Oral presentations

OBJECTIVE MR-EVALUATION OF THE HIPPOCAMPI IN THE DIAGNOSIS OF FELINE TEMPORAL LOBE EPILEPSY

Borbala A. Lörincz DVM PhD[1], Markus Grabatin MSc[1,2], Balazs B. Lörincz MD PhD Assoc. Prof[3], Yasamin Vali DVM[1]

[1]Vetmeduni Vienna, Vienna, Austria. [2]Ludwig-Maximilians University Munich, Oberschleißheim, Germany. [3]Head & Neck ENT & Oncologic, Reconstructive, Endocrine and Robotic-assisted Head & Neck Surgery AGAPLESION Bethanien and Markus Hospitals, Frankfurt am Main, Germany

Temporal lobe epilepsy (TLE) represents a distinct clinical form of feline epilepsy with focal partial seizures with orofacial involvement. On MRI, findings such as subjective enlargement as well as T2 and FLAIR hyperintensity of the hippocampi are consistent with feline TLE. Whether hippocampal contrast enhancement is an obligatory feature of feline TLE is inconsistent in the literature. However, it is most likely characteristic to the acute phase of the disease with ongoing limbic encephalitis. The aim of the present study was to define objective, reproduceable MRI features (hippocampal enlargement and T2 hyperintensity) of feline TLE. Twelve cats with the clinical diagnosis of feline TLE and hippocampal contrast enhancement were enrolled in the study. The control group comprised 31 cats with normal neurologic status and normal brain MRI. Normalised hippocampal thickness measurements (hippocampus to hemisphere width ratio) and normalized hippocampal signal intensity values (hippocampus compared to the tegmentum, to the temporal and parietal grey matter), as well as their statistical evaluation were performed. There was no significant difference in the normalised hippocampal thickness values between the groups. The hippocampal T2 signal intensities normalised to the tegmentum and temporal grey matter showed significantly higher values in the epileptic cat group. A cut-off value of 1.5 in the hippocampal T2 signal intensity normalised to tegmentum results in a sensitivity of 66%, and a specificity and a positive predictive value of 100%. Therefore, this method may be a useful quantitative tool in diagnosing feline TLE.

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DO DOGS WITH LUMBOSACRAL TRANSITIONAL VERTEBRA HAVE A HIGHER INCIDENCE OF LUMBOSACRAL STENOSIS?

Maria L Prüllage [1], Remco Folkertsma biostatistician[2], Sibylle Kneissl[1]

[1]Diagnostic Imaging, Vetmeduni, Vienna, Austria. [2]Platform for Bioinformatics and Biostatistics, Vetmeduni, Vienna, Austria

Transitional lumbosacral vertebrae (TV) are classified into 4 types: 0, normal; 1, absent fusion of sacral spinal processes; 2, isolated lumbar vertebra within the pelvic girdle; 3, partial fusion of one or both transverse processes with iliac bones. The aim of this retrospective study was to describe potential differences in the incidence of lumbosacral disc herniation (LSDH) or foraminostenosis (FS) in dogs with different types of TV. Medical records for the period 2011 to 2021 were searched for dogs that had CT imaging of the lumbar spine. One hundred and ninety-nine dogs (0.3–16.1 years old) with a mean bodyweight of 20 kg (1-58 kg) met the inclusion criteria. A TV was seen in 73 dogs, most commonly located in the 8th lumbar vertebra. Dogs having a TV type 1 or 3 presented with a higher incidence of LSDH compared to dogs having a TV type 0 or 2 (P < 0.0001). Further, dogs having a TV type 3 showed more frequently FS compared to dogs having TV type 0, 1, or 2 (P < 0.0001). No effects of age were found. Other findings in dogs with TV type 1 to 3 compared to type 0 were; reduced disc space (69.9%/12.7%), vacuum phenomenon (16.4%/7.9%), mineralized intervertebral disc space (38.4%/26.2%), spondylosis (50.7%/26.2%), or spondyloarthrosis (17.8%/12.7%). In conclusion dogs with a TV type 3 are more likely to have lumbosacral stenosis, either in the shape of LSDH or FS. This finding confirms that TV type 3 animals should be excluded from breeding.

