood smear, ear tip smear

Effect of Recombinant Human Erythropoietin on a Canine Mammary Tumour Cell Line under Normoxic and Hypoxic Conditions

Goh Shwu Hwei, [1]Rasedee Abdullah & [2]Teo Guan Young
[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine
[2]Institute of Bioscience
Universiti Putra Malaysia

Abstract

Erythropoietin (EPO) has been long known for its erythropoietic action through the binding to erythropoietin receptor (EPOR). This EPOR was thought to be only expressed on the surfaces of the erythroid progenitor cells. It was only recently that EPOR was found to occur in vascular endothelium, smooth muscle cells, skeletal myoblasts, liver stromal cells, placenta, kidney, macrophages and breast cancer cell lines. The canine mammary gland tumour identified expresses EPOR. This has lead to the uncertainty on the safety of recombinant human erythropoietin (rHuEPO) therapy in canine mammary tumour. In this study, the effects of rHuEPO were tested on the CMT-stylo primary cell culture (canine mammary gland tumour cells) at concentrations of 0, 2, 4, 8 and 16 IU/mL under normoxia (0 μg/mL $CoCl_2$) and hypoxia (2, 4, 8, 16 and 32 μg/mL $CoCl_2$). At all levels of hypoxia, there was an increase of viable cells. Treatment with rHuEPO, however, showed overall decrease in viable cells. The decrease in viable cells was due to increase in cells at the resting phase. There was a greater decrease in viable cells under hypoxia than under normoxia, especially at doses of 4 and 8 IU/mL rHuEPO. This was due to the greater cells expression of more EPOR in CMT-stylo cells under hypoxic than in normoxic condition. Based on the results, rHuEPO did not play a role in the proliferation of CMT-stylo cells. The decrease of viable cells was due to increase in cells at resting phase. The cause of increase in EPOR expression under hypoxia is currently unknown. It is still too early to deem rHuEPO safe or unsafe to be used in the treatment of canine mammary gland tumour-related anemia.

Keywords: Canine mammary gland tumour, recombinant human erythropoietin, normoxia, hypoxia

A Retrospective Study of Feline Leukemia-tested Cats in a Private Veterinary Clinic in Shah Alam, Selangor, Malaysia

Hii Yi Yi, [1]Nadzariah Cheng Abdullah & [2]Goh Yong Meng

[1]Department of Veterinary Clinical Studies
[2]Department of Veterinary Preclinical Sciences
Faculty of Veterinary Medicine
Universiti Putra Malaysia

Abstract

A retrospective study was carried out to determine the occurrence rate of Feline Leukemia Virus (FeLV) in a private veterinary clinic in Shah Alam, Selangor, Malaysia, to determine the risk factors, clinical signs, special features and the outcomes in FeLV-positive cats. Data between year 2003 and 2007 for cats tested for FeLV were retrieved and collated from the medical records of this clinic on variables, to include date of FeLV test, breed, age, sex, health status, presenting clinical signs and the status of Feline Immunodeficiency Virus (FIV) infection. The occurrence rate of FeLV infection was 42% in the 110 cats tested for FeLV. The significant risk factors in this study were cats that are less than 4 years old, male and domestic-short-haired. More of the FeLV-positive cats (52.6%) were sick at the time of testing compared to the FeLV-negative cats (17.6%). The more common clinical signs exhibited by FeLV-positive cats were abscess (30.4%), inappetance (28.3%), lymphadenopathy (15.2%), and mouth ulcer (13%). Only 30 owners of the 46 FeLV-positive cats could be contacted for follow-up. Twenty-two cats died within a year of FeLV diagnosis, 1 cat was euthanized and 7 remained healthy. Since this study only included 1.8% of the 6000 cats presented to this clinic, data on the other 6000 cats need to be collated to determine if the risk factors seen in this study merely represent the clinic population or are unique for FeLV-infected cats.

Keywords: Feline Leukemia virus, cats, Malaysia, retrospective study

Sex Determination in African and Rockhopper Penguins by DNA Analysis and Morphometric Measurements

Hwang Chung Chew, [1]Rosnina Yusoff, [1]Jalila Abu & Tan Ching Giap
[1]Department of Veterinary Clinical Studies,
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Penguins, like most seabirds, are considered sexually monomorphic. Although males are usually larger than females, sexing by direct observation and cloacal examination may be difficult, especially in penguin chicks. In this study, the sex of 28 African and 19 Rockhopper penguins from Underwater World Langkawi was determined based on PCR through genomic DNA. Primer set, P2 and P8 designed to sex most birds were used in this rapid, reliable and convenient sexing procedure for African and Rockhopper penguins. Blood samples collected on FTA® cards were more convenient and yielded more consistent results in contrast to heparinized blood samples. Additionally, the most reliable morphometric measurements for sexing adults and chicks were also obtained. Bill length, bill depth, flipper length, foot length and skull length were significantly longer in male adult African penguins compared with females whereas male adult Rockhopper penguins are heavier and have longer bill length, bill depth and skull length in contrast to the opposite gender. Among African penguin chicks, body weight, flipper length and foot length were significantly different between males and females. However, body weight should not be used in sexing penguins due to its variability across seasons. Although biometric approaches could be useful for non-invasive sex determination in penguins, only molecular procedures proved to be 100% accurate in identifying the two sexes, with a drop of blood on FTA® card being the best blood collection method.

Keywords: African penguin, Rockhopper penguin, sex determination, CHD-W, CHD-Z, PCR, morphometric measurements

Phyllanthus spp. Attenuates Gentamicin-induced Renal Damage in Rats

Johaimi Johari, [1]Hazilawati Hamzah, [2]Mohd Rosly Shaari & [1]Rasedee Abdullah
[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia
[2]MARDI, Serdang, Selangor, Malaysia

Abstract

Kidneys are one of the vital organs in our body. Kidney damage can result from toxins that will lead to renal failure. There are several remedies that can be used to treat renal damage and they comprise of modern and traditional treatments. Example of a plant that is commonly used as a traditional remedy is *Phyllanthus* spp. Few studies have been conducted to examine the effects of *Phyllanthus* on acute renal failure (ARF). The present study was conducted to examine the protective effects of *Phylllanthus* in minimising and ameliorating healing on acute renal damage. Twenty-four female Sprague Dawley rats were divided into four groups; the non-treated control (Cx), *Phyllanthus* (Phyll) treated, gentamicin (Ab) treated and gentamicin plus *Phyllanthus* (Ab+Phyll) treated groups. Freeze-dried *Phyllanthus* plants were ground into powder and mixed with a commercial rat pellet. This mixed feed was fed to Phyll and Ab+Phyll groups at 5 g/kg body weight throughout the experimental period while the Cx and the Ab groups were fed only commercial rat pellets. Rats in the Ab and Ab+Phyll groups were given gentamicin at 100 mg/kg body weight, intraperitoneally (i.p), for five consecutive days beginning day 1. All the rats were sacrificed at day 12. Blood, urine, kidney and liver samples were collected for appropriate analyses. Results obtained in this study showed that *Phyllanthus* proved to reduce the effects of gentamicin-induced ARF in rats by lowering the blood urea nitrogen (BUN) and serum creatinine concentrations, minimised polyuria, proteinuria and renal tubular epithelial cells damage, and improved excretion of endogenous creatinine through the kidneys. It also reduced the peripheral DNA damage analysed via Comet assay. The protective and/or ameliorate healing effects were further confirmed by decreased microscopic renal tubular damage. This study showed *Phyllanthus* has protective effects on gentamicin-induced ARF in rats and ameliorate healing of the renal tubular damage.

Keywords: acute renal failure, gentamicin, *Phyllanthus* spp., haemogram, serum biochemistry, renal lesion, Comet assay.

