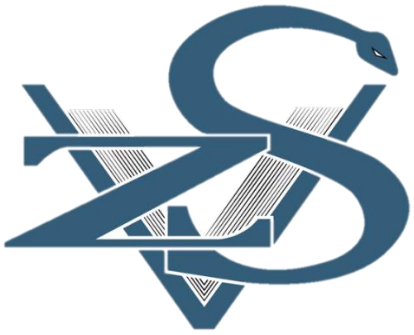
Faculty of Veterinary Medicine
University of Zagreb

International Congress
Veterinary Science and Profession

BOOK OF ABSTRACTS

ISSN 2806-8564




VETERINARSKI FAKULTET SVEUČILIŠTA U ZAGREBU
1919


UNIVERSITAS STUDIORUM ZAGRABIENSIS
MDCLXIX

10TH

INTERNATIONAL CONGRESS

VETERINARY SCIENCE AND PROFESSION

OCTOBER 5TH-7TH, 2023


ROYAL CANIN®
INCREDIBLE IN EVERY DETAIL


DDL
ZAGREB
Animal Health & Care

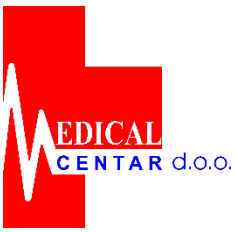

KRKA


medical intertrade


Dechra


BIG
BLUE


Arthrex®


MEDICAL
CENTAR d.o.o.


INDIBA®
revitalizing lives


MEDICINSKA
NAKLADA

ORGANISER

University of Zagreb

Faculty of Veterinary Medicine

ORGANISING COMMITTEE

President:

Zoran Vrbanac

Vice-presidents:

Nika Brkljača Bottegaro

Maja Lukač

Congress secretary:

Magdalena Kolenc

Local Organising Committee:

Lea Bakić, Maja Belić, Ivan Butković, Jelena Gotić, Ana Javor, Kim Korpes, Nino Maćešić, Maja Maurić Maljković, Marija Mamić, Sven Menčik, Tomislav Mikuš, Marko Poletto, Lada Radin, Vladimir Stevanović, Marin Torti, Ana Shek Vugrovečki, Dražen Vnuk, Ivan Zemljak

International Organising Committee:

Tibor Bartha, Danijela Kirovski, Atila Kos, Jana Mojžišova, Lazo Pendovski, Muhamed Smajlović, Ivan Stančić, Breda Jakovac Strajn, Peter Sotonyi, Martin Tomko, Petra Winter

Scientific Committee:

President: Marko Samardžija

Ivan Alić, Goran Bačić, Ljubo Barbić, Hrvoje Capak, Tatjana Vilibić-Čavlek, Martina Đuras, Anamaria Ekert Kabalin, Ivana Tlak Gajger, Gordana Gregurić-Gračner, Juraj Grizelj, Boris Habrun, Lorena Jemeršić, Ivana Kiš, Dean Konjević, Andrea Gudan-Kurilj, Dražen Matičić, Marko Pećin, Maja Popović, Krešimir Severin, Alen Slavica, Zrinka Štritof, Velimir Sušić, Danijela Horvatek Tomić, Nenad Turk, Ksenija Vlahović, Nevijo Zdolec, Ivona Žura Žaja

ISSN 2806-8564

All abstracts published in this Book of Abstracts have been reviewed by an international scientific board.

IMPRESSUM

Editors

Nika Brkljača Bottegaro, Maja Lukač, Zoran Vrbanac

Editorial Board

Magdalena Kolenc, Kim Korpes

Reviewers

Jasna Aladrović, Ivan Alić, Goran Bačić, Ljubo Barbić, Maja Belić, Nika Brkljača Bottegaro, Mirna Brkljačić, Diana Brozić, Ivan Butković, Hrvoje Capak, Martina Crnogaj, Tatjana Vilibić Čavlek, Petra Dmitrović, Martina Đuras, Ivana Tlak Gajger, Tomislav Gomerčić, Jelena Gotić, Željko Gottstein, Gordana Gregurić Gračner, Damjan Gračner, Darko Grden, Juraj Grizelj, Boris Habrun, Josipa Habuš, Suzana Hađina, Marko Hohšteter, Doroteja Huber, Anamaria Ekert Kabalin, Filip Kajin, Ivana Kiš, Dean Konjević, Gabrijela Jurkić Krsteska, Nada Kučer, Andrea Gudan Kurilj, Snježana Kužir, Maja Lukač, Nino Maćešić, Maja Maurić Maljković, Dražen Matičić, Vesna Matijatko, Sven Menčik, Tomislav Mikuš, Vladimir Mrljak, Andrija Musulin, Mario Ostović, Lana Pađen, Marko Pećin, Matko Perharić, Boris Pirkić, Valentina Plichta, Selma Pintarić, Marko Samardžija, Vladimir Savić, Krešimir Severin, Magda Sindičić, Alen Slavica, Muhamed Smajlović, Vladimir Stevanović, Iva Šmit, Zrinka Štritof, Danijela Horvatek Tomić, Marin Torti, Romana Turk, Ksenija Vlahović, Dražen Vnuk, Zoran Vrbanac, Ana Shek-Vugrovečki, Tajana Trbojević Vukičević, Lidija Medven Zagradišnik, Nevijo Zdolec, Ivan-Conrado Šoštarić-Zuckermann, Ivona Žura Žaja

Cover design

Kim Korpes

Publisher

Faculty of Veterinary Medicine, University of Zagreb

10 000 Zagreb, Heinzelova 55

Dear Esteemed Colleagues and Participants,

It is with great pleasure and enthusiasm that I welcome you to the 10th International Congress *Veterinary Science and Profession 2023*.

Our congress has evolved over the years into a global platform for the exchange of knowledge, ideas, and advancements in the field of veterinary science.

The congress promises to be an enriching experience, featuring a diverse range of sessions that delve into the most pressing issues facing veterinary professionals today. With a panel of distinguished international speakers, we will explore topics spanning *Veterinary Public Health, Farm Animals, Horses, Exotic and Wild Animals, Small Animals*, and *Free Communications*. It is our belief that the insights and discussions that emerge from these sessions will help shape the future of veterinary science and profession.

There are also nine workshops run by experts dedicated to a *hands-on* learning environment in order to advance the clinical, laboratory, and analytic skills of participants.

The *PhD Day* of the Faculty of Veterinary Medicine is part of the Congress as well. This is a valuable opportunity for young scientists to present their research and contribute to the advancement of veterinary medicine science.

The congress is held under the auspices of the President of the Republic of Croatia and Mayor of the City of Zagreb.

I would like to express my heartfelt gratitude to our invited speakers, participants, organizing committee, sponsors, and partners for their tireless efforts in making this congress a reality.

In conclusion, I hope that the 10th International Congress *Veterinary Science and Profession 2023* will be a memorable and transformative experience for all of us. Let us embrace this opportunity to come together, learn, and inspire one another as we work towards a brighter future for veterinary science.

Wishing you all the best!

Assoc. Prof. Zoran Vrbanac, DVM, PHD, DECVSMR, DACVSMR

President of the Organising Committee

Acknowledgements

The Congress and the production of these proceedings were supported by the following organisations:

Under the auspices of

The President of the Republic of Croatia

The City of Zagreb

Silver Sponsor

ROYAL CANIN LJUBLJANA d.o.o.

Bronze Sponsor

GENERA d.d.

DDL Zagreb d.o.o.

KRKA-FARMA d.o.o.

MEDICAL INTERTRADE d.o.o.

Sponsors

ARTHREX ADRIA d.o.o.

B.I.G. B.L.U.E. d.o.o.

INDIBA

MEDICAL CENTAR d.o.o.

MEDICINSKA NAKLADA d.o.o.

Additional support received from

THE FACULTY OF VETERINARY MEDICINE, UNIVERSITY OF ZAGREB

PROGRAMME

5/10/2023 THURSDAY - DAY 1

8.00-9.00 Registration *(Main Building)*

9.00-9.30 Opening ceremony *(Great Hall)*

9.30-10.10 Keynote lecture: **MARK BOWEN: TECHNOLOGY, TELEMEDICINE AND AI; FRIEND OR FOE?**

EQUINE SESSION *(Clinical Hall)*

10.20 -11.00 Invited lecture: **GAYLE HALLOWELL: Management of ophthalmic conditions in the horse**

11.00-11.15 **Medical and surgical treatment of eosinophilic keratitis in a 3-year-old warmblood horse** (K. Miljak, M. Mamić, N. Brkljača Bottegaro, J. Gotić, V. Plichta)

11.15-11.30 **An outbreak of ulcerative stomatitis associated with foxtail grass in a lipizzaner stud farm** (K. Miljak, D. Brozić, V. Stevanović, Lj. Barbić, A. Gudan Kurilj, J. Gotić, N. Brkljaca Bottegaro)

11.30.-12.00 *Coffee break, Screening of the LIFE Lynx film "Together for lynx"*

12.00-12.40 Invited lecture: **MARK BOWEN: What information can you get from a cardiac examination?**

12.40 -12.55 **Unusual clinical presentation of equine melanoma** (M. M M. Grioche, K. Miljak, D. Grden, N. Brkljča Bottegaro, J. Gotić)

12.55-13.10 **Incarceration of small intestine through a rent in the gastrosplenic ligament in a 14-year-old gelding** (M. Šćurić, J. Gotić, K. Miljak, I. Butković, L. Marković, D. Grden, N. Brkljača Bottegaro)

13.10-13.25 **Halotherapy as a potential treatment of horses with asthma-pilot study** (K. Miljak, D. Grden, E. Prokeš, M. Šćurić, N. Brkljača Bottegaro, Z. Vrbanac, V. Benko, J. Gotić)

13.25-13.40 **Beta-hemolytic streptococci isolated from horses in Croatia** (K. Fuš, S. Pintarić, S. Hađina, J. Habuš, M. Perharić, M. Cvetnić, I. Zečević, I. Benvin, Z. Štritof)

13.40-14.30 *Lunch, Poster session (Students' Hall)*

FREE COMMUNICATIONS SESSION *(Parasitology Practical Room)*

14.30-15.10 Invited lecture: **BOJAN HAMER: Bioremediation of the marine environment using cultivated bivalve shellfish and production of valuable biomass (mussel meal – shell powder)**

15.10-15.50 Invited lecture: **ALEKSANDRA DUGANDŽIĆ: Thermogenesis and the use of thermocameras in medicine**

15.50-16.05 **Antagonisation of intramuscular application of Rocuronium in rats by pentadecapeptide bpc 157** (J. Filipović, L. Pađen, A. Škrtić, S. Seiwerth, P. Sikirić)

16.05-16.20 **The importance of the veterinary profession in understanding the mass mortality events of wild bivalve populations - the example of the Pinna nobilis mortality** (T. Šarić, F. Carella, I. Župan, D. Palić, G. De Vico)

SMALL ANIMAL SESSION *(Great Hall)*

10.20 -11.00 Invited lecture: **ROSWITHA DORSCH: Feline lower urinary tract disease**

11.00 -11.40 Invited lecture: **RENÉ DÖRFELT: FLUTD – Emergency stabilization and anesthesia**

11.40.-12.00 *Coffee break*

12.00-12.40 Invited lecture: **JIMMY SAUNDERS: Diagnostic imaging of canine and feline urinary tract**

12.40-13.15 Panel all speakers

13.15-13.30 **Tumors of the urinary system in cats from Croatia** (D. Huber, L. Medven Zagradišnik, I.C Šoštarić-Zuckermann, A. Gudan Kurilj, B. Artuković, D. Vlahović, I. Mihoković Buhin, M. Hohšteter)

13.40-14.30 *Lunch, Poster session (Students' Hall)*

14.30-14.45 **Spinal computed tomography findings in French Bulldogs** (A. Javor, A. Kraljević, I. Bacan, B. Škrlin, F. Topolnjak, F. Kereković, Z. Vrbanac, H. Capak)

14.45-15.00 **Description of the canine population with spinal cord injury and the effect of treatment** (M. Kuricová, T. Lipták, S. Marešová, M. Hluchý, J. Fuchs)

15.00-15.15 **Retrospective study of ventricular arrhythmias in dogs examined at Clinic for Internal Diseases, Faculty of Veterinary Medicine, Zagreb (2018-2020)** (I. Filipčić, I. Jović, M. Torti)

15.15-15.30 **Epizootiology of retroviral infections in stray cats** (M. Perharić, B. Jagec, J. Habuš, S. Hađina, Z. Štritof, V. Stevanović, I. Benvin, I. Zečević)

6/10/2023 FRIDAY - DAY 2

8.00-9.00 Registration *(Main Building)*

FARM ANIMALS SESSION *(Clinical Hall)*

9.00 - 9.40 Invited lecture: **OŽBALT PODPEČAN: Cattle welfare through regular veternary health visits**

9.40 -10.10 Invited lecture: **LJUBODRAG STANIŠIĆ: Stallion semen collection and artificial insemination in field condition**

10.10-11.00 *Coffee break, Screening of the LIFE Lynx film "Together for lynx"*

11.00-11.20 **Effects of a metaphylactic butaphosphan and cyanocobalamin treatment on transition cow metabolism and health status** (T. Snedec)

11.20-11.40 **Serum haptoglobin concentrations in dairy cattle over the peripartal period – diagnostic tool for detection of diseases** (S. Džakula)

11.40-12.00 **Outcome of treatment in cows with complicated claw lesions** (D. Sobucka)

12.00-12.15 **Evaluation of body condition score in calves of busha cattle breed** (A. Piplica, A. Ekert Kabalin, M. Maurić Maljković, I. Vlahek, I. Sabolek, M. Ostović, V. Sušić, S. Menčik)

12.15-12.30 **Slaughter check assessment of pulmonary lesions and pleuritis in macedonian commercial pig farms** (B. Angjelovski, A. Janevski, J. Bojkovski, D. Mitrov)

12.30-12.45 **Distribution of buck spermatozoa in morphometrically distinct subpopulations in regard to values of kinetic parameters** (S. Čipčić, I. Žura Žaja, V. Berta, M. Lojkić, P. Prgomet, L. Rodman, S. Milinković Tur, B. Špoljarić, J. Pejaković Hlede, S. Vince)

12.45-13.00 **Results of virome monitoring in turkey poult production reveal possible vertical transmission and breach in biosecurity measures** (Ž. Gottstein, L. Lozica, E. Budicin, M. Lukač, D. Horvatek Tomić, S. Theuns)

13.00-14.00 *Lunch, Poster session (Students' Hall)*

PhD DAY *(Clinical Hall)*

14.00 - 14.10 Vice-dean **NINO MAĆEŠIĆ:** Introduction to a PhD Day

14.10 -14.25 Invited lecture: **DRAŽEN VNUK: Diagnostic significance of calprotectin in septic pigs**

14.25 -14.40 Invited lecture: **VELIMIR SUŠIĆ: Request for approval of the dissertation topic and lab book**

14.40-14.55 **Phenotypic and genotypic variations of reproductive performance indicators of sheep in accelerated lambing system** (I. Vlahek)

14.55-15.10 **Antimicrobial resistance of nontuberculous mycobacterium species isolated from domesticand wild animals** (I. Reil)

15.10-15.25 **Longitudinal study on Escherichia coli gene variability after application of autogenous vaccine in broiler breeder flocks** (L. Lozica)

15.25-15.40 **Effects of standardized ginger (zingiber officinale roscoe) extract on microbiome, gut morphology, antioxidative status and growth performance in broiler chickens** (M. Đurić Jarić)

15.40-15.55 **Influence of gastroesophageal reflux on surgical suture materials used for esophagotomy in pigs - ex vivo study** (V. Plichta)

15.55-16.10 Discussion

16.10-16.30 *Coffee break*

POSTER PRESENTATION– VEFUNIZG PhD students

- **Serum, tissue and proteomic analyses of testicular tumor markers in dogs** (M. Efendić)
- **Neuronal cell morphology on isogenic down syndrome model** (A. Plećaš)
- **Influence of herpesvirus infection on reproduction in goats** (J. Šavorić)
- **Ecological factors of lynx repopulation in Croatia** (I. Topličanec)
- **Copetin, new indicator of acute stress response** (M. Vučković)

VETERINARY PUBLIC HEALTH SESSION *(Great Hall)*

9.00-9.40 Invited lecture: **BENIAMINO TERZO CENCI GOGA: The importance of preslaughter procedures on the quality and safety of the meat**

9.40 -9.55 **Potential of microencapsulation in cheese production – development of innovative technology in dairy science** (M. Kiš, F. Oštarić, N. Mikulec, S. Kazazić, V. Dobranić, M. Vinceković, V. Čubrić Čurik, N. Zdolec)

9.55-10.10 **Development of new hard cheeses supplemented with Dalmatian medicinal and aromatic herbs: preliminary results of the ERDF project Center of competence 3LJ** (N. Zdolec, M. Kiš, M. Franičević, I. Kavain, J. Batinić, M. Zadravec, J. Pleadin, D. Čobanov)

10.10-11.00 *Coffee break, Screening of the LIFE Lynx film "Together for lynx"*

11.00-11.40 Invited lecture: **LUCIJA JURISIC: Towards the future: the role of veterinarians in the detection, characterization and control of zoonotic pathogens**

11.40-11.55 **Multistakeholder's knowledge, attitudes, and practices on poultry zoonoses in the provinces of Leyte and southern Leyte, Philippines** (A. M. M. Quilicot, D. G. E. Medallo)

11.55-12.10 **Bhanja Bandavirus: a neglected arbovirus of zoonotic importance in Croatia (**M. Bogdanić, V. Stevanović, V. Savić, S. Kovač, S. Krčmar, G. Miletić, D. Sabadi, M. Santini, T. Potočnik-Hunjadi, M. Al-Mufleh, Lj. Barbić, I. Ćorić, T. Vilibić-Čavlek)

12.10-12.25 **Seroprevalence and clinical signs of sars-cov-2 viral infection in dogs and cats in Croatia** (G. Miletić, S. Kovač, I. Ćorić, Lj. Barbić, I. Benvin, T. Vilibić-Čavlek, M: Maurić Maljković, V. Stevanović)

13.00-14.00 *Lunch, Poster session (Students Hall)*

EXOTIC AND WILD ANIMALS SESSION *(Great Hall)*

14.00 - 14.40 Invited lecture: **ZDENEK KNOTEK: Safe anaesthesia for reptile surgery**

14.40 -15.20 Invited lecture: **HELENE PENDL: Avian and reptilian ecoimmunology**

15.20-15.35 **Cytochemical Differentiation of Chelonian Leucocytes** (M. Mrkonjić, L. Odorčić, M. Lukač, I. Cizelj, S. Faraguna, M. Belić)

15.35-15.50 **Psittacine beak and feather disease in Moluccan eclectus parrots (Eclectus roratus) – a case report** (L. Lozica, E. Budicin, Ž. Gottstein)

15.50-16.05 **Thoracic rete mirabile in dolphins: blessing or curse?** (M. Đuras, K. Korpes, M. Kolenc, T. Trbojević Vukičević, T. Gomerčić)

16.05-16.20 *Coffee break*

16.20-16.35 **Clinical, laboratory and imaging manifestation of Encephalitozoon cuniculi infection in pet rabbits, Slovenia** (M. Škrbec, A. Dovč, N. Mlakar Hrženjak, B. Slavec, Z. Žlabravec, N. Kočar, O. Zorman Rojs, J. Račnik)

16.35-16.50 **Clinical approach to common reptile emergencies** (A. Nevistić, T. Mataušić, M. Lukač)

16.50-17.05 **Visualization of ossification during intrauterine development of wild boar** (N. Škvorc, D. Konjević, M. Bujanić, L. Bastiančić, S. Kužir)

17.05-17.20 **Age-related prevalence of Campylobacter spp. in breeding Yellow-legged Gulls** (B. Ječmenica, A. Humski, S. Duvnjak, L. Thomas Taylor, F. Krstulović, B. Šimpraga, T. Amšel Zelenika, L. Jurinović)

17.20-17.35 **Radiography as a method of sex determination in different species of monitor lizards** (T. Mataušić, A. Nevistić, I. Cizelj, D. Ivančan, I. Bacan, M. Lukač, H. Capak)

17.35-17.50 **Estimating Eurasian lynx population trends using minimum population count and individual survival** (I. Topličanec, S. Blašković, M. Sindičić, V. Slijepčević, I. Selanec, T. Sotinac, N. Fabijanić, J. Tomaić, T. Rukavina, T. Gomerčić)

18.00-18.30 *Closing and awards ceremony*

POSTER SESSION *(Students' Hall)*

1. **CAN A NOVEL BIOMARKER ASSESS PROGNOSIS AT THE TIME OF ADMISSION OF THE COLIC HORSE?**

Juliette Magoga, Jelena Gotić, Blanka Beer Ljubić, Krunoslav Bojanić, Vladimir Stevanović, Dražen Vnuk, Nika Brkljača Bottegaro

2. **CASE OF LARVAL CYATHOSTOMINOSIS IN A YOUNG STALLION IN CROATIA**

Nika Konstantinović, Ana Marija Kovač

3. **THE EFFECTS OF IONIZING RADIATION ON RED BLOOD CELLS PARAMETERS IN CHICKENS**

Marinko Vilić, Selim Pašić, Ivona Žura Žaja, Marija Majer, Nato Popara, Jadranka Pejaković Hlede

4. **CELL MORPHOLOGY OF THY1-YFP NEUROS**

Ante Plećaš, Ana Bekavac, Ivan Alić

5. **CLINICAL EVALUATION OF THE EFFECTS OF NOVEL POLYVINYL ALCOHOL/GENTAMICIN (PVA/GENT) AND POLYVINYL ALCOHOL/CHITOSAN/GENTAMICIN (PVA/CHI/GENT) HYDROGELS ON THE HEALING OF SECOND-DEGREE BURN WOUNDS USING A RAT ANIMAL MODEL**

Anja Nikolić, Ivan Milošević, Ana Janković, Milena Stevanović, Bogomir Bolka Prokić, Danica Marković, Anita Radovanović, Vesna Mišković-Stanković, Tijana Lužajić Božinovski

6. ***IN VIVO* EFFICACY OF GOLD NANOPARTICLES FOR PARKINSON'S DISEASE**

A. Gojanović, V. Dovečer, F. Vrban, M. Beus, P. Dolenec, N. Kalčec, N. Peranić, B. Bakan, I. Mamić, P. Turčić, V. Micek, K. Rotim, R. Frkanec, I. Vinković Vrček

7. **WAS THERE PIG PRODUCTION IN MONASTERIES DURING MIDDLE AGES IN CROATIA?**

Kim Korpes, Magdalena Kolenc, Martina Đuras, Tajana Trbojević Vukičević

8. **BIRDS FROM ARCHAEOLOGICAL SITE BIJELA, CROATIA: FOOD OR ACCIDENTAL FINDING**

Magdalena Kolenc, Kim Korpes, Tajana Trbojević Vukičević, Martina Đuras

9. **THERAPEUTIC EFFECT OF THE NUCLEOSIDE ANALOG GS-441524 IN A CAT WITH FELINE INFECTIOUS PERITONITIS**

Iva Zečević, Suzana Hađina, Josipa Habuš, Krešimir Martinković, Zrinka Štritof, Vladimir Stevanović, Iva Benvin, Hrvoje Capak, Matko Perharić

10. **DIAGNOSIS AND TREATMENT OF HANSEN TYPE II DISC DISEASE IN SIX CATS**

Tomáš Lipták, Scarlett Marešová, Filip Korim, Bisal Bhattarai, Mária Kuricová

11. **BOTTOM-HUNG WINDOW TRAUMA - REHABILITATION CHALLENGES IN A CAT**

Anita Kraljević, Niko Ivkić, Ana Javor, Jelena Adanić, Ivana Vuković, Iva Bacan, Hrvoje Capak, Zoran Vrbanac

12. BODY CONDITION SCORE IN CROATIAN SERVICE DOGS

Tea Dodig, Tihana Brkljačić, Paula Ćurić, Mirna Brkljačić

13. PREVALENCE OF ENDOCRINOPATHIES IN DOGS AND CATS

Paula Ćurić, Gabrijela Jurkić Krsteska, Tea Dodig, Ivana Kiš, Vesna Matijatko, Nada Kučer, Tihana Brkljačić, Mirna Brkljačić

14. SEVERE ARTERIAL THROMBOEMBOLISM IN A DOG WITH STAGE VB T-CELL LYMPHOMA – A CASE REPORT

Ivana Filipčić, Martina Crnogaj, Marin Torti, Andrea Gudan Kurilj

15. ETIOLOGY OF HYPOGLYCEMIA IN DOGS: A RETROSPECTIVE STUDY

Lucija Jeremić, David Mihaljević, Elizabeta Pongrac, Anja Raić, Luka Ećimović, Mirna Brkljačić

16. A CHALLENGING CASE OF CANINE ANGIOSTRONGYLOSIS – A CASE REPORT

Maša Efendić, Blanka Beer Ljubić, Dora Ivšić Škoda, Vlasta Đurić, Elizabeta Pongrac, Gabrijela Jurkić, Vesna Matijatko, Mirna Brkljačić, Nada Kučer, Marin Torti, Damjan Gračner, Dalibor Potočnjak, Hrvoje Capak, Dražen Vnuk, Nino Maćešić

17. CENTRAL NERVOUS SYSTEM NEOPLASIA AFFECTING THE PITUITARY GLAND RESULTING IN SUDDEN VISION LOSS IN A YOUNG FEMALE DOG – A CASE REPORT

Maša Efendić, Ivana Kiš, Elizabeta Pongrac, Gabrijela Jurkić, Karol Šimonji, Miroslav Vlašić, Nino Maćešić, Dražen Vnuk, Lidija Medven Zagradišnik, Dunja Vlahović

18. ANTIMICROBIAL SUSCEPTIBILITY OF BACTERIA ISOLATED FROM URINE OF DOGS WITH URINARY TRACT INFECTIONS

Ema Dojčinović, Dora Caušević, Selma Pintarić, Suzana Hađina, Josipa Habuš, Matko Perharić, Marija Cvetnić, Iva Zečević, Iva Benvin, Zrinka Štritof

19. LONGEVITY IN PET CATS AND THEIR LIFESTYLE

Ivana Sabolek, Mario Ostović, Branka Artuković, Andrea Gudan Kurilj, Ivan-Conrado Šoštarić-Zuckermann, Lidija Medven Zagradišnik, Doroteja Huber, Dunja Vlahović, Albert Trstenjak, Željko Pavičić, Kristina Matković, Marko Hohšteter

20. DIFFERENTIATION OF HISTIOCYTIC NEOPLASIA AND INFLAMMATORY LESIONS USING THE IBA1 IMMUNOHISTOCHEMICAL MARKER

Mavro Matasović, Karla Pavliček, Marko Hohšteter, Andrea Gudan Kurilj, Branka Artuković, Ivan-Conrado Šoštarić-Zuckermann, Doroteja Huber, Dunja Vlahović, Lidija Medven Zagradišnik

21. MULTIMODAL ANALGESIA AND ANESTHESIA FOR ORCHIECTOMY AND RADICAL BILATERAL INGUINAL MASTECTOMY IN A MALE GUINEA PIG

Klara Klašterka, Ivan Butković, Gabrijela Jurkić-Krsteska, Goran Bačić, Tugomir Karadjole, Nino Mačešić, Branimira Špoljarić, Ivan Folnožić, Silvijo Vince, Juraj Šavorić

22. FELV ASSOCIATED NON-REGENERATIVE ANAEMIA WITH CO-INFECTION WITH HAEMOTROPIC MYCOPLASMA – CASE REPORT

Iva Benvin, Iva Zečević, Krešimir Martinković, Suzana Hađina, Josipa Habuš, Zrinka Štritof, Ivona Ćorić, Vladimir Stevanović, Nenad Turk, Matko Perharić

23. BRACHIAL PLEXUS INJURY REHABILITATION IN A CAT – A CASE REPORT

Anita Kraljević, Valentina Plichta, Branimir Škrlin, Margarita Božiković, Ana Javor, Hrvoje Capak, Zoran Vrbanac

24. NODULAR GRANULOMATOUS EPISCLERITIS (NGE) IN A JAPANESE CHIN DOG

Mihovil Matković, Ivan-Conrado Šoštarić-Zuckermann, Boris Pirkić, Valentina Plichta, Marija Mamić

25. ATYPICAL PRESENTATION OF OSTEOMYELITIS IN A GERMAN SHEPHERD DOG – A CASE REPORT

Ana Javor, Maša Efendić, Iva Bacan, Anita Kraljević, Filip Topolnjak, Filip Kereković, Marko Hohšteter, Lidija Medven Zagradišnik, Mario Kreszinger, Dražen Vnuk, Zoran Vrbanac, Hrvoje Capak

26. MULTIPLE CARTILAGINOUS EXOSTOSIS CAUSING SPINAL CORD COMPRESSION IN A BULL TERRIER PUPPY – A CASE REPORT

Maša Efendić, Iva Bacan, Ana Javor, Hrvoje Capak, Elizabeta Pongrac, Iva Šmit, Martina Crnogaj, Ines Jović, Tea Dodig, Karol Šimonji, Nino Maćešić, Ivana Kiš

27. CORRELATION BETWEEN SERUM CALPROTECTIN AND DIFFERENT INFLAMMATORY RESPONSE BIOMARKERS IN DOGS

Nika Brkljača Bottegaro, Tara Kostanjšak, Ana-Maria Šimundić, Martina Crnogaj, Iva Šmit, Blanka Beer Ljubić, Krunoslav Bojanić, Borna Medić, Dražen Vnuk

28. CANINE ORAL MELANOCYTIC TUMORS: A RETROSPECTIVE STUDY OF 24 CASES

Lidija Medven Zagradišnik, Valentina Perković Miljković, Krešimir Severin, Andrea Gudan Kurilj, Branka Artuković, Ivan-Conrado Šoštarić-Zuckermann, Doroteja Huber, Ivana Mihoković Buhin, Dunja Vlahović, Marko Hohšteter

29. SETTING UP A PARR TEST AT THE DEPARTMENT OF VETERINARY PATHOLOGY, UNIVERSITY OF ZAGREB

Vida Eraghi, Dunja Vlahović, Iva Ciprić, Lidija Medven Zagradišnik, Marko Hohšteter, Doroteja Huber, Andrea Gudan Kurilj, Branka Artuković, Ivan-Conrado Šoštarić-Zuckermann, Vladimir Mrljak

30. DETERMINING THE AGE OF DOGS BASED ON COMPUTER ANALYSIS OF MACROPHOTOGRAPHY OF THE JAW

Mateo Makšan, Krunoslav Vinicki, Lidija Medven Zagradišnik, Vida Eraghi, Branka Artuković, Andrea Gudan Kurilj, Doroteja Huber, Ivan-Conrado Šoštarić-Zuckermann, Marko Hohšteter

31. PREVALENCE AND ANTIMICROBIAL SUSCEPTIBILITY OF *CORYNEBACTERIUM UREALYTICUM* ISOLATES FROM URINE OF DOGS AND CATS

Ena Bajić, Zrinka Štritof, Marija Cvetnić, Selma Pintarić

32. *ESCHERICHIA COLI* INFECTION IN NEWBORN PUPPIES- CASE REPORT

Lidija Medven Zagradišnik, Vida Eraghi, Iva Ciprić, Branka Artuković, Andrea Gudan Kurilj, Doroteja Huber, Dunja Vlahović, Marko Hohšteter, Zrinka Štritof, Ivan-Conrado Šoštarić-Zuckermann

33. SQUAMOUS CELL CARCINOMA OF THE OROPHARYNX WITH A SECONDARY CANDIDIASIS IN AN INDOOR PET HEN – A CASE REPORT

Emanuel Budicin, Liča Lozica, Ivan- Conrado Šoštarić- Zuckermann, Željko Gottstein

34. NON-INVASIVE MONITORING OF SARCOPTIC MANGE COMPATIBLE LESIONS IN RED FOXES (*VULPES VULPES*)

Barbara Nikolić, Laura Bakran, Ivona Mlakić, Tomislav Gomerčić, Ira Topličanec, Silvia Blašković, Magda Sindičić

35. SIMULTANEOUS ELECTROCUTION OF TWO GRIFFON VULTURE

Magdalena Palić, Marina Tišljar, Marko Modrić, Petar Džaja, Slaven Reljić, Krešimir Severin

36. ORHIECTOMY OF MARMOSET (CALLITHRIX JACCHUS)- CASE REPORT

Elizabeta Pongrac, Klara Klašterka, Ivan Folnožić, Juraj Šavorić, Ivan Butković

37. OPHTHALMOLOGICAL DISORDERS RELATED TO AN ORAL SQUAMOUS CELL CARCINOMA IN A NORTH AFRICAN HEDGEHOG (ATELERIX ALGIRUS) – A CASE REPORT

Paula Ćurić, Marija Mamić, Niko Ivkić, Katarina Miljak, Mirta Vučković

38. PRELIMINARY STUDY OF FATTY ACID COMPOSITION OF BRAIN TISSUE OF FREE-RANGING BROWN BEARS (*URSUS ARCTOS*) FROM CROATIA

Ivan Berečki, Jasna Aladrović, Agnieszka Sergiel, Đuro Huber, Lana Pađen

39. OPISTOGLYPHOUS SNAKES - SHOULD WE BE MORE CAREFUL?

Klara Kalčić, Josip Miljković

40. PRESCROTAL ORCHIDECTOMY OF RED SQUIRREL (*SCIURUS VULGARIS*)

Juraj Šavorić, Ivan Butković, Branimira Špoljarić, Martina Lojkić, Silvijo Vince, Nino Maćešić, Ivan Folnožić, Ivan Vlahek, Goran Bačić

41. EFFECTS OF LOW-DOSE IONIZING RADIATION ON PLASMA LIPIDS IN CHICKENS EXPOSED *IN OVO*

Jadranka Pejaković Hlede, Silvijo Vince, Ivona Žura Žaja, Marija Majer, Marinko Vilić

42. BIRTH WEIGHT, WEANING WEIGHT AND AVERAGE DAILY GAIN IN DALMATIAN PRAMENKA SHEEP FROM THE ISLAND OF BRAČ – A PRELIMINARY STUDY

Jasna Kusanović, Maja Maurić Maljković, Aneta Piplica, Velimir Sušić, Anamaria Ekert Kabalin, Sven Menčik, Ivan Vlahek

43. THE INCIDENCE AND BACTERIOLOGICAL ETIOLOGY OF CLINICAL MASTITIS ON SMALL FARMS WITH A TIE-STALL HOLDING SYSTEM

Aleksandar Janevski, Elena Mitrevska, Ivana Arsovska, Iskra Cvetkovikj, Silvana Andreevska, Angelce Todorovski, Oliver Markovski, Dine Mitrov

44. SOWS ERYTHROCYTE MORPHOMETRIC PARAMETERS AFTER *IN VITRO* BLOOD EXPOSURE AT 5G RADIOFREQUENCY ELECTROMAGNETIC RADIATION

Nikolino Žura, Silvio Vince, Marinko Vilić, Porin Perić, Ana Shek Vugrovečki, Josip Miljković, Krešimir Malarić, Velimir Berta, Saša Androci, Krešimir Tomašić, Nina Poljičak Milas, Suzana Milinković Tur, Ivona Žura Žaja

45. ANTIMICROBIAL SUSCEPTIBILITY OF LACTIC ACID BACTERIA ISOLATED FROM PAG SHEEP MILK, CURD, AND CHEESE

Ena Horvat, Marta Kiš, Snježana Kazazić, Fabijan Oštarić, Nataša Mikulec, Nevijo Zdolec

46. DETECTION OF *TPI, TCDA* AND *TCDB* GENES OF *CLOSTRIDIOIDES DIFFICILE* IN FECES OF HEALTHY DOGS AND DOGS WITH CLINICAL SIGNS OF GASTROINTESTINAL DISEASE

Magda Kamber, Vesna Mojčec Perko, Zrinka Štritof, Josipa Habuš, Vladimir Stevanović, Matko Perharić, Krešimir Martinković, Ljubo Barbić, Iva Zečević, Iva Benvin, Suzana Hađina

47. DEATH CASES IN CATTLE AS A SUSPECTED CONSEQUENCE OF VACCINATION AGAINST LUMPY SKIN DISEASE IN CROATIA

Hrvoje Pavasović, Iva Gruden Zdunić, Ena Oster, Nikola Čudina, Frane Božić

48. SERUM, TISSUE AND PROTEOMIC ANALYSES OF TESTICULAR TUMOR MARKERS IN DOGS

Maša Efendić

49. NEURONAL CELL MORPHOLOGY ON ISOGENIC DOWN SYNDROME MODEL

Ante Plećaš

50. INFLUENCE OF HERPESVIRUS INFECTION ON REPRODUCTION IN GOATS

Juraj Šavorić

51. ECOLOGICAL FACTORS OF LYNX REPOPULATION IN CROATIA

Ira Topličanec

52. COPETIN, NEW INDICATOR OF ACUTE STRESS RESPONSE

Mirta Vučković

TABLE OF CONTENTS:

ABSTRACTS

KEYNOTE LECTURE

TECHNOLOGY, TELEMEDICINE AND AI; FRIEND OR FOE?