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EXPERIMENTAL ASSESSMENT OF ATLANTOAXIAL INSTABILITY USING DYNAMIC FLUOROSCOPY

Daniela Flueckiger[1], William Pownall[2], Beatriz Vidondo[3], Franck Forterre [2], Bastien Planchamp[2], Julien Guevar[2], Christina Precht[1]

[1]Division of Clinical Radiology, Department of Clinical Veterinary Medicine, Vetsuisse Faculty, University of Bern, Bern, Switzerland. [2]Division of Small Animal Surgery, Department of Clinical Veterinary Medicine, Vetsuisse Faculty, University of Bern, Bern, Switzerland. [3]Veterinary Public Health Institute, Department of Clinical Research and Veterinary Public Health, Vetsuisse Faculty, University of Bern, Bern, Switzerland

Radiographic and CT measurements for the diagnosis of atlantoaxial instability (AAI) are influenced by the head-neck-position (HNP)[1-3]. Dynamic fluoroscopy of eight small-breed dog cadavers during continuous extension-to-flexion was performed before and after random order transection of AA ligaments via the foramen magnum. Fluoroscopy videos were subjectively assessed for AAI. Objective imaging measurements were evaluated in standardized HNPs. All dogs with intact ligaments were subjectively classified as stable. All dogs with all ligaments transected were classified as unstable at a HNP of -19 to 49.2° (mean 12.4°). Ligament apicale or Ligament alares transection only did not result in a classification as unstable. Transverse ligament transection (alone or in combination) always resulted in an unstable classification as in neutral HNP, but not in extended HNP. The modified VCI (dorsal atlantodental interval/height of C1) had the highest sensitivity (100%) and specificity (87.5%) using a cut off value of ≥ 0.57 in neutral HNP. In extended HNP, sensitivity was lower (92.31%). These results support the importance of the HNP for atlantoaxial joint evaluation. In some animals, instability may only become subjectively and objectively detectable in neutral HNP and remain undetected in extended HNP. The ligamentum transversum seems particularly important for dorsal C2 dislocation. The modified VCI was the most accurate objective measurement, in agreement with the VCI used in CT imaging[2]. In conclusion, dynamic fluoroscopy with gently controlled flexion may reveal AA instability, which was undetected in static extended HNP.

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COMPARATIVE PERFORMANCE OF VIDEO OTOSCOPY AND COMPUTED TOMOGRAPHY IN THE DIAGNOSIS OF EXTERNAL EAR DISEASE IN CATS.

Magdalena Gracz[1], Sophie Vandenabeele[1], Tania Nunes Rodrigues, Dip ECVD[2], Jimmy Saunders[1], Emmelie Stock[1]

[1]University of Ghent, Ghent, Belgium. [2]Willows Veterinary Center and Referral Service, Solihull, United Kingdom

To compare the results of computed tomography (CT) with video otoscopy for the presence of feline external ear canal masses and to describe the CT features of external ear disease in cats. Retrospective study of an evaluation of external ear canals of cats that underwent concurrent computed tomography (CT) and video otoscopy studies. CT studies were evaluated blindly by two observers and results were compared to video otoscopy findings performed by a one blinded observer. Out of 32 examined ears, 13 ears had an external ear canal mass diagnosed on video otoscopy. Based on CT findings, 13/13 external ear canal masses were correctly identified. No mass was identified falsely positive. 19/19 ears were identified as true negative, and no mass was missed. The sensitivity and specificity of CT for diagnosing external ear canal masses were 100% and 100% respectively. On histopathology, 8/13 masses were diagnosed as polyps, 1/13 mass was diagnosed as carcinoma, 3/13 masses had no histopathology performed and 1/13 mass seen on video otoscopy was diagnosed as otitis externa with granulomatous tissue formation. 12/16 cats had a mass in the external ear canal diagnosed on video otoscopy, of which 6 were DSH, 5 Main Coons and 1 Oriental Shorthair. 11/12 cats had a unilateral mass and 1/12 cats had a bilateral mass. None of the masses were mineralised. CT has high sensitivity and specificity in detecting external ear canal masses in cats comparing to video otoscopy. Main Coons have increased incident of aural masses.

SAMPLE STRATEGIES FOR ADC VALUES IN SINGLE, LARGE, INTRACRANIAL SPACE-OCCUPYING LESIONS.