3rd Proceedings of the Seminar on Veterinary Sciences, 7 - 11 January 2008: 1-8

Detection Rate of *Staphyloccus aureus* and *Bacillus cereus* from Raw Milk Samples at Milk Collecting Centres in Selangor, Malaysia

Ketty Goh Siew Lin, [1]Latiffah Hassan & [1]Siti Khairani Bejo
[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Fourteen dairy cattle milk samples were collected from Banting and Sepang Milk Collecting Center (MCC) in Selangor. Ten milliliter of raw milk sample was pipetted out from different depths of the milk churns before the milk was mixed with the milk bulk tank. Samples were kept in the icebox and brought to the Bacteriology Laboratory and Public Health Laboratory, Faculty of Veterinary Medicine, Universiti Putra Malaysia. Isolation and identification of *Staphylococcus aureus* and *Bacillus cereus* were conducted using conventional methods. The enumeration of *S. aureus* was conducted using 3M™ Petrifilm™ Staph Express Count System which consists of a Petrifilm Staph Express Count Plate and a Petrifilm Staph Express Disk. The enumeration of *B. cereus* was conducted using *Bacillus cereus* Selective Agar. The results showed that 100% of the milk samples were contaminated with *S. aureus* and 50% contaminated with *B. cereus*. There was no significant difference ($p>0.05$) in mean organism counts between raw milk samples from Banting and Sepang MCC and there was also no significant difference ($p>0.05$) in mean organism counts between raw milk from hand- and machine-milking systems. Since there is no standard guideline for number of pathogens in raw milk, the Vermont Cheese Council 2007 and Food Standards Australia New Zealand Act 1991 were adopted. With the Vermont Cheese Council 2007 as guideline, more than 57% of the raw milk samples exceeded 2000 *S. aureus* cfu/mL. High level of milk contamination with *S. aureus* may result in the production of a large amount of thermostable staphylococcal enterotoxin thus leading to Staphylococcal food poisoning in humans. Using the Food Standards Australia New Zealand Act 1991 as guideline, more than 28% of the raw milk samples exceeded 10^3 *B. cereus* cfu/g. However, no raw milk sample had exceeded 10^5 viable cells/mL, thus minimising the probability of *B. cereus* food poisoning to humans.

Keyword: raw milk, *Staphylococcus aureus, Bacillus cereus*, milk collecting center

Methicillin-resistant *Staphylococcus aureus* in Pigs

Khairina Akmar Khalid, [1]Zunita Zakaria & [2]Ooi Peck Toung
[1]Department of Veterinary Pathology and Microbiology,
[2]Department of Veterinary Clinical Studies,
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a major pathogen in human as well as animal hospitals. In this study, a conventional technique of isolation and identification was used which include catalase and coagulase tests. Detection of MRSA was made using Oxacillin Resistance Screening Agar Base (ORSAB). A total of 100 nasal swab samples were collected from four- to five-weeks old piglets from five pig farms around Perak and Selangor. Three hundred *Staphylococcus spp*. isolates were obtained from the 100 samples. Among those identified as *Staphylococcus spp*., 123 isolates (41.0%) were *Staphylococcus aureus*. Three (2.4%) MRSA were isolated. This preliminary study indicates that MRSA could be an emerging pathogen in pigs in Malaysia. It is also of concern that 36.6% of the *S. aureus* isolated were multiresistant. Therefore, preventive measures must be taken since MRSA can be transmissible from pigs to human.

Keyword: Methicillin-resistant *Staphylococcus aureus* (MRSA), *Staphylococcus aureus*, pigs.

Molecular Markers in Canine Mammary Gland Tumor and Their Prognostic and Therapeutic Values

Ku Chi Ling, [1]Rasedee Abdullah & [2]Teo Guan Young
[1]Department of Veterinary Pathology and Microbiology
Faculty of VeterinaryMedicine
[2]Institute of Bioscience
Universiti Putra Malaysia

Abstract

Canine mammary gland tumor (CMT) is known to be a cluster of molecular syndromes. This study aims to detect the presence of ten molecular markers in a canine CMT biopsy and correlate with prognostic and targeted therapeutic significance. The chosen markers were canine cytokeratin 8 (Cyto8), hypoxanthine ribosyltransferase (HPRT), estrogen receptor (ER), progesterone receptor (PgR), vascular endothelial growth factor (VEGF), human epidermal growth factor receptor (HER2), hypoxia-inducing factor 1± (HIF-1±), B-cell lymphoma 2 (Bcl-2), canine matrix metallopeptidase 2 (MMP-2), and erythropoietin receptor (EPOR). The biopsy was homogenized into cell culture (CMT-Stylo) and compared with 3T3 Murin fibroblast that serves as normal cell expression. RNA was isolated and purified using the MasterPure TM RNA Purification Kit and converted into cDNA using RT-PCR. cDNA was amplified by adding respective primers and i-PCR Master Mix and detected by ethidium bromide staining in 2% agarose gel. 3T3 Murin was positive for HPRT and CMT-Stylo was positive for all markers except ER. Cyto8 and HPRT are not tumor molecular markers. The ER and PgR are cancer risk markers and cancer occurrence after spaying in dogs carries a poor prognosis. VEGF and HER2 are associated with rapid growth and large tumor size, while MMP2 and EPOR are associated with invasiveness of CMT. HIF-1± and Bcl-2 merely dictate the adaptability of the CMT to survive. Detection of molecular markers gave better prognostic picture than clinical and histopathological findings in CMT. Many drugs for targeted therapy are still undergoing clinical trials before they are made available for our animal patient.

Keywords: CMT, molecular markers, PCR, prognostic value, targeted therapy.

Effect of *Lactobacillus casei* on Growth Performance, Faecal Enterobacteriaceae Count and Faecal pH in Growing Rats

Lee Kai Xin, [1]Abdul Rahim Mutalib & [1]Zunita Zakaria
[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

The beneficial effects of probiotic in growth performance and inhibition of pathogens growth in the body of animals have been widely studied. The aims of this study were to investigate the dose-dependant effects of *Lactobacillus casei* on the growth performance, faecal Enterobacteriaceae count and faecal pH in growing rats. The study was conducted over 15 days. Twenty-two 6-wk old male Sprague Dawley rats were randomly assigned to 4 treatment groups fed different doses of *Lactobacillus casei* Shirota. The rats were housed in 4 separate polyethylene cages according to treatment groups. Each polyethylene cages contained 8 rats. The rats were fed with standard rat pellet (Barastoc®, Australia), water *ad libitum* and acclimatized for 1 wk before starting of the experiment. Rats in different groups were fed daily with 80 mL of cultured milk drink (Yakult®) containing different doses of *L.casei* Shirota. Rats in the control group were fed with pasteurized Yakult®. Rats in the high dose group were fed with 10^8, medium dose group with 10^7, and the low dose group with 10^6 of *L.casei* Shirota. The body weight for each rat was measured every alternate day while the feed intake was measured daily from day 1 to day 15 of the study for evaluation of growth performance. Faecal samples were collected at day 1 and day 15 of the study for Enterobacteriaceae count and pH measurement. This study showed that *L.casei* has no significant effect on growth performance in growing rats. Higher dose of *L.casei* significantly lowered faecal Enterobacteriaceae count and faecal pH.

Keywords: rats, *L. casei*, growth performance, Enterobacteriaceae count, faecal pH

Antibacterial Activity of *Azadirachta indica* on *Vibrio* spp. Isolated from Cultured Shrimp

Lee Mei Kim & [1]Mohamed Shariff Mohamed Din
[1]Department of Veterinary Clinical Studies
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

The massive use and/or misuse of antibiotics to control infections in aquaculture have resulted in the development of resistant strains, which have rendered antibiotic treatments ineffective. Therefore, alternatives to antibiotic use must be found. Extract and the juice of the Indian medicinal plant *Azadirachta indica* (neem) leaves were tested against *Vibrio parahaemolyticus* and *Vibrio alginolyticus*. Aqueous extract of neem leaves did not produce any inhibitory zone while the neem juice produced inhibitory zones that showed linear relationship to the concentration of neem juice on both bacteria. The minimal inhibitory concentration (MIC) of the neem juice for *V. parahaemolyticus* and *V. alginolyticus* was 3.125% and 6.25%, respectively. The minimal bactericidal concentration (MBC) for *V. parahaemolyticus* and *V. alginolyticus* was 12.5% and 25%, respectively. It is concluded that neem juice is an antibacterial agent that should be further studied for use in aquaculture.