Mark Bowen

BVetMed MMedSci (MedEd) PhD DipACVIM DipECEIM DipECVSMR PFHEA FRCVS

Director of Education, European Board of Veterinary Specialisation,

Medical Director medicine.vet equine referrals. UK

Expert in Education, VetCEE

Introduction

The veterinary world is undergoing a revolution in technology, diagnostic equipment is being miniaturised and made more affordable, giving the practitioner access to equipment that was traditionally only within the reach of University departments. However, as our access to diagnostic equipment grows, this creates a potential wealth of information within the clinic, sometimes before the expertise is developed to optimise the use of this data. In addition, a growth in wearable technology across species means that data on the wellbeing of animals under our care that may be able to predict subtle signs of disease well before clinical signs of disease are recognised. The data that these technologies offer are currently dispersed and not integrated in any meaningful way, but a future where technology could integrate these data sources provides and exciting opportunity for early recognition of disease, alongside accurate diagnostics and predictive algorithms will revolutionize veterinary medicine. That does not mean that the role of the veterinary surgeon will become obsolete, but it does mean that our role will change.

Diagnostic technologies

Over the last 20 years technology that was previously accessible in select university hospitals has become smaller, more mobile and more affordable. These bring both opportunities and risks to animal care and must still be used.

Diagnostic imaging

Radiography has made significant advances in technology and quality of image capture, moving from film systems to first computed radiography, that in th essentially created a digital scan of a temporary xray film, to digital radiography (DR), where the image is created instantaneously. The avoidance of expensive consumable film technology (silver) and toxic processing chemicals has revolutionized practice and removes the financial restrictions to repeating images that are less than optimal. Image quality from DR imaging is of the highest standard and continues to improve as sensor density improves, in the same way as digital camera technology has advanced to create ever more megapixels. As with all diagnostic imaging a key advantage is the ability to store and share images through an industry standard of digitally watermarked images (DICOM) providing the opportunity to share images across the world at the click of a button.

Tomographic imaging is becoming widely adopted within the sector, allowing standing imaging of the head and limbs of horses without anaesthesia using both CT (head and limbs) and MRI (limbs). The latest advance of helium free high field MRI scanning that has been created for the veterinary market is clearly going to impact on the whole MRI sector due to

the financial and environmental challenges caused by helium cooled coils. PET imaging has yet to show clinical value in clinical practice, and given the need for isotope creation is unlikely to reach clinical practice for some time.

Ultrasound technology has miniaturized and what was once transportable only in a large van, can now be taken in airline carry-on luggage, providing some of the highest standard of imaging wherever required. This support the ability for peripatetic specialists to provide occasional services in small animal practice setting, or for detailed high quality imaging to be undertaken in the most appropriate location for the animal. Point of care equipment provides the ability to use had held equipment, linked to a mobile phone for ultra-rapid diagnostics.

Cardiology

The miniaturisation of cardiac ultrasound equipment is of particular value in equine cardiology where examinations can be undertaken in the home environment, without the physiological impacts of the stress of transporting horses to a central location. This is further supported by high quality ECG devices that can be applied in an ambulatory setting in any species. Mobile phone enabled stethoscopes and ECG devices created the ability to record low cost ECG

Laboratory diagnostics

Point of care 'laboratory' diagnostics and wearable devices offer many opportunities to the clinic and mobile practitioner. This can be used to measure blood gasses, electrolytes and any number of analytes. Some of the most valuable of these include blood glucose, blood lactate and the acute phase proteins. However newer technology is providing access to point of care insulin determination based on ELISA technology as well as clinic based PCR technology meaning that clinics can undertake laboratory testing of a large number of pathogens in house with a very short testing period.

With point of care diagnostics, especially those cheapest devices manufactured for use in people it is important to consider validation in your target species. While direct agreement between a traditional laboratory device and point of care technology may not occur, the diagnostic function of the test; whether it can be used to identify disease and target therapy is more important than the specific correlation data. In ELISA based technology, consideration must be given to the antigen excess (prozone) effect, whereby spuriously low results may be obtained in animals with concentration of the marker outside the diagnostic accuracy of the test. This is a feature of antigen binding to both the membrane bound immunoglobulins and well as the detector molecules so that they prevent the formation of the traditional 'sandwich' that creates a detectable marker of disease.

Telemedicine

The veterinary profession has developed negative views of telemedicine in a number of countries due to concerns that, without a veterinary, patient-client relationship (VCPR), traditional veterinary practice will be excluded from preventive health and the management of chronic disease; being left simply with the most expensive aspects of employment of out of ours work. However vet to client telemedicine does offer the opportunity for practitioners to enhance an in-person VCPR, especially in remote locations. The common criticism of an inability to examine the animal is a challenge for technology, and regulators using a 'physical examination' as a regulatory mechanism have not considered how technology will adapt to this need.

Vet-to-vet telemedicine has been in use for many years, whether by telephone or, more recently, via video or peer to peer clients (eg WhatsApp). DICOM services provide a simple method for diagnostic images to be shared remotely across the globe, allowing specialist opinions to supplement the diagnostic tools discussed above. However this still requires the acquisition of diagnostic images, which is particularly challenging in ultrasound examinations. However, the concept of 'a specialist over your shoulder' can be delivered using tele-sonography, using video sharing platforms to allow real-time comments on diagnostic images with images subsequently shared using a DICOM platform.

The unanswered question about telemedicine in veterinary healthcare remains identity management; especially in vet-to-client consultations. A method to validate the identity of the consulting vet and confirm their right to practice in the country where the animal is present has not been addressed. This is an essential aspect of ensuring clients are receiving appropriate veterinary care using this platform.

Artificial intelligence

ChatGPT has enthralled the public with its ability to generate text based on relevant online resources, often referred to a 'generative AI'. Whereas most forms of AI applied to veterinary diagnostics are using more basic forms of machine learning (ML) to match patterns to previous diagnostics, or even outcomes. ML tools have been developed that can recognise abnormalities in radiographs, in some studies more accurately than human radiographers for specific disease (eg breast cancer in people). Model to look for a wider range of diseases are only as good as the data used to train the model. Importantly veterinary oversight and critique of those models are essential to understand the opportunities and limitations. ML is widely used in laboratory diagnostics, ECG recordings as well as diagnostic imaging. However the real value in ML would be the ability to predict outcomes and target therapy. For example an ML system would learn that a given image appearance would be most likely associated with a specific long term outcomes. However to generate this data, ML systems need accurate and structured data; a recent example where ML was taught to recognised human malignant melanoma was flawed by the use of clinical images (with rulers) against proven cases of malignant melanoma, while benign tumours had no rulers. The model worked perfectly; but learnt that images with rulers were malignant!

Generative AI using current tools are a potential threat to the veterinary profession, instead of clients arriving with pages of content from Google, there are already examples where clients have made a clinical diagnosis (that was correct) that was different to the veterinarian (who was incorrect) using ChatGPT. Although in most cases, the algorithm was given historical information that had not been shared with the veterinarian. Importantly we must not ignore these tools or dismiss them; indeed they are likely to become embedded into practice management software in future.

The main risks of false information arising from AI is that it risks reinforcing its own (potentially false) interpretation of data. If a model predicts a disease has a hopeless prognosis and recommends euthanasia, and vets follow this advice without question, then it will reinforce the model and ultimately begin to change behaviour of vets resulting in false conclusions being made, even when AI systems are not used. Disagreeing with ML recommendations requires particular commitment and skills.

Conclusions

Technology provides us with many opportunities to improve veterinary care to animals. However it remains essential that veterinary surgeons retain their skill sets in acquisition and interpretation and must be able to critically evaluate data from these tools ensuring the conclusions we draw are valid. While AI has the potential to enhance the use of large data sets to predict disease, outcome and treatment, we must retain our clinical autonomy as veterinary surgeons.

INVITED LECTURES

MANAGEMENT OF OPHTHALMIC CONDITIONS IN THE HORSE

Gayle D. Hallowell, MA VetMB PhD CertVA DipACVIM DipACVECC DipECVSMR PFHEA FRCVS

Equine Medicine Consultant, Pool House Equine Hospital; Director of Veterinary Professional Development, IVC Evidensia, Melton Mowbray, UK

gaylehallowell@yahoo.co.uk

Equine Vision

Horses have good vision and large eyes. Their big pupils take in a lot of light, and the size of their retina allows a high number of photoreceptors to be involved in light capture and processing. Rods, which are responsible for vision in dim light vastly outnumber cones, which are responsible for bright light vision as well as colour perception with the ratio lying between 9:1 and 20:1. These findings, alongside a large tapetum lucidum equip the horse for being well developed for night vision.

As horses are designed to spend most of their time outdoors and can be exposed to bright conditions, they have two mechanisms to protect the retina from photic damage: significant pupillary constriction and the corpora nigra. These corpora nigra are usually three in number – can be more or less and should be symmetrical between eyes.

Horses have a field of vision adapted to being prey animals. They have a panoramic field of view with the ability to see a long way in front and behind from both eyes; the payoff to this ability is that they are limited regarding binocular vision to approximately 65o, with the image generated being clearest in the centre and fading more peripherally. Blind spots occur at short distances in front and behind.

Although depth perception is dependent upon integration of different images perceived by the left and right eyes, horses with unilateral blindness do compete successfully in equestrian sports.

Horses have only two types of cone photoreceptors in the retina, compared to three in most humans. This results in sensitivity to the blue wavelength and to one that lies between green and red. This means that although can see colour, the richness and range of colour perception is not as extensive as in humans.

Vision assessment in the horse and ophthalmic examination

Techniques available for assessment of vision in the horse are somewhat crude as we can't ask them to read a set of different-sized letters. Sometimes the first clue that vision is compromised is derived from the history where horses are reticent in dark conditions, cope poorly when moving from light to dark (or vice versa) environments or start stopping or spooking when asked to jump fences. We can observe behaviour when stabled and walking, but it should be remembered that as horses are pray animals they are gifted at taking cues from their carer and can hide sometimes very severe vision impairments.

The next step is to perform a neuro-ophthalmic examination evaluating pupil size, ocular movement and reflexes and responses to light and touch, Menace response is not present in foals <7-10 days of age, which should be considered when evaluating vision in this age group.

Visualisation of both eyes is key to evaluating vision but also abnormalities of the eye. Whether disease appears to be unilateral or not, it is essential to perform a detailed examination of both eyes. I like to use a bright light (transilluminator or mobile phone light) to initially visualise the eyelids, eyelashes, corneal surface, anterior segment, iris, corpora nigra and to obtain a tapetal reflex. This is then followed up with evaluation using an ophthalmoscope to evaluate the lens, posterior segment and retina and for further evaluation of the anterior segment and cornea. Slit lamp evaluation can be utilised for detailed examination of the corneal surface, which is of particular value for assessment of keratitis and other corneal disease. For animals with corneal oedema and evaluation of lendicular disease and changes in the posterior segment, transpalpebral ultrasound can be invaluable in identifying and documenting the extent of the ocular disease. It can also be really useful to make decisions regarding the treatment of corneal disease if there are marked abnormalities in the eye such as retinal detachment or severe cataracts.

One of the challenges when assessing vision is that structural changes in the eye, particularly in the retina, don't always correlate with the degree of vision impairment that you would expect. Utilising other techniques such as obstacle courses and covering one eye and then the other can help to understand vision impairment better, but this can still be difficult to interpret.

Very rarely electroretinograms (ERG) can be used to evaluate the electrical function of the retina to verify whether the horse's photoreceptors and adjacent cells are fully functional. In certain cases, such as congenital stationary night blindness (inherited in the Appaloosa and a few other breeds), it may show that the photoreceptors are working but not transmitting the signal to the adjacent cells in the retina thus preventing the phototransduction process resulting in blindness.

Common ocular abnormalities in the horse

The most common eye problems affecting vision or the eye in the horse include:

- Corneal disease (e.g. ulcers, stromal abscesses, immune-mediated keratitis)
- Uveitis
- Cataracts
- Squamous cell carcinoma
- Iridic cysts

Corneal ulcers

Due to eye size and position, corneal ulcers are very common as abrasions can quickly become infected with bacteria, fungi or both. The key to success with corneal ulcers is prompt identification and treatment – part of your success as a vet is great owner education – any horse with a closed eye should be evaluated by a vet as soon as possible. Diagnosis can be made using a bright light and utilising topical stains – both fluorescein and rose Bengal have a role to play. Fluorescein identifies loss of corneal epithelial cells and rose Bengal loss of the protective layers above and below the epithelial cells. Corneal ulcers are usually associated with more generalised corneal oedema and thus evaluation of the rest of the eye with transpalpebral ultrasound is beneficial.

As ulcers heal from the edge and grow inwards, it is essential to repeatedly debride the ulcer until the growing epithelial cells are adhering to a healthy basement membrane. Grid keratectomy can often help encourage neovascularisation and subsequent ulcer healing, but needs extending to the limbus and not just over the ulcer itself. When debriding, collecting cells and staining can aid the diagnostic plan, especially in areas when fungal ocular disease is prevalent.

The mainstay of treatment will focus on utilising systemic analgesia such as NSAID's, topical atropine to help manage concurrent uveitis, topical antibiotics and antifungals. Other topical therapies that may be beneficial, particularly when managing melting ulcers due to Pseudomonas or fungi, include sterile EDTA and plasma. There always has to be a practical assessment of number of treatments versus reducing efficacy of individual therapies. This is true whether medicines are being instilled directly into the eye or using a subpalpebral lavage system. Clicker training horses for ocular medication makes this procedure easier and more effective.

Horses with superficial ulcers that respond promptly to treatment have good outcomes with minimal scarring. Severe corneal infections can be costly and have a higher prevalence of scarring, whether managed medically or surgically (e.g. conjunctival flap, amniotic graft etc.). A small proportion of horses don't respond to therapy and require enucleation.

Corneal stromal abscess

Corneal stromal abscesses develop secondary to microtrauma to the cornea that inoculate infectious organisms (fungus or bacteria) into a focal area of the cornea. There is usually a focal area of opacification with surrounding corneal oedema. The eye is often inappropriately painful for the degree of disease that can be visualised. Because the top layer of cells is intact, fluorescein stain is negative with this condition.

This condition can be managed medically or surgically – a diamond burr makes medical management of these conditions possible. Once the abscess has been externally exteriorised and a superficial ulcer created, it may then respond to management as per a corneal ulcer.

Immune-mediated keratitis

Immune-mediated keratitis presents as a painful eye with variable corneal oedema. It may be ulcerated or non-ulcerated depending on cause and severity.

Topical medications such as prednisolone, dexamethasone, cyclosporine or tacrolimus are the first line of treatment, with the steroidal drugs being avoided until corneal ulceration has resolved. Long-term cyclosporine (and other) implants can help control the disease. In some circumstances, a partial keratectomy is required to control the disease; some scarring may result.

Uveitis

Uveitis is inflammation of the uveal tract – the iris, ciliary body and choroid. This can occur spontaneously and as a one-off secondary to trauma or be associated with the syndrome equine recurrent uvieits (ERU). Inflammation of these important segments of the eye can result in permanent structural changes to the eye as well as blindness – the former is obviously important at pre-purchase examination. Examples of changes seen secondary to uveitis include anterior synechiae (connections between the iris and cornea), posterior synechiae

(connections/adhesions of the iris to the anterior segment od the lens) – both of which can limit the ability of the pupil to move. Iris rests are where segments of the iris are deposited on the inside surface of the cornea or anterior aspect of the lens. Cataracts, retinal degeneration and retinal detachment are all vision-impairing long-term effect of uveitis.

Equine Recurrent Uveitis, is seen in a high prevalence in certain geographical areas and breeds (e.g. Appaloosas and Warmbloods) and is the most common cause of blindness in horses. It is considered an immune-mediated disease with known genetic and environmental/infectious risk factors.

Management involves systemic NSAID's, topical atropine and topical steroids, cyclosporine or tacrolimus. Long-term management may require subchoroidal implants of cyclosporine (or other drugs). Other preventative measures include utilising eye shields or masks to reduce corneal exposure to wind and UV.

Iridic cysts

Iridic cysts are fluid-filled circular structures extending from the corpora nigra of the iris. While they do not cause harm to the eye, they can obscure vision and result in behaviour change, particularly in bright light when the pupil is small. The main differential diagnosis for these is intra-ocular melanomas which can be seen in horses with coat colours other than grey. Transpalpebral ultrasound can be used to confirm the diagnosis. Transcorneal aspiration or laser ablation can be used to remove these if there are causing clinical signs.

Cataracts

Cataracts are a frequent cause of visual impairment in horses. They can occur on their own or secondary to uveitis. Many cataracts do not progress and ultrasound alongside a full ophthalmic examination can aid accurate categorisation. Cataracts can be removed surgically.

Squamous Cell Carcinoma

Squamous cell carcinoma is the most common neoplasm affecting the eyelid and ocular surface in horses. Several breeds, including Gypsy cobs, Haflingers, Belgians and other heavy breeds, are genetically predisposed to developing this cancer and/or associated with pink skin and exposure to UV light.

Treatment depends on the size and location of the tumour, but the smaller the tumour, usually the easier the treatment and helps reduce the risk of local metastasis. Several options are available and these include surgery (removal of the third eyelid or partial keratectomy), chemotherapy (particularly topical 5-fluorouracil or mitomycin), cryotherapy, and radiation therapy. In some cases, enucleation is recommended to reduce risk of local metastasis.

Prevention in sunny climates, at risk breeds and those with pink skin around their eyes should wear fly masks with 90% prevention of UV whenever they are outdoors.

Managing blind horses

Horses adjust to loss of vision on an individual basis – some cope very well and others less so. Blind horses need to live in a safe and consistent environment – whether a stall, paddock, or pasture – without obstacles that may harm them. Having a companion, that ideally wears a bell, can be very helpful and even in bilaterally blind animals can be almost impossible to tell that they are blind when observed at a distance. A consistent routine with the same handlers,

feeding times, placement of food and water buckets and consistent companions is very important. Verbal cues when around the horse are also essential.

Conclusions

Majority of ocular conditions can be successfully diagnosed and managed in the field using basic equipment and techniques. Fly masks to prevent further episodes and well-educated clients that present cases early improve success of treatment. Repeated follow-ups with pictures sent by clients or repeated examinations allows for changes in management to occur promptly. Debridement of corneal ulcers is your friend – everyone should have a diamond burr!

WHAT INFORMATION CAN YOU GET FROM A CARDIAC EXAMINATION?

Mark Bowen, BVetMed MMedSci(MedEd) PhD DipACVIM DipECEIM DipECVSMR PFHEA FRCVS

Director of Education, European Board of Veterinary Specialisation,

Medical Director medicine.vet equine referrals, UK

Expert in Education, VetCEE

Introduction

Findings consistent with cardiac disease, the presence of cardiac murmurs or rhythm disturbances, are very common in horses, while the presence of heart failure, resulting in poor performance, collapse or death are uncommon. While advanced diagnostics (eg echocardiography and electrocardiography) can be essential in categorising these conditions, the most important aspect of a case evaluations remains the clinical examination. In this session we will discuss how to make the most of your cardiac physical examination in order to categorise cardiac disease, and ultimately determine which animals justify more specialist assessment and/or retirement.

Cardiac auscultation

Although not the only aspect of the examination that is important, this is the most important and justifies time, in a quite environment to maximise your diagnostic opportunities. Categorising cardiac murmurs or arrhythmias will enable the practitioner to determine a diagnosis in the majority of cases and therefore provide valuable information to owners.

Cardiac murmurs

The most important factors in determining the cause of a cardiac murmur are the timing and point of maximal intensity of any cardiac murmur. In large animals, making the assumption that murmurs audible on both sides of the heart are caused by two different pathologies will facilitate decision making, although occasionally you may ultimately conclude them to be the same, especially diastolic murmur of aortic valve regurgitation. Radiation of the murmur, the direction in which the sound travels (dorsally or ventrally) can also be important in some murmurs, especially differentiating a murmur of tricuspid valve regurgitation (dorsal radiation) from a ventricular septal defect (ventral radiation). Murmur intensity can be helpful for determining the importance of some disorder, but is a poor indicator of severity. Differentiating physiological from pathological causes of murmurs is very important, since the former require not special attention.

Dysrrhythmias

Rhythm disturbances are common in fit competition horse, typically second degree AV block, that resolves as vagal tone is removed. However exercise is often a poor differentiator of these from pathological abnormalities. Respiratory sinus arrhythmia is also seen in horses, especially at the end of exercise and may result in confusing findings. Atrial fibrillation is the most important abnormality in horses and may occur alone (without mitral or tricuspid valve regurgitation) or may occur secondary to chamber enlargement.

Differentiation of arrhythmias often requires an ECG and multiple mobile phone based low cost ECG systems can be used to definitively diagnose these abnormalities and allows for ready referral for specialist opinion.

Further examination

Horses with severe valvular pathology may require further examination. The ACVIM consensus statement suggests that horses with pathological murmur louder than grade 3 should undergo further examination using echocardiography to document chamber enlargement and the presence of pulmonary hypertension, which can be fatal during high speed exercise.

Horses with aortic valve regurgitation or atrial fibrillation should undergo exercising electrocardiography in order to rule out pathological arrhythmias at exercise that may predict a high likelihood of collapse and/death during high speed exercise.

Table 1 PMI – point of maximal intensity. LIC left intercostal space, RIC right intercostal space. CHF Congestive heart failure

	Murmur/Asculation	Issues	Marker of severity
Physiological flow murmur	Systolic PMI LIC4 (or diastolic)	None	Never significant
Mitral regurgitation	Systolic PMI LIC5	Atrial fibrillation PA dilation (rup)	Loud third heart sound Echo
Tricuspid regurgitation	Systolic PMI RIC4 radiating dorsally	Atrial fibrillation	Loud third heart sound Echo
VSD	Systolic RIC4 radiating ventrally. Also LIC4 (PS)	CHF if severe	Echocardiography required
Aortic regurgitation	Diastolic	Dysrhythmias at exercise	Hyperkinetic pulse, ECG, Echo
Ruptured aortic root	Continuous	Severe	Poor px
Atrial fibrillation	May have Mitral murmur No 4th heart sound Irregularly irregular	Dysrhythmias at exercise	Mitral murmur Exercising ECG required
Second degree AV block	Regularly irregular		Normal finding, resolves with exercise
Sinus arrhythmia	Fluctuating rhythm		Normal finding, resolves with exercise

BIOREMEDIATION OF THE MARINE ENVIRONMENT USING CULTIVATED BIVALVE SHELLFISH AND PRODUCTION OF VALUABLE BIOMASS (MUSSEL MEAL – SHELL POWDER)

Prof. dr. sc. Bojan Hamer

Laboratory for Marine Nanotechnology and Biotechnology, Center for Marine Research, Ruđer Bošković Institute, Rovinj, Croatia (bhamer@irb.hr)

Mussel *Mytilus galloprovincialis* is an important commercial mariculture species and a powerful bioindicator often used to assess marine pollution. Due to the increasing demand for mussels for human consumption and anthropogenic pressure on coastal marine environments, there is a shortage of new mussel farming areas. As part of the ERA-NET BlueBio – MuMiFaST project, this study aimed to demonstrate the concept of bioremediation of the local marine environment (water column) through ecosystem services provided by the mussels *M. galloprovincialis* in the vicinity of the UPOV wastewater outfall Cuvi, as the mussels *Mytilus* sp. can philtre up to 2-5 L of seawater per hour. Purification of the water column and prevention of the spread of pollutants were demonstrated in laboratory aquaria (30 L) and backyard pools (1 m^3), where filtration by mussels and pseudo/faeces generation enhanced natural suspended matter sedimentation by 20-60% and removal of microplastics (0.5 mm cellulose acetate fibres) by up to 100%.

From undersized and juvenile mussels with an initial size of < 5 cm grown from August 2022 to May 2023, we produced approximately 400 kg of mussels at the Cuvi site and 600 kg at the control site in Lim Bay mussel farm. After harvesting the mussels and determining their vitality, meat yield, and possible contaminants (heavy metals, PAHs, PCBs, microplastics), the mussel meal produced was analysed for its nutritional content (proteins, carbohydrates, fats, water, ash, NaCl). Comparing the results of the nutritional and contaminant analyses, it can be generally concluded that mussel meal from Lim Bay mussels has a higher lipid-carbohydrate content (better quality) and that mussel meal from both sites complies with the EU regulation on permitted levels of contaminants in seafood (EU 2023/915).

In addition to environmental remediation, mussels were primarily used to produce mussel meal (meat powder), which was used as a feed additive to commercial fish feed in a feeding trial with sea bream *Sparus aurata* (July-September 2023) to promote their growth. Undersized mussels from mariculture, as well as mussels grown outside of mussel farming areas (e.g. UPOV Cuvi vicinity), can also be used as a source of valuable biomass in the circular economy.

Key words: *Mytilus galloprovincialis*, Bioremediation, Biomass production, Mussel meal, Municipal wastewater treatment plant Cuvi

THERMOGENESIS AND THE USE OF THERMOCAMERAS IN MEDICINE

Prof. dr. sc. Aleksandra Dugandžić

Katedra za fiziologiju i imunologiju, Medicinski fakultet, Zagreb

In the past few years, infrared thermography (IRT) has found its application not only in the military and construction, but also in biological professions. In veterinary medicine in addition to measuring body temperature remotely, IRT can determine changes in surface blood circulation (inflammation or sympathetic activation), detect pain in your pats, bone neoplasia in dogs, even diagnose pregnancy. In horses IRT can help in diagnosing arthritis, hoof abscesses, soft tissue damage, tendon damage, ect. In laboratory conditions, IRT is recently used for determining thermogenesis by measuring activity of brown adipose tissue (BAT) instead of previously used positron emission tomography computed tomography (PET-CT). The infrared camera software calculates the object's temperature using distance from the object, skin emissivity, reflected room temperature, air temperature, and relative humidity. Changes in BAT activity measured by infrared thermography, a noninvasive and more sensitive method, were shown to be sex, age, and phase of the estrous cycle dependent in laboratory animals. This method is also a variable tool for determining possible activating drugs that could rejuvenate BAT activity which will be important for elderly and diabetic patients.

FELINE LOWER URINARY TRACT DISEASE

Priv.-Doz., Dr. med. vet., Dr. med. vet. habil. Roswitha Dorsch

Diplomate ECVIM-CA (Internal Medicine)
EBVS® European Veterinary Specialist in Small Animal Internal Medicine

Clinic for Small Animal Medicine, Ludwig Maximilian University Munich

Feline lower urinary tract disease (FLUTD) is a common reason for cat owners to seek veterinary care. Cats with any disease of the lower urinary tract present with similar clinical signs, such as hematuria, pollakiuria, stranguria, voiding outside the litter box, and/or urethral obstruction. In the literature, there is a consensus that feline idiopathic cystitis (FIC) is the most common diagnosis in cats with FLUTD and accounts for clinical signs in 55 to 69% of cats and 15 to 30% of cats have stones (Lekcharoensuk et al., 2001; Gerber et al., 2008; Saevik et al., 2011). The proportion of cats with urinary tract infections (UTI), however, differs across the literature. Studies from the United States show that less than 3% of young and middle-aged cats with signs of FLUTD suffer from UTI (3), while studies performed in Europe (Switzerland, Norway, Germany) reveal a higher proportion of 8 to 20% (Saevik et al., 2011; Dorsch et al., 2014).

There are significant age-related differences in the incidence of the various causes of FLUTD It has been shown that in cats younger than 10 years, FIC is diagnosed in 65% of patients with FLUTD but only in 35% of cats older than 10 years. UTI and neoplasia were significantly more common in cats over 10 years than in younger cats (UTI 42% vs. 13.4%; neoplasia 12.9% vs. 1%) (Dorsch et al., 2014).

A diagnostic work-up is mandatory to identify the cause of FLUTD. This includes a urinalysis (dipstick, urine sediment, aerobic urine culture), abdominal radiographs to identify radio-dense cystoliths or urethroliths, and ultrasound of the urinary tract to exclude radiolucent cystoliths and focal bladder abnormalities such as polyps or neoplasms. If no specific cause can be identified, the disease is classified as idiopathic cystitis. Double contrast cystoscopy and transurethral cystoscopy are also helpful to exclude radiolucent cystoliths and confirm the presence of FIC.

Urethral obstruction is a common complication associated with FLUTD in male cats. The treatment of cats with obstructive FLUTD includes circulatory support with fluid therapy and oxygen administration, treatment of metabolic complications such as hyperkalemia and metabolic acidosis, analgesia, and reestablishment of urine flow by urinary catheterization with or without previous decompressive cystocentesis. Opinions on the use of decompressive cystocentesis are controversial. Possible risks associated with decompressive cystocentesis include: bladder rupture caused by puncture of an already compromised, ischemic bladder wall, additional damage to the already inflamed urinary bladder, and iatrogenic damage to the aorta or another abdominal organ. On the other hand, benefits of decompressive cystocentesis include immediate relief of patient discomfort due to bladder overdistension and relief of backpressure of urine to the kidney. There is more time for patient stabilization for sedation and catheterization of the urinary bladder. Two studies have shown that a single decompressive cystocentesis followed by placement of an indwelling urinary catheter is associated with a low risk of bladder rupture or urine leakage (Gerken et al., 2018; Reineke et al., 2021). A benefit regarding the ease of catheterization and duration of hospitalization could

not be demonstrated. For collection of urine via the indwelling urinary catheter, a closed collection system should be used. Due to the low percentage of UTIs causing urethral obstruction, treatment with antibiotics is rarely necessary and use of prophylactic antibiotic treatment is strongly discouraged. One third of cats with an indwelling urinary catheter for 48 hours develop significant bacteriuria. Only cats with significant bacteriuria should be treated with antimicrobial agents. Unless there is evidence of pyelonephritis or septicemia, antibiotics should be administered only after removal of the indwelling catheter.

Repeated urethral obstructions are seen in 17 – 58% of cats. These can be caused by debris in the bladder that move into the urethra causing a new urethral plug, by spasm of the urethra due to urethritis, urethral injury and stricture formation, and a urethral calculus. The fact that a urinary catheter can be passed does not exclude the presence of a urethral calculus. Documentation of the site and extent of urethral strictures or urethral neoplasia are best accomplished by positive contrast urethrography. Studies report a lower risk of recurrent urethral obstruction with the use of smaller catheters and indwelling catheters for more than 26 hours but not more than 48 hours.

After relieve of obstruction and treatment of metabolic complications, therapy is dependent on the underlying cause. For non-obstructing struvite cystoliths dietary dissolution therapy is indicated. Calcium oxalate stones require mechanical removal. For idiopathic cystitis, a variety of pharmacological approaches have been proposed. So far, there is only evidence for multimodal environmental enrichment and modification (MEMO), increased water intake and dietary therapy to have a significant effect on recurrence. Treatment with the α1-adrenoceptor antagonist prazosin had no positive effect on the proportion of cats with recurrent obstruction (Conway et al., 2022). No significant effect of pheromone treatment has been demonstrated. However, a tendency towards improvement of clinical signs of FIC was reported in one study. Oral or intra-vesical administration of glycosaminoglycans have so far not been reported beneficial.

Lekcharoensuk C, Osborne CA, Lulich JP. Epidemiologic study of risk factors for lower urinary tract diseases in cats. J Am Vet Med Assoc. 2001;218(9):1429-35.

Gerber B, Boretti FS, Kley S, Laluha P, Muller C, Sieber N, et al. Evaluation of clinical signs and causes of lower urinary tract disease in European cats. J Small Anim Pract. 2005;46(12):571-
Saevik BK, Trangerud C, Ottesen N, Sorum H, Eggertsdottir AV. Causes of lower urinary tract disease in Norwegian cats. J Feline Med Surg. 2011;13(6):410-7.
Dorsch R, Remer C, Sauter-Louis C, Hartmann K. Feline lower urinary tract disease in a German cat population. A retrospective analysis of demographic data, causes and clinical signs. Tierarztl Prax (K) 2014;42(4):231-9.
Bartges JW, Barsanti JA. Bacterial urinary tract infections in cats. In: Bonagura JD, editor. Current Veterinary Therapy XIII. Philadelphia: Elsevier/Saunders; 2000. p. 880-3.
Gerken KG, Cooper ES, Amy L Butler AL, Dennis J Chew DJ. Association of abdominal effusion with a single decompressive cystocentesis prior to catheterization in male cats with urethral obstruction. J Vet Emerg Crit Care. 2020; 30(1):11-17.
Reineke EL, Cooper ES, Takacs JD, Suran JN, Kenneth J Drobatz KJ. Multicenter evaluation of decompressive cystocentesis in the treatment of cats with urethral obstruction. J Am Vet Med Assoc.2021;258(5):483-492.

Conway DS, Rozanski EA, AS. Prazosin administration increases the rate of recurrent urethral obstruction in cats: 388 cases. Med Assoc.2022;260(S2):7-11.

FLUTD - EMERGENCY STABILIZATION AND ANESTHESIA

René Dörfelt

Diplomate ECVECC (Emergency and Critical Care)
Diplomate ECVAA (Anaesthesia and Analgesia)
EBVS® European Veterinary Specialist in Emergency and Critical Care
Fachtierarzt für Anästhesiologie, Intensivmedizin und Schmerztherapie
Fachtierarzt für Kleintiere

LMU Small Animal Clinic, Munich, Germany

Male cats with urinary tract obstruction are commonly presented to the emergency service. They can be presented almost without systemic deviations if the disease is detected very early or in almost dying conditions in longer disease processes of 24 hours or more.

The primary aim of the emergency examination is to evaluate the patient's cardiovascular status. If the cats are bradycardic the cause should be evaluated As soon as possible. Bradycardia can be caused by hypothermia or hyperkalemia. The optimal way to evaluate the cause is an ECG. In hyperkalemia, the ECG shows small P waves, increased P-Q distance, high and wide QRS complexes, and high and tented t-waves. If hyperkalemia is the cause of bradycardia, calcium gluconate should be used to improve the conductivity of the myocardium.

Cats are often acidodic which should be considered during sedation and anesthesia.

Besides adequate shock fluids (10 ml/kg balanced fluids IV in 10 minutes) adequate analgesia using opioids is required for pain relief.

Cystocentesis can be considered to reduce pressure on the urethra and potassium levels. Side effects can be increased vagal tone or uroabdomen. Placement of a urinary catheter is mandatory to unblock the cats. Often sedation of general anesthesia is required for this procedure. Anesthesia should be performed depending on the ASA status and the systemic complications of the diseases. If the cat is systemic stabile an alpha-2-agonist-based protocol is often used. In more critical patients cardiovascular or respiratory depressant drugs should be avoided. Sometimes general anesthesia is preferred over sedation especially if the patients are acidotic as mechanical ventilation can be initiated to control CO2 values. Whatever technique is used, intravenous access, and oxygen support are mandatory. For general anesthesia airway protection (Intubation) and complex monitoring especially using capnography in acidotic cats is also required as reliable cardiovascular monitoring using an ECG. Local anesthetic techniques such as epidural anesthesia may also help to enable catheter placement in critically ill cats.

DIAGNOSTIC IMAGING OF CANINE AND FELINE URINARY TRACT

Prof. Jimmy Saunders, DVM, PhD, CertVR, DECVD

Ghent University, Medical Imaging, Faculty of Veterinary Medicine, Merelbeke, Belgium

Urinary tract imaging depends on expense, time, equipment availability, and familiarity in the image method. Radiography and ultrasonography are widely available and relatively inexpensive. However, radiography is limited since the organ's internal architecture cannot be studied and ultrasonography (US) is time consuming (clipping and procedure) and requires operator experience. Therefore, computed tomography, more and more available in the veterinary practice, is increasingly used for imaging the urinary tract, and even the abdomen in general. Little use is made of nuclear medicine and magnetic resonance imaging (MRI) in the daily practice.

Since ultrasonography has become widely available, plain radiography is mainly performed to provide a global image of the abdomen and to visualize urinary tract stones. Intravenous urography (IVU) provides a better visualization of the urinary tract allowing to evaluate renal, ureteral and bladder size, shape, and position. However, performing an IVU is time-consuming and the quality of the examination is affected by glomerular filtration and urine specific gravity. Cystography (positive, pneumo-, or double contrast cystogram) and urethrography are easy procedures that are still routinely performed e.g. for diagnosis of post-traumatic rupture. Ultrasonography allows to differentiate the origin of a renomegaly or to identify focal renal lesions. Ultrasonography is an ideal imaging modality for routine examination of the urinary bladder, due to the anechoic content (urine) and superficial location in the caudal abdomen. However, the operator should be careful by making diagnosis as ultrasonography of the urinary bladder is subject to many artifacts. Contrast-enhanced ultrasonography (CEUS) using microbubbles is a pure blood marker that can provide useful information on the kidney function but it’s quite expensive, requires specific software and shows quite important individual variation. Elastography avoids some of the CEUS shortcomings but is still in an experimental phase for evaluation of the kidneys. Computed tomography (CT) is the imaging modality that showed the biggest advancement on imaging of the urinary tract in the last years. CT provides a detailed morphological evaluation of the entire urinary tract in a few minutes, being mainly indicated in large dogs where US is “heavy to perform”. CT became the imaging method of reference for diagnosis of ectopic ureters. Scintigraphy can determine each kidney's contribution to total and is indicated pre-nephrectomy. Little use is made from MRI for imaging the urinary tract in mainly due to its low availability and high cost.

During this presentation, all these imaging modalities will be reviewed for imaging the different structures of the urinary tract (kidneys, ureters, bladder and urethra).