Tatjana Chan, Henning Richter, Francesca Del Chicca

Clinic for Diagnostic Imaging, Vetsuisse-Faculty Zurich, University Zurich, Zurich, Switzerland

Diffusion-weighted MRI is increasingly available for brain investigation. Image interpretation of intracranial space-occupying lesions can include the derived apparent diffusion coefficient (ADC) analysis. In human medicine, ADC can help discriminating benign versus malignant intracranial lesions. This study investigates the difference in ADC values depending on the sample strategies of image analysis. MRI examinations including T2-weighted, T1-weighted pre- and postcontrast, and diffusion-weighted images of canine and feline patients presented within 5 years were reviewed retrospectively. Patients with single, large intracranial, space-occupying lesions were included. Lesion homogeneity was subjectively scored in all sequences. ADC values were calculated using 6 different sampling methods (M1-M6) on the ADC map. M1 included as much as possible of the lesion on maximum 5 consecutive slices; M2, 5 central and 5 peripheral ROIs; M3, a single, solid intra-tumoral ROI; M4, 3 central ROIs on one slice; M5, 3 central ROIs on different slices; M6, one large ROI on the entire lesion. Total of 204 animals of various breeds, gender and age were analysed. ADC values differed significantly between M4 and M6 (p=0.014), M5 and M2 (peripheral) (p=0.001), and M4 against M2 (peripheral) (p=0.012). Lesions scored as homogenous in all sequences were excluded, additional significant difference in 3 further sampling methods were present (p<0.005). ADC values of single, large, intracranial space-occupying lesions differed significantly in half of the tested sampling methods. Excluding homogeneous lesions, additional significant differences among the sampling methods were present. At the present time no sampling method can be recommended or preferred.

PC-MRI REVEALS LOW CEREBROSPINAL FLUID FLOW VELOCITY AT THE FORAMEN MAGNUM IN SMALL BREED DOGS WITH ENLARGED VENTRICLES

Sarah Hubler[1], Christina Precht[1], Gertraud Schüpbach[2], Veronika M. Stein[3], Daniela Schweizer-Gorgas[1]

[1]Division of Clinical Radiology, Department of Clinical Veterinary Medicine, Vetsuisse Faculty, University of Bern, Bern, Switzerland. [2]Veterinary Public Health Institute, University of Bern, Bern, Switzerland. [3]Division of Clinical Neurology, Department of Clinical Veterinary Medicine, Vetsuisse Faculty, University of Bern, Bern, Switzerland

In small breed dogs, enlarged ventricles of the brain are a common finding on MRI and often considered as an anatomical variant. In humans, enlarged lateral ventricles are usually the consequence of mesencephalic aqueduct stenosis. Cerebrospinal fluid (CSF) flow measurements indicating a stenosis are lacking in dogs. The aim of the present study was to measure CSF flow in small breed dogs with ventricular enlargement. In this case-control study, CSF flow velocity of 27 small breed dogs with enlarged ventricles and 8 small breed dogs without enlarged ventricles (control dogs) was measured by phase-contrast MRI at the mesencephalic aqueduct, foramen magnum (FM) and second cervical vertebra (C2). Peak systolic (PSV) and diastolic velocity (PDV), peak velocity (PV), difference between systolic and diastolic peak velocity (DPV), average velocity (AV) and maximum average velocity (MAV) were compared between both groups. Small breed dogs with enlarged ventricles had significant lower PDV, PV, AV and MAV at the dorsal and ventral subarachnoid space (SAS) of the FM compared to control dogs (p-value < 0.05). PV, DPV and MAV at the ventral SAS of FM were negatively correlated with the ventricle to brain ratio (p-value < 0.05). No significant difference between both groups was found at the mesencephalic aqueduct and C2. Small breed dogs with enlarged ventricles showed lower CSF flow velocities at the FM suggesting a stenosis at this level. Therefore, enlarged ventricles in small breed dogs should be considered as a pathological finding.

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FEASIBILITY OF US-GUIDED CERVICAL INTERVERTEBRAL DISC INJECTION TO AID IN INTRAOPERATIVE IDENTIFICATION OF HERNIATION SITES IN DOGS

Jérémie Ficheroulle, Piere P. Picavet, Kris Gommeren, Géraldine Bolen

Department of Clinical Sciences, Companion Animals, Faculty of Veterinary Medicine, Fundamental and Applied Research for Animals & Health (FARAH), University of Liège, Liège, Belgium

Intervertebral disc (IVD) herniation commonly affects dogs and may require surgery. Whilst the affected IVD is identified on imaging modalities, intraoperative orientation for cervical IVD herniations is mostly based on digital palpation which is sometimes misleading. We therefore studied the feasibility of US-guided contrast medium and methylene blue injection to aid in intraoperative IVD identification. Eleven canine cadavers were used. For each cadaver, one IVD (C2-C3 to C6-C7) was randomly selected. The ventral cervical region was ultrasonographically examined from C1 to the targeted site, pushing the trachea to the left. A 50/50 mixture of contrast medium and methylene blue (0,2 mL in 5/11; and 0,3 mL in 6/11) was injected under US-guidance in the IVD and in the ventral soft tissues. X-rays and CT-scans were performed before and after the injection. Each cadaver was dissected as if performing a ventral slot procedure. The success rate in ultrasonographically identifying the right IVD, the time taken to inject, numerical "contrast scorings" (x-ray, CT-scan) as well as a numerical "visibility scoring" (surgical) were recorded. IVD injections were successfully performed in the correct IVD in all cadavers. Mean time to injection was 5.5 minutes (range: 3 – 8.5 minutes). "Contrast" and "visibility" scores were optimal for all cadavers besides a suboptimal "visibility" score in one that was not injected in the ventral soft tissues. Ultrasonographic cervical IVD identification and US-guided injection of IVD and ventral soft tissues are feasible and helpful for intraoperative cervical IVD identification. These results should be confirmed in a clinical setting.