Keywords: *Azadirachta indica*, *Vibrio,* minimal inhibitory concentration, minimal bactericidal concentration

Screening for Microfilaricidal Effects of Selected Plant Extracts against *Dirofilaria immitis*

Leonora Tuah Merawin, [1]Arifah Abdul Kadir & [2]Rehana Abdullah Sani

[1]Department of Veterinary Preclinical Sciences

[2]Department of Veterinary Pathology and Microbiology

Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Canine dirofilariasis is a common tropical parasitic disease of companion animals, primarily caused by infestation of the filarid *Dirofilaria immitis* within the pulmonary arteries and extending into the right heart. Increased reports of adverse effects elicited by current microfilaricidal agents used against *D. immitis* such as neurological disorders and circulatory collapse warrant the search for new agents in the form of plant extracts. Plant extracts are usually disregarded by the veterinary community as 'ethno-mystic' veterinary medicine and thus the lack of focus on its medical potential. This study'determined the presence of microfilaricidal activities of the aqueous extracts of *Zingiber officinale, Andrographis paniculata* and *Tinospora crispa* Miers on *D. immitis in vitro* at concentrations of 10 mg/mL, 1 mg/mL, 100 μg/mL, 10 μg/mL and 1 μg/mL. The microfilaricidal activities of these extracts were determined within 24 h, by evaluating the relative microfilarial motility as a measure. All extracts showed microfilaricidal activity, with *Z. officinale* exhibiting the strongest overall activity, followed by *A. paniculata* and *T. crispa* Miers. The microfilaricidal mechanism these extracts is speculatively via spastic paralysis based on direct observation of the microfilarial motility. The recommendation derived from this study is for these extracts to be studied further *in vivo* or *in vitro* to determine the microfilaricidal mechanism, effects of various extract combinations, and effective mode of administration in animals.

Keywords: *Dirofilaria immitis*, *Zingiber officinale*, *Andrographis paniculata*, *Tinospora crispa Miers*, microfilaricidal activity

Evaluation of Multiplex PCR for Rapid Detection and Differentiation of *Mycoplasma gallisepticum* Field and Vaccine Strains

Liew Pit Sze, Tan Ching Giap, [1]Aini Ideris & [2]Abdul Rahman Omar
[1]Department of Veterinary Clinical Studies
[2]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Mycoplasma gallisepticum (MG) is an important organism causing respiratory disease in poultry. Increasing use of MG live vaccines and demand of rapid diagnosis have led to the development and optimization of a diagnostic multiplex PCR using three sets of primers, targeting different MG genes. This study was conducted to evaluate the differentiating potential of the multiplex PCR for rapid detection and differentiation of MG field and vaccine strains. The vaccine strains used were MG F, ts-11 and 6/85. The specificity assay was conducted using 3 MG vaccine strains, 5 MG laboratory strains, 13 local MG isolates, 16 avian Mycoplasma species and a variety of bacterial and viral microorganisms. MG reference strain, S6 and 2 local representative isolates, I29 and H21 8T were used for sensitivity assay. The DNA concentrations were measured by spectrophotometer and tenfold serial dilution, beginning from 2.5 ng/μL to 2.5 fg/μL of each strain was used to determine the detection limits of the multiplex PCR. Artificial mixtures of vaccine and field strains were also prepared. The ratio of the non-vaccine strain to the vaccine strains were from 1:1 to 1:1000, with constant vaccine DNA present in each reaction. The applicability of the multiplex PCR under Malaysian field condition was also determined using artificially MG infected embryo samples and field samples from the commercial poultry farms that have been tested by MG PCR using MG universal primers. The PCR amplifications were carried out using a 25 μL reaction master mixture with DNA templates of 2 μL for samples in suspension and 3 discs for the FTA cards extract. The multiplex PCR was highly specific for detection of MG and only produce a non-specific reaction with few microorganisms. The strains in artificial mixtures could be differentiated conveniently except in certain mixtures of field strain with F-vaccine strain which may require additional testing. The detection limits of the multiplex PCR for the field and vaccine strains ranged from 0.5 to 0.05ng, where it showed a better sensitivity towards local isolates and vaccine strain 6/85. Artificial mixtures resembled mixed infections were used to evaluate the differentiating limits. The strains could be differentially detected when the relative DNA amount of field strain to vaccine strain were at the ratio 1:1. The field strain could be detected even when 2 to 3 vaccine strains were in the mixture at the equal ratio. The multiplex PCR tested on samples from artificially MG infected embryos as well as field samples showed that it could be applied under Malaysian field conditions effectively with some restrictions. Further testing with addition of ts-11 could be performed in case of mixed infections if the result of the initial PCR testing was not conclusive. Molecular variability of MG isolates dictates the needs for on-going evaluation of the multiplex PCR. Sequencing analysis on the isolates and pen trials to improve its applicability could be performed. With further investigations, the assay would be a powerful tool for MG diagnosis.

Keywords: *Mycoplasma gallisepticum*, multiplex PCR, vaccine

Survival Determination among Canine Heart Failure Patients Presented to the University Veterinary Hospital, Universiti Putra Malaysia

Lim Siew Yin & [1]Goh Yong Meng
[1]Department of Veterinary Preclinical Sciences
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Heart failure is a state wherein the cardiac output is inadequate to meet the perfusion needs of the metabolizing tissues and exercise capacity is limited. Causes of cardiac failure may be due to volume failure, pressure overload, diastolic failure or the combination of all or any of these causes. Twenty-six canine heart patients with normal kidney and liver functions that have complete history, clinical signs, radiograph and electrocardiography (ECG) records were included in this study. Data was tabulated in SPSS software and was analyzed using the Kaplan-Meier Survival Analysis technique to determine the median survival period of the canine heart patients. In general, the Kaplan Meier Survival Analysis showed that animal presented to UVH have a median survival time of 380 ± 186 d (95% CI, 16 d, 744 d). Overall survival function is not altered by breed, sex and age. However, survival of animal is affected by medical intervention such as furosemide and ACE inhibitor with the median survival time of 991 ± 394 d (95% C.I. 218 d, 713 d) and 604 ± 128 d (95% C.I. 352 d, 855 d), respectively.

Keywords: canine heart patients, heart failure, survival analysis.

Characterisation of the Malaysian Porcine Circovirus 2 Strains

Loh Sim Yean & [1]Ooi Peck Toung
[1]Department of Veterinary Clinical Studies
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Porcine circovirus type 2 (PCV2) is recognized as the primary cause of post-weaning multisystemic wasting syndrome (PMWS). In this study, the genome of PCV2 isolate from pigs with PMWS condition in Malaysia was successfully sequenced. This is the first successful completed PCV2 sequence from Malaysia. The extent of genetic variation among PCV2 isolates from Malaysia and other countries as reported in the gene bank were determined by nucleotide identity analysis and further characterised by phylogenetic tree analysis. One complete genome of PCV2 (Accession. No. EU391637) of 1767 bp from Farm X in Penang and another partial sequence (1513bp) from Farm T in Selangor were sequenced. PCV2 isolate from Farm X (Penang) shared about 98% nucleotide sequence identity with other reference PCV2b isolates, meanwhile partial genome of PCV2 isolate from Farm T (Selangor) showed 97% nucleotide sequence similarity with other reference PCV2a isolates. Based on the phylogenetic tree outline together with Blast search and nucleotide identity, it is highly suggestive that the Farm T isolate belongs to PCV2a. This study showed that both the PCV2a and PCV2b strains were present in Malaysia. Interestingly, they were found in different geographical location, where Farm X in Penang has PCV2b and Farm T in Selangor has PCV2a.

Keywords: pigs, PCV2, PMWS, PCV2a, PCV2b, phylogenetic tree analysis

Cytopathic Features in Rat Tissue-inoculated Cell Culture

Lu Sin Chiew, [1]Zeenathul Nazariah Allaudin, [2]Loh Hwei San, Chan Poh Soon, Nazrina, Noraini, Tan Siok Shin, Tan Sing Giap & [1]Mohd Azmi Mohd Lila

[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia
[2]Nottingham University, Selangor, Malaysia

Abstract

Fifty-nine female wild rats were trapped randomly at restaurants, food stalls and wet markets in Serdang, Selangor, Malaysia. Brain, salivary gland and uterus were collected from each rat. The organs were processed and inoculated in rat embryonic fibroblast (REF) cell cultures. In general, four different types of cytopathic features were observed: aggregation of round cells, syncytial and plaque formation, ballooning and "crabgrass"- like appearance. Based on the cytopathic features, herpesvirus, adenovirus and mycoplasma infections were suspected. The polymerase chain reaction (PCR) was utilized for detection of virus and mycoplasmas. All organ samples showed negative results for both alphaherpesvirus and adenovirus screening. However, the prevalence rate of mycoplasma infection in rats was 88% (52/59). Random PCR detection for mycoplasma in two groups of rat tissue-inoculated REF cell cultures that showed either presence or absence of cytopathic effect (CPE) were 92% (12/13) and 77% (14/18) positive respectively. Control sample which is essentially REF cell culture without any inoculation was screened negative for mycoplasmas. In conclusion, our findings suggested that screening method solely based on cytopathic features is not reliable and confusing in cases of mixed infections in cell cultures. Thus, further diagnostic test should be undertaken for confirmation.