SAFE ANAESTHESIA FOR REPTILE SURGERY

Prof. Zdenek (Sid) Knotek, DVM Ph.D Dipl ECZM (Herpetological Medicine and Surgery)

Avian and Exotic Animal Clinic, Faculty of Veterinary Medicine, University of Veterinary Sciences Brno, Czech Republic

The anaesthetic management of reptile patients is always challenging. The low metabolic activity and relatively low oxygen consumption of these animals require special consideration during induction, maintenance and recovery. Pathologic conditions are commonly present in reptiles, and these may complicate anaesthetic management (e.g. dehydration, ascites, intestinal tympany, anaemia and/or hypoglycaemia, dystocia, etc.)

Pre-anaesthetic assessment

All patients should be physically examined and full haematology, biochemistry and radiographs should be performed prior to considering anaesthesia. The minimal tests needed include packed cell volume (PCV), complete blood count (CBC), concentrations of total protein (TP), glucose, phosphorus and uric acid. Preoperative care includes intensive fluid therapy. Keeping the patient warm with electric heating pad (30 - 37.5 °C) during and after anaesthesia is mandatory. Intravenous (IV), intraosseous (IO), subcutaneous (SC) or intracœlomic (ICe) fluid support is indicated in dehydrated individuals, based on the results of the diagnostic procedures. Preoperative fasting is recommended in all cases of chelonian anaesthesia unless surgery is performed as an emergency procedure. Parasympatholytics (atropine or glycopyrrolate) to reduce secretions and prevent bradycardia are not generally indicated in reptiles; however, atropine does appear to be clinically effective in management of bradycardia in some marine turtle species. Various combinations of anaesthetics with analgesics have been recommended for surgical procedures in reptiles. The standard protocol for reptile anaesthesia is based on the use of inhalation anaesthesia after induction with alfaxalone or propofol. Intubation in chameleons is a difficult procedure that must be done with patience and delicacy. Respiratory rate should range from 4 to 10 breaths per minute.

Analgesia

Selection of a suitable analgesic protocol (drugs, interactions, frequency of administration, doses) should be made in conjunction with an assessment of the unique metabolic and pharmacokinetic processes that occur in the wide spectrum of different groups of reptiles. Opioids act by modulating nociception in the periphery, the spinal cord and supraspinal areas of the central nervous system. The use of opioids in reptiles undergoing invasive surgery is generally recommended. In combination with anaesthetic agents, opioids help to reduce the dose of anaesthetics required. Opioids administered to reptiles are not associated with major changes in heart rate, respiratory rate, sedation or excitement. Studies showed that butorphanol did not provide adequate analgesia (infrared heat stimuli to the hind limbs) and caused short-term respiratory depression in a group of red-eared terrapins, while morphine provided analgesia with long-lasting respiratory depression. The μ-agonist tramadol is an effective analgesic drug that is safer than morphine in analgesia of semi-aquatic terrapins.20 Recent studies suggest that some opioid drugs with μ-agonist activity would be the most adequate for reptilian anaesthesia/analgesia. Morphine and tramadol seem to be the analgesic

agents of choice. Published data exist with respect to the efficacy of non-steroidal anti-inflammatory drugs (NSAIDs) in reptiles (meloxicam, carprofen).

Administration routes

Spinal (intrathecal) anaesthesia

Several studies investigated the feasibility and efficacy of spinal anaesthesia in chelonians in red-eared terrapins. Intrathecal administration of lidocaine proved to be a feasible and effective technique for induction of spinal anaesthesia in chelonians. Preservative-free 2% lidocaine (4mg/kg) was administered into the intrathecal space at the level of the proximal coccygeal vertebrae. Spinal anaesthesia was used successfully also for surgery on giant tortoises.

Parenteral anaesthesia

Intramuscular (IM) or subcutaneous (SC) injections are preferably administered into the cranial part of the patient body (forelimbs of lizards and chelonians). Subcutaneous administration achieves the same depth of anaesthesia as the intramuscular route and should be considered as an easy form of administration, particularly for the injection of large drug volumes. Vascular access is more difficult in chelonians when compared to other reptile species. The subcarapacial plexus (subcarapacial sinus, sub vertebral sinus) is the optimal site for intravenous injections in chelonians. Observations of possible adverse effects of subcarapacial venepuncture (with high risk of erroneous sub meningeal administration) have been documented. Jugular or dorsal coccygeal veins are easily catheterized in large tortoises, but it is difficult to use them for intravenous administration in medium to small turtles and terrapins.

Neuromuscular blockade

Rocuronium, a reversible neuromuscular blocking agent, administered IM provided safe, short-term immobilization to facilitate endotracheal intubation in reptiles.

Anaesthetic agents

Dissociative anaesthetics (ketamine, tiletamine)

A combination of ketamine with benzodiazepines and propofol will result in smooth induction and recovery with good muscle relaxation and analgesia. Semi-aquatic terrapins are very resistant to the effect of ketamine and tiletamine-zolazepam. High doses of tiletamine-zolazepam will produce variable sedation in red-eared terrapins and it is therefore recommended to use tiletamine-zolazepam in reptiles for the induction of inhalant anaesthesia only (with low doses).

α-2 adrenergic agonists (xylazine, medetomidine, dexmedetomidine)

Xylazine or medetomidine produce minimal sedation when used alone. However, in combination with dissociative anaesthetics (ketamine), they produce excellent chemical immobilization. The combination of medetomidine and ketamine (and atipamezole for rapid reversal) is reported as a feasible method for anaesthesia in captive as well as wild reptiles. A combination of medetomidine and ketamine also provided safe and effective induction prior

to sevoflurane inhalation anaesthesia of desert tortoises and loggerhead sea turtles. The intranasal route of atipamezole administration is equally effective compared to SC or IM injection.

Benzodiazepines

Midazolam, which is considered a more appropriate choice than diazepam, has been used for sedation and minor manipulation in reptiles, however only variable sedation has been seen when used alone. It is rather used in combination with propofol, ketamine or with an alpha-2-adrenergic agonist. The benzodiazepine zolazepam serves as a muscle relaxant and anticonvulsant and is popular for reptile anaesthesia in a combination with the dissociative anaesthetic tiletamine.

Propofol

Propofol is a hypnotic sedative that provides rapid induction. When administered intravenously (IV) or intraosseously (IO), propofol starts its activity in reptiles within one minute, producing short-term anaesthesia for about 20 minutes. Propofol is rapidly metabolised but has little analgesic properties. Low doses (1-5 mg/kg) are relatively safe and have no negative influence on respiration. Nevertheless, it is recommended to use propofol very carefully in patients suffering from chronic heart diseases and/or respiratory diseases. Because propofol is not analgesic, it is used in combination with other drugs, like midazolam.

Alfaxalone

Steroids alfaxalone (3α-hydroxy-5α pregnane-11, 20-dione) has been used for anaesthesia in many reptiles, with good results in snakes, lizards and chelonians. Alfaxalone represents a veterinary alternative of drugs used for controlled sedation or anaesthesia in reptiles. The advantages of alfaxalone in small animals include rapid induction and fast recovery. Injection of alfaxalone is not painful and no signs of irritation or inflammation have been observed even after perivascular infusion. Studies on the use of alfaxalone in reptiles vary both in the amount of recommended dose and effect observed in reptiles. The main advantage of the steroid anaesthetic alfaxalone in reptiles is its short duration of action. Alfaxalone used at the dose rate of 8mg/kg via the jugular vein provides excellent anaesthetic induction in Chelodina longicollis. The objective of some studies was to characterise the clinical effects of alfaxalone administered intramuscularly to red-eared terrapins (Trachemys scripta elegans). Alfaxalone administered at a dose of 10 mg/kg IM was insufficient to allow intubation or surgical plane anaesthesia in a group of ten adult terrapins kept at 24 – 27 °C. All terrapins lost the palpebral reflex and head and limb retraction reflex within 9.40 ± 6.83 minutes. Onset of light anaesthesia was recorded from12.60 ± 6.56 minutes until 41.70 ± 18.83 minutes. The head and limb retraction reflexes have been recorded at 71.10 ± 11.15 minute. In the second study, endotracheal intubation was successful in 80% of terrapins kept at 20 °C, but was impossible in 100% of terrapins kept at 35 °C. Loss of nociceptive response in the forelimbs, hind limbs and cloaca was recorded in 20 % of terrapins kept at 20 °C.67 No adverse reaction or side effects have been documented in reptiles after alfaxalone anaesthesia. When administered intravenously, the effect of alfaxalone starts within two minutes. Short-term anaesthesia is maintained for about 20 minutes.

Inhalation anaesthesia

Inhalation anaesthesia in reptiles can be performed with the use of simple machines, and for most chelonian patients a non-rebreathing is chosen. The optimal O2 flow rates for reptiles are between 200 to 1000 mL/min, depending on the size and species of reptile. Good quality tracheal tubes and a system free from leaks are essential. Awakening in chelonians is preceded by characteristic tachycardia and tachypnea. Most patients require ventilation pressure of between 5 and 12 cm water pressure (3.68 – 8.83 mm Hg). The minute volume is calculated using the formula minute volume = 10 mL/kg tidal volume x breaths per minute. Cardiac shunting of blood from both left to right and right to left may play a role in inhaled anaesthetic uptake and elimination, potentially causing delayed induction and delayed (or even rapid) recovery. Moreover, it can also affect systemic blood pressure and arterial/venous oxygen concentration, which will impact anaesthetic monitoring such as pulse oximetry. Gaseous anaesthetics of choice for chelonians are isoflurane and sevoflurane. Premedication with opioids and the use of parenteral anaesthetics for induction decrease MAC in reptiles. The anaesthetic carrier gas should be 100% oxygen.

Induction

The safest method of induction is parenteral administration of propofol, alfaxalone or tiletamine-zolazepam. For potentially painful procedures, administration of analgesics prior to the event is recommended. Anaesthesia can be induced with a premedication cocktail of medetomidine (50 µg/kg, IV) and ketamine (5 mg/kg, IV), the patient is intubated and then maintained with sevoflurane (0.5% to 2.5%) and oxygen. Alfaxalone is another anaesthetic of choice, used at a dose rate of 8mg/kg body weight, achieving a good surgical plane of anaesthesia for most simple procedures. For longer procedures reptiles have to be intubated and maintained with isoflurane and oxygen.

Monitoring

Assessing anaesthetic depth in reptile patients is challenging. In terrapins, disappearance of the head, neck, and limb withdrawal reflex is indicative of good immobilization, and the absence of a corneal reflex indicates deep anaesthesia. Tail and limb withdrawal reflexes are lost during surgical anaesthesia. Heart/pulse rate may be monitored with an ultrasound, a pulse oximeter or Doppler flow detector. An electrocardiogram (ECG) can be used, however, since the reptilian heart can beat even after death, the tracing may be of little value. Prior to recovery, there is generally an increase in both spontaneous respirations and heart rate.

Recovery

Administration of inhalant gas should be discontinued 30 to 60 min prior to the end of the surgical procedure. At the completion of the procedure, oxygen is replaced with room air. In sea turtles the recovery phase is characterised by hypoxemia, progressive acidemia, hypercapnia, and lactic acidosis. Atipamezole (at five times the medetomidine dose, or ten times the dexmedetomidine dose) is administered IM at the end of surgery if indicated. Intravenous administration of atipamezole resulted in asystole or severe bradycardia in Gopher tortoises. Median time from atipamezole administration to extubating is about 14 minutes (2 – 84 minutes). Reversal of benzodiazepine or opiate effects are accomplished with flumazenil, naloxone (or naltraxone), respectively, when needed.

Peri-operative care

During anaesthesia, heat pads, infrared lamps, hair-dryers or another source of heat may be used to warm the patient. Care should be taken not to exceed the species´ optimum temperature range. A basic set-up for post-operative recovery can be an enclosure with clean paper substrate and a shelter. Analgesics are used at the clinician's discretion. Subcutaneous (SC), intravenous (IV), intracœlomic (Ice) or intraosseous (IO) administrations of fluids are used as needed.

Local Anaesthesia

Local anaesthesia using lidocaine or procaine is used for wound infiltration and intraosseous catheter placement, and for topical anaesthesia to facilitate tracheal tube insertion.72,73 In conjunction with a suitable immobilisation agent, local anaesthesia is used for minor surgical procedures.

AUTHOR ADDRESS
Prof. Z. Knotek, DVM, Ph.D Dip ECZM (Herpetological Medicine and Surgery)
Avian and Exotic Animal Clinic
Faculty of Veterinary Medicine
University of Veterinary Sciences Brno
Palackeho trida 1946/1
CZ 612 42 Brno
Czech Republic
e - mail: knotekz@vfu.cz

AVIAN AND REPTILIAN ECOIMMUNOLOGY

Dr. Helene Pendl, DVM

Pendl Lab Diagnostic microscopy, Zug, Switzerland

Ecoimmunology is the study of the interactions between environmental factors and the immune systems of organisms. It encompasses the ways in which environmental conditions such as climate change, pollution, and resource availability can affect the functioning of the immune system, and how the immune system in turn affects the ecology and evolution of populations. This field combines the disciplines of ecology, immunology, and evolutionary biology to gain a deeper understanding of the relationships between the environment and the health and survival of individual organisms and populations. This lecture will serve as an introduction to avian and reptilian ecoimmunology. It will elucidate trade-offs between immune function and other phenotypic traits at different life stages for both "in situ" wild and "ex situ" captive environments. Practical examples will show how this knowledge will help veterinarians to better care for their patients.

CATTLE WELFARE THROUGH REGULAR VETERNARY HEALTH VISITS

Assoc. Prof. Ožbalt Podpečan, DVM, PhD, DECBHM

Nacionalni centar za dobrobit životinja, Veterinarski fakultet, Sveučilište u Ljubljani.

Gerbičeva 60, 1000 Ljubljana

Dobrobit životinja je koncept koji definira kvalitetu života životinje kako je percipira sama. Životinja se dobro osjeća, odnosno razina dobrobiti je visoka kada je zdrava, dobro hranjena, sigurna, nema boli, strahova ili briga i može pokazati ponašanja koja su važna za njezinu fizičku i mentalnu ravnotežu. Istodobno, dobrobit je složeno područje koje se dotiče etičkih, ekonomskih, kulturnih, socijalnih, vjerskih i političkih aspekata skrbi o životinjama. Dok znanost pruža informacije i osigurava širenje znanja, etika je ta koja odlučuje što je prihvatljivo društvu u smislu stavova prema životinjama. Tijekom proteklog desetljeća došlo je do značajnog pomaka u razumijevanju pitanja dobrobiti životinja. Nova znanstvena znanja i napredak u profesijama koje se bave životinjama pružili su mnogo bolji uvid u okolnosti koje utječu na dobrobit ili zaštitu životinja. S jedne strane, tradicionalne granice između domaćih i kućnih ljubimaca nestaju jer sada imamo kućne ljubimce poput svinja, a s druge strane, raspon vrsta koje uzgajaju ljudi i čuvaju u društvene svrhe se širi. Uredbom o mjeri dobrobiti životinja Republike Slovenije za razdoblje 2014.-2020. utvrđuje se sadržaj i provedba mjere definiranjem uvjeta pristupa, korisnika, trajanja obveza, mogućih zahtjeva i uvjeta za njihovo ispunjavanje, načina izračuna plaćanja i iznosa plaćanja, kao i detaljnijih provedbenih pravila koja se odnose na kontrole, sustav smanjenja plaćanja i isključenja iz programa. Tom se mjerom poljoprivrednici potiču na ispunjavanje zahtjeva u pogledu dobrobiti životinja koji nadilaze zakonske zahtjeve upravljanja. Poljoprivrednici koji se dobrovoljno obvežu na ispunjavanje zahtjeva mjere, aktivni su poljoprivrednici i redovito ispunjavaju obveze u pogledu dobrobiti životinja koje nadilaze relevantne obvezne standarde, imat će koristi od plaćanja. Poboljšanje dobrobiti goveda u uzgoju pozitivno utječe ne samo na dobrobit životinja, već i na rezultate proizvodnje i kvalitetu hrane životinjskog podrijetla.

Ključne riječi: dobrobit goveda, mjera za dobrobit životinja, posjeti zdravlju životinja

STALLION SEMEN COLLECTION AND ARTIFICIAL INSEMINATION IN FIELD CONDITIONS

Doc. dr. sc. Ljubodrag Stanišić

Department of Reproduction, Fertility and Artificial Insemination

Faculty of Veterinary Medicine, University of Belgrade, Serbia

Libido, mating ability and semen collection in stallions can depend on many factors. These factors can be hereditary, environmental or learned behaviour patterns that are greatly influenced by the handling and care of the stallion. In artificial insemination and semen conservation programs, efficient collection of high-quality ejaculate is extremely important. Ejaculate collection is part of the evaluation of the health and breeding status of stallions before or after the purchase/sale. Ejaculate collection and processing procedures can be the cause of poor semen quality. During semen collection in field conditions, attention should be paid to the collection area and collection methods. The use of an artificial vagina is the most common and most successful collection method.

The use of artificial insemination (AI) techniques in equine reproduction has many advantages compared to natural insemination (Brinsko et al., 2010; McKinnon et al., 2011). The choice of a larger number of stallions, the safety of animals during mating, the reduced risk of sexually transmitted diseases and problems with transportation are just some of the reasons for the increasingly frequent use of artificial insemination. After the collection and dilution oj ejaculate, several insemination doses can be made, which enables more efficient use of the stallion. Semen extenders serve as supportive and protective factors that increase fertility rates (Samper, 2008). The use of phantoms for collection reduces the risk of injury. The artificial vagina (AV) as an instrument for the ejaculate collection allows examination of sperm quality before insemination and early detection of pathology that can affect the fertility of the stallion. The pregnancy rate is equal or higher after AI with fresh or chilled semen compared to the natural mating, while slightly less success is recorded with AI using frozen semen (Sieme et al., 2004).

There are also "flaws" in AI programs. The success of such programs depends on the knowledge and skill of the "handler" of the stallion, but also on the collector, because spermatozoa are very susceptible to the influence of the external environment. Improper collection, handling and processing of ejaculate, as well as improper insemination procedures, lead to lower fertilization rates. Costs related to the purchase of the necessary equipment for AI can increase the overhead costs of breeding programs. However, if the costs incurred are calculated per mare, they are usually reduced due to the multiple insemination of different mares with a single ejaculate. One important disadvantage during the collection of ejaculate and the use of AV is the increased risk of injury to the person performing the collection. Proper training for persons involved in the semen collection process is essential. In addition, continued training is required to achieve satisfactory results when inseminating mares with low doses of chilled/frozen semen since the requirements for processing and handling the semen are increased (Brinsko et al., 2010; McKinnon et al., 2011).

Key words: equine, semen collection, artificial insemination, artificial vagina

Brinsko SP, Blanchard TL, Varner DD, Schumacher J, Love CC, 2010, Manual of Equine Reproduction. Elsevier Health Sciences.
McKinnon AO, Squires EL, Vaala WE, Varner DD (Eds.), 2011, Equine reproduction, John Wiley & Sons.
Samper JC, 2008, Equine breeding management and artificial insemination. Elsevier Health Sciences.
Sieme H, Katila T, Klug E, 2004, Effect of semen collection practices on sperm characteristics before and after storage and on fertility of stallions, Theriogenology, 61, 769-84.

THE IMPORTANCE OF PRESLAUGHTER PROCEDURES ON THE QUALITY AND SAFETY OF THE MEAT

Prof. Beniamino Terzo Cenci Goga, DVM, PhD, DECVPH

Department of Veterinary Medicine, Universitry of Perugia, Perugia, Italy

Animal welfare is a recognized and important issue within the European Union. European regulations (e.g., Regulations 1/2005 and 1099/2009) and guidelines emphasize the need to respect and protect the welfare of animals during transport and slaughter procedures.

This project aimed to create a prototype of an updated cattle path that minimizes stress and reduces the use of coercive means such as electric prods, while also decreasing the risk of injury due to trauma or falls. The ultimate goal was to ensure the welfare and protection of the animals, as outlined by European guidelines, while simultaneously improving the quality of the meat produced.

Seventy-one animals of varying breeds, ages, sexes, and origins were included in the study. The cattle were divided in groups, each assigned a different path and handling procedure. Behavioral parameters of both the animals and the operators, as well as blood parameters (cortisol and β-endorphins), were measured to evaluate the effectiveness of the prototype.

For the prototype's construction, different materials were evaluated. In the end, the choice fell on multilayer pressed cardboard which guaranteed the right balance between functionality, cost and resilience. The group managed using the innovative prototype path and correct handling procedures exhibited a reduced need for coercive intervention by the operators. Additionally, the animals displayed improved ethological indicators of stress, and their blood levels of cortisol and beta-endorphins were lower.

The results obtained in this study demonstrate that the prototype path enables cattle to move forward more easily, thereby enhancing their welfare and minimizing risks for both the animals and operators. The application of the prototype path developed in this study has the potential to significantly improve animal protection conditions and meat quality in numerous abattoirs.

TOWARDS THE FUTURE: THE ROLE OF VETERINARIANS IN THE DETECTION, CHARACTERIZATION, AND CONTROL OF ZOONOTIC PATHOGENS

Lucija Jurišić, DVM, Ph.D.

Virology Unit, Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise, Teramo, Italy

Faculty of Veterinary Medicine, University of Teramo, Italy

The effectiveness of the detection and characterization of animal infectious diseases depends on a solid understanding of pathogen's biology and the implementation of cutting-edge methods by well trained professionals. Due to their skillset and experience in the identification of zoonotic agents, eradication of infectious diseases in animals, and prevention of transmission of pathogens from animals to humans, veterinarians demonstrated to have a crucial role in mitigating/ preventing future outbreaks of public health concerns.

Thus, this lecture goes deep into different aspects of my recent doctoral research in Italy: virus detection in both laboratory and field conditions, characterization and genome analysis of emerging viruses including SARS-CoV-2, and pathogenesis studies on laboratory animal models. The thread of these studies was the combination of innovative novel diagnostic technologies, including NGS-based tools, big data management, and pathogenesis studies.

This lecture intends to highlight the role of veterinary public health institutes, or even better One Health institutes, in facing the emergence of animal and public health concerns. A new generation of veterinarians is warranted by the current needs of the society. This need should be covered through a profound revolution of veterinary schools' teaching programs. Bioinformatics, genomics, statistics, ecology, social sciences and science communication are fundamental skills for the veterinarians of the future that will face the next pandemic of animal origin.

EQUINE SESSION

ORAL PRESENTATIONS

MEDICAL AND SURGICAL TREATMENT OF EOSINOPHILIC KERATITIS IN A 3-YEAR-OLD WARMBLOOD HORSE

Katarina Miljak[1], Marija Mamić[1], Nika Brkljača Bottegaro[1], Jelena Gotić[2], Valentina Plichta[1]

[1]Surgery, orthopaedics and ophthalmology Clinic (Faculty of Veterinary Medicine University of Zagreb, Croatia)

[2]Internal Medicine Clinic (Faculty of Veterinary Medicine University of Zagreb, Croatia)

Eosinophilic keratitis (EK) is an immune-mediated disorder that has been described in cats, rabbits, and horses. In this case report, we describe the first case of EK that was admitted to the Veterinary Teaching Hospital which required both medical and surgical treatment.

The 3-year-old Warmblood horse presented with symmetrical lesions on both eyes after being treated with topical antibiotics for 10 days without significant improvement. On examination, mild blepharospasm and epiphora were observed on both eyes. The menace responses, palpebral and oculocephalic reflexes, and direct and consensual pupillary reflexes were present bilaterally. There was no aqueous flare observed. The intraocular pressures were 15 mmHg in the left and 14 mmHg in the right eye. Fluorescein staining showed a symmetric 4-5mm superficial ulceration on the cornea under the third eyelid on both eyes. No abnormalities were found on the fundus examination. The cytologic evaluation revealed the presence of eosinophils in samples taken from both eyes without evidence of bacteria and fungi. The horse was treated with topical tobramycin 0.3%, atropine 1%, cyclosporin 0.2%, and systemic phenylbutazone (4.4 mg/kg PO BID). Due to the delayed healing of ulcerations, a corneal debridement was performed with a corneal burr (AlgerBrush II®, Alger Equipment Company, Lago Vista, TX, USA) on the fifth day of treatment. The horse was discharged home after 3 weeks of hospitalisation with a complete resolution of clinical signs. The horse remained well, and no reoccurrence of the initial clinical symptoms was observed 10 months after discharge.

Eosinophilic keratitis remains a rarely diagnosed condition in this region. The similar clinical presentation to other corneal diseases and the need for additional diagnostic tests present a challenge for the correct diagnosis. This report describes the importance of surgical treatment when medical therapy alone is not sufficient for the successful management of EK.

AN OUTBREAK OF ULCERATIVE STOMATITIS ASSOCIATED WITH FOXTAIL GRASS IN A LIPIZZAN STUD FARM

Katarina Miljak[1], Diana Brozić[2], Vladimir Stevanović[3], Ljubo Barbić[3], Andrea Gudan Kurilj[4], Jelena Gotić[5], Nika Brkljača Bottegaro[1]

[1]Surgery, orthopaedics and ophthalmology Clinic (Faculty of Veterinary Medicine University of Zagreb, Croatia)

[2]Animal nutrition and dietetics (Faculty of Veterinary Medicine University of Zagreb, Croatia)

[3]Microbiology and Infectious diseases (Faculty of Veterinary Medicine University of Zagreb, Croatia)

[4]Veterinary Pathology (Faculty of Veterinary Medicine University of Zagreb, Croatia)

[5]Internal Medicine (Faculty of Veterinary Medicine University of Zagreb, Croatia)

Stomatitis in horses can be caused by traumatic injury, different plants, medications, contact irritants, toxins, benign or malignant neoplasia, immune-mediated disorders, and viral infections. This case report presents an outbreak of equine ulcerative stomatitis caused by the ingestion of foxtail grass.

In July 2020, quarantine measures were assigned to the Lipizzaner National Stud Farm due to the suspected outbreak of equine viral stomatitis after all horses presented with hypersalivation and periodontal ulcerations of varying intensity. A new batch of hay was introduced 10 days before the development of the first clinical signs. The hay was supplied by a manufacturer of ecologically harvested grass where no herbicides were used. Three horses with the most pronounced clinical signs were selected for detailed examination and sample collection. The examined horses had a body condition score of 7-8/9, they were bright, alert, and responsive and showed no signs of dysphagia or inappetence. The most frequently observed symptoms were halitosis, ptyalism, labial oedema, deep and bleeding ulcerations on the gingiva and the mucocutaneous junction, and firmly attached plant particles in the ulcerations and along the periodontal gingival sulcus. All horses on the Stud Farm tested negative for panHerpes vesicular stomatitis virus, Rhinovirus and Equine Arteritis Virus. Botanical analysis of hay revealed the presence of up to 95% of foxtail grass in the total sample. Following the elimination of the foxtail grass hay from the diet, symptoms were resolved within the next 3 weeks without any additional treatment.

To the best of our knowledge, this is the first report of an outbreak of ulcerative stomatitis associated with foxtail grass in Croatia that caused clinical signs in all horses on the same premises. The present report emphasizes the risk factors related to the use of ecologically produced hay harvested from improperly cultivated pastures for horse nutrition.

UNUSUAL CLINICAL PRESENTATIONS OF EQUINE MELANOMA

Margaux Marthe Marie Grioche[1], Katarina Miljak[2], Darko Grden[3], Nika Brkljača Bottegaro[2], Jelena Gotić[3]

[1] Faculty of Veterinary Medicine, University of Zagreb, Croatia

[2] Surgery, orthopaedics and ophthalmology clinic, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[3] Internal medicine clinic, Faculty of Veterinary Medicine, University of Zagreb, Croatia

Equine melanoma is one of the most common skin tumors. They are usually found on the head, anal, tail and inguinal regions, in 80% of aged grey-and white-coated horses. Melanomas are considered malignant neoplasms with a high tendency to metastasize through haematogenous and lymphatic spread. The present report describes three unusual clinical manifestations of equine melanoma.

A 22-year-old grey Holstein gelding with history of melanoma on his tail was admitted for an increased swelling in the left prescapular and distal jugular regions. The swelling has increased in size in the previous couple of weeks. On ultrasound examination the swelling showed complex echogenicity and echostructure. Cytological evaluation described it as melanoma.

A 6-year-old grey Warmblood gelding was presented with sudden onset of ataxia. The horse was previously treated for melanoma of the parotid gland using surgery and radiation. On admission the horse showed signs of mild ataxia and partial facial paralysis of the left side. The spread of melanoma was evident in the left guttural pouch seen endoscopically compared to previous exams.

A 21-year-old grey Holstein mare underwent examination due to the presence of widespread nodular tumours on various areas of the body, with the biggest seen on the nuchal crest, ventral abdomen and inguinal region. The lesions were very firm and markedly nodular on palpation and extremely sensitive during FNA sampling. The mare had history of melanoma in the anal and perianal regions. Cytologic evaluation revealed melanoma along with the presence of mineralisation, indicating comprehensive calcinosis associated with this neoplasm.

These unusual cases indicate prioritizing any clinical presentation in aged grey or white horses, especially ones previously diagnosed with melanoma due to its high metastatic potential.

INCARCERATION OF SMALL INTESTINE THROUGH A RENT IN THE GASTROSPLENIC LIGAMENT IN A 14-YEAR-OLD GELDING

Morana Šćuric[1], Jelena Gotić[2], Katarina Miljak[3], Ivan Butković[4], Lazar Marković[5], Darko Grden[2], Nika Brkljača Bottegaro[3]

[1] Faculty of Veterinary Medicine, University of Zagreb, Croatia, student

[2] Internal diseases clinic,Faculty of Veterinary Medicine, University of Zagreb, Croatia

[3]Clinic for Surgery, Orthopaedics and Ophthalmology, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[4] Clinic for reproduction and obstetrics,Faculty of Veterinary Medicine, University of Zagreb, Croatia

[5] Department of Equine, small animal, poultry and wild animal diseases, University of Belgrade, Serbia

Incarceration of the small intestine through a rent in the gastrosplenic ligament (GSL) accounts for 4.5% of all small intestinal lesions, with a prevalence of 1.5% of all horses undergoing exploratory celiotomy.

A 14-year-old Appaloosa gelding was admitted with colic signs lasting for about four hours. At admission the horse showed signs of severe abdominal pain shortly responsive to analgesia. Gastric reflux was not present. Heart rate was 60 beats/minute with intestinal hypomotility in all four quadrants. Rectal examination showed no specific findings except for mildly distended small intestine in the cranial abdomen. There was an excessive amount of abdominal free fluid and mildly distended loops of small intestine findings on abdominal FOCUS ultrasound exam.

The horse underwent abdominal celiotomy due to deterioration of clinical signs. There was moderate amount of amber-colored free abdominal fluid. The cranial part of small intestine was moderately distended. There was a laceration present in the ventral part of the GSL,7 to 8 centimetres long, in which the central part of the jejunum was incarcerated. The intestinal wall of the incarcerated part of the jejunum was thick and dark purple with oedematous mesentery, without blood vessels pulsation present and the peristaltics was absent. End-to-end resection and anastomosis of 3.5 meters of devitalised intestine with reconstruction of the ligament was performed. During the clinical recovery there was a mild postoperative ileus that lasted two days after surgery, no other complications were noted with no recurrence in the following 4 months.

Incarceration of small intestine in the gastrosplenic ligament in horses is an uncommon finding associated with a good survival rate if surgically treated. There are no specific diagnostic indicators described that would suggest the presence of a GSL entrapment. This condition should be considered as differential diagnosis in cases with an unclear rectal examination findings.

HALOTHERAPY AS A POTENTIAL TREATMENT OF HORSES WITH ASTHMA – PILOT STUDY

Katarina Miljak[1], Darko Grden[2], Ema Prokeš[3], Morana Šćuric[4], Nika Brkljača Bottegaro[1], Zoran Vrbanac[5], Valerija Benko[6], Jelena Gotić[2]

[1] Surgery, orthopaedics and ophthalmology clinic, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[2] Internal diseases clinic, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[3]Animalogic Cooperative, Macinec, Croatia

[4] Faculty of Veterinary Medicine, University of Zagreb, Croatia

[5] Department of radiology, ultrasound diagnostics and physical therapy, Faculty of Veterinary Medicine, University of Zagreb, Croatia

6 Biology and pathology of fish and bees, Faculty of Veterinary Medicine, University of Zagreb, Croatia

Halotherapy is the use of salt by inhalation of an aerosol which consist of small salt particles that circulate in an enclosed area. Halotherapy has positive effects on the treatment and prevention of respiratory diseases in humans. The aim of this study was to quantify the effect of halotherapy on bronchoalveolar lavage (BAL) cytology in horses with and without asthma.

Bronchoalveolar lavage samples were taken from twelve horses. Based on the cytology evaluation and the percentage of neutrophils in BAL fluid, horses were divided into two groups (asthma and non-asthma). Bronchoalveolar lavage fluid with 25% or more neutrophils was considered asthmatic. Halotherapy was administered daily for 50 minutes for three weeks. Halogenator administered 70 g of medical salt in two 20-minute cycles. Grinder speed was set at 50% and ventilator speed was set at 50%. After the three-week halotherapy treatment period, BAL samples were repeated.

All horses tolerated the administration of halotherapy well. Difference was found in the percentage of neutrophils ($p<0,001$) and macrophages ($p<0,001$) before halotherapy between groups. There was no difference in percentage of neutrophils and macrophages between groups after the administration of halotherapy. In the asthma group, halotherapy induced a decrease of neutrophils ($p<0,005$) and an increase of macrophages ($p<0,001$).

Halotherapy improved parameters of BAL cytology in the studied horses. Therefore, it could have an important role in the management of equine asthma. Main limitations of the study are the absence of a control group and a small sample group.

BETA-HEMOLYTIC STREPTOCOCCI ISOLATED FROM HORSES IN CROATIA

Klara Fuš[1], Selma Pintarić[2], Suzana Hađina[2], Josipa Habuš,[2] Matko Perharić,[2] Marija Cvetnić[2], Iva Zečević[2], Iva Benvin[2], Zrinka Štritof[2]

[1]Student, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[2]Faculty of Veterinary Medicine, University of Zagreb, Department of Microbiology and Infectious Diseases with Clinic, Zagreb, Croatia

Beta-hemolytic streptococci (BHS) are important pathogens in horses. The most important species are *Streptococcus equi* subsp. *equi*, causative agent of strangles, as well as *S. equi* subsp. *zooepidemicus* and *S. dysgalactiae* subsp. *equisimilis*, both of which can be both commensal and pathogenic and also cause disease in humans. This study includes clinical samples from horses collected during a clinical examination and sent to a bacteriology laboratory for diagnostic purposes over a nine-year period (2013-2022). The aim of the study was to retrospectively investigate the prevalence of BHS and the distribution of BHS species. Samples were processed according to standard bacteriological procedures. The isolated BHS were identified by cultural, morphological, and biochemical characteristics and additional tests such as the analytical profile index (API) test kit (Biomerieaux, France) or matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry (MALDI-TOF MS).

Of the 803 samples processed, 299 (37.2%) samples exhibited bacterial growth. Of these, BHSs were isolated from 96 (32.1%) samples. Seventy-three (76%) BHS isolates were stored for further analysis and included in this study. Of these, 37 (50.7%) BHS isolates were from the respiratory tract, 10 (13.7%) were from the reproductive tract, 12 (16.4%) were from abortion samples, 11 (15.1%) were from other tissue samples, and three (4.1%) were from swabs of unknown origin. BHS species were identified by MALDI TOF MS (n=43), API (n=26), or both (n=4). The species distribution was 53 (72.6%) *S. equi* ssp. *zooepidemicus*, 14 (19.2%) *S. dysgalactiae* ssp. *equisimilis*, two (2.7%) *S. equi* ssp. *equi*, two (2.7%) *S. equinus*, and two (2.7%) *S. canis*. In this study, BHS accounted for approximately one-third of the bacteria isolated from equine clinical specimens, confirming their importance as a cause of infection in horses. This is the first study on the prevalence of BHS in horses in Croatia.

EQUINE SESSION

POSTER PRESENTATIONS

CAN A NOVEL BIOMARKER ASSESS PROGNOSIS AT THE TIME OF ADMISSION OF THE COLIC HORSE?

Juliette Magoga[1], Jelena Gotić[2], Blanka Beer Ljubić[2], Krunoslav Bojanić[3], Vladimir Stevanović[4], Dražen Vnuk[5], Nika Brkljača Bottegaro[5]

[1]Student, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[2]Clinic for Internal Diseases, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[3]Laboratory for Aquaculture Biotechnology, Division of Materials Chemistry, Ruđer Bošković Institute, Zagreb, Croatia

[4]Department for Microbiology and Infectious Diseases with Clinic, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[5]Clinic for Surgery, Orthopaedics and Ophthalmology, Faculty of Veterinary Medicine, University of Zagreb, Croatia

Equine colic is a frequent emergency and associated pathological processes might be challenging to identify, but their late determination could be fatal. Biomarkers of intestinal lesions could be valuable tools to assist veterinarians in decision-making, and Acute Phase Proteins (APPs) in particular. This retrospective study aimed to quantify haptoglobin, High Mobility Group Box 1 (HMGB1) and calprotectin in horses hospitalised for colic pain, to help identify etiologies and determine cases prognosis. We hypothesised an increase in HMGB1 and calprotectin concentrations, and a decrease in haptoglobin concentration in more severe colics.

Serum and EDTA plasma were collected from 46 colicky horses at admission. History and clinical exam data were recorded. ELISA kits were used to quantify HMGB1 and calprotectin, and haptoglobin was measured with a spectrophotometric method. Horses were grouped by outcomes (died/survived) and colic types (strangulated/non-strangulated). Associations with groups were tested with two-sample tests. Correlations of variables were analysed using Spearman's test with Bonferroni correction. Bland-Altman analysis was used to compare differences between serum and plasma values.