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ASSOCIATION BETWEEN LOCATION OF ACUTE INTERVERTEBRAL DISC EXTRUSION AND EXTENSIVE EPIDURAL HEMORRHAGE IN FRENCH BULLDOGS

Julius Underberg[1], Arianna Maiolini[2], Daniela Schweizer[1]

[1]Department of Clinical Veterinary Medicine, Division of Clinical Radiology, Vetsuisse Faculty, University of Bern, Bern, Switzerland. [2]Department of Clinical Veterinary Medicine, Division of Clinical Neurology, Vetsuisse Faculty, University of Bern, Bern, Switzerland

Acute intervertebral disc extrusion (IVDE) might be accompanied by extensive epidural haemorrhage (EEH) and result in spinal cord compression distant to the original extrusion. EEH is more common in French Bulldogs (FB) compared to other breeds[1]. FB suffer from lumbar IVDE more commonly than other breeds[2], but the association of location of IVDE and EEH is controversial. The aim of this retrospective study was to investigate the association between location of IVDE and EEH in a population of FB. MRI of the spine of FB were examined for location of IVDE and presence, location and extent of EEH. EEH was defined as extension of more than 1.5 times the vertebral body length. Of the 146 FB with IVDE, 6 % affected the thoracic (T11/12-T12/13) and 94% affected the lumbar (T13/L1- L6/L7) spine. The most common location of IVDE was L4/5 (22%) followed by L3/4 (20%) and T13/L1 (15%). 67% had EEH; the highest proportion of EEH was seen at L5/L6 (81%), followed by L2/3 (76%) and L1/L2 (74%). EEH occurred in 69% of lumbar IVDE and in 66% with thoracic location (T11/12, T12/13). This population of FB confirms that FB are more likely to have lumbar than thoracic IVDE and that 2/3 have EEH. Although the proportion of EEH is highest in the caudal lumbar spine, there seems no relationship between lumbar IVDE and EEH. Anatomical differences between the thoracic and lumbar spine do not seem to fully explain the occurrence of EEH.

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EVOLUTION OF THE MAGNETIC RESONANCE IMAGING LESIONS IN DOGS TREATED FOR MENINGOENCEPHALITIS OF UNKNOWN ORIGIN BETWEEN INITIAL DIAGNOSIS AND RELAPSE

Carole Soulé, Laurent Blond, Stéphanie Piazza, Robin Cavalerie, Clément Baudin

CHV Languedocia, Montpellier, France

Meningoencephalitis of unknown origin (MUO), a supposed immune-mediated disease, regroups necrotizing encephalitis and granulomatous meningoencephalomyelitis without a definitive histopathological diagnosis. Response to the immunosuppressive therapy is variable and relapse is common. To the authors knowledge, no study about the follow-up by magnetic resonance imaging (MRI) during relapse was reported. This study aims to describe the evolution of the MRI lesions in dogs treated for MUO between the initial diagnosis and relapse. MRI of dogs diagnosed with MUO that had immunosuppressive therapy with improvement/resolution and relapse were reviewed and compared. Eighteen dogs met our inclusion criteria. All dogs were below 12.5kg, including 6/18 French Bulldogs, 5/18 Chihuahuas and 3/18 Yorkshire Terriers. Ten were females. The mean age was 2.6 years. Initial MRI imaging findings were mostly irregular and ill-defined (18/18) multifocal (15/18), T2W hyperintense (18/18), T1W iso- to hypointense (18/18) and enhancing (16/18) intra-axial lesions, mainly located in the forebrain (17/18). Delay between the 2 MRI's was 31 to 1081 days (mean delay of 280 days). All dogs with delay of relapse above 233 days (11 dogs) had new lesions. All dogs but one with delay of relapse less than 149 days (6/7 dogs) had a persistence/partial improvement of the initial lesions. Relapse lesions were multifocal in 17/18 dogs. Signalment and imaging findings were consistent with previously described results. All but one dog had multifocal lesions at relapse. MRI follow-up is useful to evaluate MUO relapses, occurrence of new lesions is expected above 233 days.