Keywords: cytopathic effect, polymerase chain reaction, mycoplasmas, wild rats

Effect of Extenders on Viability and Abnormality of Cryopreserved Goat Spermatozoa

Mark Hiew Wen Han, [1]Abdul Wahid Haron, [1]Rosnina Hj Yusoff & [2]Mohd Azam Khan Goriman Khan

[1]Department of Veterinary Clinical Studies
Faculty of Veterinary Medicine, Universiti Putra Malaysia
[2]Ar-Raudhah Bio-Tech Farm Sdn. Bhd.

Abstract

A study was conducted to evaluate the effect of extenders on viability and abnormality of cryopreserved goat spermatozoa. Twelve semen samples were collected from four healthy bucks using artificial vagina. They were evaluated for volume, colour, wave pattern, concentration, general and individual motility, live percentage and abnormal morphology. The samples were then washed with TALP (Tyrode's Albumin Lactate Pyruvate) solution to remove the seminal plasma. After adding the two extenders (Bioxcell™ and the Tris-based extender), the semen were packed into straws and sealed. Cooling was done for 3 h at 4°C before being frozen and stored in liquid nitrogen. Samples were evaluated on day 1, 3 and 7 after cryopreservation for forward motility, live and abnormal percentage. Spermatozoa in both extenders did not show significant difference ($p > 0.05$) for the three parameters observed. However, numerically, spermatozoa cryopreserved in Bioxcell™ showed better readings for forward motility (averaging 45.14 ± 2.66% over the three post-thaw days compared to Tris' 42.08 ± 2.15%) while spermatozoa in the Tris-based extender gave higher live (32.22 ± 2.54% compared to 30.43 ± 2.37% of Bioxcell™) and abnormal percentage (7.94 ± 0.90% compared to 5.69 ± 0.76% of Bioxcell) readings. The three post-cryopreservation days did not show any significant difference ($p > 0.05$). In conclusion, both the extenders can be utilised to cryopreserve goat spermatozoa and cryopreservation can be done for up to 7 days without any significant change in spermatozoa quality.

Keywords: Extender, cryopreservation, goat spermatozoa, forward motility, abnormal.

The Prevalence of Vancomycin-Resistant Enterococci in the Veterinary Students of the Faculty of Veterinary Medicine, Universiti Putra Malaysia

Mellissa Noraini Amiruddin, [1]Latiffah Hassan & [1]Zunita Zakaria
[1]Department of Veterinary Pathology and Microbiology,
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

The present cross-sectional study was undertaken to determine the prevalence of vancomycin-resistant enterocci (VRE) in veterinary students of the Faculty of Veterinary Medicine, Universiti Putra Malaysia (UPM). The risk factors associated with the prevalence of VRE in healthy students were also investigated. Ninety-two rectal fecal swabs were collected from the veterinary students of all years of the Doctor Veterinary Medicine program. The enterococci colonies isolated were inoculated onto VRE agar supplemented with 20 μg/mL and 32 μg/mL vancomycin. Biochemical tests such as catalase, bile esculin and 6.5% NaCl were conducted to further confirm VRE isolates. Questionnaires were used together with the fecal swab sample results from the veterinary students to identify the factors associated with the presence of VRE. A total of 14 (15.2%) out of 92 students were tested positive for VRE. The prevalence of VRE in veterinary students was most likely associated with ownership of pet animals (mainly cats and dogs) and exposure to animal cases presented to Universiti Veterinary Hospital, Universiti Putra Malaysia.

Keywords: Vancomycin-resistant enterococci, risk factors, prevalence, veterinary students, Universiti Putra Malaysia

Antibiotic Residues in Chicken Meat Sold in Markets and Raw Milk from Milk Collecting Centres in Sepang and Banting, Selangor, Malaysia

Nazirah Abdullatad & [1]Saleha Abdul Aziz
[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

The term 'antibiotic residue' refers to the small amount of an antibiotic or its breakdown product(s) that remains in or on an agricultural product following treatment with that antibiotic. Many of the antibiotics used to treat bacterial infections in humans also have veterinary applications. Inappropriate use of antibiotic in animals poses public health risk. Antibiotic used in food producing animals may affect human health by the presence of residues in food of animal origins and particularly by the selection of resistant bacteria in animals. This study was carried out to determine the presence of antibiotic residues in chicken meat and raw milk. Sixty chicken meat samples were purchased from grocery stores, supermarkets and night markets located in Serdang area and a total of 12 raw milk samples were collected from Sepang and Banting Milk Collecting Centres, Selangor, Malaysia. The presence of antibiotic residue was detected using *Bacillus stearothermophilus* Disc Assay (BSDA), a simple microbiological inhibition method. Two procedures were carried out using this method, which involved 45 min and 3 h incubation periods. All (100%) chicken meats were negative for antibiotic residues (zones of inhibition less than 10 mm). However, the diameters of inhibition zone of the 7 (11.7%) meat samples in 45 min incubation and 13 (21.7%) samples in 3 h incubation showed a range of 8 to 10 mm which could be assumed to be 'intermediate'. On the other hand, 12 (100%) milk samples were negative in 45 min incubation whereas two (16.7%) samples in 3 h incubation were positive. However, five (41.7%) milk samples in 45 min and 10 (83.3%) in 3 h incubation gave diameters of inhibition zone within the range of 8 to 10 mm. The presence of antibiotic residues in meat and milk may be due to a number of factors which include poor management practices. It is imperative that antibiotics be prescribed only when absolutely necessary and used properly as indicated.

Keywords: antibiotic residues, chicken meat, raw milk, milk collecting centres

Occurrence of Antibiotic-resistant *Salmonella* spp in Tortoises and Turtles

Noorazrena Abdul Aziz & [1]Saleha Abdul Aziz
[1]Department of Veterinary Pathology and Microbiology,
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

The popularity of reptiles as pets and exhibit animals in zoological gardens continues to increase in many countries worldwide including Malaysia. Pet reptiles include snakes, iguanas, lizards, tortoises and turtles. The objectives of the study were to determine the occurrence of Salmonella spp in tortoises and turtles and to determine the antimicrobial pattern of *Salmonella* isolates against six antibiotics namely, ampicillin, enrofloxacin, tetracycline, ciprofloxacin, streptomycin, and erythromycin. Ninety chelonian (turtles and tortoises) cloacal samples and 15 water samples were collected from recreational parks, aquarium shops, and individual owners for isolation and identification of Salmonella spp. Fifteen (33.3%) of the turtles, 10 (22%) tortoises, and 7 (46.7%) water samples were positive for *Salmonella*. Of the 32 isolates, 27 (84.4%) showed multiple resistance while 5 (5.6%) demonstrated resistance to one antibiotic only. The isolates showed 13 antibiotic resistance patterns. The highest resistance rates were toward erythromycin (81%) and streptomycin (78%), followed by ampicillin (56%), enrofloxacin (25%), ciprofloxacin (22%), and tetracycline (16%). The *Salmonella* serotypes identified in this study were *S. Newport, S, Pomona, S. typhimurium, S. tenessee, S. Arizona, S. bresany*, and *S. coarcallis*. The study showed that turtles and tortoises have high occurrences of antibiotic-resistant *Salmonella*, and that there is a potential for the transmission of *Salmonella* from the chelonians to humans.

Keywords: *Salmonella*, tortoise, turtles, antibiotic resistance

Health and Reproduction Status of Dairy Cattle in Ladang 16, Universiti Putra Malaysia

Nor Natasha Mohd Sofian & [1]Abdul Aziz Saharee
[1]Department of Veterinary Clinical Studies
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

University Putra Malaysia (UPM) manages a large farm and is planning to improve the efficiency of the animal health and production management. The ultimate aims are to develop showcase farm for the public to view, a model farm for farmers to emulate and for student teaching. The University also plans to develop the farm into an economic unit to create income. The objective for this project was to determine the current herd health status of cattle at the dairy unit of Ladang 16, UPM. The study involved 30 cows and 1 bull of Friesian-Sahiwal breed. Data collection was through personal interviews as well as from farm records and screening tests for *Brucella* and *Leptospira.* Body scoring, California Mastitis Test (CMT), pregnancy diagnosis and semen evaluation were done. The farm was free from brucellosis and had a very low prevalence of leptospirosis. The mortality rate was 4% and the annual culling rate 10%. The CMT showed that 48% of the lactating cows had sub-clinical mastitis. In these cattle, the calving interval and days open were slightly higher than normal. There are several breeding problems within this herd of animals, which included abortions, retained placenta, repeat breeders, dystocia and metritis. The bull chosen had good semen quality and reproductive status. From the study, the farm showed a moderate health and reproductive status.