There were no significant differences between groups regarding concentrations of haptoglobin (serum 0.7±0.4g/L; plasma 0.8±0.4g/L), calprotectin (serum 33.9±28.3ng/mL; plasma 35.3±26.7ng/mL) and HMGB1 (serum 51±32.6ng/mL; plasma 53.1±26.6ng/mL). Overall, serum concentrations tend to be significantly lower than plasma concentrations; except for calprotectin for which relative bias was not conclusive. Calprotectin and HMGB1 were positively correlated ($p<0.01$).

The tested APPs were not reliable as prognostic or diagnostic biomarkers. However, calprotectin and HMGB1 might be increased in colic compared to literature reference ranges. Limitations of the study, besides the small sample size and cases heterogeneity, are mostly related to the lack of knowledge on equine APPs.

CASE OF LARVAL CYATHOSTOMINOSIS IN A YOUNG STALLION IN CROATIA

Nika Konstantinović[1], Ana Marija Kovač[2]

[1]Department of Parasitology and Parasitic Disease with Clinic, Faculty of Veterinary Medicine, University of Zagreb, Croatia.

[2]Department of Animal Nutrition and Dietetics, Faculty of Veterinary Medicine, University of Zagreb, Croatia.

Small strongyles (subfamily *Cyathostominae*) are the most common parasites of horses today. Most of the infections are asymptomatic. However, if young horses ingest a large number of infective L3 larvae the risk of developing a clinical syndrome called larval cyathostominosis, which can be fatal, grows. Factors determining individual susceptibility to clinical larval cyathostominosis are still unidentified.

A three-year-old stallion was purchased and placed in a livery yard that has no parasitological monitoring in place.

A month after arrival, the first clinical episode occurred, with signs including skin changes, poor performance, periodical lethargy, and occasional diarrhea during exercise. Fecal egg count (FEC) was performed using the FLOTAC method as described by Cringoli et al, 2010. The result was negative. Afterwards, moxidectin wormer was applied and cyathostomin adults and larvae were found in feces. FEC testing was carried out throughout the year and only on a few occasions was FEC result positive. Following clinical episodes hematology and biochemistry analysis were unremarkable. The stallion kept showing different clinical episodes every time moxidectin wormer was not given every 3 months. The diet was balanced with a good quality hay *ad libitum*, pelleted alfalfa, wheat bran, sugar beet pulp, rolled oats, and complete feed mixtures with the supplementation of brewer's yeast, methionine, biotin, and linseed oil. Regular assessments of body condition score and body weight were carried out with alteration of the ratio according to the finding. As he reached the age of 4.5 years, clinical episodes gradually resolved, even when moxidectin was withheld.

Larval cyathostominosis is usually overlooked due to often negative FEC results, vague clinical symptoms, and unremarkable blood results. This is the first documented case in Croatia, where FEC monitoring is still rarely done consequently increasing the possibility for the development of parasitic disease and antiparasitic resistance.

FREE COMMUNICATIONS SESSION

ORAL PRESENTATIONS

ANTAGONISATION OF INTRAMUSCULAR APPLICATION OF ROCURONIUM IN RATS BY PENTADECAPEPTIDE BPC 157

Jelena Filipović[1], Lana Pađen[2], Anita Škrtić[3], Sven Seiwerth[3], Predrag Sikirić[3]

[1] *General Hospital "Dr. Tomislav Bardek", Koprivnica, Croatia*

[2] *Faculty of Veterinary Medicine University of Zagreb, Zagreb, Croatia*

[3] *School of Medicine, University of Zagreb, Zagreb, Croatia*

Rocuronium bromide is an amino steroid nondepolarizing neuromuscular blocking agent, a competitive antagonist for nicotinic acetylcholine receptors at the neuromuscular junction. Pentadecapeptide BPC 157 is a stable gastric protein, cytoprotective mediator, promotes muscle healing and has neuroprotective properties. Given that the BPC 157 can act as a succinylcholine antagonist, the aim of this work was to determine whether the BPC 157 can antagonize the local effects of intramuscularly applied rocuronium bromide and prevent muscle paralysis and muscle damage.

Study was conducted with 13-18-week-old, 200-300 g body weight, female albino *Wistar* rats, randomly assigned at 6 rats/group/interval. Rats were bred at registered animal facility. Animal care was following standard operating procedures. This study was approved by the Local Ethics Committee. Rocuronium was given into the right quadriceps muscle, once a week for 7 weeks in a dose of 12 mg, 6 mg, 3 mg, 4x1.5 mg. Immediately after, the treated group received 1 mL of BPC 157 ip. solution (concentration 10µg/kg or 10ng/kg) and the control group received an equal volume of saline. The effect was determined clinically by observing the behaviour of treated animals, including presence of neurological deficit and motor dysfunction.

We assessed local paralytic effect in injected muscle, immediate leg contracture, initial agitation before muscle disability, countless muscle twitches before complete muscle tonus loss, motionless laying, and thereafter, violent screaming upon light touch. Furthermore, we observed muscle fibres decrease and edema in injected and non-injected muscle. BPC 157 eliminated the local rocuronium effect (leg contracture) and markedly attenuated or eliminated behavioural agitation, muscle twitches, motionless laying. No violent screaming upon light touch appeared. BPC 157 counteracted muscle fibres decrease and edema.

Results showed that BPC 157 can antagonize the local effects of intramuscularly applied rocuronium bromide and prevent muscle paralysis and muscle damage.

THE IMPORTANCE OF THE VETERINARY PROFESSION IN UNDERSTANDING THE MASS MORTALITY EVENTS OF WILD BIVALVE POPULATIONS - THE EXAMPLE OF THE *PINNA NOBILIS* MORTALITY

Tomislav Šarić[1], Francesca Carella[2], Ivan Župan[1], Dušan Palić[3], Gionata De Vico[2]

[1]*Department of Ecology, Agronomy and Aquaculture, University of Zadar, Croatia*

[2] *Department of Biology, University of Naples Federico II, Naples, Italy*

[3] *Chair of Fish Diseases and Fisheries Biology, Faculty of Veterinary Medicine, Ludwig-Maximilians-University Munich, Germany*

In the last 20 years, fishermen, divers and marine biologists observed increased frequency and provided information about the mass mortality events (MME) of wild bivalve populations at various locations. Such events often did not attract much attention from the scientific community and their causes often remained unexplained. This is not surprising considering the complex interactions between different disease-causing agents (parasites, bacteria, and viruses) and various environmental factors to which these, in the adult stage sessile or poorly mobile animals, are exposed.

The MME of the *Pinna nobilis*, the largest bivalve in the Mediterranean Sea, began to spread in 2016 and soon drew attention from both scientists and citizens. At the beginning of mortality, a few interdisciplinary, often international, teams were created to investigate this mortality and save the *P. nobilis* from extinction. Unfortunately, by the end of 2021, MME has affected the entire Mediterranean Sea, with estimated mortality of 99.99 % of the *P. nobilis* population.

Research has shown that the mortality of *P. nobilis* individuals was usually the result of the synergistic effect of various pathogens in diseased animals and their relationship with abiotic factors. Bacteria from the genus *Mycobacterium* were most often found in sick animals, followed by the parasite *Haplosporidium pinnae*, bacteria from the genus *Vibrio* and parasites from the genus *Perkinsus*.

P. nobilis MME has not yet been fully clarified and research into the possible primary cause of the MME continues. However, the research has shown the importance of a more significant involvement of the veterinary profession and scientists with specific knowledge of bivalve pathology in research on the mortality of wild bivalve populations. Also, considering the zoonotic potential of some of the identified pathogens, the need for a One-Health approach in researching animal diseases, even when it comes to bivalves, has been demonstrated once again.

FREE COMMUNICATIONS SESSION

POSTER PRESENTATIONS

THE EFFECTS OF IONIZING RADIATION ON RED BLOOD CELLS PARAMETERS IN CHICKENS

Marinko Vilić[1], Selim Pašić[2], Ivona Žura Žaja[1], Marija Majer[3], Nato Popara[2], Jadranka Pejaković Hlede[1]

[1]Department of Physiology and Radiobiology, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[2]Department of Physics, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[3]Ruđer Bošković Institute, Zagreb, Croatia

It has been shown that a low dose of ionizing radiation can alter the number of blood cells. Since available data on the effect of low doses of ionizing radiation on blood counts in birds are very scarce, the purpose of this study was to investigate various parameters related to red blood cells in chickens hatched from eggs exposed to low dose of gamma radiation. Fertilized eggs of the breed COBB 500 were divided into two experimental groups. One group was irradiated with a dose of 0.15 Gy one hour before incubation and the second group was irradiated with the same dose on the 7th day of incubation. The dose rate was about 23.84 mGy/s and the distance between the axis of the source and the axis of the eggs was 3.06 m. All experimental groups had a control group which was sham irradiated. Blood samples (N=10) were collected from the right jugular vein on the 1st, 3rd, 5th, 7th, and 10th day after hatching. Red blood cell (RBC) counts were obtained manually using a Neubauer hemocytometer. The concentration of hemoglobin (Hb) was measured spectrophotometrically. Red blood cell proportion in blood volume (HCT) was determined by the microhematocrit method. In addition, the RBC indices were calculated as mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC). In response to irradiation before incubation with a radiation dose of 0.15 Gy, the number of erythrocytes decreased, while MCV and MCH values increased in one-day-old chicks. In chickens irradiated with a dose of 0.15 Gy on the 7th day of incubation, the total number of red blood cells decreased on the 3rd and 5th days, compared to the control group, while MCV was increased on the same days of the chickens' lives. In the same group, Hb concentration was significantly decreased on the 10th day, and HCT on the 3rd day after hatching. Our results indicate that acute low-dose gamma irradiation of 0.15 Gy has a significant effect on the erythrocytes of chickens hatched from eggs irradiated before and on the seventh day of incubation.

CELL MORPHOLOGY OF THY1-YFP NEUROS

Ante Plećaš[1], Ana Bekavac[2], Ivan Alić[1]

[1]Department of Anatomy, Histology and Embryology, Faculty of Veterinary Medicine University of Zagreb, Zagreb, Croatia

[2]Laboratory for Stem Cells, Croatian Institute for Brain Research, School of Medicine, Zagreb, Croatia

The main goal of our study was to describe cell morphology during in vitro differentiation as well as during embryonic development of mouse transgenic line B6.Cg-Tg(Thy1-YFP)16Jrs/J, which under the control of Thy1 gene promoter, expresses YFP. Neural stem cells were isolated from the telencephalon of 14.5 old mouse embryos (E14.5) and from new-born pups. E14.5 cells were cultured as neurospheres, seeded on coverslips and differentiated to mature neurons while the primary cells were differentiated immediately after isolation. Mice embryos were fixed in different time points and histological slides were prepared. Neuron specific antibodies (MAP2, SMI and TUBB3) were used for the immunolabelling. Confocal images were captured by Olympus FV 3000 microscope and analysed by IMARIS software - Neuroscience module. Our data showed significant increases in axons during differentiation ($p<0,001$) while the dendrites do not show significant differences. Moreover, we showed high Pearson (0.7) coefficient colocalization between THY1-YFP and MAP2. The same pattern of expression we observed during in vitro differentiation and embryonic development. In previous studies we analysed total expression of neuronal markers while with the IMARIS software we showed new data based on filaments such as number of branches, terminal points, and neurite diameter. With our recent data we described single cell morphology labelled with THY-YFP, and one more time validated transgenic mouse strain as an excellent tool in neuroscience.

Funding: Adris grupa d.d. 251-61-01/139-22-01

CLINICAL EVALUATION OF THE EFFECTS OF NOVEL POLYVINYL ALCOHOL/GENTAMICIN (PVA/GENT) AND POLYVINYL ALCOHOL/CHITOSAN/GENTAMICIN (PVA/CHI/GENT) HYDROGELS ON THE HEALING OF SECOND-DEGREE BURN WOUNDS USING A RAT ANIMAL MODEL

Anja Nikolić[1], Ivan Milošević[1], Ana Janković[2], Milena Stevanović[2], Bogomir Bolka Prokić[1], Danica Marković[1], Anita Radovanović[1], Vesna Mišković-Stanković[3], Tijana Lužajić Božinovski[1]

[1] Faculty of Veterinary Medicine, University of Belgrade, Belgrade, Serbia

[2]Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia

[3]Faculty of Ecology and Environmental Protection, University Union - Nikola Tesla, Belgrade, Serbia

New therapeutic agents for burn treatment are constantly developed and their efficiency is tested on animal models in preclinical studies. The aim of our study was to clinically evaluate the effects of novel PVA/Gent and PVA/CHI/Gent hydrogels on the healing of second-degree burns, using a rat animal model.

Thermal injuries were induced in 48 male 3-month-old Wistar rats according to the protocol developed by Tavares Pereira et al. (2012). Animals were then randomly divided in the control group and two groups treated with hydrogels. The experiment was approved by the veterinary directorate (decision number 323-07-04903/2022-05/1). The clinical evaluation was done on days 3, 7, 14 and 21, and based on the wound contraction and semi-quantitative assessment of the following parameters: blistering, edema, redness, crust, bleeding, secretion, and scar tissue. Parameters were graded on a scale from 0 (absent) to 3 (severe).

On the 21st day wound contracted by 83.68 ± 1.30% in all animals. On the 3rd day redness and secretion were the most noticeable parameters. However, redness was absent in 20% of the treated groups animals compared to the 12.5% of the control group animals, and secretion was absent in 57.14% of treated groups animals compared to 25% of control group animals. On the 7th day the crust was noticeable in 97.29% of all animals, but it was graded higher (2) in 16.21% of treated groups animals compared to the 8.33% of control group animals. On the 14th day the crust was still present in 88.88% of all animals. Scar tissue was present in 65% of control group animals, all animals from PVA/Gent treated group, but only in half of animals from PVA/CHI/Gent treated group. On the 21st day scar tissue was present in all animals, and graded as mild.

Both novel hydrogels show potential in improving the healing of second-degree burns, but further histological analysis is needed to gain insight in the process of tissue reparation and advantages of each hydrogel.

Tavares Pereira, D.dosS., Lima-Ribeiro, M. H., de Pontes-Filho, N. T., Carneiro-Leão, A. M., & Correia, M. T. (2012). Development of animal model for studying deep second-degree thermal burns. Journal of biomedicine & biotechnology, 2012, 460841. https://doi.org/10.1155/2012/460841

IN VIVO EFFICACY OF GOLD NANOPARTICLES FOR PARKINSON'S DISEASE

A. Gojanović,[1] V. Dovečer,[2] F. Vrban,[3] M. Beus,[1] P. Dolenec,[4] N. Kalčec,[1] N. Peranić,[1] B. Bakan,[1,5] I. Mamić,[6] P. Turčić,[6] V. Micek,[1] K. Rotim,[3] R. Frkanec,[7] I. Vinković Vrček[1]

[1]Institute for Medical Research and Occupational Health, Ksaverska cesta 2, 10000 Zagreb, Croatia

[2]General Hospital Varaždin, Ivana Meštrovića 1, 42000 Varaždin, Croatia

[3]UHC Sisters of Charity Zagreb, Vinogradska cesta 29, 10000 Zagreb, Croatia

[4]Faculty of Medicine, University of Rijeka, Braće Branchetta 20/1, 51000 Rijeka, Croatia

[5]Atatürk University, Faculty of Science, Department of Molecular Biology and Genetics, 25240, Erzurum, Turkey

[6]Faculty of Pharmacy and Biochemistry, University of Zagreb, Domagojeva 2, 10000 Zagreb, Croatia

[7] Faculty of Science, Department of Chemistry, University of Zagreb, Horvatovac 102a, 10000 Zagreb, Croatia

Parkinson's disease (PD) is one of the two most common neurodegenerative diseases in the world, characterized by the degeneration of dopaminergic neurons which causes massive depletion of dopamine. The aim is to evaluate the efficacy of gold nanoparticles coated with peptidoglycan monomer (PGM-AuNPs) as delivery system for levodopa, current gold standard treatment of PD. Investigation was carried out using an *in vivo* hemiparkinsonian rat model of PD. This model was performed by injection of 6-hydroxydopamine into the right hemisphere of the rat brain according to the stereotaxic atlas. Behavioral assays including the rotarod test, gait analysis and neurological severity score were used to evaluate the changes in motor activity in rats before and after surgery as well as the efficacy of the treatment. PGM-AuNPs in combination with levodopa and levodopa-carbidopa significantly improved motor dysfunctions in females compared to single treatment with levodopa/carbidopa. This difference was not so pronounced in males according to behavioral tests.

Acknowledgment: This study was financially supported by the "Research Cooperability" Program of the Croatian Science Foundation funded by the European Union from the European Social Fund under the Operational Programme Efficient Human Resources 2014–2020 (grant HRZZ-PZS-2019-02-4323).

WAS THERE PIG PRODUCTION IN MONASTERIES DURING MIDDLE AGES IN CROATIA?

Kim Korpes, Magdalena Kolenc, Martina Đuras, Tajana Trbojević Vukičević

Department of Anatomy, Histology and Embryology, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Different settlements had different roles in meat production and supply during the Middle Ages. Low-status sites were usually rural areas where most animal production occurred, while high-status sites were rich fortified settlements supplied with meat from rural sites. However, little is known about meat production in religious sites, such as monasteries. Archaeozoological material excavated from a site carries valuable information about ancient meat production. Many bones belonging to juvenile or subadult male pigs refer to a site that was supplied with meat rather than meat production.

Our study analyses pig bones and teeth found during excavations of three monasteries in Continental Croatia – Benedictine Monastery in Bijela, Benedictine Abbey in Rudina and Pauline Monastery of All Saints in Streza. Using radiocarbon dating, all bones of pigs used in our study originated from the 13th to 16th century. After excavation, bones and teeth were brought to the Archaeozoological laboratory at the Department of Anatomy, Histology and Embryology at the Faculty of Veterinary Medicine University of Zagreb. They were washed, dried at room temperature and subjected to standard archaeozoological analysis.

In the total sample of bones, pigs account for about 40% at the Benedictine Abbey and Pauline Monastery, while at the Benedictine Monastery, about 12%. The number of pig bones analysed was 566 for the Benedictine Abbey, 257 for the Pauline Monastery and 51 for the Benedictine Monastery. Out of these, on 42 pig mandibles and maxillae, gender was estimated. In all three site samples, male teeth were dominant over female and most of the bones, suitable for age determination, belonged to juvenile animals. Based on the results we presume that during Middle Ages, monasteries in Continental Croatia did not engage in pig production but were very well supplied with pig meat, possibly from nearby rural sites.

BIRDS FROM ARCHAEOLOGICAL SITE BIJELA, CROATIA: FOOD OR ACCIDENTAL FINDING

Magdalena Kolenc, Kim Korpes, Tajana Trbojević Vukičević, Martina Đuras

Department of Anatomy, Histology and Embryology, Faculty of Veterinary Medicine University of Zagreb, Zagreb, Croatia

Birds have been an important part of the human diet throughout history. Ancient avian material found at archaeological sites may have originated from domesticated birds that served as food, scavengers that fed on waste pits, or wild birds kept for entertainment or used in rituals/burials. However, avian material is rarely found, primarily because of its fragility. Moreover, data on avian remains in scientific publications from the Balkan region are limited. To understand the role of birds in ancient Continental Croatia, we analysed avian material from the archaeological site Bijela – Benedictine Monastery of St. Margaret (15th to 19th CE). The analysis included the determination of the skeletal element, taxa, age, when possible, cutmarks, burning, and pathologies. Bird remains represented 16.76% of all animal material from the site. A high number of remains belonged to chickens (29.15%) and corvids (23.89%). Another 12.55% belonged to pigeons, geese, common starling, ducks, Eurasian sparrowhawk and tawny owl. The rest of the remains belonged to the *Aves* group because the species could not be determined. More than half (51.82%) of all bird specimens were adults, 30.77% were juveniles and 6.48% were subadults. The age could not be determined for the rest. Pathological changes were observed in one chicken femur and one ulna from the *Aves* group, while one chicken tibiotarsus was burned. According to our findings, we can conclude that chicken meat was frequently consumed at the Bijela monastery. A small part of the diet was composed of pigeons, geese and ducks. Since a lot of bones originated from adult birds, we presume that inhabitants consumed eggs. Although the high prevalence of corvid bones could indicate the consumption of corvid birds, no cutmarks on these bones were observed. Other publications have stated that corvids were avoided in human diet, implying that corvids at Bijela were scavengers found accidentally on site, together with other non–domestic species.

SMALL ANIMALS SESSION

ORAL PRESENTATIONS

TUMORS OF THE URINARY SYSTEM IN CATS FROM CROATIA

Doroteja Huber, Lidija Medven Zagradišnik, Ivan-Conrado Šoštarić-Zuckermann, Andrea Gudan Kurilj, Branka Artuković, Dunja Vlahović, Ivana Mihoković Buhin, Marko Hohšteter

Department of Veterinary Pathology, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Neoplasms of the urinary tract of cats are uncommon. Few surveys have been performed worldwide, but so far no systematic investigation was performed in Croatia. The purpose of this research was to document epidemiologic information and tumor data from cats which were diagnosed with urinary tumors at the Department of Veterinary Pathology.

Cats diagnosed with urinary tract tumors by histopathology in the period from 2009 to 2022 were included in the study. Following data were analyzed: breed, sex, and age of cats, tumor location and type, and biological behavior.

For the research, 3317 archived samples from cats were evaluated. One or more tumors were diagnosed in 1073 cats. Tumors affected the urinary system in 32 cats, corresponding to a tumor prevalence of 1.0% (general population), and 3.0% (population of tumor-bearing cats). The most affected breeds were non-pedigree (68.8%) and European shorthaired cat (12.5%). Tumors affected approximately equal numbers of male (50.0%) and female (46.9%) cats. In one cat (3.1%) the sex was unknown. The average age of affected animals was 8.9 years (range 1 to 18 years, mod 2 and 8 years). Diagnosed tumors were lymphoma (78.1%), urothelial carcinoma (18.6%), and myxoma (3.1%). Affected locations were kidney (75%) and urinary bladder (25%); lymphoma and myxoma affected the kidney, while lymphoma and urothelial carcinoma were tumors affecting the urinary bladder. Majority of tumors was malignant (96.9%).

This study gives insight into urinary tumors that occur in Croatian cats. Tumor prevalence and tumor types diagnosed in the current study correspond to literature data, showing that the Croatian cat population suffers from the same tumors as cat populations elsewhere. The most frequent tumor of the urinary system in the current study was lymphoma, which is one of the most frequent tumors of cats overall. The low prevalence indicates that these tumors are rare, but nevertheless important diseases of the urinary tract in cats.

SPINAL COMPUTED TOMOGRAPHY FINDINGS IN FRENCH BULLDOGS

Ana Javor, Anita Kraljević, Iva Bacan, Branimir Škrlin, Filip Topolnjak, Filip Kereković, Zoran Vrbanac, Hrvoje Capak

Department of Radiology, Ultrasound Diagnostic and Physical Therapy, Faculty of Veterinary Medicine, University of Zagreb, Croatia

With the rising popularity and increased irresponsible breeding, French Bulldogs have become one of the most prevalent breeds associated with different spinal pathologies. The aim of the study was to describe the most common spinal computed tomography (CT) findings in French Bulldogs.

The data from the archives of the Department of Radiology, Ultrasound Diagnostics and Physical Therapy of the Veterinary Teaching Hospital University of Zagreb was retrospectively searched in a three-year period. There were 33 CT findings of French Bulldogs that were reviewed and analysed. Spinal pathologies were divided into the following categories: anomalies of the vertebral column (1), fracture and luxation (2), intervertebral disk disease - IVDD (3), inflammatory conditions (4), degenerative conditions (5), neoplasia (6), metabolic and unclassified conditions (7).

The most prevalent conditions were categorized into anomalies of the vertebral column (84,8% - 28/33) and IVDD (96,9% - 32/33). Most patients with congenital anomalies of the vertebral column also had IVDD. The most common congenital anomalies are hemivertebrae and transitional vertebrae. There was one case (3,03% - 1/33) of discospondylitis as inflammatory condition which was a result of a complication after spinal decompression surgery. In the category of metabolic and unclassified conditions there were two patients (6,06% - 2/33) both diagnosed with spinal arachnoid diverticula.

Our study indicates that all the French Bulldogs that had CT-scan performed with or without referral for spinal pathologies had at least one vertebral pathology described. Misalignment of the vertebral column is suspected to be correlated with intervertebral disc instability and a higher probability of IVDD. None of the patients had luxation and neoplasia which is probably the result of high sensitivity for diagnosing these conditions using X-ray as a more accessible modality.

DESCRIPTION OF THE CANINE POPULATION WITH SPINAL CORD INJURY AND THE EFFECT OF TREATMENT

Mária Kuricová, Tomáš Lipták, Scarlett Marešová, Marian Hluchý, Jakub Fuchs

Small Animal Clinic, University Veterinary Hospital, University of Veterinary Medicine and Pharmacy in Košice, Komenského 73, Košice 041 81, Slovakia

Spinal diseases are among the most difficult clinical cases in small animal practise. They can affect all breeds, sizes, ages, and sexes of dogs and cats. However, some breeds may be predisposed to certain types of disease. Despite an effort and research in this area, the prognosis following spinal cord injury (SCI) is still unpredictable to some degree. The most favourable outcomes and prognosis can be ensured by early definitive diagnosis and treatment, which is most often surgery in cases of disc diseases.

We are presenting pre-surgical and post-surgical findings in the affected population of dogs. From November 2020 to April 2023, 158 animals (125 dogs, 33 cats) with SCI were admitted to the Small Animal Clinic of UVMP in Košice. This number represents approximately 63 cases per year. Sixty-eight (43%) animals were treated conservatively (mean Modified Frankel Score MFS=1.82), and surgical treatment was performed in the remaining 57% of animals (82 dogs, 8 cats) with mean MFS=3.67. The mean age was 7.6±4.9 years, body weight 14.4±12.5 kg. Chondrodystrophic breeds were mainly affected (59%). MRI was performed in 65 cases (72%, 57 dogs, 8 cats). Most surgeries were performed for thoraco-lumbar lesions (53%) ($p<0.05$), followed by cervical (29%), and lumbo-sacral (18%). Stabilisation of the spine was performed in 11 cases (12%). Five animals were euthanized at the owner's request because of failure to convalesce, 4 animals were euthanized because of recurrence of neurologic deficits, 5 cases did not improve and remained in a cart, and 5 cases improved with severe residual neurologic deficits. The efficacy of surgical treatment was 79%, based on improvement of MFS by at least 1 grade.

The incidence of spinal disease, particularly disc disease, is increasing significantly, as is the number of chondrodystrophic breeds and their crosses represented. Despite the overall good outcome after surgical treatment, the number of dogs with non-satisfactory outcome is still high.

RETROSPECTIVE STUDY OF VENTRICULAR ARRHYTHMIAS IN DOGS EXAMINED AT CLINIC FOR INTERNAL DISEASES, FACULTY OF VETERINARY MEDICINE, ZAGREB (2018-2020)

Ivana Filipčić[1], Ines Jović[2], Marin Torti[2]

[1]PhD student (Faculty of Veterinary Medicine, Zagreb, Croatia)

[2]Clinic for Internal Medicine (Faculty of Veterinary Medicine, Zagreb, Croatia)

Ventricular arrhythmias (VAs) are abnormal rhythms originating from the ventricles. They have potential to cause significant hemodynamic compromise or even death and are among the most clinically relevant arrhythmias. VAsare commonly associated with structural heart disease or systemic disease, and in minority of cases they may occur in healthy dogs. The most common are premature ventricular contractions (PVCs), accelerated idioventricular rhythm (AIVR), monomorphic and polymorphic ventricular tachycardia (VT) and bundle branch blocks (BBB).

The aim of this retrospective study was to characterize the population of dogs with VAs and determine whether they had structural heart disease or extracardiac disease.

Electronic records of dog's admitted at the Clinic for Internal Diseases (January 2018 to December 2020) were examined, and only those who had complete records and underwent full clinical workup (incl. cardiac ultrasound) were included (n=307). Of those 111 (36%) had arrhythmia on ECG, and 48 (43%) (25 males and 23 females) had VAs. Most of the dogs were purebred (n=35), with the Cane Corso, Doberman and Great Dane overrepresented. Majority of dogs were older than 6 years (81%), and were heavier than 21 kg (70%, range from 4 to 76 kg). In 31 of dogs (64.5%) VAs were cardiac in origin: due to acquired heart diseases in 68%, congenital heart diseases in 26% and heart tumours in 6%. The most common VAs in these dogs were PVCs (55%), followed by BBBs (35%) and VT (10%). In 12 of the dogs (25%) the VAs were extracardiac in origin: 50% had tumours, 16.5% had epilepsy, 16.5% had pyometra, 8.5% systemic arterial hypertension, 8.5% had ethylene glycol poisoning. In 5 dogs (10.5%) the cause of arrhythmia was not found. Since the heart was healthy, these dogs were grouped together with the extracardiac group (EG). The most common VAs in theEG were PVCs (65%), followed by BBBs (17.5%), and AIVR (17.5%).

To conclude, the results of this study show that VAsoccur more often in dogs with structural heart disease, that are purebred and heavier than 21 kg.

EPIZOOTIOLOGY OF RETROVIRAL INFECTIONS IN STRAY CATS

Matko Perharić[1], Barbara Jagec[2], Josipa Habuš[1], Suzana Hađina[1], Zrinka Štritof[1], Vladimir Stevanović[1], Iva Benvin[1], Iva Zečević[1]

[1]Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[2]Mr. Kvakan, Veterinary Clinic for Small Animals, Čakovec, Croatia

Feline leukemia virus (FeLV) and feline immunodeficiency virus (FIV) are retroviruses that are common in domestic cat populations worldwide. These viruses are associated with severe diseases that eventually lead to death. This study investigates the prevalence and risk factors for FIV and FeLV infections in stray cats.

The study was conducted on 179 stray domestic cats immediately upon arrival at the cat shelter in Međimurje County in northwestern Croatia. Blood samples were collected from the cephalic vein to confirm retroviral infection. BIONOTE Anigen Rapid FIV/FeLV test were used to evaluate clinical samples. Prevalence data were summarised in percentages, while other comparisons were analysed using the $\chi 2$-test. A value of $P < 0.05$ was considered significant.

The overall prevalence (n=179) for FeLV was 24.58% (n=44) and for FIV 10.05% (n=18). Two cats (1.11%) were positive for both retroviruses. The prevalence for FIV infection was significantly (P=0.03) higher in males (n=96; positive-14) than in females (n=83; positive-4). Significant difference was not comfirmed (P=0.4) between males (n=96; positive-26) and females (n=83; positive-18) for FeLV infection. In addition, we found a significant difference (P =0.01) in males (n=96; positive-42) than in females (n=83; positive-22) for positive retroviral status than females. The mean age was 4.3 years in FeLV infected cats and 7.0 years in FIV positive cats.

This study confirms a high rate of retroviral infections in stray cats. The results also indicate the main risk factors: the natural territorial fighting behaviour of male cats, which predisposes them to a higher rate of FIV infection, while the high prevalence of FeLV is probably the result of high dense population and the small number of cats vaccinated against FeLV. Prevention measures should include testing, identification and isolation of positive cats, and FeLV vaccination of all outdoor cats.

SMALL ANIMALS SESSION

POSTER PRESENTATIONS

THERAPEUTIC EFFECT OF THE NUCLEOSIDE ANALOG GS-441524 IN A CAT WITH FELINE INFECTIOUS PERITONITIS

Iva Zečević, Suzana Hađina, Josipa Habuš, Krešimir Martinković, Zrinka Štritof, Vladimir Stevanović, Iva Benvin, Hrvoje Capak, Matko Perharić

Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Feline infectious peritonitis (FIP) is a viral-induced, immune-mediated disease of cats caused by certain strains of feline coronavirus. Several studies have shown that the nucleoside analog GS-441524 is a potentially highly effective treatment option. This study aimed to evaluate the efficacy of GS-441524 in a FIP positive cat after 84 days of treatment.

A 2-year-old feline leukemia positive domestic cat was referred in April 2022 with a history of lethargy, decreased appetite, weight loss and breathing difficulties. Clinical examination revealed pyrexia, tachypnea, and dehydration. Initial complete blood count (CBC) showed left-shift neutrophilia and lymphopenia. Biochemistry revealed a serum albumin-globulin ratio of 0.38 and pleural effusion was noted. FIP was confirmed by the following tests: effusion albumin-globulin ratio, Rivalta test, blood and effusion serology, effusion cytology and RT-PCR. Treatment started with GS-441524 at a dosage of 4mg/kg SC for the following 12 weeks. Amoxicillin 22mg/kg and prednisolone 2mg/kg were administered for the first 10 days of treatment. CBC, albumin-globulin ratio, radiographs and physical examinations were performed regularly to assess the efficacy of treatment.

Clinical improvement was observed after the first three weeks of treatment. Throughout the treatment period, resolution of pleural effusion, normal CBC and improvement in albumin-globulin ratio were noted. In the following three months, the dose of GS-441524 was increased to 8 mg/kg from the eighth week of treatment due to anisocoria.

Until recently, progressive FIP was considered an incurable disease. Previous treatment included immunosuppressive drugs and supportive care. Over the past five years, several antiviral drugs have been studied for FIP. At the time of submission of this report, no relapse of clinical signs were noted, therefore GS-441524 is confirmed as an effective treatment for FIP.

DIAGNOSIS AND TREATMENT OF HANSEN TYPE II DISC DISEASE IN SIX CATS

Tomáš Lipták[1], Scarlett Marešová[1], Filip Korim[2], Bisal Bhattarai[3], Mária Kuricová[1]

[1]Small Animal Clinic, University of Veterinary Medicine and Pharmacy in Košice, 041 81 Košice, Slovak Republic

[2]Department of Morphological Disciplines, University of Veterinary Medicine and Pharmacy in Košice, Komenského 73, 041 81 Košice, Slovakia

[3]Moscow State Academy of Veterinary Medicine and Biotechnology MVA named after K I Skryabin, Ulitsa Akademika Skryabina, 23, 109472 Moscow, Russia

Intervertebral disk disease (IVDD) is a degenerative disease that affects the spine of dogs and cats. It usually results in compression of the spinal nerves and spinal cord. IVDD is a very common cause of spinal cord injuries in dogs, but it is considered rare in cats. However, it might be that the incidence is higher than reported. As in dogs and humans, therapy is mainly based on surgical decompression, which also provides acceptable results in cats. To evaluate the success rate of surgery in cats with Hansen type II disc disease.

Client-owned cats (4 males, 2 females) aged 4-9 years, BCS 5-7, with acute onset of back pain, paraparesis/tetraparesis to plegia and urinary incontinence treated with surgical decompression after lesions were identified with magnetic resonance imaging. The lesions were intervertebral disc extrusions at C6-C7, T6-T7, T12-T13, L1-L2, L2-L3, L5-L6.

Most cats showed deficits of upper motor neurons in both hind legs before surgery (4/6). Urinary incontinence with LMN was noted in two cats (2/6); the others suffered from urinary retention and urine leakage from overflow (4/6). Postoperative recovery was good to excellent in all cases, with improvement of mobility, reduction of pain, and disappearance of neurologic deficits within 14 days in three cats, 18 days in one cat, 21 days in two cats, and 28 days in one cat.

Chronic compressive spinal cord lesions and lesions resulting in loss of deep pain perception have an unfavourable prognosis in terms of recovery of limb function and autonomic function (urination and defecation). In a larger study, 30 cats were treated surgically, and 16 of them had an excellent outcome, 5 cats had a good outcome with residual neurologic deficits, 5 cats had a satisfactory outcome, 3 were euthanized, and 1 cat died. In general, the prognosis and recovery in cats with disc disease appear to be the same as in dogs, with the early timing of surgery being a very important factor.

BOTTOM-HUNG WINDOW TRAUMA - REHABILITATION CHALLENGES IN A CAT

Anita Kraljević[1], Niko Ivkić[2], Ana Javor[1], Jelena Adanić[3], Ivana Vuković[4], Iva Bacan[1], Hrvoje Capak[1], Zoran Vrbanac[1]

[1]Department of Radiology, Ultrasound Diagnostic and Physical Therapy, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[2]Surgery, Orthopaedics and Ophthalmology Clinic, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[3]Doctor of Veterinary Medicine, Zagreb, Croatia

[4]Faculty of Veterinary Medicine, University of Zagreb, Croatia, student

Bottom-hung window trauma occurs when cats are trapped in the small V-shaped opening at the top of the window and is one of the causes of acute pelvic limbs traumatic paralysis.

A 9-month-old female Bengal cat presented pelvic limb paraplegia, resulting from hanging from a window for over 4 hours, stabilization began 5-6 hours later. The initial clinical findings showed hypothermia, and cold hind limbs, especially the distal parts. Bilateral weak femoral pulse, flaccid pelvic limb muscles, absent left limb nociception, and incontinence were noted in the cat. Neurological grade upon admission was Scott's grade 5. Blood works showed elevation of renal, hepatic and muscle parameters and electrolyte imbalance related to ischemic injury. The total body radiography was unremarkable. Initial stabilisation was provided with isotonic balanced crystalloid fluid, administered as boluses in 30 ml/kg IV, followed by the same solution as CRI at 3ml/kg/h IV. Oxygen therapy and heating were also provided in the first hours of treatment. Physical therapy was initiated five days after the trauma. The protocol included electro-acupuncture, massage, and proprioceptive exercises. A land treadmill was introduced as the patient progressed. Two weeks after the trauma, a wound with signs of infection was observed in the right lumbar area due to an ischemic injury suspected to be related to the *bottom-hung window* trauma.