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VARIATION OF HOUNSFIELD UNIT VALUES IN A BONE DENSITY CALIBRATION PHANTOM IN POSTMORTEM WHOLE-BODY COMPUTED TOMOGRAPHY SCANS OF CATS

Veronica U. E Näslund[1], Kerstin M Hansson[1], Cecilia Ley[2], Patricia G Hedenqvist[1], Orcun Goksel[3], Charles J Ley[1]

[1]Department of Clinical Sciences, Swedish University of Agricultural Sciences, Uppsala, Sweden. [2]Department of Biomedical Sciences and Veterinary Public Health, Swedish University of Agricultural Sciences, Uppsala, Sweden. [3]Department of Information Technology, Uppsala University, Uppsala, Sweden

Alterations in bone density detected by computed tomography (CT) can be useful in disease diagnosis and monitoring. For specific bone density measurements, a calibration phantom (CP) is recommended due to variation between Hounsfield units (HU) and bone density, although the degree of this variation in veterinary patients is not clarified. If HU variation is low or can be controlled, then possibly HU could be used to estimate bone density without a CP. This study aimed to investigate extent and causes of HU variation in a CP in cat CTs. A CP was included in postmortem whole-body CT scans of 18 cats. Scans were done with the CP: in front, under the head and under the mid body of the cat. Protocols included two different settings for tube current, kernel, and slice thickness. Table height was manually adjusted for each cat. Volumetric regions of interest were used to measure HU in the CP. HU values from the CP in front of the cat were subtracted from the other acquisitions of the same cat, to correct for animal-independent variation. Largest HU variations were seen between cats and due to changes in table height, phantom position, and kernel. Significant correlation was detected between table height and HU and between table height and cat weight. This study provides insight into factors affecting HU values in a CP and identifies object to gantry-centre distance as one key factor. The results are important to consider when estimating bone densities using HU alone.

ULTRASONOGRAPHIC ASSESSMENT OF THE ILEO-COLIC JUNCTION IN NORMAL DOGS

Florian Azoulay, Julien Fritz, Delphine Rault, Eddy Cauvin, Julie Besson, Laurent Couturier

AzurVet, Saint-Laurent-du-Var, France

The ultrasonographic appearance of the ileo-colic junction (ICJ) has been established in the normal cat but not in the dog. Most textbooks and consensus mention that the ICJ in dogs is challenging to examine. The purpose of our prospective study was to evaluate the feasibility and technique of systematic ultrasonographic evaluation of the ICJ and to describe its ultrasonographic features. Abdominal ultrasound was performed prospectively in 50 non-sedated healthy dogs of varying ages and weight. The time taken to perform this protocol following a standardized method was recorded for each operator in order to evaluate the feasibility and duration of the technique. We compared the time needed to identify the ICJ between board-certified radiologists, and two trained residents. Measurements were performed for the ICJ (papilla thickness, ICJ length and thickness), distal ileum and caecum wall thickness, as well as US layer appreciation. The ICJ was identified in 98% of the cases by boarded radiologist and residents. We did find a weak correlation between the size of the dog and the time required to identify the ICJ. The appearance of the canine ICJ is similar to the feline one on the transverse section and had a nipple shape on the longitudinal section. This study suggests that US identifies the ICJ in dogs free of digestive signs. The technique proposed is fairly simple to perform this study provides reference values for the ultrasonographic appearance of the ICJ.

ACCURACY OF EXAMINER-DEPENDENT ASSESSMENT COMPARING THE ECHOGENICITY OF LIVER AND SPLEEN ON ULTRASOUND, AS CONTROLLED BY THE HEPATOSPLENIC INDEX

Sophie Ophey, Claudia Köhler, Sabrina Gamerad, Johanna Langguth, Anne-Kristin Moritz, Ingmar Kiefer