Keywords: reproduction, health, dairy, cows, Universiti Putra Malaysia

Plasmid Analysis of *Escherichia coli* Isolated from Animals

Nor Azlina Abdul Aziz & [1]Zunita Zakaria
[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Twenty *Escherichia coli* cultures were obtained from the Bacteriology Laboratory, Faculty of Veterinary Medicine, Universiti Putra Malaysia. The cultures originated from different animals and cases background. The isolates were reidentified as *E. coli* before subjected to antibiotic susceptibility test and plasmid extraction. All the isolates of *E. coli* were examined for resistance to ten antibiotics. Ninety-five percent of *E. coli* isolates were found to be resistant to at least one antibiotic. The isolates showed high resistance toward penicillin (90%), followed by tetracycline (80%) and neomycin (65%). The least resistance was to cephalothin (15%), gentamicin (20%) and chloramphenicol (25%). There were 11 multiresistant patterns observed. All isolates were found to possess one common plasmid band weighing 23 kb. Molecular weight of plasmids in the isolates varied from >100 to 0.85 kb. Five of the 20 *E. coli* isolates contained only one plasmid, while the other 15 isolates demonstrated multiple plasmids. There were 13 different profiles generated by 20 *E. coli* isolates. Pearson Correlation of two-tailed test with 99% confidence level showed a highly significant correlation (88.6%) between number of antibiotic resistance and number of plasmid band. The result showed 88.6% increase in number of plasmid bands, causing increase in antibiotic resistance.

Keywords: *Escherichia coli*, animals, antibiotic resistance pattern, plasmid analysis, correlation

A Retrospective Study on the Management of Captive Malayan Sun Bears in Malaysian Zoos

Norhanita Jumali, [1]Shaik Mohamed Amin Babjee & [1]Abdul Rani Bahaman
[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

The current population of Malayan sun bears in the wild is unknown. The reduction of sun bear population in the wild is contributed by loss of habitat due to continuous excessive logging and poaching. The management of captive Malayan sun bears is important in order to save this species from extinction. In this study, the management was studied on various aspects of husbandry management, disease prevention program, common medical findings, necropsy findings and management complications. All records from National Zoo, Taiping Zoo and Melaka Zoo dated from January 1997 to September 2007 were collected and analyzed. Most of the sun bears in the zoos were donated, confiscated or captured by Department of Forestry. The total number of sun bears in all three zoos is thirty-four. Six births were recorded and out of the six, only three survive to adulthood. Captive born cubs were raised by dam or hand-raised by the veterinary hospital workers. Cases of hand-raised cubs happened when cubs were rejected by the dam or cubs donated at young age. There are three sections of the bear's enclosure which are the exhibit, night quarters and cages. All three sections did not give adequate space for the bears but this unsatisfactory condition is reduced by providing environmental enrichment in a form of feed such as honey and peanut. Cleaning of enclosure was done daily using pipe water and hydroblast. Sun bears has a wide diet regime. In all three zoos, the major feed given was fruits such as bananas and papayas. The occurrence of medical cases and death was low due to the hardy nature of sun bears. The common medical cases encountered were wounds due to fighting followed by gingivitis and diarrhea.

Keywords: Malayan sun bear, management, records, medical cases, zoo

Health and Reproductive Status of Beef Cattle in Field 16, Universiti Putra Malaysia

Nur Izni Mohd Zaharri, [1]Abd Aziz Saharee & [1]Rosnina Hj Yusoff
[1]Department of Veterinary Clinical Studies
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

The study was conducted to determine the health and reproductive status of beef cattle in Field 16, Taman Pertanian Universiti with the ultimate aim of developing a model farm at Universiti Putra for the purpose of teaching, extension and public exhibition. The study involved 80 beef cattle of the Kedah-Kelantan and Brangus breeds. The tests carried out were for Brucellosis and Leptospirosis, using the RBPT and MAT techniques, and blood parasite screening. The result showed that these animals were free from the two infectious diseases and blood parasites. Semen evaluations on active breeder showed 80% motility, semen concentration of 73 x 10^6/mL, and 71% live sperm, which were within the normal range. There were 3% semen abnormalities, which was acceptable. Reproductive parameters such as calving interval, calving to conception, as well as calving rate were determined from records kept at the farm. The results showed that the average calving interval was 438 days and the average calving to conception was 124 days. There was an increase of 48% in calving rate as well as 40% in pregnancy rate from previous years. In general, the beef cattle in Field 16 are free from threatening diseases and showed a moderate level of reproductive status.

Keywords: health and reproductive status, cattle, Universiti Putra Malaysia

Protective Effects of *Phyllanthus* sp. on Gentamicin-induced Acute Renal Failure in Rats

Nurul Syakirah Mohammad Hatta, [1]Hazilawati Hj. Hamzah, [1]Rasedee Abdullah & [2]Mohd Rosly Shaari

[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia
[2]MARDI, Serdang, Selangor, Malaysia

Abstract

Acute renal failure (ARF) is the sudden onset of kidney dysfunction. Kidney failure is normally caused by toxins and ischemia. Certain herbs and chemical compounds have nephroprotective properties. *Phyllanthus* spp. is a local herb that is well-known as the old-folks remedies. The liver-protective effects of *Phyllanthus* are well-researched and it is commonly known as a liver tonic. However little is known about its nephroprotective properties. This study was conducted to determine the effects of *Phyllanthus* on gentamicin-induced renal damage in rats. Twenty Sprague-Dawley rats were used and divided into four equal groups. The Control (Ctr) group was given a commercial rat pellet. Phyllanthus (Phy) group was given the ground commercial rat pellet mixed with freeze-dried *Phyllanthus* at 5000 mg/kg. The other two groups, Antibiotic (Ab) and Antibiotic + Phyllanthus (Ab + Phy) groups received intraperitoneal (i.p) injections of gentamicin at 100 mg/kg, SID, for 5 d consecutively and sacrificed 24 h after the last gentamicin dose. Rats in Ab group were fed with the commercial rat pellet, and rats in Ab + Phy group supplemented with *Phyllanthus*, daily, for two weeks before gentamicin treatment was given. Blood, urine, kidney and liver samples were collected for analysis. Blood analysis showed that Phyllanthus had successfully reduced BUN and serum creatinine levels in rats with ARF. Peripheral DNA damage, as a result of azotaemia, analysed by Comet assay decreased in ARF rats supplemented with Phyllanthus. The protective effect of *Phyllanthus* in minimising renal damage was supported by urinalysis. Acute renal failure (ARF) rats given *Phyllanthus* supplementation showed mild renal damage, in which polyuria, proteinuria and tubular damage were less severe, and excretion of endogenous creatinine from the blood greater compared to rats in the Ab groups. Microscopic examination of the renal tubules further supports the protective effects of Phyllanthus on the kidney. Kidney damage decreased remarkably in the kidney of ARF rats supplemented with Phyllanthus. In conclusion, this study showed *Phyllanthus* spp. has protective effects on gentamicin-induced ARF in rats.