The partial nociception in the left hind leg returned two days after injury, and the cat started to control urination ten days after the trauma. The cat became ambulatory 30 days after the trauma and regained full function after two months. Five months after the trauma, the cat gave birth to 2 healthy kittens.

A recent study showed that the mortality of cats admitted with neurological grade 5 was 55%. This case confirms that a patient can be stabilised after a *bottom-hung window* trauma and recover despite statistically poor prognosis.

BODY CONDITION SCORE IN CROATIAN SERVICE DOGS

Tea Dodig[1], Tihana Brkljačić[2], Paula Ćurić[3], Mirna Brkljačić[1]

[1]*Clinic for Internal Medicine (Faculty of Veterinary Medicine, University of Zagreb, Croatia)*

[2] *Institute Pilar (Institute of Social Sciences Ivo Pilar, Zagreb, Croatia)*

[3]*Intern in Veterinary Teaching hospital, Faculty of Veterinary Medicine, University of Zagreb, Croatia*

Service dogs are of great importance in today's society. Police dogs are used primarily for drugs, explosive or human detection and for attacks. Guide and therapy dogs are often assigned to people with physical, emotional, and mental disabilities. Croatian Guide Dog and Mobility Association trains dogs for the aforementioned users. The aim of this study was to test differences between police and guide dogs regarding body condition score (BCS). Data about dogs were collected by a uniform questionnaire fulfilled by each dog guide or user. The investigation included 44 service dogs, namely 24 police and 20 guide dogs. In the guide group, there was an equal ratio of males and females, and most of them (n=19) were neutered, while in the police group, the gender ratio was 1:3 in favor of males, among which only 2 were neutered. The dogs' age was between 1 and 12 years. Police dogs were significantly younger (Mp=28 ±12,473 months; Mg=66,95 ±37,842 months) and had significantly lower BCS (Mp=3,71±0,464; Mg=4,75±0,910) using 9-point scale from 1 to 9. However, if only the dogs younger than 40 months (22 p and 7 g) are taken into account the BCS difference between the two groups is lost (Mp=3,73±0,456; Mg=4,00±0,00). The findings of this study suggest that the differences in BCS between police and guide dogs can be attributed to the older age of guide dogs which is associated with a decrease in agility but also to the higher activity level of police dogs due to the more strenuous type of work. Dog owners should be encouraged and instructed about the techniques that could keep their dogs in optimal physical condition which is equally important for their job performance, life quality and welfare. We advise that the working dogs have regular veterinary consults with an emphasis on the nutritional need of each dog.

PREVALENCE OF ENDOCRINOPATHIES IN DOGS AND CATS

Paula Ćurić[1], Gabrijela Jurkić Krsteska[1], Tea Dodig[1], Ivana Kiš[1], Vesna Matijatko[1], Nada Kučer[1], Tihana Brkljačić[2], Mirna Brkljačić[1]

[1]*Faculty of Veterinary Medicine University of Zagreb*

[2] *Institute of Social Sciences Ivo Pilar*

Nowadays, most pets are treated like family members so there is a significant increase in the incidence of diseases in middle and old-aged pets, such as endocrinopathies. Most common canine endocrinopathies include *diabetes mellitus*, hyperadrenocorticism and hypothyroidism whereas *diabetes mellitus* and hyperthyroidism are most common in cats. Clinical signs are sometimes subtle, progress slowly and can differ with each case. Diagnostics can be difficult, but in most cases endocrine tests can confirm the diagnosis. Treatment is usually successful, yet various complications during treatment are common.

The aim of this research was to retrospectively review medical records through „Vef Protokol" programme and to investigate the occurrence of endocrinopathies in dogs and cats at the Clinic for Internal Medicine of the Faculty of Veterinary Medicine University of Zagreb, Croatia, between January 1st 2000 and December 31st 2022.

Among entire hospital population in investigated period (45065 dogs and 9804 cats) there were 162 dogs with hyperadrenocorticism, 124 dogs and 31 cats with *diabetes mellitus*, 82 dogs and 2 cats with hypothyroidism, 56 cats with hyperthyroidism, 32 dogs with hypoadrenocorticism and 1 dog with pheochromocytoma which met the inclusion criteria

Endocrinopathies were recorded in 0,82% dogs and 0,94% cats. In both dogs and cats, females were overrepresented. Average age was 11.6 years in dogs and 11.2 in cats. Purebreds were more represented than mixed breed dogs whereas domestic shorthaired cats were more common. Differences from the other research are due to different inclusion criteria and popularity of certain pet breeds in different parts of the world.

Endocrinopathies were more common in cats rather than in dogs even though dogs were overrepresented. Hyperadrenocorticism and hyperthyroidism were the most diagnosed endocrinopathies in dogs and cats, respectively, probably due to characteristic signs that are recognised by the owners.

ANTIMICROBIAL SUSCEPTIBILITY OF BACTERIA ISOLATED FROM URINE OF DOGS WITH URINARY TRACT INFECTIONS

Ema Dojčinović[1], Dora Caušević[1], Selma Pintarić[2], Suzana Hađina[2], Josipa Habuš[2], Matko Perharić[2], Marija Cvetnić[2], Iva Zečević[2], Iva Benvin[2], Zrinka Štritof[2]

[1]Students, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[2]Department of Microbiology and Infectious Diseases with Clinic, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Urinary tract infections (UTIs) are one of the most common reasons for antimicrobial treatment in dogs. The applicability of international guidelines for the treatment of UTI may depend on local resistance patterns. The aim of this study was to investigate the prevalence and antimicrobial susceptibility of UTI pathogens in dogs. The results of urine culture and antimicrobial susceptibility testing in dogs (AST) performed over a four-year period (May 2018-May 2022) were retrospectively evaluated. Urine samples were processed using classical methods for isolation and identification of bacteria. AST was performed for six antimicrobials using the Kirby-Bauer disk diffusion method. Of the 1034 urine samples processed, 361 (35%) showed significant bacterial growth. The most frequently isolated bacteria were *E. coli* (45%), *Proteus* spp. (14%), *Staphylococcus* spp. (13%), *Enterococcus* spp. (7%), *Klebsiella* spp. (6%), and *Enterobacter* spp. (4%). Resistance to the antimicrobials recommended as first-line agents in the guidelines, amoxicillin and co-trimoxazole, was as follows: *E. coli* (57%/32%), *Proteus* spp. (29%/53%), *Staphylococcus* spp. (34%/22%), *Enterococcus* spp. (38%/100%), *Klebsiella* spp. (100%/85%), and *Enterobacter* spp. (100%/58%). The high rates of resistance to first-line antimicrobials observed in this study are likely biased when compared to the general canine population because most urine samples were obtained from a veterinary teaching hospital that primarily admits referral patients. Therefore, these results should not discourage clinicians from following the guidelines, but rather should raise awareness of the unpredictable susceptibility of bacteria in previously treated dogs or dogs with various comorbidities. Therefore, it is prudent to initiate antimicrobial treatment in these animals based on urine culture results and AST.

SEVERE ARTERIAL THROMBOEMBOLISM IN A DOG WITH STAGE VB T-CELL LYMPHOMA – A CASE REPORT

Ivana Filipčić[1], Martina Crnogaj[2], Marin Torti[2], Andrea Gudan Kurilj[3]

[1]PhD student (Faculty of Veterinary Medicine, Zagreb, Croatia)

[2]Clinic for Internal Medicine (Faculty of Veterinary Medicine, Zagreb, Croatia)

[3]Department of Veterinary Pathology (Faculty of Veterinary Medicine, Zagreb, Croatia)

Lymphoma is the most common hematopoietic neoplasm in the dog. It can occur in multicentric, alimentary, mediastinal and extranodal form. Immunophenotype is a prognostic marker and T-cell lymphoma is generally associated with a worse prognosis and more complications.

A 9 year-old, intact male, Labrador Retriever, was admitted because of anorexia, weight loss, vomiting, diarrhea and neurological signs. On physical examination the dog was lethargic and cachectic, the mucous membranes were pale and dry. Popliteal lymph nodes (LNs) were enlarged, a mass in the mesogastrium was suspected during palpation, femoral pulse was hypokinetic.

Complete blood count showed severe anemia and leukocytosis with lymphocyte predominance. Major changes in biochemistry profile were marked hypoalbuminemia and hyperglobulinemia. Abdominal ultrasound was performed with a major finding of severe thrombosis of the abdominal aorta. Considering the clinical state and prognosis the dog was euthanized. Necropsy revealed severe splenomegaly with multiple infarcts, hepatomegaly, enlarged subcutaneous and mesenteric LNs, renal infarcts and severe thrombosis of abdominal aorta, iliac and femoral arteries. Histopathology showed proliferation and diffuse infiltration of small to medium sized neoplastic lymphocytes in affected LNs, spleen and liver. Additionally, multiple thrombi with consequent infarcts were confirmed in the spleen. Immunohistochemistry determined that the majority of neoplastic lymphocytes were positive for CD3 antibody (T lymphocytes).

In conclusion, thrombosis and thromboembolism are known deleterious consequences of lymphoma in people and have been sporadically reported in dogs. This case reports stage Vb T-cell lymphoma complicated with arterial thromboembolism (ATE) and confirms that ATE contributes to lymphoma-associated morbidity and mortality in dogs. Evidence of thrombosis should prompt the clinician to evaluate for coexisting disease processes.

LONGEVITY IN PET CATS AND THEIR LIFESTYLE

Ivana Sabolek[1], Mario Ostović[1], Branka Artuković[2], Andrea Gudan Kurilj[2], Ivan-Conrado Šoštarić-Zuckermann[2], Lidija Medven Zagradišnik[2], Doroteja Huber[2], Dunja Vlahović[2], Albert Trstenjak[3], Željko Pavičić[1], Kristina Matković[1], Marko Hohšteter[2]

[1]Department of Animal Hygiene, Behaviour and Welfare, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[2]Department of Veterinary Pathology, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[3]Fifth-year student, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Cats are among the most numerous pet animals in the Western World. Understanding of their longevity can improve housing strategies resulting in improved cat health and welfare. Indoor housing provides them many health benefits; yet, such lifestyle disables them from performing many physiological behaviours, which is more enabled for outdoor cats. The aim of this study was to determine the longevity of pet cats regarding their lifestyle.

The electronic medical record database Issa–VamsTec–Zagreb of the Department of Veterinary Pathology, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia, was searched for all cats undergoing necropsy in the period from March 10, 2009, to March 10, 2019. In total, 1,718 cases were reviewed. Information regarding the cat housing and age, as well as their sex and breed was available for 693 cats (40.3%). Cats were classified into groups of indoor, outdoor, and indoor-outdoor cats. Data were analysed using Statistica v. 14.0 software.

Study results showed that 334 cats were housed indoors (52.4% males, 47.6% females), 117 outdoors (70.9% males, 29.1% females) and 242 cats were indoor-outdoor cats (58.3% males, 41.7% females). Significant differences ($P<0.01$) in the longevity between these groups of cats were found. The mean±SD age (in years) was 8.30±6.13 for indoor cats, 4.50±3.57 for outdoor cats and 6.49±5.07 for indoor-outdoor cats. For male and female cats, respectively, the mean±SD age (in years) was as follows: 7.45±6.03 and 9.21±6.13 (indoors), 4.62±3.34 and 4.20±4.12 (outdoors), and 5.67±4.35 and 7.64±5.76 (indoors-outdoors). Mixed-breed cats were most numerous cats in all groups observed (79.9% indoors, 97.4% outdoors, 94.2% indoors-outdoors).

Accordingly, pet cat lifestyle affects their longevity, with indoor housed cats having longest lifespan. Further studies should focus on the quality of pet cat life.

DIFFERENTIATION OF HISTIOCYTIC NEOPLASIA AND INFLAMMATORY LESIONS USING THE IBA1 IMMUNOHISTOCHEMICAL MARKER

Mavro Matasović[1], Karla Pavliček[2], Marko Hohšteter[3], Andrea Gudan Kurilj[3], Branka Artuković[3], Ivan-Conrado Šoštarić-Zuckermann[3], Doroteja Huber[3], Dunja Vlahović[3], Lidija Medven Zagradišnik[3]

[1]Vet Point, Veterinary Practice, Zagreb, Croatia

[2]Faculty of Veterinary Medicine, University of Zagreb, Croatia

[3]Department of Veterinary Pathology, Faculty of Veterinary Medicine, University of Zagreb, Croatia

Ionized calcium binding adapter molecule 1 (Iba1) is an immunohistochemical (IHC) marker expressed by the cells of the monocyte-macrophage lineage and is used for the diagnosis of proliferative, reactive and inflammatory histiocytic diseases in dogs. The aim was to differentiate between neoplastic histiocytes and inflammatory cells of monocyte-macrophage lineage based on the staining pattern and intensity of Iba1 and on distribution of Iba1 positive cells.

An IHC analysis was performed using the Iba1 marker of 20 histological canine tissue samples previously identified by morphological diagnosis established at the Department of Veterinary Pathology, Faculty of Veterinary Medicine, Zagreb (DVP) between 2019. and 2021. as histiocytic tumours with low, medium or high probability. Furthermore, the inflammatory infiltrates of those neoplasms were analysed.

The diagnosis was confirmed with the Iba1 staining in 4 out of 9 highly, 4 out of 8 moderately, and 2 out of 3 morphologically marginally suspicious histiocytic neoplasms previously diagnosed as canine cutaneous histiocytomas (4), histiocytic sarcomas (4) and unidentified round cell neoplasms (2). The distribution of Iba1 positive cells was diffuse in 12 samples, focal extensive in 4 samples and multifocal in 3 samples. The strongest intensity of Iba1 expression was shown in focal extensive distribution of Iba1 positive cells, while the multifocally distributed cells have shown the weakest expression.

The standard morphological diagnostic toolset should be complemented with the Iba1 staining in cases where the distinction between the histiocytic neoplasms and other morphologically similar tumours is ambiguous. However, since Iba1 is not specific for the neoplastic histiocytic cells exclusively, in samples where the differentiation between neoplasms and other pathological lesions is morphologically unclear, application of the broader IHC panel is necessary.

MULTIMODAL ANALGESIA AND ANESTHESIA FOR ORCHIECTOMY AND RADICAL BILATERAL INGUINAL MASTECTOMY IN A MALE GUINEA PIG

Klara Klašterka[1]; Ivan Butković[2]; Gabrijela Jurkić-Krsteska[3], Goran Bačić[2]; Tugomir Karadjole[2]; Nino Mačešić[2]; Branimira Špoljarić[2] Ivan Folnožić[2]; Silvijo Vince[2]; Juraj Šavorić[2]

[1] Small animal internship program, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[2] Clinic for Obstetrics and Reproduction; Faculty of Veterinary Medicine, University of Zagreb, Croatia

[3] Clinic for Internal diseases, Faculty of Veterinary Medicine, University of Zagreb, Croatia

A one-year-old, male guinea pig was presented to the Clinic because of the two inguinal masses. Physical examination revealed a 4x4cm right inguinal flat mass with hard-elastic consistency, and a 2x1cm left inguinal clustered mass, also with hard-elastic consistency. Clinical exam showed lethargy and weakness. Rectal temperature was 38,5°C, heart rate 200/min and respiration rate was 60/min.

Premedication was done with medetomidine (100 ug/kg IM), buprenorphine (0,1 mg/kg IM) and ketamine (10 mg/kg IM). Also, meloxicam (0,4 mg/kg SC.) and metoclopramide (0,5 mg/kg IM) were given in the time of premedication and continued orally for 3 days post operatively. Because of the pedal withdrawal reflex reappearance, medetomidine (100 ug/kg IM) and ketamine (10 mg/kg IM) were repeated while prepping the surgery site. The eyes were lubricated with a sterile saline. Mask induction and anesthesia maintenance was done with an 100% oxygen and 3% isoflurane mixture while breathing spontaneously. Mean arterial pressure and ECG were monitored during anesthesia. Depth of anesthesia was assessed by pedal and palpebral reflex reappearance. First, orchiectomy was done by preforming closed scrotal technique, skin was incised with No 11. blade, surrounding tissue around funiculus spermaticus was bluntly dissected. Multifilament absorbable 3-0 suture was used for the ligation of funiculus spermaticus. Elliptical incision was preformed above each mass. Before closing mastectomy wounds splash block with lidocaine (1 mg/kg in total) was done to reduce the pain. Walking sutures were placed as tension-relief technique for skin approximation, using 3-0 absorbable multifilament. The skin of both mastectomy and orchiectomy wounds was closed using 3-0 absorbable multifilament with an intradermal pattern.

Post operatively, guinea pig was given warmed Lactated Ringer solution (20 ml/kg SC), enrofloxacin (5 mg/kg SC) and buprenorphine (0,1 mg/kg SC). Approximately three hours after surgery, guinea pig started eating. The owner reported that he was interactive and producing feces the same evening. The histopathology finding was an inflammatory lipoma.

In conclusion, this anesthetic protocol was suitable for the procedure.There was no anesthesia nor surgery related complications, also this anesthetic protocol provided a good multimodal analgesia, sedation and myorelaxation.

FELV ASSOCIATED NON-REGENERATIVE ANAEMIA WITH CO-INFECTION WITH HAEMOTROPIC MYCOPLASMA – CASE REPORT

Iva Benvin, Iva Zečević, Krešimir Martinković, Suzana Hađina, Josipa Habuš, Zrinka Štritof, Ivona Ćorić, Vladimir Stevanović, Nenad Turk, Matko Perharić

Department of Microbiology and Infectious Diseases with Clinic, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Feline leukemia virus (FeLV) is a significant cause of morbidity and mortality in cats worldwide, leading to a wide range of clinical signs. The occurrence of co-infection with haemotropic mycoplasma poses additional challenges and potential complications for feline health.

A 9-month-old European shorthair cat was presented with a history of lethargy, inappetence, respiratory distress, and with a positive FeLV p27 antigen test. On presentation the cat was in lateral recumbency, hypothermic, dyspnoeic with pale mucous membranes. Initial blood work showed severe non-regenerative anaemia (hematocrit 7%) with thrombocytosis and neutrophilia without leucocytosis. The biochemistry profile showed low creatinine and urea levels and hypokalaemia, while X-ray and ultrasound of thorax and abdomen were negative. Molecular analyses confirmed FeLV provirus and the presence of haemotropic mycoplasma.

Stabilisation and initial treatment started with oxygen supplementation and xenotransfusion with canine PRBC, after which improvement occurred. Concurrently, the cat was treated with doxycycline over a 4-week period until a negative PCR for haemotropic mycoplasma. Moreover, the cat received four feline PRBC transfusions, methylprednisolone and darbepoetin alfa over a 10-week period. Antiretroviral therapy was initiated with recombinant feline interferon omega (rFeIFN-ω). Following the first cycle of treatment with rFeIFN-ω, the cat showed an improvement in haematocrit increase. Unfortunately, only two cycles of treatment with rFeIFN-ω were completed. Afterwards, no improvement was observed and the cat was euthanized due to inauspicious prognosis and poor clinical condition.

This case highlights the importance of haemotropic mycoplasma detection in all cases of FeLV-induced anaemia to ensure appropriate diagnostic testing and treatment. However, cats lacking strong FeLV-specific immunity and undergo progressive infection often develop fatal FeLV-associated diseases despite treatment.

ETIOLOGY OF HYPOGLYCEMIA IN DOGS: A RETROSPECTIVE STUDY

Lucija Jeremić[1], David Mihaljević[1], Elizabeta Pongrac[2], Anja Raić[3], Luka Ećimović[4], Mirna Brkljačić[2]

[1]Student of Veterinary Medicine (Faculty of Veterinary Medicine, University of Zagreb)

[2]Clinic for Internal Medicine (Faculty of Veterinary Medicine, University of Zagreb)

[3]Clinic for Surgery, Orthopedics and Ophthalmology (Faculty of Veterinary Medicine, University of Zagreb)

[4]Laboratory of Clinical Pathology (University Animal Hospital, Swedish University of Agricultural Sciences)

Hypoglycemia is characterized by low blood glucose which can result from numerous factors including various diseases, hormonal imbalances, prolonged fasting, insulin overdose etc. Regardless the etiology, it can adversely affect immune function, fluid balance and neurological status of patient. Clinical manifestation of hypoglycemia in dogs may vary from weakness, lethargy, tremor, seizures to coma and death. Efficient management entails prompt symptoms identification and instant veterinary intervention. The objective of this study was to retrospectively investigate the incidence and underlying causes of hypoglycemia in dogs admitted at the Clinic for Internal Medicine, Faculty of Veterinary Medicine, University of Zagreb, Croatia between May 1st 2022 and May 1st 2023. During the investigated period, among the overall hospital population of 3173 dogs, there were 39 with hypoglycemia (blood glucose δ3,3mmol/L) namely 59% females and 41% males. Among them 36% were mix breed while 64% were purebred with the Maltese being overrepresented (20%). The median age was 78 months $\pm$ 54,30 ranging from 3 to 181 months while the median weight was 10,0 $\pm$ 10,83 kg from 0,80 to 37,40 kg. The median blood glucose was 2,60 $\pm$ 0,74 mmol/L. Neurological symptoms were observed in 25,64%. Glucose was administered either orally or intravenously in 33,33%. Infections and/or inflammations were assigned to hypoglycemia in 42%, neoplasms in 29% while 16% of patients had multiple feasible etiology factors of hypoglycemia. In 13% etiology of hypoglycemia was due to other causes (i.e. portosystemic shunt). A short-term outcome was favourable in 59%, unfavourable in 28% and unknown in 13%. Among dogs with unfavourable outcome 63,6% were euthanized while 36,4% died during hospitalisation. The incidence of hypoglycemia in dogs is 1,2% and in majority of cases it can be attributed either to infections and inflammations or to neoplasms.

BRACHIAL PLEXUS INJURY REHABILITATION IN A CAT – A CASE REPORT

Anita Kraljević[1], Valentina Plichta[2], Branimir Škrlin[1], Margarita Božiković[3], Ana Javor[1], Hrvoje Capak[1], Zoran Vrbanac[1]

[1]Department of Radiology, Ultrasound Diagnostic and Physical Therapy, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[2]Surgery, Orthopedics and Ophthalmology Clinic, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[3]Doctor of Veterinary Medicine, Zagreb, Croatia

Brachial plexus injury is the most common cause of acute forelimb monoparesis in small animals. These injuries often follow vehicular accidents or fall from heights.

A two-year-old domestic tomcat, intact, was admitted to the clinic with a non-weight bearing on the right front (RF) limb. The history of trauma could not be excluded since it is an outdoor cat. The distal RF limb was slightly flexed during an examination without contacting the ground. The affected limb showed no pathological mobility or pain. Radiography examination of the RF limb displayed intact bone structures. A neurological examination showed a loss of deep pain sensation in all digits of the RF limb. The sensation was absent on all structures distal to the elbow and the medial side from the central part of the humerus downwards. A brachial plexus injury was suspected, and considering the neurological findings, it was assumed that the ulnar and radial nerves were affected. Physical therapy was recommended, and the patient started therapy a few days after the trauma.

Rehabilitation protocol included magneto therapy, electrotherapy and a land treadmill two to three times per week. In addition, the home rehabilitation program consisted of massage and joint passive range of motion several times per day.

Progress was already visible after four weeks of therapy, and twelve weeks after, deep pain sensation was felt in the third and fourth digits, indicating that the ulnar nerve's function had returned. Also, the cat was weight-bearing on the RF limb and had no visible muscle atrophy.

Physiotherapy methods in combination with the owner’s dedication and participation, proved effective and resulted in almost full recovery in a relatively short time in this case of brachial plexus injury.

NODULAR GRANULOMATOUS EPISCLERITIS (NGE) IN A JAPANESE CHIN DOG

Mihovil Matković[1], Ivan-Conrado Šoštarić-Zuckermann[2], Boris Pirkić[3], Valentina Plichta[3], Marija Mamić[3]

[1]student, Veterinary Faculty, University of Zagreb, Zagreb, Croatia

[2]Department of Veterinary Pathology, Veterinary Faculty, University of Zagreb, Zagreb, Croatia

[3]Clinic for Surgery, Orthopaedics and Ophthalmology, Veterinary Faculty, University of Zagreb, Zagreb, Croatia

Nodular granulomatous episcleritis (NGE) is an inflammation of the sclera that can affect the temporal limbus, cornea, and nictitating membrane. NGE is more common in collies, cocker spaniels, and Shetland sheepdogs. Microscopically, it is granulomatous inflammation with histiocytes, lymphocytes, and plasma cells. NGE is most likely immune mediated.

An eight-year-old male Japanese Chin dog was brought to the Clinic for Surgery, Orthopaedics and Ophthalmology, Veterinary Faculty, Zagreb because the owner noticed some masses on eyes. Ophthalmologic examination revealed an episcleral mass near medial canthus of right eye with a diameter of 3 to 4 mm, more vascularized than the surrounding tissue and connected with blood vessel directly to medial eye canthus. The intraocular pressure was normal in both eyes. Conjunctivas of both eyes were hyperemic and edematous. A similar process started in the left eye. Under general intravenous anesthesia, ultrasonography with FNA of the masses was performed in both eyes. Ultrasonography revealed no abnormalities. Cytologic findings showed fare amount of fibrillar protein (collagen) surrounded with neutrophils, macrophages, and epithelial keratinized cells. Prednisolone acetate 1% BID and saline 5% have been administrated topically in both eyes. After five days, the edema persisted while hyperemia subsided. Systemic prednisone 5mg PO BID was administered. The eyes responded well, with slight hyperemia and complete resolution of edema. Ten days later, topical administration of cyclosporine A 0.2% BID and dexamethasone 0.1% BID was initiated in both eyes. Prednisone was reduced to SID and prednisolone acetate was discontinued. The animal responded very well to therapy.

NGE has not yet been described in Japanese Chin dog. Due to its immune-mediated nature, corticosteroids are effective for NGE. Azathioprine can also be used as an immunosuppressive therapy. The outcome of this dog was excellent due to prompt diagnosis and proper therapy.

ATYPICAL PRESENTATION OF OSTEOMYELITIS IN A GERMAN SHEPHERD DOG – A CASE REPORT

Ana Javor[1]*, Maša Efendić[2*], Iva Bacan[1], Anita Kraljević[1], Filip Topolnjak[1], Filip Kereković[1], Marko Hohšteter[3], Lidija Medven Zagradišnik[3], Mario Kreszinger[4], Dražen Vnuk[4], Zoran Vrbanac[1], Hrvoje Capak[1]

* equal contribution for publication

[1]Department of Radiology, Ultrasound Diagnostic and Physical Therapy, Faculty of Veterinary Medicine, University of Zagreb, Croatia

2Internal Medicine Clinic, Faculty of Veterinary Medicine, University of Zagreb, Croatia

3 Department of Veterinary Pathology, Faculty of Veterinary Medicine, University of Zagreb, Croatia

4Clinic for Surgery, Orthopedics and Ophthalmology, Faculty of Veterinary Medicine, University of Zagreb, Croatia

A 15-month-old German Shepherd dog was presented with left hind limb (HL) lameness lasting 2 weeks. Owner administered NSAID for 5 days after which dog showed improvement. Complete blood count marked severe eosinophilia, while serum biochemistry and neurological examinations were unremarkable. Severe pain in flexion and extension of the left knee as well as pain in HL movement were noted during orthopedic examination.

Radiography findings showed extensive sclerotic reactions invading the medullary cavity of the tibial metaphysis and diaphysis. Slight irregular periosteal changes were visible on the cranial margin of the proximal part of the tibia. Additionally, there was a well marginalized irregular radiolucent area measuring 1.6 x 1.4 cm visible on the anteroposterior view. The patient was referred to computed tomography of the thorax, abdomen and hindlimbs pre and post IV injection of iodinated contrast medium. Monostotic mildly aggressive bone lesion of the left tibia associated with regional lymphadenomegaly and muscle atrophy and peri-tibial soft tissue swelling was described. Differential diagnosis included osteomyelitis, panosteitis or primary bone neoplasia.
Tibial biopsy with microbiological culture was performed under general anesthesia. Histopathology results showed bone necrosis, osteolysis and chronic active osteomyelitis with proliferation of granulation tissue. There were no neoplastic cells in the bone sample. Bacteriological and mycotic results of bone tissue samples were negative.

The patient was prescribed NSAID therapy as needed. Five months later the dog presented with front right leg lameness and the X-ray of humerus showed typical manifestation of panosteitis. At the same time a follow up X-ray of left tibia showed complete regression of the osteolytic changes and periosteal irregularities. Medullary cavity of the tibia was of higher opacity, but homogenously enhanced. At that point the patient did not show any lameness on hind left limb.

MULTIPLE CARTILAGINOUS EXOSTOSIS CAUSING SPINAL CORD COMPRESSION IN A BULL TERRIER PUPPY – A CASE REPORT

Maša Efendić[1], Iva Bacan[2], Ana Javor[2], Hrvoje Capak[2], Elizabeta Pongrac[1], Iva Šmit[1], Martina Crnogaj[1], Ines Jović[1], Tea Dodig[1], Karol Šimonji[1], Nino Maćešić[3], Ivana Kiš[1]

[1] Clinic for Internal Diseases, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[2]Department of Radiology, Ultrasound Diagnostic and Physical Therapy, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia,

[3]Clinic for Reproduction and Obstetrics, Faculty of Veterinary Medicine, University of Zagreb, Croatia

A 4-months-old Bull Terrier puppy was admitted to the Clinic due to hind limbs paraparesis without history of trauma. Three days before, therapy with nonsteroidal anti-inflammatory drugs was administrated without clinical improvement. Complete blood count and serum biochemistry were unremarkable. Neurological examination showed ataxia on the right side of the body with proprioceptive deficits in right forelimb and both hind limbs. During manual manipulation of the neck mechanical resistance was present in the head extension position. Obvious signs of pain were present during the palpation of thoracic vertebrae. Spinal reflexes of the forelimbs were normal and in hind limbs increased. Radiography findings showed new bone formation in the thoracic spine segment changing the position of the spinosus processus the 5th and 7th thoracic vertebra (suspected osteoma or osteochondroma). A total body and spine computed tomography (CT) pre and post IV injection of iodinated contrast medium was performed. CT indicated multiple sites of smoothly marginated osteoproductive bone lesions along the vertebral column. The most relevant findings at the spinous process of T6 where the lesion extends ventrally into the vertebral canal resulting in focal stenosis of its diameter and moderate correspondent spinal cord compression. No other major thoracic abnormalities were detected. The differential diagnosis primarily included a multiple cartilaginous exostosis. Fine needle aspiration did not reveal diagnose due to lack of cells. Unfortunately, owner elected euthanasia without performing bone biopsy or further treatment. In this case CT was confirmed as extremely indicative diagnostic imaging choice for relatively rare condition in juvenile dogs with nonspecific neurological clinical signs.

A CHALLENGING CASE OF CANINE ANGIOSTRONGYLOSIS – A CASE REPORT

Maša Efendić[1], Blanka Beer Ljubić[1], Dora Ivšić Škoda[1], Vlasta Đurić[1], Elizabeta Pongrac[1], Gabrijela Jurkić[1], Vesna Matijatko[1], Mirna Brkljačić[1], Nada Kučer[1], Marin Torti[1], Damjan Gračner[1], Dalibor Potočnjak[1], Hrvoje Capak[2], Dražen Vnuk[3], Nino Maćešić[4]

[1] Clinic for Internal Diseases, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[2]Department of Radiology, Ultrasound Diagnostic and Physical Therapy, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia,

[3]Clinic for Surgery, Orthopaedics and Ophtalmology, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia,

[4]Clinic for Reproduction and Obstetrics, Faculty of Veterinary Medicine, University of Zagreb, Croatia

A 1-year-old Hungarian vizsla was admitted to the Clinic for the second opinion due to the long-lasting dry cough for the last 4 months with intermittent dyspnea even under the treatment with antibiotics and corticosteroids with no other clinical signs. Examination revealed fever (40°C), neck pain during manipulation and bilaterally harsh lung sounds. CBC showed mild anemia and prolonged coagulation parameters. Biochemistry parameters were unremarkable and the snap test for vector-borne diseases (*Anaplasma, Ehrlichia,* Lyme disease and Heartworm) was negative. Thoracic radiography showed atypical pulmonary pattern with generalized bronchial thickening and multifocal alveolar infiltrate. Upon the x-ray findings antigen blood test for *Angiostrongylus vasorum* was performed with positive result. To increase the sensitivity of result, the PCR of EDTA blood was performed for *A. vasorum* with the positive result. First stage larvae of *A. vasorum* was also found by coprology examination. Application of imidacloprid/moxidectin resulted in resolution of all clinical symptoms and coagulation values returned to the reference levels in only 3 days. The therapy was repeated 2 more times within a month. Month after the therapy x-ray follow-up showed regression of pulmonary changes.

In conclusion, the lack of clinical symptoms and lack of pleural effusion and typical x-ray image for *A. vasorum* was conducted due to previous treatment with antibiotics and corticosteroids. Therefore, this case was challenging. It is important to summarize all clinical symptoms with diagnostic procedures to achieve correct diagnosis due to the possibility of the appearance of similar symptoms and blood results in some other diseases such as immune-mediated conditions (Steroid Responsive Meningitis-Arteritis or Systemic Lupus Erythematosus), bacterial meningitis or vector-borne diseases. Also, non-targeted therapy (specially with corticosteroids) can really mask the typical symptomatology.

CORRELATION BETWEEN SERUM CALPROTECTIN AND DIFFERENT INFLAMMATORY RESPONSE BIOMARKERS IN DOGS

Nika Brkljača Bottegaro[1], Tara Kostanjšak[2], Ana-Maria Šimundić[3], Martina Crnogaj[1], Iva Šmit[1], Blanka Beer Ljubić[1], Krunoslav Bojanić[4], Borna Medić[1], Dražen Vnuk[1]

[1] *Faculty of Veterinary Medicine of University of Zagreb, Zagreb, Croatia*

[2] *Rockhall Veterinary practice, Limerick, Ireland*

[3] *Department of Medical Laboratory diagnostics Clinical Hospital ˝Sveti duh˝, Zagreb, Croatia*

[4] *Ruđer Bošković Institute, Zagreb, Croatia*

Calprotectin is an acute-phase protein that is released after exposure to microorganisms and after the death of neutrophils. In dogs, C-reactive protein (c-CRP) is an important protein in the acute phase of inflammation in serum whose concentration rapidly increases as a result of many conditions including infectious diseases, immune-mediated diseases and neoplasms. The aim of this study was to compare serum calprotectin concentrations (c-CP) with white blood cells, serum c-CRP and albumin as inflammatory parameters in dogs.

The study included fifteen dogs admitted at the hospital for reasons unrelated to the study (both healthy and various clinical cases). Blood samples (whole blood and serum) were analyzed within 4 hours from collection. Serum c-CP concentrations were measured using ELISA commercial kit. Shapiro-Wilk test was used to test the normality of distribution on all data analyzed in serum and whole blood. Concentrations of c-CP, c-CRP and albumin measured in serum were compared with each other and with leucocyte, segmented and band neutrophils count in whole blood. The strength of the association between variables was measured with Pearson's correlation test. Values of $p<0.05$ were considered significant.

Median age of the dogs in the study was 7 years; there were eight different dog breeds, both gender. There was a moderate positive correlation between c-CP and c-CRP ($\rho=0.45$), a moderate negative correlation between c-CP and albumin ($\rho=-0.54$) and c-CRP and albumin ($\rho=-0.44$). There was no significant correlation between c-CP and white blood cell parameters. C-CP was positively correlated with positive acute-phase proteins, and negatively with negative acute-phase proteins.

Data confirms that c-CP is correlated with other acute-phase proteins in dogs. Its concentrations are positively correlated with c-CRP and negatively to albumin concentration.

CENTRAL NERVOUS SYSTEM NEOPLASIA AFFECTING THE PITUITARY GLAND RESULTING IN SUDDEN VISION LOSS IN A YOUNG FEMALE DOG – A CASE REPORT

Maša Efendić[1], Ivana Kiš[1], Elizabeta Pongrac[1], Gabrijela Jurkić[1], Karol Šimonji[1], Miroslav Vlašić[1], Nino Maćešić[2], Dražen Vnuk[3], Lidija Medven Zagradišnik[4], Dunja Vlahović[4]

[1] Clinic for Internal Diseases, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[2]Clinic for Reproduction and Obstetrics, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[3]Clinic for Surgery, Orthopedics and Ophthalmology, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[4]Department of Veterinary Pathology, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

A 3-year old American Staffordshire Terrier bitch was admitted to the Clinic due to depression, head press and sudden bilaterally vision loss. Complete blood count showed inflammatory leukogram. Changes in serum biochemistry parameters indicated mild hypokalemia and hyperalbuminemia. Serological results for *Neospora caninum* antibodies (IFAT) were not detected. Neurological examination revealed bilateral vision loss, facial and nasal sense loss, slower swallowing with minimal tongue movement. Proprioception in the left fore and hind limbs were absent and there was no left side flexor reflex. The patient underwent an MRI scan of the brain pre and post contrast administration. The pituitary gland was severely enlarged with rounded profile and heterogeneous signal intensity and the dorsal compression to the third ventricle and border effacing rostrally with the optic chiasm were noted. The enlarged pituitary gland was surrounded by minimal edema. The MRI changes were primarily compatible with pituitary apoplexy on an underlaying hypophysitis or pituitary neoplasia. Due to the progressive clinical signs, the owner opted for euthanasia. Postmortem examination revealed a solitary, well demarcated mass measuring 2.5 cm in length and 1.7 cm wide with a rough, pale pink surface and scattered irregular red areas on the ventral aspect of the brain in the parasellar region. Optic chiasm and pituitary gland could not be grossly detected due to the tumor invasion. In the histopathological findings, tumor cells had round to oval nuclei, abundant eosinophilic cytoplasm, and indistinct cytoplasmic borders. Mitoses were rare. Neutrophils were scattered throughout the mass. Areas of necrosis and hemorrhage were also present. In the cerebral neuropile focal areas of encephalomalacia were observed. After histochemical (PAS) and immunohistochemical analysis (cytokeratin, vimentin) which revealed positive staining for vimentin, the most likely diagnosis is meningioma with concurrent focal encephalomalacia.