University of Leipzig, Department of Small Animal Medicine, Leipzig, Germany

Comparison between echogenicity of liver and spleen is a method to detect diffuse parenchymal changes on ultrasound. However, because of its examiner-dependent nature, we aimed to evaluate the accuracy of the subjective assessment of the liver echogenicity relative to spleen, controlled by the measurement of the hepatosplenic index. Measurements of the hepatosplenic index were used as standards to compare with individual assessments by different examiners. Therefore, Imaging-acquisitions and measurements of the hepatosplenic index were performed using a linear probe with a region of interest (ROI) positioned at the same depth in each organ (liver and spleen). Retrospectively, images were evaluated independently by four blinded radiologists. The relative liver echogenicity was divided into three main categories (isoechoic, hypoechoic, hyperechoic compared to spleen). These categories were further classified into three subcategories in terms of the degree of echogenicity (low, moderate, high). A total of 106 patients with 122 measurements were examined. The agreement of observers and the index was 69.8% on average. It ranged from 60.5% to 76.2% for individual observers. Interobserver agreement was substantial ($\kappa = 0.667$) for the main groups and fair ($\kappa = 0.389$) for the subgroups. The overall assessment of the liver echogenicity compared to the spleen is variable between observers, especially when a more accurate assessment of echogenicity is required. This highlights the fact that ultrasound is examiner-dependent, and the subjective assessment of diffuse parenchymal changes should be interpreted with caution. Therefore, objective methods such as the hepatosplenic index are needed.

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ULTRASONOGRAPHIC APPEARANCE OF THE ILEOCAECOCOLIC JUNCTION IN CATS WITH SALMONELLOSIS.

Magdalena Anna Brzozowska[1], Ewa Stanczyk[2], Martin Ole Rapp[1]

[1]Evidensia, Strömsholm, Sweden. [2]VETCT Telemedicine, Cambridge, United Kingdom

Salmonellosis is considered rare in cats. While the most common type of infection is the carrier state, the clinical disease commonly presents as enterocolitis. When salmonellosis is confined to the gastrointestinal tract, gross pathological findings may include acute enteritis limited to the distal ileum, caecum and colon. We hypothesized that cats with gastrointestinal signs due to salmonellosis would have ultrasonographically abnormal ileocaeco-colic junction. Ultrasonographic studies of cats tested for Salmonella with bacterial culture were retrospectively reviewed. The measurements of ileal-, caecal- and colic walls were obtained from ultrasonographic images. The size of the regional lymph nodes, echogenicity of the mesenteric fat and the presence of peritoneal effusion at the ileocaeco-colic junction were noted. One hundred cats met the inclusion criteria. Seventy tested positive, and 30 were negative for Salmonella infection. The positive group showed a significantly thickened wall of the ileum (p<0. 001, range 1. 9-5,7mm, mean=3. 250mm, SD=0.6595), caecum (p<0.001, range 2.1-3.9mm, mean=2.871mm, SD=0.4915), and ascending colon (p<0.05, range 1-3.1mm, mean=1.467mm, SD=.5471) in comparison to the negative group. In the positive group, the ileocaecal lymph nodes were significantly larger (p<0.001, range 2.7-7.8mm, mean 4. 896mm, SD=1.1536). All Salmonella-positive cats had focal hyperechoic mesenteric fat, and 23% (16/70) had peritoneal effusion. To the authors' knowledge, this is the first report describing ultrasonographic changes in cats with salmonellosis. The combination of the thickening of the wall of the intestines at the ileocaeco-colic junction and regional lymphadenopathy could indicate salmonellosis and should be considered as a differential diagnosis in cats with gastrointestinal disease.

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EVALUATION OF RENAL CORTICAL ANISOTROPIC BACKSCATTERING ARTIFACT IN PREDICTING CLINICAL OUTCOMES IN AZOTEMIC CATS

Ming-Jen KangS[1], Pin-Chen Liu[1,2], Hock Gan Heng[3], Kuan-Sheng Chen[1,2]

[1]Department of Veterinary Medicine, College of Veterinary Medicine, National Chung Hsing University, Taichung, Taiwan. [2]Veterinary Medical Teaching Hospital, College of Veterinary Medicine, National Chung Hsing University, Taichung, Taiwan. [3]VetCT, Orlando, FL, USA

Renal cortical anisotropic backscattering artifact (CABA) is a focal hyperechogenicity caused by the incident ultrasound beams perpendicular to the renal tubules. The absence of CABA correlates with feline chronic kidney disease and its staging. The relationship between CABA and the clinical outcomes of feline azotemia remains unknown. This study aimed to investigate whether CABA can be used to predict the clinical outcomes in hospitalized azotemic cats. The presence of CABA and serum creatinine concentration (sCr) for the azotemic cats on the first day of admission were reviewed by two observers with differing experiences. Azotemic cats were divided into two groups (group I: sCr>2.8mg/dL; group II: 1.6≤sCr≤2.8mg/dL) based on International Renal Interest Society stages. A good clinical outcome was defined when the sCr reduced to <2.8mg/dL in group I or <1.6mg/dL in group II after treatments. The correlation between a good clinical outcome and CABA presence was assessed using a 2x2 table. Fifty-one cats were included (group I: n=41; group II: n=10) from 2018-2021. A substantial intra- and inter-observer consistency (kappa=0.73 and 0.74, respectively) was found in the CABA evaluation. A significant correlation was observed between a good clinical outcome and CABA presence (P=0.0016, odd ratio=8.57) in group I. The sensitivity and specificity of using CABA for predicting the clinical outcome were 81.0% and 70.0%, respectively. However, no significant associations were noted between CABA presence and clinical outcomes in group II (P=1). Renal CABA could be used for predicting clinical outcomes in azotemic cats, especially for those with sCr>2.8mg/dL.