Keywords: acute renal failure (ARF), gentamicin, *Phyllanthus* spp., haemogram, serum biochemistry, renal lesion, comet assay

Diurnal Stereotypies and Physio-Behavioural Response to Enrichment in Captive Malayan Sun Bears (*Helarctos malayanus*)

[1]Ong Siew Mei, [1]Tan Hwee Mien, [1]Grace Langat, [1]Abdul Rani Bahaman, [2]Sumita Sugnaseelan & [1]Reuben Sharma

[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine
[2]Department of Animal Science, Faculty of Agriculture
Universiti Putra Malaysia

Abstract

This study was conducted to investigate the diurnal activity patterns and the effects of environmental enrichment on stereotypic behaviour and cortisol secretion in eight Malayan Sun Bears, housed in indoor and outdoor enclosures. Behavioural observations were carried out during the pre-enrichment and enrichment periods *via* scan sampling and an activity budget was constructed. The enrichment materials provided were coconut fronds and plastic bottles filled with twigs. Saliva was collected twice a day for cortisol assay. Both the indoor and outdoor bears showed high frequencies of resting, locomotion and total stereotypy. Resting was the most common activity (57 ± 2.2%) of the outdoor bears during the pre-enrichment period. Conversely, the indoor bears showed significantly higher ($F=27.05$; $P<0.05$) locomotor behaviour (44.0 ± 2.5%) compared to their conspecifics housed outdoors. The bears housed in barren indoor enclosures displayed significantly higher ($F=26.52$; $P<0.05$) total stereotypy (35.0 ± 2.0%) compared to the bears housed in enriched outdoor enclosures (21.0 ± 1.9%). Pacing and patrolling were the most common stereotypies observed in both indoor (30.3 ± 2.3%) and outdoor (19.7 ± 1.8%) bears. Total stereotypy decreased significantly ($F=13.50$; $P<0.05$) for the indoor bears when enrichment was provided. Indoor bears benefited more from the environmental enrichment where they showed four times higher solitary play behaviour with the introduced novel objects compared with their conspecifics housed outdoors. Although total stereotypy was significantly reduced, environmental enrichment did not exert a lasting effect on the secretion of salivary cortisol for both groups of bears. In addition, the bears exhibited a high level of individual variation in physio-behavioural response to the stimuli provided. While enrichment alters behavioural patterns, it is apparent that both enclosure design and individual temperament plays a significant role in managing stereotypy and stress responses in captive bears.

Keywords: Malayan Sun Bear, *Helarctos malayanus*, stereotypic behaviour, salivary cortisol, environmental enrichment

Isolation and Identification of Antimicrobial Resistant *Salmonella* and *Vibrio spp.* in Cultured Pacific White Shrimp (*Penaeus vannamei*)

Ooi Mei Chen, [1]Mohamed Shariff Mohamed Din & [2]Saleha Abdul Aziz
[1]Department of Veterinary Clinical Studies
[2]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine
Universiti Putra Malaysia

Abstract

This study investigated the presence of human bacterial pathogens namely *Salmonella* and *Vibrio* spp. in cultured Pacific White Shrimp, *Penaeus vannamei* using selective media (Xylosine-Lysine-Tergitol-4 and Brilliant-Green Phenol Red Lactose Sucrose agar for *Salmonella*; and Thiosulphate Citrate Bile Salt Sucrose agar with 3% sodium chloride for *Vibrio*) and confirmed with biochemical tests. The pathogenic bacteria were screened for antibiotic resistance to 10 different antibiotics (chloramphenicol, nitrofurantoin, oxolinic acid, sulphonamides, tetracycline, sulfamethoxazole / trimethoprim, norfloxacin, ampicillin, doxycycline hydrochloride and erythromycin). From the three farms in Selangor, 60 shrimp samples collected showed occurrence of 3.3% of Salmonella and 48.3% of Vibrio. *Salmonella enterica* serovar Corvallis isolated from the shrimps showed two antibiotic resistance patterns. Five *Vibrio* species of public health significance were identified. They were *Vibrio cholerae* (11/60 or 18.3%), *Vibrio mimicus* (10/60 or 16.7%), *Vibrio parahaemolyticus* (6/60 or 10%), *Vibrio vulnificus* (4/60 or 6.7%) and *Vibrio alginolyticus* (1/60 or 1.7%). All *Vibrio* isolates, except for two, were resistant to ampicillin. *Vibrio* isolates showed one to four antibiotic resistance patterns. Farm owners, processors and consumers should be concerned about the presence of pathogenic *Salmonella* and *Vibrio* and apply adequate measures to ensure safety of shrimps and its products.

Keywords: Pacific White Shrimp, *Salmonella*, *Vibrio*, antibiotic resistance

Detection and Isolation of Pathogenic Leptospires from Rats, Water Effluent and the Environment of Zoo Negara, Malaysia

Penny Hu Huong Niong, [1]Abdul Rani Bahaman & [1]Siti Khairani Bejo
[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Twenty rats from Zoo Negara were trapped and examined for leptospirosis. The rats were euthanized and a blood sample was collected from each rat for serological study. All serum samples were examined for the presence of leptospiral infection by the microscopic agglutination test (MAT). Sixteen live antigens which were *icterohaemorrhagiae, canicola, pomona, shermani*, *hadjo bovis, javanica, pyogenes, autumnalis, bataviae, australis, grippotyphosa, celledoni, tarassovi*, *ballum, cynopteri,* and *djasiman* were tested against the twenty serum samples. Serological study showed that none of the rats had an antibody against the sixteen live antigens used. Kidney samples were collected from the rats for leptospiral isolation and polymerase chain reaction (PCR) assay. Leptospiral isolates were obtained from kidneys. Bacteriological cultures showed three of the twenty kidney samples were positive for leptospires infection. However, PCR showed that all kidney samples were negative for pathogenic leptospires. Sixty water samples were obtained from various locations of the zoo for isolation of the organisms and PCR assay. Leptospiral isolates obtained from waters in bacteriological culture showed seven of sixty water samples were positive for leptospires. On the other hand, PCR showed that all water samples were negative for pathogenic leptospires. Based on PCR, all the rats and water samples were negative for leptospires. However, as opposed to PCR, bacteriological cultures gave higher infection rates in both water and kidney samples. This study suggested that the leptospires isolated were not pathogenic.

Keywords: leptospirosis, rats, water, Zoo Negara, MAT, PCR

Prevalence of Metarpophalangeal Joint Disease in Racing Thoroughbreds at Selangor Turf Club, Malaysia

Samsiah Harun, [1]Bashir Ahmad, [2]Goh Yong Meng & [3]Shri Kanth

[1]Department of Veterinary Clinical Studies
[2]Department of Veterinary Preclinical Sciences
Faculty of Veterinary Medicine, Universiti Putra Malaysia
[3]Selangor Turf Club, Selangor, Malaysia

Abstract

One hundred and seventy-one x-rays of lameness cases from total of 485 cases attributed to a fetlock joint disease seen at Selangor Turf Club between 2003 and 2006 were analyzed. It was noted that 74.9% of fetlock problem were localized in the metacarpophalangeal joints and 9.4% of cases in the metatarsophalangeal joints. A total of 15.2% of the joint problems were seen either on the forelimbs only or hindlimbs only or both. The prevalence of metacarpophalangeal joint cases for the period of 2003 to 2006 is 26.39%. Based on radiograph findings and prevalence, a slight increment on disease occurrence was observed from 2003 to 2005, which decreased in 2006. The majority of cases (65.63%) of metacarpophalangeal joint disease were localized in left forelimb, while 34.37% of cases were in right forelimb. Clinical diagnoses within the right forelimb in this study were soft tissue swelling (25.88%), sesamoiditis (18.82%), capsulitis (18.24%) and fractures of sesamoid bones (5.89%). In the left forelimb, the clinical diagnoses were soft tissue swelling (28.16%), sesamoiditis (18.19%) and capsulitis (17.24%). Inflammation of the synovial pad was more frequent in right forelimb (12.57%) then the left (9.66%). Enlargements of vascular channel more frequent in right forelimb (13.14%) than the left (11.93%) but ulceration of proximal first phalanx was more frequent in the left (14.77%) than the right forelimb (10.86%). There was no significant relationship ($p>0.05$) between age, sex and types of pathological changes in this study.

Keywords: Thoroughbred, metacarpophalangeal joint disease

A Comparative Study between the Carcass Composition of Jungle Fowl (*Gallus gallus*), Malaysian Indigenous Chicken (*Gallus gallus domesticus*) and Broiler Chicken (*Gallus domesticus*)

Santhi Mutuviren, [1]Shanthi Ganabadi & [2]Halimatun Yaakub
[1]Department of Veterinary Preclinical Sciences, Faculty of Veterinary Medicine
[2]Department of Animal Science, Faculty of Agriculture
Universiti Putra Malaysia

Abstract

Thirty-five birds consisting of 10 adult jungle fowl, 10 adult Malaysian indigenous chickens and 15 adult broilers were used in this study to evaluate carcass composition. The chickens were sacrificed using cervical dislocation method and then frozen. Prior to dissection, the carcasses were thawed and divided into forequarter and hindquarter. The forequarter was then divided into breast, wing and ribs. The muscle, fat, skin, bone of all the different portions were separated, weighed and recorded. The broilers were found to have significantly higher ($p<0.05$) muscle weight compared to the indigenous chickens and jungle fowl. The broilers also had significantly higher fat weight compared to the indigenous chickens and jungle fowl whereas the jungle fowl showed significantly higher ($p<0.05$) bone weight compared to the broilers and indigenous chickens.