CANINE ORAL MELANOCYTIC TUMORS: A RETROSPECTIVE STUDY OF 24 CASES

Lidija Medven Zagradišnik[1], Valentina Perković Miljković[2], Krešimir Severin[3], Andrea Gudan Kurilj[1], Branka Artuković[1], Ivan-Conrado Šoštarić-Zuckermann[1], Doroteja Huber[1], Ivana Mihoković Buhin[1], Dunja Vlahović[1], Marko Hohšteter[1]

[1]Department for Veterinary Pathology, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[2]PSI CRO d.o.o, Zagreb, Croatia

[3]Department of Forensic and Judicial Veterinary Medicine, Faculty of Veterinary Medicine, University of Zagreb, Croatia

Melanoma is the most common oral malignancy in dogs. Oral melanoma (OM) is neoplasia occurring in outbred, immunocompetent dogs and appears to be a possible model for human melanoma research. Histopathological examination of the biopsy is important for determining its malignant potential and biological behavior.

From the archives of the Department of Veterinary Pathology, Faculty of Veterinary Medicine, University of Zagreb, 24 randomly selected samples of canine oral melanoma (OM) were histopathologically examined. Evaluated parameters were breed, age, sex, tumor subtype, mitotic activity (MA), pigmentation, and nuclear atypia.

The average age of dogs with OM was 11.6 years; 79% were males and 21% were females. Oral melanomas were most commonly diagnosed in crossbreeds (30%), golden retrievers (21%), and poodles (13%). High MA>4/10 HPF was observed in most OM (75%). Also, the significance of MA relative to the OM cell subtype was determined. The spindle OM showed a higher MA compared to other subtypes (50%). Comparing the pigmentation of OM in the combined cell subtype, moderate pigmentation dominated in 38%, and a high degree of pigmentation compared to nuclear atypia showed no significant correlations. Nuclear atypia >30% was present in 54% of the samples.

In this research, breed, age, and sex distribution, as well as MA, corresponds to the previous literature data. Our results showed a statistically significant difference in higher MA values in spindle types compared to other types of OM which may consequently be important for the determination of OM with higher malignant potential. In order to further improve the diagnosis and prognosis of oral melanocytic tumors, it is necessary to conduct further research on as many animals as possible.

SETTING UP A PARR TEST AT THE DEPARTMENT OF VETERINARY PATHOLOGY, UNIVERSITY OF ZAGREB

Vida Eraghi[1], Dunja Vlahović[1], Iva Ciprić[1], Lidija Medven Zagradišnik[1], Marko Hohšteter[1], Doroteja Huber[1], Andrea Gudan Kurilj[1], Branka Artuković[1], Ivan-Conrado Šoštarić-Zuckermann[1], Vladimir Mrljak[2]

[1]Department of Pathology, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[2]Laboratory of proteomics, Internal Diseases Clinic, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

The need for more rigorous assessment of molecular assays is evident in veterinary molecular diagnostic tests. A notable example is the PCR for antigen receptor gene rearrangements (PARR) analysis, aiding canine lymphoma diagnosis. Lymphoma diagnosis typically achieved through fine-needle aspirate (FNA) cytologic assessment or histological examination of affected tissue. But distinguishing lymphoid malignancies from benign processes is tough, even with immunochemistry. PARR results offer valuable ancillary data for definitive diagnosis.

In this study, we chose six sets of published primers. Two primer pairs were chosen to assess the amplification of immunoglobulin heavy chain (IgH) rearrangements, providing coverage for various rearrangements. Two sets of primers were chosen for assessing T-cell receptor gamma (TCR) genes, and one pair of primers was used for assessing the amplification of the constant region gene of IgM, serving as a positive control. The extracted DNA from FNA slides and formalin-fixed, paraffin-embedded (FFPE) tissues, previously diagnosed as B and T-cell lymphoma using cytology and immunochemistry, was tested. In total, we performed the PARR test on 12 FFPE samples (6 T-cell and 4 B-cell lymphoma, 2 negative controls) and 15 FNA slides (6 T-cell and 8 B-cell lymphoma, 1 lymphoid hyperplasia). After checking the results by gel electrophoresis, all DNA samples showed positive results with the control positive primers. Both IgH primer sets covered clonal immunoglobulin rearrangements fully (100%) in B-cell lymphoma, yielding no positive results in T-cell lymphoma and non-lymphoma samples. The highest success rate, devoid of false positives and negatives in TCR clonal rearrangement analysis, originated from one set of our tested primers (66%). Our findings confidently detect gene rearrangements (84%) using established primer sets: 1 positive control, 2 for IgH assessment, and 1 for TCR assessment, integrated in our department.

DETERMINING THE AGE OF DOGS BASED ON COMPUTER ANALYSIS OF MACROPHOTOGRAPHY OF THE JAW

Mateo Makšan[1], Krunoslav Vinicki[2], Lidija Medven Zagradišnik[3], Vida Eraghi[3], Branka Artuković[3], Andrea Gudan Kurilj[3], Doroteja Huber[3], Ivan-Conrado Šoštarić-Zuckermann[3], Marko Hohšteter[3]

[1]Veterinarska ambulanta Luna, Varaždin, Croatia

[2] Digicyte d.o.o., Zagreb, Croatia

[3]Department of Pathology, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Determining the age of dogs is important in establishing their identity when performing necropsies. It holds great significance in trading animals, as it serves as a means of verifying the accuracy of animal records and plays a crucial role in forensic veterinary medicine. The age of an animal can become a subject of various legal disputes; therefore, the age estimation method must be objective, reliable and accurate.

The Convolutional Neural Network (CNN) is a model for data processing and data-based learning, automatically derived from a large number of examples without the need for extracting features before the actual learning process. The aim of this research is to develop an innovative method for determining the age of dogs that can be systematically used for clinical examination, forensic investigations, and academic purposes.

In this research, 123 dog jaws that were subjects of autopsies from 2019 to 2020 at the Faculty of Veterinary Medicine, University of Zagreb, were examined and photographed. The dogs were categorized into three age groups: 1 to 5, 6 to 11, and more than 11 years old. From each dog, both the upper and lower jaws were photographed from above, and one photo from each one was used. These processed photos were then utilized to train the neural network.

The computer achieved a successful categorization of 21 out of the 30 tested photos into the appropriate age groups using the full photos, resulting in a 70% accuracy rate. Additionally, a different method involving processed mosaic photographs was applied. But the results were less accurate (56%).

Among all animal species, dogs exhibit the greatest range of phenotypic diversity in teeth, leading to individual dogs of the same chronological age having various biological ages. Despite being trained on a relatively small number of photographs, the CNN used in the study demonstrated satisfactory results, showcasing the potential of determining the age of dogs using CNN and Deep Learning techniques.

PREVALENCE AND ANTIMICROBIAL SUSCEPTIBILITY OF *CORYNEBACTERIUM UREALYTICUM* ISOLATES FROM URINE OF DOGS AND CATS

Ena Bajić[1], Zrinka Štritof[2], Marija Cvetnić[2], Selma Pintarić[2]

[1]Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia, student

[2]Department of Microbiology and Infectious Diseases with Clinic, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Corynebacterium urealyticum is a Gram-positive, aerobic, slow-growing, lipophilic bacillus with strong urease activity. In veterinary medicine, *C. urealyticum* is rarely reported and is mainly isolated from the lower urinary tract of dogs and cats. This microorganism is often multidrug-resistant, so infections caused by it are challenging to treat.

The aim of this study was to determine the prevalence and antimicrobial susceptibility of *C. urealyticum* isolates from urine of dogs and cats.

Between January 2019 and November 2022, a total of 1247 urine samples were collected from cats and dogs. Identification of all isolates with morphological and biochemical characteristics of the genus *Corynebacterium* was performed by MALDI-TOF MS. Antimicrobial susceptibility was determined by the disk diffusion method according to EUCAST recommendations using penicillin (1 unit), vancomycin (5µg), ciprofloxacin (5µg), tetracycline (30µg), clindamycin (2µg), and rifampicin (5µg).

There was a total of 12 isolates (1.0%) of *Corynebacterium* spp. of which five (41.7%) were identified as *C. urealyticum*, three from cats and two from dogs. All five isolates (100.0%) showed resistance to penicillin and ciprofloxacin, four (80.0%) to clindamycin and three (60.0%) to tetracycline. No isolates were resistant to rifampicin and vancomycin. Multidrug resistance was found in four isolates (80.0%).

This study is the first report showing the presence of multidrug-resistant *C. urealyticum* isolates in animals in Croatia. Although the frequency of urinary tract infections caused by *C. urealyticum* was quite low, this finding is valuable for public health due to the close contact of pets with their owners.

ESCHERICHIA COLI INFECTION IN NEWBORN PUPPIES- CASE REPORT

Lidija Medven Zagradišnik[1], Vida Eraghi[1], Iva Ciprić[1], Branka Artuković[1], Andrea Gudan Kurilj[1], Doroteja Huber[1], Dunja Vlahović[1], Marko Hohšteter[1], Zrinka Štritof[2], Ivan-Conrado Šoštarić-Zuckermann[1]

[1]Department of Pathology, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[2]Department of Microbiology and Infectious Diseases with a clinic, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

A five-year-old South African Mastiff dam underwent an elective cesarean section, delivering eight healthy puppies. The puppies were not properly fed with their mother's milk and were instead fed with milk replacements. After three days, four puppies exhibited symptoms such as depression, lack of appetite, weakness, and tachypnea, which worsened over the following days. After five days, one puppy died. The next day, three more puppies died. The necropsy of the deceased puppies revealed edema and severe multifocal to coalescent hemorrhages in the lungs, liver degeneration, and anemia. Histopathology findings showed severe, acute suppurative hemorrhagic, partly fibrinous bronchopneumonia with multifocal densely scattered bacterial colonies in the lungs, congestion in the cerebrum, diffuse vacuolar degeneration of hepatocytes, extramedullary hematopoiesis in the liver and the spleen and multifocal hemorrhages in the heart. A bacteriological examination of the lungs revealed a very dense growth of hemolytic *Escherichia coli* in pure culture. After conducting a comprehensive examination, including histopathological analysis and bacteriological examination of the lungs, it was determined that the affected puppy suffered from severe bacterial bronchopneumonia.

The most common cause of *E. coli* infection in puppies is the consumption of contaminated milk from unhealthy mothers. However, based on the clinical findings, the mother did not exhibit any symptoms related to *E. coli* infection, and also, did not feed the puppies properly. Another theory is that if puppies do not receive enough colostrum from their mothers, which transfers antibodies that prevent infection, they may have compromised immune systems and are more prone to infections like *E. coli*. In this case, considering the history and our findings, the second scenario appears to be correct.

EXOTIC AND WILD ANIMALS SESSION

ORAL PRESENTATIONS

CYTOCHEMICAL DIFFERENTIATION OF CHELONIAN LEUKOCYTES

Marina Mrkonjić[1], Lara Odorčić[1], Maja Lukač[2], Ivan Cizelj[3], Siniša Faraguna[4], Maja Belić[4]

[1] Student, Faculty of Veterinary Medicine, Zagreb, Croatia

[2]Department of Poultry Diseases with Clinic, Faculty of Veterinary Medicine, Zagreb, Croatia

[3]Zagreb City Zoo, Zagreb, Croatia

[4]Department of Pathophysiology, Faculty of Veterinary Medicine, Zagreb, Croatia

Complete blood count is one of the fundamental diagnostic methods used to monitor the health status of chelonians. The specificities of manual determination of reptilian blood parameters, as well as the morphology and blood cell count, which frequently change under the influence of internal and external factors, represent the great challenge for veterinarians. The most common errors, which can lead to incorrect interpretation of the hemogram, occur in distinguishing small lymphocytes from thrombocytes and/or reticulocytes, as well as in the differentiation of granulocytic leukocytes: heterophils and eosinophils.

The aim of this study was to determine the morphological differences between leukocytes of terrestrial and aquatic turtles using different cytochemical stains, thus contributing to their easier differentiation.

The research was conducted on five Hermann's tortoises (*Testudo hermanni*) and five Chinese striped turtles (*Mauremys sinensis*). Approximately 0.5 mL of blood was taken from the dorsal tail vein of each animal. Ten blood smears for each animal were stained with Wright-Giemsa stain and cytochemical stains including Luxol fast blue, Periodic acid-Schiff (PAS) and Luna stain.

With Wright-Giemsa staining granules in heterophils and eosinophils were not clearly differentiated. According to PAS and Luxol fast cytochemical stainings, heterophils and eosinophils exhibited similar affinity, although eosinophils stained more intensely with Luxol stain. The most distinct differences between eosinophils and heterophils were observed in Luna cytochemical staining, where granules in eosinophils stained positive, intensely pink, unlike heterophils which showed a negative affinity in Luna staining.

In conclusion, Luna cytochemical staining is the most suitable staining for differentiating heterophils from eosinophils in chelonian blood. This study contributes to a better understanding of the cytochemical properties of reptilian blood cells.

The obtained results will be explained in greater detail during the oral presentation of the work.

PSITTACINE BEAK AND FEATHER DISEASE IN MOLUCCAN ECLECTUS PARROTS *(ECLECTUS RORATUS)* – A CASE REPORT

Liča Lozica, Emanuel Budicin, Željko Gottstein

Department of Poultry Diseases with Clinic, Faculty of Veterinary Medicine, University of Zagreb, Heinzelova 55, 10000 Zagreb, Croatia

Psittacine beak and feather disease (PBFD) is a viral infection caused by avian circovirus. The birds are infected as nestlings, but the progress of the disease can be acute or chronic, so the symptoms sometimes occur only in adult birds. The virus replicates in fast-growing cells, so the most prominent symptoms are usually feather lesions. Here we present two cases of PBFD in Moluccan eclectus parrots *(Eclectus roratus)*.

Two Moluccan eclectus parrots – a female and a male, from different owners were brought for physical examination to the Department of Poultry Diseases with Clinic in the span of two weeks. The symptoms included gradual loss of feathers on most parts of the body except the head, and occasional feather plucking. Both birds were two years old and originated from the same breeder. Based on the anamnesis, differential diagnoses included a behavioral disorder, circovirus or polyomavirus infection. Feather samples from both birds were taken for molecular diagnostics of circo- and polyomavirus. DNA was isolated from the feathers using a commercial kit, and tested using PCR according to a standardized protocol.

Both birds were positive to circovirus and negative to polyomavirus. One of them was also affected by sudden changes in the everyday routine which triggered separation anxiety. As the infection is incurable, the owners were suggested to start supportive therapy. Infected birds become immunocompromised and more susceptible to secondary infections which are usually the cause of death. For that reason, supportive care included supplements for boosting the immune system and therefore preventing secondary infections, as well as different methods of preventing the feather plucking. As circovirus is very contagious and hard to eradicate, it is extremely important to monitor the breeders and pet shops in order to prevent further spread of the disease.

THORACIC RETE MIRABILE IN DOLPHINS: BLESSING OR CURSE?

Martina Đuras[1], Kim Korpes[1], Magdalena Kolenc[1], Tajana Trbojević Vukičević[1], Tomislav Gomerčić[2]

[1]Department of Anatomy, Histology and Embryology, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[2]Department of Veterinary Biology, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Retia mirabilia are anatomical structures found in different animal species at certain positions in the body. In dolphins, rete mirabile is situated within the thorax, ventrally along the bodies of thoracic vertebrae and along the vertebral canal. It represents an impressive network of small branches that originate from dorsal intercostal arteries and veins which serve for pressure regulation and as oxygen reservoir for the central nervous system. Despite a favourable topographical position ensured by the vertebrae, cetacean rete mirabile is very sensitive to intentional trauma (severe blunt trauma, stubbing injuries, gunshots). Here we report on fatal injuries of the thoracic rete mirabile in three bottlenose dolphins (*Tursiops truncatus*) found in the Adriatic Sea, one adult male (ID276 found in 2012) and two juvenile males (ID109 found in 2003 and ID214 found in 2010). Aside superficial skin wounds, muscle and rib damages, in those dolphins the left (ID 109 and 214) and the right pleural cavity (ID 276) were filled with blood. Shotgun pellets (ID 214 and ID 276) and a gun bullet (ID109) were recovered from the thoracic rete mirabile, the thoracic wall or cavity. No evidence of injuries of the thoracic aorta or other big vessels in the thoracic cavity were found. All dolphins died because of extensive haemorrhage into pleural cavities due to the thoracic rete mirabile injuries caused by passage of the rifle projectiles. Croatian law prohibits causing intentional trauma, including killing of marine mammals, and the described cases underwent a legal procedure according to the prescribed acts. Our study highlights how important the knowledge on special anatomical structures is, especially in endangered species where anthropogenic factors influencing the survival of certain specimens should be evaluated.

CLINICAL, LABORATORY AND IMAGING MANIFESTATION OF *ENCEPHALITOZOON CUNICULI* INFECTION IN PET RABBITS, SLOVENIA

Maruša Škrbec[1], Alenka Dovč[1], Nina Mlakar Hrženjak[1], Brigita Slavec[1], Zoran Žlabravec[1], Nina Kočar[1], Olga Zorman Rojs[1], Jožko Račnik[1]

[1]Institute of Poultry, Birds, Small Mammals, and Reptiles, Faculty of Veterinary Medicine, University of Ljubljana, Gerbičeva 60, 1000 Ljubljana, Slovenia

Encephalitozoon cuniculi is a microsporidian parasite that primarily infects domestic rabbits. It is the causative organism of encephalitozoonosis, a disease with an internationally recognized seroprevalence among rabbits. This study determines the presence, clinical manifestation and serological status of encephalitozoonosis in pet rabbits in Slovenia.

From 2017 to 2021, pet rabbit sera were collected and tested for E. cuniculi with the indirect immunofluorescence assay. IgM and IgG antibodies against E. cuniculi were confirmed in 160 cases (65.6%). Neurological signs (torticollis with head-tilt, nystagmus, imbalance) were present in 62 rabbits (38.8%). Gastrointestinal signs (recurrent hypomotility, chronic weight loss, cachexia, anorexia) were observed in 43 rabbits (26.9%). Twelve rabbits (7.5%) showed urinary system signs (polyuria/polydipsia, sludgy urine, dysuria) and 3 rabbits (1.9%) showed eye disorder signs (phacoclastic uveitis). Forty rabbits (25%) were clinically healthy despite seropositivity. Statistical analysis of biochemical blood parameters showed that positive rabbits had elevated globulin and deviated albumin levels in comparison to normal reference values. 68 whole-body radiographs and 32 abdominal ultrasound reports were analyzed, looking for changes in the shape or size of the urinary bladder, the presence of urinary sludge or abnormalities related to the kidneys (shape, size, nephrolites).

We suspect that E. cuniculi-associated neurologic effects could disturb the normal urinary bladder contraction and consequently distend the bladder wall as urine cannot be passed normally, leading to incontinence, dysuria, or other urinary system signs. The results suggest that active encephalitozoonosis (clinical signs and presence of IgG and IgM) was detected in 59% of tested rabbits. As 68% of the asymptomatic animals had elevated titers of IgM, indicating an active infection, preventive serological testing for E. cuniculi in rabbits should be performed.

CLINICAL APPROACH TO COMMON REPTILE EMERGENCIES

Anamarija Nevistić[1], Tvrtko Mataušić[1], Maja Lukač[2]

[1]Faculty of Veterinary Medicine, University of Zagreb, Croatia, Student

[2] Faculty of Veterinary Medicine, University of Zagreb, Croatia

Reptile emergencies can be acute but are often a result of chronic conditions, commonly due to inadequate husbandry and nutrition, and late recognition of signs of illness by the owners. Systematic clinical approach and understanding of reptile anatomy and physiology is crucial in dealing with critical patients.

First step is obtaining patient history, with emphasis on husbandry and feeding. Clinical examination should be systematic but fast and focused on assessment of mental status, cardiovascular and respiratory system. One should look for any visible signs that could direct towards the diagnosis. Diagnostic procedures include blood withdrawal for complete blood count and biochemistry analysis, measuring ionized calcium levels, radiography, and ultrasound.

The most common reptile emergencies include trauma, wounds, fractures, thermal injuries, and various respiratory, neurological, and gastrointestinal conditions. Although some of the conditions can be dramatic, assessment of vital signs and stabilization of the animal should always be the first step. In complex cases and terminal phases of illness, euthanasia should be considered.

Before initiating any treatment, the animal should be warmed up to its preferred optimal temperature zone (POTZ). Vascular access, or if not possible, placement of intraosseous catheter, is vital for rehydration of critical patients and drug administration. When choosing an appropriate type of fluid, one should remember that reptile's plasma osmolarity is lower than mammals', and care should be taken to avoid fluid overload. Fluids should be warmed before administration. Signs of pain are not always obvious but analgesia is needed in any condition that is considered painful in mammals.

Dealing with reptile emergencies can be challenging and good understanding of species characteristics is needed for proper interpretation of clinical findings and initiation of treatment and ensuring the best odds for survival in critical patients.

HISTOLOGICAL VISUALIZATION OF OSSIFICATION DURING INTRAUTERINE DEVELOPMENT OF WILD BOAR (*SUS SCROFA*) – A PRELIMINARY STUDY

Nikolina Škvorc, Dean Konjević, Miljenko Bujanić, Lucija Bastiančić, Snježana Kužir

Faculty of Veterinary Medicine University of Zagreb, Zagreb, Croatia

New bone formation in the embryo and foetus occurs in two ways, via intramembranous and endochondral ossification. In intramembranous (direct) ossification the bone is formed directly from mesenchymal connective tissue, without a cartilaginous precursor phase. This type of ossification mainly occurs during the formation of certain cranial bones, as well as the bony collar of developing long bones. Endochondral (indirect) ossification involves the formation of bone on a template of hyaline cartilage. In this process, a cartilage model is initially formed and is gradually replaced by bone tissue. This type of ossification is present mainly during the formation of long bones. The aim of this study is to visualize cartilage and bone tissue at different stages during the intrauterine development of the wild boar (*Sus scrofa*).

The samples of nine uteruses were collected in the state open hunting ground No. I/3 *ČRNOVŠĆAK* during the regular execution of the hunting management program. We selected five foetuses from different uteruses in the length (L) 45-53 mm and fixed them in 4% buffered formalin. Alcian Blue staining was used to visualize the cartilage. Enzyme trypsin was used to remove excess stain and degrade soft tissues. Alizarin Red S staining was used to visualize the bone tissue.

With Alcian Blue – Alizarin Red S method cartilage was stained blue, bone purple, while the rest of the tissue was transparent. In two samples (L=46 mm, age 36 days) ossification (purple) was observed in parts of the frontal bone, maxilla and mandible, while the rest of the skeleton was built of cartilage (blue). In other three samples (L=51 mm, age 38 days), ossification was present in parts of the frontal bone, nasal bone, maxilla, palatine bone, mandible, neck of the scapula (*collum scapulae*), proximal part of the ribs, and middle part of long bones such as humerus, radius, ulna, femur, tibia and fibula.

In conclusion, our findings suggest that ossification in wild boar initiates in certain head bones. Subsequently, the ossification progresses to the proximal part of the ribs, as well as the bones of the limbs. Our results coincide with data from the literature on domestic pigs. In future research, the plan is to collect more samples representing different intrauterine developmental stages of wild boars.

AGE-RELATED PREVALENCE OF *C. JEJUNI* AND *C. LARI* IN ADULT AND JUVENILE YELLOW-LEGGED GULLS

Biljana Ječmenica[1], Andrea Humski[2], Sanja Duvnjak[2], Louie Thomas Taylor[3], Fani Krstulović[1], Borka Šimpraga[1], Tajana Amšel Zelenika[1], Luka Jurinović[1]

[1]*Croatian Veterinary Institute, Poultry Centre, Zagreb, Croatia*

[2]*Croatian Veterinary Institute, Zagreb, Croatia*

[3]*Association BIOM, Zagreb, Croatia*

Campylobacter spp. are widespread bacteria, commonly found in wild birds. Some birds, like Yellow-legged Gull (*Larus michahellis*), a common seabird in Croatia, have them naturally in their intestinal tract. The epidemiology of *Campylobacter* spp. in wild birds is still poorly understood, so we aim to describe the prevalence and genetic diversity of two bacteria species, *C. jejuni* and *C. lari* in adults and juvenile Yellow-legged Gulls.

Gulls were captured at several breeding colonies during 2021 and 2022. A cloacal swab was taken from each individual and tested for the presence of *Campylobacter* spp. Bacteria isolation was done according to the valid ISO method and identification using PCR. Isolated *Campylobacter* spp. were genotyped using the MLST method.

In total, 600 gulls were caught and isolates from 76 swabs were identified as *Campylobacter* spp. (12.67%), of which most isolates were *C. jejuni* (72.37%) and *C. lari* (23.68%). From 108 adults, 6.48% and 5.56% had *C. jejuni* and *C. lari* respectively, while from 492 chicks, 9.76% had *C. jejuni* and 2.44% *C. lari*. The most common clonal complex found for *C. jejuni* was ST-1275 (37.25%), ST-45 (5.88%) and ST-21 (3.92%), while *C. lari* showed great diversity of sequence types; the most common were ST77, ST297, ST312 and ST320.

C. jejuni was the most frequently detected *Campylobacter* species in examined Yellow-legged Gulls, followed by *C. lari*. Juvenile and adult birds showed similar prevalence of *Campylobacter* spp., probably because of the feeding method, a regurgitated food by adults. Although during this study there was a small number of isolates from adults compared to juvenile birds, juveniles show a higher prevalence of *C. jejuni* than *C. lari*. There is a high genetic diversity of both bacteria with different and yet undescribed genotypes, which underlines how understudied *Campylobacter* spp. is in wild birds.

RADIOGRAPHY AS A METHOD OF SEX DETERMINATION IN DIFFERENT SPECIES OF MONITOR LIZARDS

Tvrtko Mataušić[1], Anamarija Nevistić[1], Ivan Cizelj[2], Dražen Ivančan[2], Iva Bacan[3], Maja Lukač[3], Hrvoje Capak[3]

[1]*Faculty of Veterinary Medicine, University of Zagreb, Croatia, Student*

[2]*Zagreb Zoo, Croatia*

[3]*Faculty of Veterinary Medicine, University of Zagreb, Croatia*

Sex determination in monomorphic lizards could be very challenging. In order to establish proper breeding colonies of monitor lizards in captivity, different methods are tested.

To see whether the radiography of hemipenal bone (hemibaculus) could be an appropriate method for sex determination in these animals, and at what age it could be used as a reliable method, 17 monitor lizards were subjected to the x-ray and the findings were compared to those obtained by probing. From a total of nine subgenera belonging to *Varanus* genus, representatives of the following four subgenera were examined: subgenus Euprepiosaurus - Macrae's monitors (*Varanus macraei*), (N=4) and emerald monitors (*V. prasinus*), (N=7); subgenus Papusaurus - crocodile monitors (*V. salvadori*), (N=2); subgenus Psammosaurus - desert monitor (*V. griseus*), (N=1); and subgenus Varanus - Spencer's monitors (*V. spenceri*), (N=3).

Regarding the sex determination, the visibility of hemipenal bone was somewhat higher in lateral, than dorso-ventral projection. Radiographic findings were consistent with those obtained by probing in 14 of 15 adult animals. In the desert monitor, probing indicated male gender while the x-ray in lateral projection gave an ambiguous result. Due to a different anatomical shape of hemipenal bone in this subgenus the radiographic finding was not clear like in other subgenera. Therefore, more animals should be tested in the future in order to determine the usefulness of radiography for sex determination in this subgenus. To find out from what age the radiography could be used for sex determination, two one- month old Macrae's monitors were subjected to initial radiography. No hemipenal bone structures were visible.

In conclusion, the radiography of the tail base in lateral radiography projection was successful in the sex determination in three out of four monitor lizard subgenera tested. This indicates its potential as an additional tool for sex determination in monitor lizards.

ESTIMATING EURASIAN LYNX POPULATION TRENDS USING MINIMUM POPULATION COUNT AND INDIVIDUAL SURVIVAL

Ira Topličanec[1], Silvia Blašković[1], Magda Sindičić[2], Vedran Slijepčević[3], Ivana Selanec[4], Tomislav Sotinac[4], Nera Fabijanić[4], Josip Tomaić[5], Tomislav Rukavina[6], Tomislav Gomerčić[1]

[1] Department of Veterinary Biology, Faculty of Veterinary Medicine University of Zagreb, Zagreb, Croatia

[2] Department of Hunting and wildlife, Faculty of Veterinary Medicine University of Zagreb, Zagreb, Croatia

[3] Department of Wildlife Management and Nature Conservation, Karlovac University of Applied Sciences, Karlovac, Croatia

[4] Regional office Sinj, Association BIOM, Sinj, Croatia

[5] Velebit Nature Park, Gospić, Croatia

[6] Public institution for nature protection Ličko - senjska county, Gospić, Croatia

Accurate assessment of abundance and monitoring population trends is crucial for effective wildlife conservation and management strategies. In this study, we evaluated Eurasian lynx (*Lynx lynx*) photographs collected during a 15-year research period (2008 – 2023). All data used in this study are stored in the Faculty of Veterinary Medicine University of Zagreb database (http://lynx.vef.hr). In the 2008 – 2018 period, camera traps were used on a smaller scale, while extensive camera trapping across the entire distribution range was implemented between years 2018 and 2023. Individual identification was achieved through visual identification techniques, by a minimum of two independent researchers. Leveraging a customized script prepared in R software, we constructed the capture history of individual lynx, with the exclusion of offspring from the analysis. We used only the right side of their flanks as distinguishing features, which resulted in 207 different animals over the whole period. To estimate the number of individuals certainly alive within a specific timeframe, we used the sum of individual lynx recorded within a 12-month interval with the addition of individuals recorded both before and after that interval. To show the population trend, we used a 12-month moving window shifted by 1 month. For the period from December 2018 to March 2021, results of our analysis revealed a mean of 81.7 (SD 3.65) lynx individuals detected. The minimum and maximum numbers recorded were 76 and 88, respectively, resulting with a range of 12 individuals. We also identified the longest survived animal, a male named Goran ZIP, which was monitored for an impressive 2759 days (7.5 years). Combining the minimum population count and individual survival, we provided insight into population trends of the Eurasian lynx in Croatia for three consecutive years.

Key words**:** *Lynx lynx*, photo identification, abundance, population trends

EXOTIC AND WILD ANIMALS SESSION

POSTER PRESENTATIONS

SQUAMOUS CELL CARCINOMA OF THE OROPHARYNX WITH A SECONDARY CANDIDIASIS IN AN INDOOR PET HEN – A CASE REPORT

Emanuel Budicin[1], Liča Lozica[1], Ivan- Conrado Šoštarić- Zuckermann[2], Željko Gottstein[1]

[1] Department of Poultry Diseases with Clinic, Faculty of Veterinary Medicine, University of Zagreb, Heinzelova 55, 10000 Zagreb, Croatia

[2] Department of Veterinary Pathology, Faculty of Veterinary Medicine, University of Zagreb, Heinzelova 55, 10000 Zagreb, Croatia

Squamous cell carcinoma (SCC) is a malignant tumor derived from the squamous epithelium. It is commonly diagnosed in all domestic animals including birds. These tumors are locally invasive, but rarely metastasize. Common sites of development include the skin, uropygial gland and upper gastrointestinal tract. Candidiasis is a common yeast infection in birds, but it is uncommon in adult birds without any predisposing factors.

A female hen, 4 years old, was clinically examined due to a mass in the mouth and aphagia lasting about a month. The history revealed unusual living and dietary habits of the hen. Clinical examination revealed a fragile bright yellow mass extending from the oral cavity to the mid-section of the pharynx, almost completely obstructing the lumen of the oesophagus and larynx. After the removal of the mass, the mucosa was sporadically bleeding. The palatal surface of the oropharynx contained some necrotic tissue. After the start of the symptomatic treatment, the laboratory results confirmed candidiasis as a diagnosis. Unfortunately, after ten days of treatment, the hen died. Necropsy was performed and samples from the oropharynx were collected for the microscopic examination which revealed an infiltrative neoplasm arising from the superficial squamous epithelium of the oesophagus and consisting of atypical epithelial cells showing squamous metaplasia and forming characteristic keratin pearls, thus a diagnosis of squamous cell carcinoma was made.

Squamous cell carcinoma can be commonly found in avian species, but this is uncommon in chickens. There are only a few reports of malignant masses involving the upper digestive tract. This case report describes a case of SCC arising in the oropharynx with a secondary complication of candidiasis. Thus, SCC should be excluded as a differential diagnosis in cases with proliferative upper gastrointestinal lesions.

NON-INVASIVE MONITORING OF SARCOPTIC MANGE COMPATIBLE LESIONS IN RED FOXES (*VULPES VULPES*)

Barbara Nikolić[1], Laura Bakran[1], Ivona Mlakić[1], Tomislav Gomerčić[2], Ira Topličanec[2], Silvia Blašković[2], Magda Sindičić[3]

[1]*Faculty of Veterinary Medicine University of Zagreb, Zagreb, Croatia, student*

[2] *Department for veterinary biology, Faculty of Veterinary Medicine University of Zagreb, Zagreb, Croatia*

[3]*Department for hunting and wildlife, Faculty of Veterinary Medicine University of Zagreb, Zagreb, Croatia*

Sarcoptic mange (caused by *Sarcoptes scabiei*) is a globally distributed disease, identified in almost 150 species of wild and domestic mammals and humans. Research indicates the increase of sarcoptic manage during the past 50 years and red foxes (*Vulpes vulpes*) were identified as one the main hosts among wildlife. Even though monitoring of mange is of great importance for veterinary public health so far only one study was conducted on foxes in Croatia. The disease is manifested by skin lesions, so in recent years camera traps are used for monitoring of geographical and temporal distribution of mange compatible lesions in wildlife. We used data from camera trapping study of Eurasian lynx (*Lynx lynx*) in Gorski kotar and Lika regions in Croatia. During the 2018 – 2022 period, camera traps active on 148 locations collected 3254 events of red foxes (one event includes all pictures of single animal collected within 10-minutes). Photos were visually checked for mange compatible lesions. A single researcher conducted a first round of identification, and two other researchers rechecked events that had been difficult to classify. A total of 530 (16.3%) events were excluded due to the insufficient quality of the photos, so final analysis was done on 2724 events. During the 5-year research the lowest percentage of foxes with mange compatible lesions was noted in 2019 (12.6%) and the highest in 2018 (32.5%), while the 5-year average was 22.9%. Number of animals with visible skin lesions grew evenly from the beginning of the year and towards the summer months, after which it declined as the colder season approached. On average, the highest number of foxes which displayed possible symptoms of sarcoptic mange was noted in July and August. This research has confirmed effectiveness of camera traps for monitoring of sarcoptic mange compatible skin lesions in red foxes, however while interpreting the data it is also important to consider the shortcomings of this method.

Key words**:** red fox, *Vulpes vulpes*, *Sarcoptes scabiei*, camera traps, alopecia

SIMULTANEOUS ELECTROCUTION OF TWO GRIFFON VULTURE

Magdalena Palić[1], Marina Tišljar[2], Marko Modrić[3], Petar Džaja[1], Slaven Reljić[1], Krešimir Severin[1]

[1]*Department of Forensic and State Veterinary Medicine, Faculty of Veterinary Medicine, University of Zagreb, Croatia*

[2] *Independent Researcher*

[3] *Public institution Priroda, Rijeka, Croatia*

Electrocution as a result of electric shock is one of the most common causes of wild birds mortality. Mostly, large raptors are killed when the electric circuit is closed in direct contact with the conductors of power lines. These events often lead to the death of an animal and the occurrence of specific changes.

In March this year, carcasses of two griffon vultures (*Gyps fulvus*) were found on the island of Cres under the pillar of the medium voltage power line. Carcasses were delivered at the Department of Forensic and State Veterinary Medicine of the Faculty of Veterinary Medicine, University of Zagreb to determine the cause, mechanism, and manner of death. External examination of plantar surface in both carcasses revealed local skin damage which, due to its morphological characteristics, corresponds to electrical marks. Internal examination of the carcass showed systemic venous congestion, intramuscular haemorrhages, accumulation of blood in the chest and abdomen, severe oedema, congestion, and lung haemorrhage. Photographs from the scene revealed the specific postural position of the carcasses, which also indicates that the animals died as a result of electrocution. The plantar surface injuries correspond to the entry of electricity through the plantar surface of one vulture and the exit through the plantar surface of another. From the above, it can be concluded that the electric shock occurred at the moment of contact between two griffon vultures which were simultaneously on the conductors of the electric power line.