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PREVALENCE AND MORPHOLOGY OF PERSISTENT THYMIC TISSUE ON COMPUTED TOMOGRAPHY IN ADULT CATS

Siemone C. Vester, Sophie P. van Liemt, Stefanie Veraa.

Utrecht University, Utrecht, Netherlands

Persistent thymic tissue has been described as an incidental finding in thoracic Computed Tomographic (CT) scans in adult dogs. In cats, involution of the thymus starts at 6-8 months of age. No reports describing the prevalence and CT appearance of persistent thymic tissue in cats exist. The aim of this study was to assess the presence and describe the CT-features of presumed persistent thymic tissue in adult cats. Imaging records of adult cats (>1 year) that underwent thoracic CT from October 2013 to November 2022 were retrospectively reviewed. Cases with cranial mediastinal disease or obliteration of the mediastinum were excluded. Breed, gender and age as well as presence of tissue, location (cranial-mid-caudal), distribution and shape were recorded. Pearson Chi-square test and Two-sample T-test were performed to evaluate association with and differences between recorded data. 151/315 cases (48%) showed persistent thymic tissue, being variable in attenuation and shape, and present from thoracic inlet to the left craniolateral aspect of the heart. Mean age of cats with thymic tissue was significantly lower than cats without ($P<.001$). Younger cats had a more spread out (multilocation) distribution whereas older cats tended to have a single location of thymic tissue. Purebred cats had more often persistent thymic tissue ($P<.001$), whereas gender did not seem to have any influence ($P=.23$). Persistent thymic tissue is a common feature and can have a variable location as well as appearance in thoracic CT of adult cats and should be differentiated from cranial mediastinal pathologies.

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SPLENIC ENHANCEMENT PATTERN IN CONTRAST ENHANCEMENT COMPUTED TOMOGRAPHY OF THE DOG AND CAT

Riccardo Rossi[1], Luca Lapira[2], Kerry Rolph[3], Tiziana Liuti[1]

[1]Diagnostic Imaging Department, Royal (Dick) School of Veterinary Studies, University of Edinburgh, Roslin, United Kingdom. [2]Diagnostic Imaging Department, Veterinary Teaching Hospital, University of Milan, Lodi, Italy. [3]Center for Integrative mammalian Research, Ross University School of Veterinary Medicine, Basseterre, Saint-Kitts and Nevis

Heterogeneous contrast enhancement of the spleen is a common finding in veterinary and human contrast enhancement computed tomography (CECT). The aims of this study were to investigate its frequency and imaging features in dogs and cats. CECT studies of 231 dogs and cats with and without splenic pathology were reviewed. Patient details including signalment , diagnosis, laboratory results were recorded and CECT images were reviewed: pre-contrast heterogeneity, size, enhancement pattern and intensity (score 1-3) in the arterial, portal and venous phase were recorded. Forty-one dogs and 9 cats met the inclusion criteria. Zebra and patchy patterns were identified in normal (46) and abnormal (4) spleens. Zebra pattern was present in 34.1% of dogs and 88.8% of cats. In the arterial phase it was present in 100% of the dogs and 87.5% of the cats; in the portal phase 85.7% and 100%, while in the venous 42.8% and 75% respectively. In all the patients it was mostly pronounced in the arterial and portal phases, and less in the venous. The patchy pattern was present in 63.4% of dogs and 1.1% of cats, with similar enhancement characteristics to the zebra but rarely present in the venous phase. As in humans, the spleen frequently enhances with these patterns during the arterial and portal phases, likely due to the different vascular pathways and perfusion rates between the red (early enhancement) and the white (late enhancement) pulp. These patterns, in the absence of splenic pathology in the plain sequence, are unlikely to indicate splenic pathology.