Keyword: broiler, Malaysian indigenous chicken, jungle fowl, carcass composition

Clinical Observation of Herpesvirus-infection in a Murine Model

Shahron Nawi, [1]Zeenathul Nazariah Allaudin & [1]Fuzina Husin
[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

Clinical signs the important factors in herpesvirus pathogenicity. The main aims of this project were to observe the clinical signs produced by infections by two strains of herpesvirus (V5 and V19) isolated from captive wildlife animals in mice and to determine the survival time of mice post-viral infection. The viral isolates were propagated and prepared in stock and the stock titer determined by plaque forming assay. Seven-eight Balb/c inbred mice (5-8 weeks old) obtained from the Institute for Medical Research, Kuala Lumpur, Malaysia were divided into two groups of 39 mice each. Group 1 was the Herpesvirus V5-infected group and Group 2 the Herpesvirus V19-infected group. Each group was infected with intranasal inoculations of 10^3, 10^4, 10^5, 10^6 and 10^7 pfu/mL of the respective viral isolates. Within each group, 6 rats each received 10^3 and 10^4 pfu/mL virus and 8 rats each received 10^5, 10^6, and 10^7 pfu/mL viral isolate. Three uninfected rats for each group served as controls. The time post-infection for clinical signs (rubbing mouth/ nose, depressed, huddling together, ruffled hair, trembling/shivering, dyspnea/tachypnea, bleeding nose/ear incoordinated gait, circling movement, hunched position, and tilted head) to appear was recorded. The result from of clinical sign observations showed that there are differences in the time of occurrence and the severity of infection. For both strains, higher viral concentrations were observed to cause mortality as early as day 2 post-inoculation. Mice inoculated with low dose of virus resulted in mortality one day later and produced milder forms of clinical sign. The mortality rate of mice differed minimally between herpesvirus strains. Survival time analysis revealed that herpesvirus V19 strain was more pathogenic than the V5 strain.

Keywords: clinical signs, herpesvirus, V5, V19, pathogenicity, survival time analysis, mortality rate

Hypothalamic-Pituitary-Adrenal Axis Response to Physical Restraint in the Green Iguana (*Iguana iguana)*

Sharmini Julita, [1]Goh Yong Meng [2]Reuben Sharma & [3]Sumita Sugnaseelan
[1]Departmentment of Veterinary Preclinical Sciences
[2]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine
[2]Department of Animal Science, Faculty of Agriculture
Universiti Putra Malaysia

Abstract

This study was conducted to ascertain the response of the hypothalamic pituitary adrenal (HPA) axis to physical restraint in 16 Green Iguanas *(Iguana iguana*). The iguanas were randomly placed into four treatment groups, consisting of three restraint techniques (manual, towel and vasovagal) and one control unrestrained group. Blood samples were collected *via* the ventral tail vein before the restraint was applied and at intervals of 10, 20 and 30 min post-restraint. Blood samples were assayed for various stress biomarkers including corticosterone, glucose, heterophil:lymphocyte (H:L) ratio, creatine kinase (CK) and calcium. All three restraint techniques exhibited an overall increase in circulating corticosterone indicating an acute stress response. At 30 min post-treatment, the iguanas restrained manually showed a 50% increase in plasma corticosterone. This was significantly higher ($p<0.05$) than the levels obtained from conspecifics subjected to the towel and vasovagal restraint techniques. The manual and vasovagal restraint groups as well as the unrestrained controls showed a significant ($p<0.05$) increase in plasma glucose concentrations after 20 min. Plasma CK concentrations in the vasovagal and towel restrained iguanas did not differ significantly ($p<0.05$) from the controls. However, the CK concentrations in the manually restrained group were three times lower than the conspecifics in other treatment groups. This may be due to the tonic mobility that the manually restrained iguanas reverted to while being held. Similar profiles were obtained with circulating calcium levels. In contrast, the H:L levels in all groups did not differ significantly throughout the duration of the experiment, indicating that this marker may not be reliable in detecting acute stress in reptiles. In conclusion, all restraint techniques elicited an acute stress response in the iguanas. However, based on the profiles of corticosterone secretion, it is apparent that both towel and vasovagal restraint techniques were less stressful for the iguanas and can be recommended over simple manual restraint.

Keywords: Green Iguana, hypothalamic-pituitary-adrenal axis, corticosterone, restraint, acute stress response

Parasites and Blood Parameters of the Spotted Dove

Syahril Anwar Zainal Abidin, [1]Shaik Mohamed Amin Babjee & [1]Rasedee Abdullah

[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

The spotted dove *(Streptopelia chinensis)* is one of the most common dove found in Malaysia. It is a popular pet bird among Malaysian. Despite being popular in this country, there is a lack of study on the blood parameters and parasites of this birds that could aid in veterinary medicine. In this study, the goal was to establish a baseline for the blood leukocytes differential count parameter as well as identifying the common gastrointestinal parasites and blood parasites of the spotted dove. Fifty adult birds were used in this study. Blood samples were used to produce blood films which were examined under the microscope to identify blood parasites as well as perform leukocyte differential count. Fecal samples were used to examine for gastrointestinal parasites through direct smear and simple floatation techniques. The fecal sample reveals only the presence of coccidian oocyst. The blood film reveals no blood parasites. A baseline for the leukocytes differential count was obtained and showed to be 50.72% heterophils, 32.4% lymphocytes, 9.62% monocytes, 2.58% eosinophils, and 4.94% basophils. The ranges for the leukocyte are 38.42 - 63.02 $x10^9$/L heterophils, 22.14 - 42.66 $x10^9$/L lymphocytes, 3.53 - 15.71 x 10^9/L monocytes, 0.35 - 4.81 x 10^9/L eosinophils, and 4.94 - 9.2 x 10^9/L basophils. Morphology of the leukocytes of the spotted dove is typical of the normal avian species and easily recognized

Keywords: spotted dove *(Streptopelia chinensis)*, parasites, blood parameters

Assessment of Oregano Herbs (*Oreganum aetheroleum)* as Feed Supplement for Better Growth Performace in Catfish Juveniles (*Clarias macrocephalus,* Gunther, 1864*)*

Syuhada Ahmad Kamil & [1]Hassan Mohd Daud
[1]Department of Veterinary Clinical Studies
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

A study was carried out to investigate the efficacy of Oregano herbs as a feed supplement to promote a better growth performance of and as an anti-microbial agent in catfish juveniles (*Clarias macrocephalus,* Gunther, 1864*)*. A total of 120 catfish juveniles were used. Sixty fish aged approximately 5 weeks were randomly divided into four groups of 15 fish each and labeled as Group 1 to Group 4. The stomach contents were collected for lactic acid bacteria (LAB) culture and the anterior part of duodenum for histology. Another 60 fish aged approximately 10 weeks were randomly divided into four groups and labeled as Group A to Group D and were used to measure the weekly body weight and body length. Two control groups were also prepared. The treatment groups were supplemented with 0.1%, 0.3% and 0.5% of oregano herbs preparations, respectively mixed with commercial feed. The commercial feed was fixed at 3% of the average body weight per day per fish and given twice daily i.e. in the morning and evening. The control groups were fed only with commercial feed at the same body weight percentage and twice daily. For Group A to Group D, the fishes were weighed and measured every 7 days. For Group 1 to Group 4, five juveniles were randomly selected and dissected every seven days. To determine the effect of the oregano as an anti-microbial agent, 0.1%, 0.3% and 0.5% of oregano herb were blended in normal saline and mixed with *Aeromonas hydrophilia.* The results revealed a significant relationship between the percentage of oregano to the body weight on day 21 ($r=0.9510$, $p<0.05$). There was a positive correlation ($p<0.05$) between the percentages of oregano to the standard body length of the catfish juvenile after day 21 of experiment ($r=0.9849$). However, there was no significant correlation ($p<0.05$) between the effect of oregano to the LAB cells isolated from the gut for days 0, 7, and 21. A positive correlation ($p<0.01$) was observed between the percentages of oregano to the antimicrobial activity against *Aeromonas hydrophila*. There was no significant correlation ($p<0.05$) between the concentration of oregano and the length of the villi of the gut either for day 7 or 21, suggesting that oregano feed supplementation did not influence gut development.