The precise mechanism of death is not yet fully known, it is believed that death occurs as a result of the effects of electricity on the respiratory centre in the central nervous system or a direct impact on cardiac activity. Determining the manner of death in the case of electrocutions is a key factor in developing a system that will contribute to reducing the impact of electric power lines on the abundance and diversity of wild birds.

ORHIECTOMY OF MARMOSET (CALLITHRIX JACCHUS)- CASE REPORT

Elizabeta Pongrac[1], Klara Klašterka[2], Ivan Folnožić[3], Juraj Šavorić[3], Ivan Butković[3]

1 Clinic for Internal medicine, Faculty of Veterinary Medicine, University of Zagreb,

Croatia

2 Small animal internship program, Faculty of Veterinary Medicine, University of Zagreb, Croatia

3 Clinic for reproduction and obstretics, Faculty of Veterinary Medicine, University of Zagreb, Croatia

These days a lot of small animal practitioners are faced with the treatment of exotic animals, considering that more and more people keep them as pets. A year old marmoset came on Clinic for reproduction and obstretics for orchiectomy. It is the first case ever described on this Clinic. Marmoset fasted for six hours before the procedure. Due to the fast metabolism, marmoset was put in the box filled with isoflurane for induction and easier manipulation. Intravenous cannula was placed on *vena coccygea lateralis* and intramuscular therapy was given in *m.quadriceps*. For premedication midazolam 0,3 mg/kg, buprenorfine 10 µg/kg and ketamin 20 mg/kg, were used intramuscularly. For maintenance of anesthesia, the mask with isoflurane was used. Fluid therapy was administrated during the entire procedure. Scrotal orchiectomy, due to anatomical specificities, was performed through bilateral scrotal incisions. Scrotum was opened with a small incision and the testicles were pulled out and ligated on the funilculars. Sutures were placed to close dead spaces and an intredermal suture to minimize the stress of removing the sutures from the skin. For antimicrobial prophylaxis amoxicilin and clavulanic acid 22 mg/kg was given subcutaneous as a single dose. Meloxicam was given in dose 0,2 mg/kg orally through five days for postoperative care. The marmoset woke up shortly after the procedure. In conclusion, the procedure was successfuly done and the patient recovered and was discharged home the same day. On control examination patient was doing fine and returned to his daily activities.

OPHTHALMOLOGICAL DISORDERS RELATED TO AN ORAL SQUAMOUS CELL CARCINOMA IN A NORTH AFRICAN HEDGEHOG (ATELERIX ALGIRUS) – A CASE REPORT

Paula Ćurić[1], Marija Mamić[2], Niko Ivkić[2], Katarina Miljak[2], Mirta Vučković[2]

[1] Internship programme, Veterinary faculty, University of Zagreb, Croatia

[2] Clinic for surgery, ophthalmology and orthopedics, Veterinary faculty, University of Zagreb, Croatia

Squamous cell carcinoma (SCC) is a malignant epidermal tumor composed of neoplastic keratinocytes. Exposure to UV light plays a role in tumor development as they commonly develop on hairless skin, nasal planum and in the mouth and can cause massive tissue destruction. This case report presents an oral SCC with unilateral exophthalmos in a pet hedgehog.

A 3-year-old female North African hedgehog was presented with progressive unilateral exophthalmos and loss of vision of the right eye (OD), inappetence and apathy persisting for several days.

Physical examination findings showed no abnormalities other than asymmetry of the face due to right-sided buphthalmos. OD periocular area was clean, conjunctivas were hyperemic with the protruding third eyelid. OD menace response and palpebral reflex were absent, the right pupil showed no pupillary light response. Intraocular pressure was 11 mmHg OD and 9 mmHg on the left eye. OD fluorescein test was diffusely positive.

In order to perform a complete physical examination, general anesthesia was induced with 2% isoflurane in oxygen through a face mask. Gingival mass was found on the right side of the maxillar premolar and molar area. The mass was pink to dark red colour, unevenly shaped. The surrounding teeth were falling out due to damaged periodontal ligament. Biopsy was performed with 4 mm biopsy punch and 7 tissue specimens were sent for a histopathological examination (HPE).

Whole body X-ray showed intact skull bone structure, oral soft tissue swelling and mild meteorismus of the gastrointestinal tract.

HPE showed an infiltrative mass composed of nested polygonal cells, ulcerated superficial epithelium, gingival hyperplasia with inflammatory cells and was identified as an oral SCC. No cytostatic therapy was performed due to poor prognosis and cost of treatment.

This case report emphasises the importance of a mouth examination in small mammals with acute exophtalmos and considering SCC as a common differential diagnosis.

PRELIMINARY STUDY OF FATTY ACID COMPOSITION OF BRAIN TISSUE OF FREE-RANGING BROWN BEARS (*URSUS ARCTOS*) FROM CROATIA

Ivan Berečki[1], Jasna Aladrović[1], Agnieszka Sergiel[2], Đuro Huber[1], Lana Pađen[1]

[1] *Faculty of Veterinary Medicine University of Zagreb, Croatia*

[2] *Institute of Nature Conservation of Polish Academy of Sciences, Kraków, Poland*

The central nervous system has the second greatest lipid content after adipose tissue. Docosahexaenoic acid (DHA; 22:6n–3) and arachidonic acid (AA; 20:4n–6) are present in very high amount in brain lipids and are derived from dietary precursors: linoleic acid (18:2n–6) and α-linolenic acid (18:3n–3). The main source of these precursors in the wild brown bear diet are various kinds of berries and nuts. DHA is mainly found in the phospholipids of synaptic terminal membranes and is important for signal transduction process. AA participates in many signalling pathways and is necessary for neuronal development and enrichment of myelinic lipids. To our knowledge, fatty acid (FA) composition of brown bear (*Ursus arctos*) brain has not been investigated yet, so the objective of this study was to determine the FA composition.

The study was conducted on 11 free-ranging brown bears from Croatia (3 females, 8 males) sampled during 2022 spring and autumn hunting seasons in Gorski kotar. Brain was sampled in the *pons* and *medulla oblongata* regions through *foramen magnum*. Samples were homogenized, total lipids extracted than composition of FA was determined by gas chromatography.

Female brains were composed of 34.4±6.3% monounsaturated, 33.0±1.5% saturated and 32.6±6.3% polyunsaturated FA. While FA from male brains were represented by 34.5±3.1% saturated, 34.2±6.9% monounsaturated and 31.3±7.3% polyunsaturated FA. In females, DHA and AA were represented by 11.2±4.6% and 5.1±2.1%, respectively; while in males percentages were 9.3±3.7% and 3.6±1.4%, respectively.

These are the first published data on FA composition of the brown bear brain. The values are similar to other mammal's brain composition values. Results indicate differences in FA brain composition between the sexes and show importance in respect of securing the availability of natural foods. Further research should comprise larger sample size, taking the effect of season, geographical location, age, and body mass into account.

OPISTOGLYPHOUS SNAKES - SHOULD WE BE MORE CAREFUL?

Klara Kalčić[1], Josip Miljković[2]

[1] *Student, Faculty of Veterinary medicine, University of Zagreb, Zagreb, Croatia*

[2] *Department of Physiology and Radiobiology, Faculty of Veterinary medicine, University of Zagreb, Zagreb, Croatia*

Opistoglyphous snakes and their venom are a topic not yet fully explored in human or in veterinary medicine. Many of them are often referred to as non-venomous because medically significant bites rarely occur. Various species of snakes in this category are often kept as pets, most notably western hognose snakes (*Heterodon nasicus*) and Asian vine snakes (*Ahaetulla sp.*). The boomslang (*Dispholidus typus*) also used to fit in this category, before September 1957., when the first recorded death following a boomslang bite took place. The incident proved that rear-fanged snake bites indeed produce serious consequences and even death. Despite that, various studies have led to discord, with some claiming the secretions produced by these snakes are harmless while others allege there is a potential danger in their toxicity.

The dentition of these snakes is referred to as opistoglyphous. They possess large fangs situated caudally on the maxilla and facing rearwards. There are two types of glands to be taken into consideration when dealing with venomous snakes; Duvernoy's gland (present in rear-fanged snakes) and the venom gland (present in front-fanged snakes). The two diverge in their build, as Duvernoy's glands produce small amounts of secretions applied without being compressed by specialized muscles, while venom glands have ample storage space and contain insertions of compressor muscles which cause the venom to be injected with high pressure.

Oral secretions of opistoglyphous snakes are not well studied as those of elapids and viperids. The venom of rear-fanged snakes has begun being investigated in the early 20th century, only after severe consequences or fatal instances following bites, as in the few cases mentioned above. In conclusion, veterinarians working with rear-fanged snakes should handle them the same as front-fanged venomous snakes to safely protect themselves and others exposed.

Keywords: rear-fanged snakes, snake bites, snake venom

PRESCROTAL ORCHIDECTOMY OF RED SQUIRREL (*SCIURUS VULGARIS*)

Juraj Šavorić[1], Ivan Butković[1], Branimira Špoljarić[1], Martina Lojkić[1], Silvijo Vince[1], Nino Maćešić[1], Ivan Folnožić[1], Ivan Vlahek[2], Goran Bačić[1]

[1]Clinic for Obstetrics and Reproduction; Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[2]Department of Animal Breeding and Livestock Production; Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

A one-year-old, male squirrel, was presented to the Clinic because the owner wanted to neuter the squirrel due to frequent urination and increased aggressive behaviour as a consequence of puberty. The mating season starts in January. The female red squirrel may produce two litters in a year, one in the spring and the other in summer.

Premedication was done with dexmedetomidine (0,02 mg/kg I/M) and ketamine (15 mg/kg I/M). After 10 minutes, the hair in the surgical area was trimmed and disinfection of site of incision was done along with S/C application of meloxicam (0,3 mg/kg), enrofloxacin (7 mg/kg) and metoclopramide (0,5 mg/kg). Mask induction and anaesthesia maintenance were done with an oxygen and isoflurane mixture while breathing spontaneously. Orchidectomy was done by performing a closed prescrotal technique. A single 1,5 cm long prescrotal skin incision was made using a No. 11 scalpel blade. Subcutaneous tissue was bluntly dissected until the externalisation of a testicle. Funiculus spermaticus was ligated using an absorbable monofilament (Monoplus, BBraun 4-0). The same procedure was performed on contralateral side. The same suture material was used for the approximation of subcutis using continuous pattern and for skin closure using an intradermal pattern.

Postoperatively, the squirrel was given warmed Lactated Ringer solution (20 ml/kg S/C) and was heated using a heat pad. Dexmedetomidine was antagonised using atipamezole. The owner reported that he was eating and producing faeces the same evening.

Used premedication and anaesthesia protocol proved to be a safe and reliable choice for the neutering procedure. Castration techniques for exotic mammals include scrotal, prescrotal and abdominal surgical approaches. Some of these can be further classified as open or closed. The prescrotal approach for the orchidectomy using an intradermal pattern for skin closure minimised the risk of developing complications such as scrotal haematoma and wound dehiscence.

Key words: Squirrel neutering, orchidectomy

FARM ANIMALS SESSION

ORAL PRESENTATIONS

EFFECTS OF A METAPHYLACTIC BUTAPHOSPHAN AND CYANOCOBALAMIN TREATMENT ON TRANSITION COW METABOLISM AND HEALTH STATUS

Teja Snedec[1], Melanie Schären-Bannert[1], Kirsten Theinert[1], Lilli Bittner-Schwerda[1], Fanny Rachidi[1], Fabian Pietsch[1], Joachim Spilke[2], Walter Baumgartner, Gerd Möbius [4], Alexander Starke [1]

[1]Clinic for Ruminants and Swine, Faculty of Veterinary Medicine, University of Leipzig, Germany

[2]Institute of Agricultural and Nutritional Sciences, Martin-Luther University, Halle-Wittenberg, Germany

[3] Universitätsklinik für Wiederkäuer, Veterinärmedizinische Universität Wien

[4] Institut für Tierhygiene und Öffentliches Veterinärwesen, Veterinärmedizinische Fakultät der Universität Leipzig, Leipzig

During the transit period, dairy cows are at risk of developing metabolic disorders. Studies of the liver metabolome appear to be suitable for identifying animals at risk. Metaphylactic administration of butaphosphane and cyanocobalamin (Cato) is aimed at stabilizing metabolism and thus animal health. The study evaluated the liver metabolome of dairy cows during the transit phase, with particular attention to the effect of metaphylactic administration of Cato (Catosal®, Bayer Animal Health, 10%). In addition, the effects of an intensive study protocol on performance and health traits in cows were recorded.

Over a period of one year, a prospective, triple-blind randomized study was conducted on 287 German Holstein cows on a dairy farm. Production and clinical characteristics were recorded in 80 cows, blood, urine and liver tissue were taken, and the liver was examined sonographically. The metabolome of the liver tissue samples was analyzed. Cows were treated with either Cato (N = 20.5 ml; N = 20.10 ml/100 kg bw) or placebo (N = 20 each, both doses) (day -7, -6, -5 ante partum, 1st, 2nd, 3rd post partum). Production characteristics were recorded in 207 cows. The animals were used as a comparison to capture the effects of the intensive study protocol. Statistical analysis was performed using SAS software®.

The liver metabolome differs during the transit phase (metabotype A, B, C). Type A cows have moderate, type B mild and type C severe changes in the liver metabolome. Type C stands out after calving compared to type B due to lower lipomobilization and fewer diseases. A dose-dependent effect of Cato treatment, which is positive for animal health and differs between metabotypes, was recorded.

When comparing the cows of the experimental groups (N = 80) and the unmanipulated control animals (N = 207), the former showed a lower milk yield (305 d, difference: 472 kg, SE: 214 kg; P = 0.05) with higher cell content to (5–50 DIM, difference: 0.43, SE: 0.22, P = 0.05; DIM 151–200 difference: 0.43, SE: 0.20; DIM 201–250, difference: 0.49, SE: 0.22; DIM 251–300, difference: 0.55, SE: 0.25; DIM 301–350, difference: 0.61, SE 0.28; P = 0.03). The stillbirth rate was lower in the experimental group. In the experimental animals, findings associated with transcutaneous liver biopsy were documented on the abdominal wall (diffuse inflammation 11.9%, abscess 4.6%) and in the liver tissue (increased echogenicity 10.4%).

As a result of an intensive study protocol with multiple sampling, the health and production characteristics of the experimental cows can be negatively affected. In order to avoid long-term negative effects on animal health, it is important that all laboratory animals are subject to monitoring by qualified veterinarians. The results demonstrated an indication-based health-promoting effect of metaphylactic treatment with Cato.

SERUM HAPTOGLOBIN CONCENTRATIONS IN DAIRY CATTLE WITH METABOLIC DISTURBANCES IN THE TRANSITION PERIOD

Sofija Dzakula[1], Teja Snedec[1], Kirsten Theinert[1], Fabian Pietsch[1], Melanie Schären[1], Fanny Rachidi[1], Gabor Köller[1], Andreas Latz[2], Jörg Lehmann[3], Anke Hoffmann[3], Joachim Spilke[4], Alexander Starke[1], Lilli Bittner-Schwerda[1]

[1]Clinic for Ruminants and Swine, Faculty of Veterinary Medicine, University of Leipzig, Germany

[2]Novatec Immunodiagnostica GmbG, Dietzenbach, Germany

[3]Department Therapy Validation, Fraunhofer IZI, Leipzig, Germany

[4]Institute of Agriculture and Nutritional Sciences, Biometrics and Informatics in Agriculture Group, Martin-Luther University, Halle-Wittenberg, Germany

Haptoglobin is potentially participating in the pathogenesis of other diseases as fatty liver disease. The aim of this study was to explore haptoglobin concentrations (haptoconc) over the peripartal period in cows suffering from metabolic disturbances.

Samples were taken from 80 German Holstein cows (mean 305-d production: 10,957 kg; mean lactation number: 3.9). Blood samples were collected 14, 7 d ante partum, 1, 7, 14, 28, 42 d post partum (p.p.), resp.. Haptoconc in serum were determined (VetLine Bovine Haptoglobin ELISA kit, NovaTec Imunodiagnostics GmbH). Fatty acids were analyzed using a colorimetric-based assay (NEFA assay, Randox Laboratories Ltd.), BHB a Cobas c 311 system (Roche Diagnostics) and ketonbodies as acetoacetic acid in urine samples (Ketostix, Bayer Vital GmbH).

Cows with repeated ketonuria had 21 d p.p. a haptoconc of 439.6 ± 719 mg/l (Mean ± SD) in comparison to 72.2 ± 165 mg/l in cows without ketonuria during the whole study period. When BHB was elevated (>0.6 mmol/l) on d 7 and 28 p.p. cows presented haptoconc of 957.9 ± 1017 mg/l and 373 ± 841 mg/ml resp., in comparison to cows with BHB below 0.6 mmol/l on these days, who had haptoconc of 876.8 ± 1693 mg/l and 240.9 ± 495 mg/ml. Cows with high NEFA concentrations (>300 µmol/l) 14 d before calving had haptoconc of 117.7 ± 460 mg/l in comparison to cows with lower NEFA presenting 72.4 ± 245 mgl/l.

In conclusion, there might be a link between metabolic disturbances and haptoconc, however the SD were high, suggesting a great variation between single animals. Further analyses are needed in order to determine the tendency of haptoconc for every particular cow and to interpret the results in association with clinical findings. Haptoglobin is therefore an interesting marker for health surveillance on farm.

OUTCOME OF TREATMENT IN COWS WITH COMPLICATED CLAW LESIONS

Dominika Sobucka, Johannes Kretschmann, Tilman Kühn, Alexander Starke, Fanny Rachidi

Clinic for Ruminants and Swine, Faculty of Veterinary Medicine, University Leipzig, Germany

Lameness is one of the most common causes of culling on dairy farms. Claw amputation (Amp) is an established surgical method for complicated claw lesions. The first 100 days after Amp are the period of greatest risk. The aim of the study was to assess the culling time, method and causes of culling of dairy cows after the Amp.

In a case-control study from April 2020 to April 2022, data were collected from 37 German Holstein cows with perforating claw lesions on one dairy farm (2,540 cows, Ø 8,570 kg, 305-day milk yield). All cows were treated with antibiotics and anti-inflammatory agents, and the Amp procedure was performed under local intravenous anaesthesia of the distal part of the limb. The Amp were performed by the same experienced surgeon. In the first period after surgery, all cows were kept in a special box with an adapted floor and short distances from water, feed and the milking parlour. Herd management data (HERDEplus, dsp-Agrosoft GmbH) were used to analyse the type, timing and reason for culling.

After the study period, 65% (N = 24) of the cows were slaughtered, 24% (N = 9) were euthanized, 8% (N = 3) died, one was still in the herd. The average period of stay in the herd was 176 days and ranged from 6 to 550 days. 61% of cows (N = 22) survived more than 100 days. In 6 cases, the cows were re-inseminated after the procedure and began another lactation period. Of the 36 cows culled, 64% (N = 23), according to the herd management program data, were culled due to hoof health problems (22% other reasons, 8% infertility, 6% milking problems).

With appropriate surgical treatment and professional post-operative care, cows with Amp have a good chance of surviving in the herd or improving their health in order to be slaughtered.

EVALUATION OF BODY CONDITION SCORE IN CALVES OF BUSHA CATTLE BREED

Aneta Piplica[1], Anamaria Ekert Kabalin[1], Maja Maurić Maljković[1], Ivan Vlahek[1], Ivana Sabolek[2], Mario Ostović[2], Velimir Sušić[1], Sven Menčik[1]

[1]Department of Animal Breeding and Livestock Production, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[2]Department of Animal Hygiene, Behaviour and Welfare, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

The Busha breed of cattle is well adapted to extensive husbandry systems characterised by modest feeding, breeding, care and rearing conditions. Feeding is one of the most important non-genetic factors affecting calf vigour and physical development. Inadequate feeding can result in stunted growth of offspring. Calf feeding can be evaluated based on the body condition score (BCS), which provides information on optimal nutritional intake during growth and development, which is important for further fattening or breeding of heifers and bulls. The aim of this study was to determine the BCS of Busha calves in an extensive farm in the Lika region, Croatia. A total of 108 animals, including 52 female and 56 male calves aged 3 to 4 months, were examined. BCS was assessed using a visual-tactile method that recorded the expression of the sacrum, pelvis, and lateral and sciatic humps. The scoring system included a scale of 1 to 5 with a gradation of 0.25, and an average BCS value of 3.0 denoted the optimal condition. The Mann-Whitney U test was used to analyse the difference in BCS between female and male calves. The average BCS value of the calves was 2.87. In the female calves, the average BCS was 2.88 (N = 52), with a minimum value of 2.50 (N = 6), followed by a value of 2.75 (N = 24), a value of 3.00 (N = 13), a value of 3.25 (N = 5), and a maximum value of 3.50 (N = 4). In male calves, the average BCS was 2.85 (N = 56), with a minimum value of 2.50 (N = 6), followed by a value of 2.75 (N = 26), a value of 3.00 (N = 20), a value of 3.25 (N = 3), and a maximum determined value of 3.50 (N = 1). Analysis of BCS between female and male calves. There was no difference ($P > 0.05$) in BCS between female and male calves. The results of this study suggest that sex has no effect on BCS. Nevertheless, it is of great importance to closely monitor the BCS of both female and male calves in extensive rearing because they are exposed to different conditions that are influenced by the specific breeding conditions. Careful monitoring of calf health indicators such as BCS and the application of appropriate management practises can ensure optimal growth and productivity.

SLAUGHTER CHECK ASSESSMENT OF PULMONARY LESIONS AND PLEURITIS IN MACEDONIAN COMMERCIAL PIG FARMS

Branko Angjelovski[1], Aleksandar Janevski[1], Jovan Bojkovski[2], Dine Mitrov[1]

[1] Department of Farm Animals Internal Medicine, Faculty of Veterinary Medicine-Skopje, Ss. Cyril and Methodius University, Lazar Pop-Trajkov 5-7, 1000 Skopje, N. Macedonia

[2] Department of Ruminants and Swine Diseases, Faculty of Veterinary Medicine, University of Belgrade, 11000 Belgrade, Republic of Serbia

Pulmonary evaluation at slaughterhouse is a valuable tool for assessing respiratory health in pig herds. The objective of this study was to assess pulmonary lesions and pleuritis in slaughterage pigs from five commercial pig farms with a history of respiratory disease.

Five Macedonian farrow-to-finish pig farms with a history of respiratory diseases participated in the study. The average number of sows in the herds was 133 (range 50 to 170). At abattoir,50 lungs per farm were evaluated and scored for lesions associated with enzootic pneumonia and chronic pleuritis. Lungs were scored for enzootic pneumonia (EP)-like lesions and each of the lobe was individually assessed and scored according to the affected surface using 0-4 point scale.The total score of each lung ranged from 0 to maximum 28 points. For presence of pleuritis, lungs were evaluated using the Slaughterhouse Pleurisy Evaluation System (SPES) and scoredwith five grades (0-4) depending on the severity and location of the lesions.

Presence of (EP)-like lesions was found in 228 (91.2%) of all examined lungs ranging from 82 to 98% on farm level. Mean lung lesion score (LLS) for all farms was 11.5 (8.04-14.4).The highest percentage of lungs (60.4%) had LLS >10 compared to the lungs with scores 1-5 (12.4%) and 6-10 (18.4%) respectively. Significantly higher percentage of severe LLS (>10) was detected among some of the farms ($p<0.001$).Pleuritis was found in 26.4% of all examined lungs with mean SPES score of 0.75 (0.14 - 1.10). Percentage of SPES scores of 0, 1, 2, 3 and 4 in all lungs were 73.4%, 1.6%, 8.8%, 8.4% and 7.6% respectively. Significant difference of mean SPES score was obtained between two farms.

In all investigated farms, pneumonia lesions were more prevalent than pleuritis. Most of the affected farms with pneumonia had severe to mild pulmonary lesions that could be related with different management and preventive measures implemented on the farm level. Further research is necessary to reveal risk factors associated with pulmonary and pleurisy lesions in Macedonian pig farms.

DISTRIBUTION OF BUCK SPERMATOZOA IN MORPHOMETRICALLY DISTINCT SUBPOPULATIONS IN REGARD TO VALUES OF KINETIC PARAMETERS

Snježana Čipčić[1], Ivona Žura Žaja[2], Velimir Berta[3], Martina Lojkić[4], Petra Prgomet[5], Laura Rodman[5], Suzana Milinković Tur[2], Branimira Špoljarić[4], Jadranka Pejaković Hlede[2], Silvijo Vince[4]

[1] Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia, PhD Student

[2]Unit of Physiology and Radiobiology, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[3]Veterinary Practice Ludbreg, Ludbreg, Croatia

[4]Clinic for Obstetrics and Reproduction, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[5]Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia, Student

The aims of this study were to determine the values of bucks' spermatozoa kinetic (motion and velocity) and morphometric parameters in frozen-thawed ejaculate samples; to determine spermatozoa subpopulations and their respective proportions in the formed groups from spermatozoa kinetic parameters.

In 30 frozen-thawed ejaculate samples of French Alpine bucks spermatozoa kinetic and morphometric parameters were determined. The spermatozoa kinetic parameters (linearity - LIN, straight-line velocity - STR, amplitude of lateral head displacement - ALH, beat cross frequency – BCF, curvilinear velocity, average path velocity, wobble, straightness) were determined using computer assisted sperm analyser. Morphometric analyses were performed in stained smears using the Spermac method by computer - assisted program. Each kinetic parameter was grouped (group 1 - higher values and group 2 - lower values).

Using the principal component and cluster analysis according to morphometric parameters three subpopulations were obtained (S1 – spermatozoa with the smallest head ellipticity, elongation and regularity, the highest head rugosity, the shortest tail, the largest mid-piece width; S2 – the largest / longest spermatozoa; S3 – the smallest spermatozoa). Spermatozoa in LIN and STR group 1 had a significant lower proportion of S1 and S3, and a higher proportion S2 *vs* group 2, respectively. Spermatozoa in ALH and BCF group 1 had a significant lower proportion of S2, and a higher proportion of S3 *vs* group 2, respectively.

It can be concluded that the largest spermatozoa have higher LIN and STR, while the smallest spermatozoa have higher BCF and ALH. Although the smallest spermatozoa are faster in lateral head displacement and have higher beat cross frequency, they do not move progressively. On the other hand, the largest spermatozoa are slower in lateral head displacement and have lover beat cross frequency, but have greater progressive motility.

RESULTS OF VIROME MONITORING IN TURKEY POULT PRODUCTION REVEAL POSSIBLE VERTICAL TRANSMISSION AND BREACH IN BIOSECURITY MEASURES

Željko Gottstein[1], Liča Lozica[1], Emanuel Budicin[1], Maja Lukač[1], Danijela Horvatek Tomić[1], Sebastiaan Theuns[2]

[1] *Faculty of Veterinary Medicine, Zagreb, Croatia*

[2] *PathoSense BV, Lier, Belgium*

Viral infections pose a high threat to poultry production worldwide, causing problems in different organs, most frequently in the digestive tract. To be able to monitor such flocks, especially parent flocks, it is important to have simple and effective mechanisms of control. Diagnostic platform PathoSense developed a simple and effective way for whole genome sequencing of microorganisms present in the swabbed tissue sample using nanopore sequencing technology. Besides the identification of a microorganism, it enables a quantitative result as well. During monitoring of the turkey poult flock, swabs of intestinal tract were taken at two and 19 days of age and sent for sequencing. Results have shown a high prevalence of avastrovirus and rotavirus G, and medium prevalence of turkey avisivirus, together with the medium prevalence of bacteria, like *Latilactobacillus* sp. and *E. coli*, and low prevalence of *Enterococcus sp*. At age of 19 days, medium prevalence of turkey avisivirus, avastrovirus, rotavirus G and A, and lower prevalence of gallivirus and turkey parvovirus were detected. Results have shown an early presence and possible vertical transmission of viral pathogens, as they were present in high quantity and poults have shown symptoms early. In older age, as expected, a lower quantity of viruses was present, but with a more diversified virome with six different viral species present, showing a possible breach in biosecurity on the farm. Results have also shown the presence of possible bacterial pathogens, *E. coli* and *Enterococcus*, which can cause significant problems in the meat producing animals. In conclusion, virome monitoring produced high-quality epizootiological and clinical results indicating a possible direction of spread of the infection, level of biosecurity measures on the farm and probable clinical outcomes.

Keywords: sequencing, PathoSense, Avisivirus, Avastrovirus, Rotavirus, Gallivirus, Parvovirus

FARM ANIMALS SESSION

POSTER PRESENTATIONS

EFFECTS OF LOW-DOSE IONIZING RADIATION ON PLASMA LIPIDS IN CHICKENS EXPOSED *IN OVO*

Jadranka Pejaković Hlede[1], Silvijo Vince[1], Ivona Žura Žaja[1], Marija Majer[2], Marinko Vilić[1]

[1]*Faculty of Veterinary Medicine University of Zagreb, Zagreb, Croatia*

[2]*Ruđer Bošković Institute, Zagreb, Croatia*

The impact of low-dose ionizing radiation on lipid metabolism in chickens remains largely unexplored. Understanding the effects of radiation on lipid metabolism is important due to the essential role lipids play in fundamental physiological processes such as energy storage, maintenance of membrane integrity, and hormone synthesis. This study aimed to investigate the effects of gamma radiation on plasma cholesterol and total lipids in chickens exposed *in ovo*.

Fertilized Ross 308 eggs (n=100) were randomized to experimental and control groups. The experimental group were exposed to 0.3 Gy gamma radiation one hour before incubation, and control group was sham irradiated. Blood samples (10 chicks per group) were taken on 1st, 3rd, 5th, 7th, and 10th day after hatching. Cholesterol and total lipid levels were measured using a colorimetric method. Statistical analysis was performed using SAS 9.4 software. Independent testing of samples between the control and experimental group was performed using the Student's t-test.

Exposure to ionizing radiation resulted in a significant reduction in plasma cholesterol concentrations in one-day-old chickens compared to the control group. Compared to the control group, the irradiated chickens had a decreased concentration of total lipids on the fifth day after hatching, while an increased level is found on the tenth day after hatching.

The observed alterations in plasma cholesterol and total lipids in response to low-dose ionizing radiation suggest that even low dose gamma radiation can have a significant effect on lipid metabolism in chickens. It is possible that radiation-induced oxidative stress plays a role in altering lipid metabolism. However, further investigations are necessary to elucidate the underlying mechanisms and assess the potential implications of these findings on poultry health and production.

BIRTH WEIGHT, WEANING WEIGHT AND AVERAGE DAILY GAIN IN DALMATIAN PRAMENKA SHEEP FROM THE ISLAND OF BRAČ – A PRELIMINARY STUDY

Jasna Kusanović, Maja Maurić Maljković, Aneta Piplica, Velimir Sušić, Anamaria Ekert Kabalin, Sven Menčik, Ivan Vlahek

Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Dalmatian Pramenka is the most numerous Croatian autochthonous sheep breed whose breeding area is the region of Dalmatia, including the Central-Dalmatian islands. It is considered that a distinct type of this breed is present on the island of Brač. In order to distinguish this type from other populations of Dalmatian Pramenka, phenotypic data on exterior, production and reproduction, as well as genotypic data, need to be collected and analysed. Therefore, the aim of this preliminary study was to record lamb production characteristics in the Brač type of Dalmatian Pramenka. A total of 21 singleton-born lambs (12 male, nine female), born between January 5 and 15, 2023, were included in the analysis. Sex, birth weight (BW), weaning weight adjusted at 60 days (WW60) and average daily gain (ADG) were recorded. The significance of the differences between male and female lambs in BW, WW60 and ADG was examined using T-test. The overall means and standard deviations of BW, WW60 and ADG were 2.74 ± 0.15 kg, 18.90 ± 1.79 kg, and 0.27 ± 0.03 kg, respectively. Female lambs were significantly ($P<0.05$) heavier at birth (2.82 ± 0.18 kg) than male lambs (2.68 ± 0.10 kg). WW60 in males (19.39 ± 1.54 kg) was higher than in females (18.23 ± 1.97 kg), but the difference was not statistically significant ($P>0.05$). Nonsignificant ($P>0.05$) differences in ADG were recorded between male (0.28 ± 0.02 kg) and female (0.26 ± 0.03 kg) lambs. The overall variability of the data was low, and the coefficients of variation of BW, WW60 and ADG were 5.60%, 9.46%, and 11.42%, respectively. Females were heavier than males at birth, whereas the reverse was true at weaning. This indicates that males have greater growth potential from birth up to 60 days of age. Data from a larger number of Brač type of Dalmatian Pramenka lambs, both from different flocks and from ewes of different ages, need to be analysed to draw valid conclusions about their production.

THE INCIDENCE AND BACTERIOLOGICAL ETIOLOGY OF CLINICAL MASTITIS ON SMALL FARMS WITH A TIE-STALL HOLDING SYSTEM

Aleksandar Janevski[1], Elena Mitrevska[1], Ivana Arsovska[2], Iskra Cvetkovikj[2], Silvana Andreevska[3], Angelce Todorovski[3], Oliver Markovski[4], Dine Mitrov[1]

[1] Department of farm animals-Internal Medicine, (Faculty of Veterinary Medicine, Skopje, North Macedonia)

[2] Department of Microbiology (Faculty of Veterinary Medicine, Skopje, North Macedonia)

[3] Vet clinic Pro-infovet, Petrovec (Skopje, North Macedonia)

[4] Vet clinic TD Mak Marketing (Ohrid, North Macedonia)

The aim of this study was to establish the incidence and bacteriological causes of clinical mastitis (CM) on small farms in one region. This study was necessary, keeping in mind that CM is still the most expensive and widespread disease with an endemic character.

The study was conducted between January 1st and May 31st, 2023. A total of 1032 dairy cows were included in the study, which were distributed across 200 small farms, all operating under surveillance of a single veterinary clinic. Milk samples were collected from all cows exhibiting signs of CM, characterized by abnormal milk and hard and/or swollen milk glands. To analyze the samples, 10µl from each sample was subcultured on a blood agar plate and subsequently incubated at 37°C for 24 to 48h. The identification of the bacteria was conducted using MALDI Biotyper® Sirius, (Bruker).

A total of 49 quarters with CM cases were reported, originating from 27 cows. The incidence rate was determined as 4.7 cases for each quarter and 2.6 cases per cow, per 100 cows at risk. Bacterial growth wasn't determined in 20% of the samples (10/49). Among the 39 milk samples in which bacteria were identified, 43 strains were detected. Mixed infections involving two causes were observed in five quarters, and one strain remained unidentified. The isolated bacteria and their frequencies were as follows: *Streptococcus uberis* (26%), *Klebsiella oxytoca* (14%), Coagulase-negative staphylococci (14%), *E. coli* (11%), *Streptococcus agalactiae* (9%), *Staphylococcus aureus* (7%), *Lactococcus lactis* (5%), *Lactococcus garvieae* (5%), and in one isolate (2%) each of *Moraxella catarrhalis, Enterococcus faecalis, Strept. mitis/oralis,* and *Strept. parauberis*.

The obtained results indicate that three dominant causes of CM in small cattle farms are environmental pathogenic bacteria. Consequently, it is crucial to educate farmers about implementing appropriate hygiene practices during milking procedures, raising high-milk-producing cows, and implementing preventive measures to safeguard the mammary gland.

SOWS ERYTHROCYTE MORPHOMETRIC PARAMETERS AFTER *IN VITRO* BLOOD EXPOSURE AT 5G RADIOFREQUENCY ELECTROMAGNETIC RADIATION

Nikolino Žura[1,4,8], Silvio Vince[2], Marinko Vilić[3], Porin Perić[4], Ana Shek Vugrovečki[3], Josip Miljković[3], Krešimir Malarić[5], Velimir Berta[6], Saša Androci[6], Krešimir Tomašić[6], Nina Poljičak Milas[7], Suzana Milinković Tur[3], Ivona Žura Žaja[3]

[1] *Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia, PhD Student*

[2]*Clinic for Obstetrics and Reproduction, Faculty of Veterinary Medicine, University of Zagreb, Croatia*

[3]*Unit of Physiology and Radiobiology, Faculty of Veterinary Medicine, University of Zagreb, Croatia*

[4]*University Hospital Center Zagreb, Department of Rheumatology and Rehabilitation, Zagreb, Croatia*

[5]*University of Zagreb, Faculty of Electrical Engineering and Computing, Zagreb, Croatia*

[6]*Veterinary Practice Ludbreg, Ludbreg, Croatia*

[7]*Unit of Pathophysiology, Faculty of Veterinary Medicine, University of Zagreb, Croatia*

[8]*University of Applied Health Sciences, Zagreb, Croatia*

The effects of radiofrequency electromagnetic radiation (RF-EMR) from 5G frequencies on erythrocyte (RBC) morphometric parameters in animals are not known. The aim of this study was to determine the effect of the 5G RF-EMR at 3500 MHz on sows' RBC morphometric parameters after a short-term (2h) *in vitro* exposure.

Blood samples from 16 sows of the German Landrace breed, aged 1 to 2 years, were taken from the *vena cava cranialis*. Per sow, one EDTA tube was labelled as experimental and one as control. The experimental blood samples were exposed to continuous RF-EMR at 3500 MHz, 4 hours after sampling, using gigahertz transverse electromagnetic chamber at 20 to 22 °C for 2 hours and field level of 10 V m^{-1}. The control samples were kept in the same conditions except exposing to 5G RF-EMR. The smears of experimental and control blood samples were made immediately after blood exposure to 5G RF-EMR. Morphometric analyses were performed on sows' RBCs in Pappenheim stained blood smears (> 100 RBCs per smear) SFORM computer-assisted program. Following morphometric RBCs size and shape parameters were determined: area, outline, convex area, minimal and maximal radius, length and breadth, ellipticity, elongation, solidity, roundness, form factor, contour index.