Keywords: catfish juveniles, oregano, growth performance, lactic acid bacteria, antimicrobial, gut development

Determination of the Proliferation of a Canine Mammary Tumor Cell Line under Hypoxic Condition and its Response to Chemotherapy

Tan Shin Yee, [1]Rasedee Abdullah & [2]Teo Guan Young
[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine
[2]Institute of Bioscience
Universiti Putra Malaysia

Abstract

Regions of hypoxia exist in solid tumors due to the irregular vascular supply within these tumors. The regions were found to demonstrate resistance towards radiotherapy and chemotherapy. This study aims to determine the proliferation of a canine mammary tumor (CMT-stylo) cell line under hypoxic condition and to further determine the response of these hypoxic cells to Doxorubicin and erythropoietin. Cells were seeded onto 96 well plates, with cobalt chloride at 0, 1, 2, 4, 8, 16, 32 μg/mL as the hypoxia inducing agent. Doxorubicin and a 1:1 combination of erythropoietin and Doxorubicin (EDOX) were added at 1, 2, 4 μg/mL after 24 h incubation. After 72 h of treatment, the cells were subjected to MTT cell viability assay. Increased cell proliferation was observed at all levels of hypoxia. Cell cycle analysis via flow cytometry revealed more cells were in the synthesis phase. Increased cell killing by Doxorubicin occurred under hypoxia which was comparable to the hypoxia-induced increase in cell proliferation. Erythropoietin worked synergistically with doxorubicin, achieving more cell killing compared to Doxorubicin being used alone.

Keywords: tumor hypoxia, canine mammary gland tumor, MTT assay, Doxorubicin, erythropoietin.

Gross Pathology and Histopathology of Post-weaning Multisystemic Wasting Syndrome in Pigs in Selangor and Perak, Malaysia

Teh Tong Ngee, [1]Ooi Peck Toung, [2]Sheikh Omar Abdul Rahman & [3]Tan Do Yew

[1]Department of Veterinary Clinical Studies

[2]Department of Veterinary Pathology and Microbiology

Faculty of Veterinary Medicine, Universiti Putra Malaysia

[3]Molecular Biology Lab, Vet Food Agro Diagnostics (M) Sdn Bhd., Petaling Jaya

Abstract

Fifteen pigs which showed pallor, wasting and dyspnea from five farms on which there had been a previous diagnosis of post-weaning multisystemic wasting syndrome (PMWS) were investigated. During necropsy, the most prominent lesion was lymphadenopathy of the inguinal and mesenteric lymph nodes. Other lesions were cranioventral pulmonary consolidation. Porcine circovirus 2 (PCV2) antigens and nucleic acid were detected in all the samples by nested polymerase chain reaction. Microscopic lesions attributable to PMWS were found in lymphoid organs (lymph nodes and spleen), liver, kidney and lungs. The most consistent microscopic lesions were various degrees of lymphoid depletion, affecting both lymphoid follicles and parafollicular zones, and progressive multifocal to diffuse infiltration of lymphoid tissues by macrophages. Multinucleated giant cells were seen frequently in lymphoid tissue. These three lesions indicated that there was granulomatous inflammation in the lymphoid tissues. No cytoplasmic inclusion bodies in macrophages were seen in the samples. A series of non-lymphoid lesions also were detected which included interstitial pneumonia, bronchopneumonia, periportal mononuclear inflammatory infiltration (cholangiohepatitis) of the liver in varying degrees, hyperplasia and hypertrophy of the Kuppfer cells, glomerulonephritis and interstitial nephritis. This project showed that lymphoid depletion and diffuse infiltration of lymphoid tissues by macrophages can be useful indicators for future diagnosis of PMWS. On the other hand, microscopic lesions in other organs were not consistent and should only be used as a reference guideline in suspected PMWS infected cases. Detailed lymphoid tissue examinations together with PCV2 detection in the tissues are more essential for diagnosis in PMWS.

Keywords: Pig, PMWS, PCV2, lymphoid depletion, granulomatous inflammation

Serological Prevalence of Brucellosis in Cattle in Pahang, Malaysia

Wan Zarina Che Wan Mohamed Anuar
[1]Siti Khairani Bejo & [1]Abdul Rani Bahaman
[1]Department of Veterinary Pathology and Microbiology
Faculty of Veterinary Medicine, Universiti Putra Malaysia

Abstract

A serological study on brucellosis caused by *Brucella abortus* was conducted in beef cattle in the state of Pahang, Malaysia. A total of 662 serum samples collected from 5 districts which involved 25 herds were tested using Rose Bengal Plate Test (RBPT), Complement Fixation Test (CFT) and (ELISA). The RBPT recorded 19 positive samples, while CFT showed 25 positives and ELISA 58 positives suggesting the prevalence of brucellosis based on the tests to be 2.9%, 3.8%, and 8.8%, respectively. Enzyme-linked Immunosorbent Assay was more sensitive but less specific and would be a useful screening technique. It could also possibly be considered as an alternative confirmatory test in combination with CFT which is more specific. These would make the diagnosis more accurate, reliable and competitive.

Keywords: *Brucella abortus*, RBPT, CFT, ELISA

Testicular Size and Semen Evaluation of Potential Breeder Bucks

Zamri Zainir, [1]Abdul Wahid Haron, [1]Rosnina Hj. Yusoff & [2]Mohd Azam Khan Goriman Khan

[1]Department of Veterinary Clinical Studies
Faculty of Veterinary Medicine, Universiti Putra Malaysia
[2]ar-Raudhah Biotech Farm Sdn Bhd

Abstract

Goat production in Malaysia is one of the focuses in livestock production as it is emphasized in Ninth Malaysia Plan. Buck plays important role in term of breeding to fulfill the demand for consumption of meat and other goat product by Malaysian. The ability of a buck as a breeder can be determined by Breeding Soundness Examination (BSE). This study was conducted to determine the breeding capacity in four potential breeder bucks (Cyclone, Ryno, CP and X2) in a goat farm in Selangor. Body weight and testicular size were obtained prior to semen collection. Semen collection was conducted using artificial vagina and semen parameters such as volume, sperm general motility, sperm progressive motility, sperm concentration, sperm live percentage and sperm abnormal morphology were evaluated to determine the breeding potential of the bucks. Four semen samples was obtained from each animal. Cyclone has body weight of 114.05 ± 0.03 kg, Ryno with 98.58 ± 1.22 kg, CP and X2 with 69.88 ± 0.15 kg and 59.15 ± 0.20 kg respectively. Cyclone has the largest scrotal circumference with 36 ± 0.00 cm, followed by Ryno with 29.75 ± 0.25 cm. CP has a scrotal circumference of 25.80 ± 0.25 cm and 28.75 ± 0.25 cm for X2. Cyclone produced 0.98 ± 0.19 mL of semen, Ryno with 0.8 ± 0.80 mL of semen, CP and X2 produced 0.88 ± 0.42 mL and 0.75 ± 0.20 mL of semen respectively. Sperm concentration of Cyclone is 5071.88 ± 797.30 x 10^6 sperm/mL. From Ryno, sperm concentration is 2681.25 ± 404.03 x 10^6 sperm/mL. CP and X2 are produced 3743.75 ± 289.59 x 10^6 sperm/mL and 5081.13 ± 1189.44 x 10^6 sperm/mL respectively. Sperm of Ryno has 78.75 ± 2.04% of general motility. CP produced 76.25 ± 5.15% of generally motile sperm whereas X2 produced 72.5 ± 6.61%. Among the four bucks, X2 has higher progressively motile sperm which was 91.25 ± 3.75% followed by Cyclone which was 77.50 ± 6.61% and Ryno with 77.50 ± 14.21%. Percentage of progressive sperm motility of CP was 73.75 ± 20.87%. X2 has the highest percentage of live sperm which is 64.90 ± 4.97% followed by CP with 61 ± 7.27%. Cyclone and Ryno produced 59.75 ± 7.92% and 54.84 ± 6.20% of live sperm respectively. All bucks have lower percentage of abnormal sperm with reference to the standard values of BSE. All bucks met the requirement in BSE and suitable as breeders.

Keywords: buck, breeding soundness examination, semen, testicular size