Significantly higher values of RBCs outline, minimal radius and contour index were established in control samples, respectively. Conversely, significantly lower values of RBCs solidity, elongation and form factor were determined in control samples, respectively.

In conclusion, sow RBCs exposed to continuous 5G RF-EMR at 3500 MHz were statistically more round, with fewer folds, smoother edges and more compact compared to the RBCs of control samples, which were more elongated with more folds on the surface and less compact. *In vitro* blood exposure at 5G RF-EMR could have an effect on higher permeability of the erythrocyte membrane.

VETERINARY PUBLIC HEALTH SESSION

ORAL PRESENTATIONS

POTENTIAL OF MICROENCAPSULATION IN CHEESE PRODUCTION – DEVELOPMENT OF INNOVATIVE TECHNOLOGY IN DAIRY SCIENCE

Marta Kiš[1], Fabijan Oštarić[2], Nataša Mikulec[2], Snježana Kazazić[3], Vesna Dobranić[1], Marko Vinceković[4], Vlatka Čubrić Čurik[5], Nevijo Zdolec[1]

[1]Department of Hygiene, Technology and Food Safety, Faculty of Veterinary Medicine, University of Zagreb, Croatia

[2]Department of Dairy Science, Faculty of Agriculture, University of Zagreb, Croatia

[3]Division of Physical Chemistry, Ruđer Bošković Institute, Croatia

[4]Department of Chemistry, Faculty of Agriculture, University of Zagreb, Croatia

[5]Department of Animal Science, Faculty of Agriculture, University of Zagreb, Croatia

Improving existing production and thus the properties of the final product has always been one of the main objectives of the food industry. Although cheese production has improved significanty over time, globalization and industrial progress, on the other hand, have led to a loss of originality and biodiversity among producers. The project "Potential of microencapsulation in cheese production" (KK. 01.1.1.04.0058) aimed at integrating the microencapsulation process into traditional cheese production, which in the end will have a significant impact on the cheese quality, yield and production process. Apart from the technological side, the use of ingredients from various natural sources would preserve biodiversity and upgrade dairy production.

During the three years of the project, the main objectives included sequencing of the DNA genotype of Pag sheep, extraction of coagulation enzymes from sucling lamb's abomasum, isolation and characterization of lactic acid bacteria from the traditional cheese production chain, preparation of rennet and lactic acid bacteria in microencapsulated form and their application in the production of Pag cheese.

The project activities resulted in selection of an autochthonous Pag sheep breed for enzyme extraction, the successful production of natural rennet, and the isolation and characterization of two indigenous strains of lactic acid bacteria. These two components were prepared in microencapsulated form and allowed the production of Pag cheese with the same characteristics as the commercial product.

To date, this is the first report of the use of an encapsulated strain of lactic acid bacteria isolated from the abomasum of lambs and natural rennet in the production of hard sheep cheese. These results serve to introduce new innovative technologies in traditional cheese production by preserving biodiversity and adding value and global recognition to these product.

This research was funded by the project: “Potential of microencapsulation in cheese production”, KK.01.1.1.04.0058.

DEVELOPMENT OF NEW HARD CHEESES SUPPLEMENTED WITH DALMATIAN MEDICINAL AND AROMATIC HERBS: PRELIMINARY RESULTS OF THE ERDF PROJECT CENTER OF COMPETENCE 3LJ

Nevijo Zdolec[1], Marta Kiš[1], Marijana Franičević[2], Ivana Kavain[2], Josip Batinić[2], Manuela Zadravec[3], Jelka Pleadin[3], Darko Čobanov[4]

[1]University of Zagreb, Faculty of Veterinary Medicine, Zagreb, Croatia

[2]CEKOM 3LJ, Ugljane 115c, Trilj, Croatia

[3]Croatian Veterinary Institute, Savska cesta 143, Zagreb

[4] PUĐA d.o.o. Čaporice 133, Čaporice

The Center of competence 3LJ project, financed by the European Regional Development Fund, has created a common space for science and industry, pooling their knowledge and experience and bringing universities and institutes together with business, especially small and medium-sized enterprises. The project's main activities and expected results (2020 - 2023), which involved six institutions and two companies, were the development of 15 new innovative products in the fields of pharmaceuticals, nutrition and functional foods based on medicinal and aromatic herbs, including five new types of cheese.

Five autochthonous herbs from the region of Dalmatia, Croatia, were selected for the study: basil (*Ocimum basilicum* L.), sage (*Salvia officinalis* L.), lavender (*Lavandula officinalis* L.), immortelle (*Helichrysum italicum* (Roth) G. Don) and savory (*Satureja montana* L.). In addition, rosemary (*Rosemarinus officinalis* L.) was tested in some laboratory experiments.

In the project's first phase, the antimicrobial potential of alcoholic and oil extracts against selected foodborne pathogens and spoilage bacteria was tested in the 2020 and 2021 seasons. Following these studies, the effect of cold-sterilized herbs and their extracts was tested against commercial cheese starter cultures in pasteurized milk. Two experimental productions of cheese supplemented with minced dried herbs were conducted at concentrations of 0.5, 1.0, 1.5 and 2.0%, and 0.05, 0.10, 0.25 and 0.5%, respectively.

In this presentation, the main results, including the antimicrobial properties of the herbal extracts, sensory properties and microbiological safety of the new cheeses, will be presented.

Acknowledgement: The study was supported by European Regional Development Fund, Project Center of competence 3LJ, KK.01.2.2.03.0017.

MULTISTAKEHOLDER'S KNOWLEDGE, ATTITUDES, AND PRACTICES ON POULTRY ZOONOSES IN THE PROVINCES OF LEYTE AND SOUTHERN LEYTE, PHILIPPINES

Ana Marquiza M. Quilicot, Darlen Grace E. Medallo

Visayas State University, Visca, Baybay City, Leyte 6521-A Philippines

A survey was conducted to determine the level of knowledge, practices, and attitudes (KAP) on poultry zoonoses among poultry meat and egg retailers, consumers, and smallholder poultry raisers in Leyte and Southern Leyte provinces. Factors associated with the KAP scores of the study population were identified. A total of 451 stakeholders (153 poultry product consumers, 128 poultry raisers, 124 poultry raiser-retailers, and 46 retailers) participated in the study. The KAP questions concerned poultry zoonoses signs, prevention, control, and treatment. Information on respondents' age, gender, educational attainment, employment, and sources of information concerning poultry zoonoses was also gathered to determine its association with the KAP scores of the respondents. Multivariable linear regression analysis determined the factors associated with stakeholders' level of knowledge, attitudes, and practices on poultry zoonoses. The stakeholders have a moderate knowledge level with high attitudes and practices. Knowledge scores tends to be lower in males (β=-0.599, p=0.027) and among non-poultry raiser groups (retailer-consumer [β=-6.382, p=0.001] and consumer [(β=-5.797, p<0.001)). Attitude scores tend to be higher among consumers ((β=6.013, p=0.004). Practice scores decrease among single respondents ((β=-3.105, p=0.017). There is a significant positive association between knowledge (β=6.572, p=0.030; β=2.010, p<0.001) with attitude and practice scores. Despite the current attitudes and practices among stakeholders, stakeholders still need to enhance knowledge levels to correct misconceptions and improve attitudes and practices concerning poultry zoonoses.

This work was supported by the Department of Science and Technology (DOST)- National Research Council of the Philippines (NRCP) through the Frontier Research Agenda and Capability Building of Researchers in the Visayas under the NRCP Science and Technology Experts Pool-Visayas (NSTEP-Visayas).

BHANJA BANDAVIRUS: A NEGLECTED ARBOVIRUS OF ZOONOTIC IMPORTANCE IN CROATIA

Maja Bogdanić[1], Vladimir Stevanović[2], Vladimir Savić[3], Snježana Kovač[2], Stjepan Krčmar[4], Gorana Miletić[2], Dario Sabadi[5,6], Marija Santini[7,8], Tanja Potočnik-Hunjadi[9], Mahmoud Al-Mufleh[10], Ljubo Barbić[2], Ivona Ćorić[2], Tatjana Vilibić-Čavlek[1,8]

[1]Croatian Institute of Public Health, Zagreb, Croatia

[2]Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[3]Croatian Veterinary Institute, Zagreb, Croatia

[4]Department of Biology, Josip Juraj Strossmayer University of Osijek, Osijek, Croatia

[5]Clinical Hospital Center Osijek, Osijek, Croatia

[6]Medical Faculty, Josip Juraj Strossmayer University of Osijek, Osijek Croatia

[7]University Hospital for Infectious Diseases "Dr. Fran Mihaljević", Zagreb, Croatia

[8]School of Medicine, University of Zagreb, Zagreb, Croatia

[9]General Hospital Varaždin, Varaždin, Croatia

[10]County Hospital Čakovec, Čakovec, Croatia

Bhanja bandavirus (BHAV) is a zoonotic arbovirus belonging to the *Phenuiviridae* family, genus *Bandavirus*. After the first virus isolation in 1974, several seroepidemiological studies were conducted in the 1970s and 1980s indicating the presence of BHAV in Croatia. However, more recent data on the BHAV prevalence are lacking. The aim of this study was to analyze the prevalence of BHAV-neutralizing (NT) antibodies in patients with neuroinvasive diseases of unknown etiology.

A total of 254 patients who developed symptoms during the four consecutive arbovirus transmission seasons (2017-2021) were included in the study. Serum and cerebrospinal fluid (CSF) samples were tested for the presence of BHAV NT antibodies using a virus neutralization test. CSF and urine samples were also tested for BHAV RNA using an RT-qPCR.

BHAV RNA was not detected in any samples, while NT antibodies were detected in serum samples of 53/20.8% (95%CI=16.0-26.3) of patients. In two patients presented with meningitis, NT antibodies were detected in the CSF suggesting a recent BHAV infection. Both patients were residents of rural areas in continental Croatia, and one reported a tick bite on the head two weeks before the onset of symptoms. The high BHAV seropositivity was observed in all age groups (15.2-29.1%). Patients with 'febrile headache' and meningitis were more often seropositive (22.2%/44.7%) than patients with meningoencephalitis and myelitis (10.0% each). There was no difference in the seropositivity regarding gender and area of residence (urban or suburban/rural).

The presented results indicate the presence of BHAV in continental Croatia. Further studies are needed to determine the clinical significance of this neglected arbovirus in the human population. In addition, testing different animal species as possible reservoirs/hosts will contribute to a better understanding of the BHAV epidemiology in Croatia.

SEROPREVALENCE AND CLINICAL SIGNS OF SARS-COV-2 VIRAL INFECTION IN DOGS AND CATS IN CROATIA

Gorana Miletić[1], Snježana Kovač[1], Ivona Ćorić[1], Ljubo Barbić[1], Iva Benvin[1], Tatjana Vilibić-Čavlek[2,3], Maja Maurić Maljković[1], Vladimir Stevanović[1]

[1]Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[2]Croatian Institute of Public Health, Zagreb, Croatia

[3]School of Medicine, University of Zagreb, Zagreb, Croatia

SARS-CoV-2 is a novel coronavirus that causes a disease in humans called COVID-19. Infection with the virus has also been proven in farmed minks, wild, zoo and pet animals. In this research, we wanted to assess SARS-CoV-2 seroprevalence in dogs and cats in Croatia.

The animals were tested for the three most prevalent variants in human population, Alpha, Delta and Omicron. In total, 296 dog serum samples and 140 cat serum samples were collected from January to April 2022 at the Clinics of the Veterinary Faculty of the University of Zagreb. An in-house microneutralisation test was used as it was proven highly specific. The test showed SARS-CoV-2 seroprevalence of 21.9% in dogs and 18.6% in cats. Alpha variant antibodies were the most prevalent in both species, followed by Delta. The smallest percentage of cat and dog sera had Omicron neutralisation antibodies. In contrast to humans, a significant level of cross-neutralisation was recorded in dogs and cats, which points to a different immune response. Interestingly, age and sex, which have been emphasised as important factors in humans and animals, did not affect the susceptibility of dogs and cats to the infection. Regarding the clinical manifestation of SARS-CoV-2, gastrointestinal signs were more pronounced in seropositive dogs and respiratory signs in positive cats.

Given pets close relationship with owners and that dogs and cats are the most common pets, both species are at a high risk of getting infected. On the other hand, if they do become a source of infection, they could play an important role in the epidemiology of the disease in humans. Almost every fifth dog and cat in this research tested positive for SARS-CoV-2 antibodies, making the virus a significant pathogen in dogs and cats. Although there is no evidence that dogs and cats are a source of infection for humans, the number of positive animals indicates that it is necessary to monitor the spread of infection in animals in close contact with humans.

VETERINARY PUBLIC HEALTH SESSION

POSTER PRESENTATIONS

ANTIMICROBIAL SUSCEPTIBILITY OF LACTIC ACID BACTERIA ISOLATED FROM PAG SHEEP MILK, CURD, AND CHEESE

Ena Horvat[1], Marta Kiš[2], Snježana Kazazić[3], Fabijan Oštarić[4], Nataša Mikulec[4], Nevijo Zdolec[2]

[1]University of Zagreb, Faculty of Veterinary Medicine, Zagreb, Croatia, student

[2]University of Zagreb, Faculty of Veterinary Medicine, Department of Hygiene, Technology and Food Safety, Zagreb, Croatia

[3]Ruđer Bošković Institute, Zagreb, Croatia

[4] University of Zagreb, Faculty of Agriculture, Zagreb, Croatia

The indigenous microbiota of traditional cheeses may be a source of potential dairy cultures that can be used in controlled, standardized production. The aim of this study was to evaluate the antimicrobial susceptibility of lactic acid bacteria isolated during the traditional production of Pag cheese.

Lactic acid bacteria (LAB, n=160) were isolated from raw sheep milk, curd and cheese during ripening using de Man, Ragosa and Sharpe agar (MRS) and identified by MALDI-TOF mass spectrometry. After identification to species level, isolates were tested for antimicrobial susceptibility to ampicillin, vancomycin, gentamycin, kanamycin, streptomycin, erythromycin, clindamycin, tetracycline, and chloramphenicol by E-test (Minimal Inhibitory Concentrations) on MRS agar. The results were interpreted according to the microbiological cut-off values proposed by EFSA.

A total of 16 different species of LAB were identified by MALDI-TOF MS and a selected representative isolate was subjected to E-test. Seven species, namely Lactococcus raffinolactis, Enterococcus faecalis, Pediococcus pentosaceus, Enterococcus italicus, Lacticaseibacillus paracasei, Companilactobacillus paralimentarius and Latilactobacillus curvatus were resistant to at least one antimicrobial agent. Multidrug-resistant isolates were assigned to E. faecalis, Lc. raffinolactis, E. italicus, L. paracasei, and C. paralimentarius. LAB isolates were most frequently resistant to kanamycin, streptomycin, and gentamycin.

The results showed a moderate prevalence of antimicrobial resistance in selected LAB isolates from sheep cheese production. Isolates that showed complete sensitivity to antimicrobial agents, namely Lactiplantibacillus plantarum, Lactococcus lactis, Enterococcus faecium, and Enterococcus durans, are potential candidates for further characterization to be selected for dairy applications.

This research was funded by projects “Potential of microencapsulation in cheese production” KK.01.1.1.04.0058 and “Improving professional practice on farm animals and horses at the Faculty of Veterinary Medicine of the University of Zagreb-VETFARM” UP.03.1.1.04.0045.

DETECTION OF *TPI, TCDA* AND *TCDB* GENES OF *CLOSTRIDIOIDES DIFFICILE* IN FECES OF HEALTHY DOGS AND DOGS WITH CLINICAL SIGNS OF GASTROINTESTINAL DISEASE

Magda Kamber, Vesna Mojčec Perko, Zrinka Štritof, Josipa Habuš, Vladimir Stevanović, Matko Perharić, Krešimir Martinković, Ljubo Barbić, Iva Zečević, Iva Benvin, Suzana Hađina

Department of Microbiology and Infectious Diseases with Clinic, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Clostridioides difficile is a gram-positive, anaerobic, sporulating bacterium whose toxigenic strains produce two major toxins: toxin A and B, encoded by the *tcdA* and *tcdB* genes. *C. difficile* infection (CDI) in dogs is primarily caused by these two toxins, and clinical signs can range from mild, self-limiting disease to acute hemorrhagic diarrhea. The fact that dogs are carriers of this emerging zoonotic pathogen poses a significant public health concern. The aim of this study was to determine the presence of the triose phosphate isomerase housekeeping gene (*tpi),* and the toxin-encoding genes *tcdA* and *tcdB* of *C. difficile* in the feces of healthy dogs and dogs with clinical signs of gastrointestinal (GI) disease.

Fecal samples were collected from 116 dogs, of which 49 were healthy and 67 had clinical signs of GI disease. Touchdown multiplex polymerase chain reaction targeting the *tpi* gene was used to detect *C. difficile,* while toxigenic variants were determined by the presence of the *tcdA* or *tcdB* gene or both. The severity of clinical signs of GI disease was assessed and scored using the previously proposed criteria (0 - no changes, 1- mild, 2 - moderate, 3 - severe).

Of 116 fecal samples analyzed, 5.2% (6/116) of dogs were *C. difficile*-positive (detection of the *tpi* gene), 4% (2/49) of healthy dogs, and 6% (4/67) of dogs with GI disease. The toxigenic variant *tcdA+/tcdB-* was detected in 4.5% (3/67) of dogs with GI disease. They exhibited mild to severe clinical signs of GI disease.

This is the first molecular study of *C. difficile* infections in the dog population in Croatia, contributing to the growing evidence of the presence of this bacterium in their feces. Further research is needed to investigate the role of *C. difficile* in the pathogenesis of GI disease in dogs and explore dogs as a potential source of CDI in humans.

DEATH CASES IN CATTLE AS A SUSPECTED CONSEQUENCE OF VACCINATION AGAINST LUMPY SKIN DISEASE IN CROATIA

Hrvoje Pavasović[1], Iva Gruden Zdunić[2], Ena Oster[1], Nikola Čudina[1], Frane Božić[1]

[1]Unit of Pharmacology and Toxicology, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

[2]Veterinary and Food Safety Directorate, Ministry of Agriculture, Zagreb, Croatia

In this paper, 15 reported cases of suspected deaths in cattle after vaccination against lumpy skin disease (LSD) were randomly selected and analysed. The aim of the analysis was to establish a possible link between vaccination and the deaths.

The cases were recorded electronically on the reporting form, assessed using pharmacovigilance tools and classified as probable, possible, unclassified/inconclusive or unlikely.

In seven cases animals died without symptoms. Six deaths occurred within 6 to 24 hours after vaccination and one after 7 days. In eight cases animals died following different symptoms after vaccination. Two of those included hypersensitivity reactions (breathing difficulty and hypersalivation) and occurred within 2 and 5 days after vaccination. The remaining six cases occurred within 1 to 15 days after vaccination as LSD-like symptoms (lumps, skin oedema), injection site reactions, decrease in milk production and/or general disorders (fever, recumbency etc.). The deaths occurred 1 to 40 days after vaccination. Three autopsies revealed underlying diseases (e.g. bronchopneumonia) together with skin oedema caused by vaccination.

Asymptomatic deaths were poorly documented, including lack of autopsy. In 6 cases, the onset of death (6 to 24 hours) can be considered as possibly related to vaccination (anaphylaxis), while in the case of death after 7 days, the causal relationship remains unknown. Deaths with other observed symptoms were assessed as probably or possibly related to vaccination based on the known reactions, although they may have only contributed to the existing condition leading to death (inconclusive).

In the cases studied, there is no clear association between vaccination and death in cattle. In cases with short time to death (6 hours), an anaphylactic reaction can be assumed, which is possible after any vaccination. In cases with longer time to death (up to 40 days), due to recorded symptoms and health deterioration, vaccine reactions might be the contributing factor.

PhD DAY

ORAL PRESENTATIONS

PHENOTYPIC AND GENOTYPIC VARIATIONS OF REPRODUCTIVE PERFORMANCE INDICATORS OF SHEEP IN ACCELERATED LAMBING SYSTEM

Ivan Vlahek

Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

The hypotheses of the research were that within-breed variations of reproductive indicators in prolific sheep depend on genetic and non-genetic factors and that reproductive indicators determined at the beginning of breeding activity can be predictors for the total number of lambs that a sheep will produce in its lifetime. A total of 134 sheep of the Romanov breed, raised in an accelerated lambing system with continuous reproduction, were analysed. Early reproductive indicators were age at the first lambing (AFL), first litter size (FLS) and first interlambing period (FIL), while the lifetime production of the sheep (LP4) was expressed as the total number of lambs born up to the age of 4. Linear models for interpreting the variability of reproductive indicators included different combinations of non-genetic and genetic factors: month of birth, breeding group, ram, first mating, the month of first lambing, type of first litter, mother-daughter relationship, growth and differentiation factor gene 9 (GDF9) and the insulin-like growth factor 1 gene (IGF1). Associations between reproductive indicators were analyzed by phenotypic and genotypic correlations, and heritabilities were estimated by mother-daughter regression. The sheep included in the research lambed 4 to 6 times until they were four years old and produced an average of 11.87 lambs. The average values of AFL, FLS and FIL were 373 days, 1.98 lambs, and 258 days, respectively. The model for FLS provided little information on the sources of variation in that trait (R2 = 7.64%). The month of birth of the ewe and the first mating were the most important factors in AFL variations, while FIL was the most influenced by the mating group. The FLS and the FIL were the most important sources of variation for LP4. The same variables were the most reliable predictors of LP4. Phenotypic and genotypic correlations for all trait pairs were low, and observed values for heritabilities were not statistically significant.

Keywords: reproductive performance; variation; lifetime production; prediction; sheep

ANTIMICROBIAL RESISTANCE OF NONTUBERCULOUS MYCOBACTERIUM SPECIES ISOLATED FROM DOMESTICAND WILD ANIMALS

Irena Reil[1], Ljubo Barbić[2], Gordan Kompes[1], Maja Zdelar Tuk[1], Sanja Duvnjak[1], Silvio Špičić[1]

[1] *Croatian Veterinary Institute, Zagreb, Croatia*

[2] *Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia*

The aim of this study was determination of different types of nontuberculous mycobacteria (NTM) present in domestic and wild animals in the Republic of Croatia using molecular methods, as well as determination of antimicrobial resistance of NTM from different sources.

A total of 593 samples from 153 animals as well as 71 archives isolates were bacteriologically examined on the presence of Mycobacterium sp. Strain identification was performed by multiplying the gene of the 16S rRNA region and 65 kD antigen, followed by the method of specific hybridization. The amplification of the IS901 was used to determine the subspecies within the M. avium complex. Unidentified isolates were subjected to sequencing of parts of the 16S rRNA, rpoB, hsp65 genes, and the ITS region. Antimicrobial susceptibility testing of slowly and rapidly-growing isolates was performed by broth microdilution method.

Members of the genus Mycobacterium were isolated from 80 animals, belonging to 20 different NTM species. Among slowly-growing species resistance was most prevalent to moxifloxacin, doxycycline, rifampicin, ciprofloxacin, trimethoprim-sulfamethoxazole and linezolid. Rapidly-growing species were most resistant to cefepime, cefriaxone, amoxicillin/clavulanic acid and clarithromycin.

Isolated strains showed high percentages of resistance to most antibiotics recommended for human therapy indicating zoonotic potential with possible challenges in the treatment of NTM infections in humans, and also indicating the possible role of animals as reservoirs of multi-resistant strains of NTM.

LONGITUDINAL STUDY ON ESCHERICHIA COLI GENE VARIABILITY AFTER APPLICATION OF AUTOGENOUS VACCINE IN BROILER BREEDER FLOCKS

Liča Lozica

Department of Poultry Diseases with Clinic, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Escherichia coli (E. coli) is the most common bacterial cause of decreased production and high mortality rates in the poultry industry. Avian pathogenic E. coli (APEC) is one of the extraintestinal (ExPEC) subpathotypes, characterized by high genetic diversity. APEC genome diversity complicates the efficacy of the immunoprophylaxis programs, which are the foundation of poultry health protection.

In this research, 115 E. coli strains were longitudinally isolated from the chicken carcasses diagnosed with colibacillosis. The strains originated from four and five flocks, on Farm A and Farm B, respectively, which are part of the same broiler breeder company. The selected strains originated from the flocks vaccinated with commercial, combination of commercial and autogenous, or solely autogenous vaccines. The strains were sequenced, individually analysed and mutually compared based on the phylogenetic groups, multilocus sequence types (MLST), virulence-associated genes (VAGs), antimicrobial resistance (AMR) genes, and core-genome single-nucleotide polymorphisms (cgSNPs). The aim of this dissertation was to investigate the effect of autogenous vaccines on the genetic heterogeneity of E. coli strains on poultry farms.

The results showed that autogenous vaccine application gradually induced lower genetic heterogeneity of the isolates, based on the prevalence of phylogenetic groups, STs and cgSNP phylogeny. In total, 23 sequence types (STs) were detected, with 52.58% of the isolates belonging to two clonal complexes. Nevertheless, the average number of virulence genes per isolate increased on both farms, while the prevalence of the antimicrobial resistance genes decreased. Out of the highly prevalent STs, ST95, ST390 and ST131 had the highest average number of VAGs per isolate.

The overall results of the research confirmed that application of autogenous vaccines affects the genetic heterogeneity and virulence profiles of E. coli.

EFFECTS OF STANDARDIZED GINGER (ZINGIBER OFFICINALE ROSCOE) EXTRACT ON MICROBIOME, GUT MORPHOLOGY, ANTIOXIDATIVE STATUS AND GROWTH PERFORMANCE IN BROILER CHICKENS

Martina Đurić Jarić

Marketing Manager Animal Health, Krka-Farma d.o.o., Zagreb, Croatia

Ginger (Zingiber officinale Roscoe) is a well-known herb used as a dietary supplement to relieve certain diseases in traditional medicine. Previous research on poultry has been highly variable, but there are indications that it can promote growth, improve digestion and oxidative status. However, dosing, application mode and extraction processes need to be standardized to be certain of its effectiveness. Our research will for the first time use a standardized form of ginger extract with a chemically defined composition that will allow more objective testing. Two hundred one-day-old Ross 308 chickens were randomly divided into 4 groups (5 pens/group) and fed 0., 2.5, 5 and 10 g of ginger extract per kg feed. During the experiment, production results, biochemical and haematological parameters, antioxidant status, microbiome and intestinal morphometry were assessed. The addition of ginger extract in the lowest and highest dose had a negative effect on the final masses. With dose increase we observed a negative effect on feed consumption, and the group that received the highest dose had the highest mortality. On the other hand, the addition of ginger extract at a dose of 5g/kg of food had a positive effect on feed efficiency. The tested preparation did not adversely affect the diversity and richness of bacterial genera in the intestine. All of the experimental groups had a desirable balance of intestinal bacteria at the phylum and genus level. The addition of ginger extract at a dose of 5 g/kg of feed had a positive effect on the morphometric parameters of the small intestine segments and no negative effect was detected on the occurrence of pathological changes in liver tissue. The research demonstrates that the positive effects of ginger extract are clearly dose dependent. In conclusion, a dose of 5 g/kg of feed achieved the best overall results and could therefore be useful to the poultry industry in improving the efficiency and sustainability of chicken production.

INFLUENCE OF GASTROESOPHAGEAL REFLUX ON SURGICAL SUTURE MATERIALS USED FOR ESOPHAGOTOMY IN PIGS - EX VIVO STUDY

Valentina Plichta

Clinic for Surgery, Orthopaedics and Ophtalmology, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

In the last decades gastroesophageal reflux disease (GERD) has increasing prevalence in human population. GERD is a condition in which the reflux of gastric content into esophagus is causing symptoms like heartburn and regurgitation or complications such as erosive esophagitis and adenocarcinoma. Surgical procedures on esophagus are performed daily. Presence of body fluids, bacteria or pH values can influence on resorption and increase degradation of suture material.

Aim of this study was to determine the effect of pepsin, HCl and sucralfate on strength of esophagotomy reconstruction line and to compare two different methods for intraluminal pressure measurement.

In this study 54 porcine esophagus were tested and divided in 3 groups based on conditions in which esophagotomy line were exposed and 3 subgroups based on suture material used for wound closure. The longitudinal 4 cm long esophagotomy incision were performed throughout all layers. Esophagotomy closure were performed with one of the suture materials (Biosyn, PDS II and V-LocTM 90) size 4-0 using simple continuous pattern.

After reconstruction the intraluminal pressure was tested for each sample. In the standard technique leakage of methylene blue dye and measurement with blood pressure transducer. With the new model anesthesia ventilation machine was used to imitate esophageal peristalsis.

Tensile strength and maximal elongation of samples for all used suture materials were tested.

Results of this study showed that intraluminal pressure values measured with new technique are significantly higher. From all used suture materials V-LocTM 90 has lowest values of tensile strength and elasticity. Acidic conditions increased maximal elongation for PDS II in contrast to V-LocTM 90.

PhD DAY

POSTER PRESENTATIONS

SERUM, TISSUE AND PROTEOMIC ANALYSES OF TESTICULAR TUMOR MARKERS IN DOGS

Maša Efendić

Clinic for Internal Diseases, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Older dogs are prone to the development of testicular neoplasia, which are most often benign in nature, but there is a possibility of malignant biological behavior. Previous studies have established serum and immunohistochemical biomarkers for testicular neoplasia in dogs, but their connection has not been investigated yet. Research in medicine emphasizes proteomics, which analyzes the complete protein component. There are few publications for the purpose of diagnostic and prognostic markers of testicular neoplasia in men, but so far, there are no proteomic studies on testicular neoplasia in dogs. The aim of this research is to determine the relationship between the expression of tumor markers in the serum and neoplastic testicular tissue of dogs, as well as the possibility of analyzing proteome profile for the purpose of identifying new biomarkers from the serum and tissue of dogs with testicular tumors, which could lead to the new early diagnostic procedures in veterinary medicine. In our research serum analysis will include the detection of the biomarker Anti-Müllerian hormone (AMH) with ELISA kit for the quantitative determination of breed-specific (canine) AMH. After the orchiectomy, a histopathological analysis of the testicular tissue will be performed and also an immunohistochemical analysis in order to prove the expression of an AMH and the cellular marker Ki-67. Proteomic analysis of serum and testicular tissue will be performed using a semi-quantitative proteomic approach.

NEURONAL CELL MORPHOLOGY ON ISOGENIC DOWN SYNDROME MODEL

Ante Plećaš, Ivan Alić

Department of Anatomy, Histology and Embryology, Faculty of Veterinary Medicine University of Zagreb, Zagreb, Croatia

Down syndrome (DS) is the most common genomic disorder of intellectual disability, and it is caused by trisomy of chromosome 21. The main goal of our study was to differentiate neurons derived from induced pluripotent stem cells (iPSCs) in 2D culture from an individual with structural mosaic for DS, describe cell morphology and compare disomic (D21) and trisomic (T21) cells. Neural stem cells (NSCs) were induced from isogenic iPSCs and differentiated to mature neuros over 100 days. Trisomy/Disomy was confirmed by FISH, pluripotency of iPSCs was confirmed by markers of pluripotency (Oct4, SSEA, TRA1-60 and TRA1-81), while the NSCs were validated by markers Sox2, Nestin and Pax6. Finally, NSCs were differentiated to neurons. Mature neurons were stained with specific markers (TUBB3, MAP2 and SMI). Fluorescent figures were captured by Olympus FV3000 confocal microscope and analysed by IMARIS 9.9.1 software. Our data showed significant differences between disomic and trisomic neurons in the cell number, their branching, axon and dendrite diameter and length and number terminal points. Based on our preliminary data we can conclude that trisomy of chromosome caused aberrant neuronal morphology.

Key words: Down Syndrome, iPSCs, neuronal morphology, neuronal filament

Funding: Adris grupa d.d. 251-61-01/139-22-01

INFLUENCE OF HERPESVIRUS INFECTION ON REPRODUCTION IN GOATS

Juraj Šavorić

Clinic for Obstetrics and Reproduction; Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Four known species of herpesviruses can infect goats. There is no evidence of the clinical manifestation of the infection; thus, infection is considered inapparent. It has been proven that some herpesviruses can cause malignant catarrhal fever (MCF) in susceptible ruminants and can have a negative effect on reproduction (Canines). It has been proven that herpesvirus infection can cause balanoposthitis in bucks and vulvovaginitis and abortion in goats. The prevalence of herpesvirus infection in goats on Croatian territory has yet to be studied since there is only one available student's thesis that was used to determine the total sample number according to the prevalence (11.6 %)

At least four farms are planned to be included in the experiment, with a total number of goats exceeding 158. Sample collection will occur during two stress periods in goat production: oestrus and puerperium. Besides results of clinical examination, mucosal swabs, blood and milk samples, and epizootiological data will be collected to determine the prevalence, clinical manifestation and risk factors of the infection, on individual and farm level. Reproductive parameters will be compared between infected and non-infected goats. Fetometry and body measurement of offspring after kidding will determine the influence of infection on the growth and development of the kids. An epizootiological questionnaire for each farm will be formed so possible risk factors can be studied. Deoxyribonucleic acid (DNA) will be isolated from swabs and will undergo polymerase chain reaction (PCR) with a multiplication of viral DNA parts. Electrophoresis in agarose gel will confirm successful reaction, and positive samples will be sent for genome sequencing, for the purpose of phylogenetic analysis.

Serological testing using Eradikit CpHV1 for the detection of exposure to the herpesvirus infection will be performed.

Obtained results could give us better insight into epizootiology and pathogenesis of herpesvirus infections in goats, which can lead to developing better prophylactic measures.

ECOLOGICAL FACTORS OF LYNX REPOPULATION IN CROATIA

Ira Topličanec

Faculty of Veterinary Medicine University of Zagreb, Zagreb, Croatia

Significant inbreeding and small effective population size have been genetically proven in the Dinaric lynx population, making it the most endangered mammal species in Croatia. To prevent population extinction, translocation of lynxes from Carpathian to the Dinaric mountains was planned within the LIFE Lynx project. For effective implementation of the translocation and monitoring of its success, it was crucial to gain insight into key indicators of the population status, such as abundance and distribution. Comprehensive study using camera traps was conducted to determine the minimum population size and distribution of the local population in Croatia. During the two seasons, 2018 – 2020, a minimum of 89 adult lynxes were identified, which presents the first scientifically – based estimation of lynx population size in Croatia. Camera trapping also revealed a phenotypic change in the population. Notably, there was a significant difference ($p < 0.05$) in the occurrence of the four coat patterns between individuals photographed 1978 - 1999 and those photographed 2001 - 2019, with the frequency of big spots pattern increasing over time. Following the translocations, an effective methodology was established to monitor the movement of the released lynxes. Animals involved in the study (N=6) settled on average 23 days (SD = 16.5) post-release, while the main movement direction of the released animals was to the NW-SE, corresponding to the orientation of the predominant ridgelines of the Dinaric Mountain range. The first kill sites of all animals were detected on average 3.4 days (SD = 1.7) after the release. Additionally, when comparing the use and availability of the terrain aspect, we concluded that the lynx chose to move along the mountain range and not perpendicular across. Findings obtained in this study have provided valuable insights into the Dinaric lynx population, contributing to the more effective conservation strategy for this and future repopulation programmes.

Acknowledgement: This study was co-financed by the European Commission through the LIFE programme (LIFE16 NAT/SI/00634) and by the Environmental Protection and Energy Efficiency Fund.

COPETIN, NEW INDICATOR OF ACUTE STRESS RESPONSE

Mirta Vučković

Clinic for Surgery, Ophtalmology and Orthopedics, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia

Acute stress response occurs as a result of the body's reaction to pain, which disrupts homeostasis and leads to the release of stress hormones and synthesis of the acute phase proteins. The hypothalamus-pituitary-adrenal gland axis is activated and the synthesis of arginine vasopressin, which is involved in hemodynamics and osmoregulation. Copeptin is the C-terminal part of the arginine vasopressin precursor peptide, and is a sensitive and stable surrogate marker for arginine vasopressin release.

The aim of the research is to determine the level of acute stress response during knee joint arthrotomy in sheep depending on the applied intraoperative analgesic protocol. During anesthesia, the right knee joint was accessed by medial parapatellar arthrotomy and the articular cartilage damage of the femoropatellar joint was performed. A different anesthesia protocols to maintain intraoperative analgesia were used for three groups of 10 sheep. In the first group, analgesia was performed with intravenous methadone, in the second with continuous intravenous fentanyl, while in the third group, epidural analgesia was used with levobupivacaine. Blood samples were taken from all sheep for further analysis in three time intervals, after sedation, 3 hours after the first blood draw and then 24 hours after the first blood draw. The enzyme-linked immunosorbent assay was used to determine the concentration of copeptin in frozen serums. Values were expressed as a relative increase compared to zero time and are expressed as mean value +/- standard deviation.

The results of copeptin concentration in group 1 after 24 hours was increase of 31%. A decrease in the value of 16 % is observed after 3 hours in group 2, while in group 3 after 24 hours the concentration is almost the same as the initial value.

Measurement of copeptin levels may provide key information for risk stratification in different clinical situations. Copeptin has been proposed as a indicator of acute stress response.