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PREVALENCE OF CANINE RENAL CREST HYPERATTENUATION IN COMPUTED TOMOGRAPHY

Blanca Serra Gomez de la Serna, Frederike Schiborra, Rachel Marwood

School of Veterinary Science. - Department of Small Animal Studies. Small Animal Teaching Hospital (University of Liverpool), Neston, United Kingdom

Normal canine kidneys are reasonably homogeneous soft tissue attenuating structures on non-enhanced CT images. However, occasionally visible differences in attenuation between the renal crest and medulla are observed. This finding and its potential clinical implications have not been previously investigated. This study aimed to estimate the prevalence of renal crest hyperattenuation (RCH) and investigate possible associations with signalment and laboratory parameters. Abdominal CT images from 100 dogs, with contemporaneous biochemistry and urinalysis data, were categorised by two radiologists into dogs with and without visible RCH. The attenuation in Hounsfield units (HU) of the renal crest and renal medulla was measured. Signalment, biochemical and urinalysis data were analysed for associations with RCH. Correlation coefficients were calculated for measured HU and associated continuous parameters. Prevalence of RCH was 43/99 dogs (43.4%, 95%CI 33-53%). Urinary specific gravity (USG) was significantly different between dogs with and without RCH (p=0.034). Weak positive correlations were identified between left and right renal crest attenuation and USG (r=0.233 and 0.253 respectively; p=0.05). Renal crest hyperattenuation is a common finding in dogs undergoing abdominal CT. No specific associations of RCH were identified with parameters typically altered in a variety of diseases, as only USG is significantly different in dogs with and without RCH and the correlation between attenuation and USG is weak. The lack of associations indicated low clinical utility of this finding. Further investigation may be warranted for the relevance in specific diseases.

ACCURACY OF COMPUTED TOMOGRAPHY FOR PREDICTION OF ADRENAL TUMOR ADHESION WITH ORGANS AND VESSELS IN DOGS AND CATS.

Manuela Baldinetti[1], Pamela Di Donato[1,2], Marion Grapperon-Mathis[1], Chiara Mattei[1,2], Melania Moioli[1,2], Swan Specchi[1,2], Ignazio Drudi[3], Stefano Nicoli[1,4], Filippo Cinti[1,5], Federica Foschi[1], Pascaline Pey[1,2]

[1]Ospedale Veterinario "I Portoni Rossi", Anicura, Zola Predosa, Italy. [2]Antech Imaging Services, Irvine, CA, USA. [3]Department of Statistical Sciences, Alma Mater Studiorum, University of Bologna, Bologna, Italy. [4]Clinica Veterinaria Roma Sud, Roma, Italy. [5]San Marco Veterinary Clinic and Laboratory, Veggiano, Italy

The presence of adhesions created by adrenal tumours (AT) with adjacent structures is essential information for surgical planning. The aim was to establish CT accuracy in predicting AT adhesion with adjacent organs and vessels. In this prospective multicentre study, 30 dogs and two cats with AT, pre-and postcontrast computed tomography (CT) and adrenalectomy, were enrolled. Images were reviewed by five blinded radiologists, using consensus-based CT criteria for adhesions: no cleavage plane (1); "fat stranding" (2); increased contact surface (3); irregular margins, broad base of hyperattenuating fat layer toward organs (4); AT tumour deforming adjacent organ profile (5); common vascularization between AT and organs (6); mass effect (7); traction displacement toward AT (8). At surgery, AT adhesion were observed in 27/32 patients (84.4%). Single criterion alone could not predict the presence of adhesions. Using a probabilistic classification tree, different combinations of two or more criteria with other variables (side, image quality, tumour rupture) showed a good accuracy in the prediction of adhesion for some organs and vessels. For the caudal vena cava, a combination of 1-3-4-5 criteria together in a right AT had an accuracy of 86.2%; for renal vein the combined 1-2-3-4-5 criteria had an accuracy of 84.8%, and of 93.8% in CT study of excellent quality. For kidney, 1-2-3-4-5 combination had an accuracy of 90%. Radiologist's agreement for detecting adhesions was excellent (>80%).Combination of repeatable CT criteria could provide probabilistic information for the presence of adhesions between AT and adjacent organs and vessels.

COMPARISON OF MULTIPLE IMAGING MODALITIES FOR EVALUATING EX VIVO ADRENAL GLANDS IN DOGS

Olga Amorós, Michelle Imlau, Eimear Shorten, Antonella Puggioni, Giulia Dalla Serra, Brian Cloak, Séamus Hoey

University College Dublin, Dublin, Ireland

Cross-sectional imaging is widely used to characterize adrenal tumours in humans. In small animal veterinary medicine, computed tomography (CT) is considered a robust imaging technique for the detection of adrenal masses. Studies investigating the utility of Magnetic Resonance Imaging (MRI) in canine adrenal gland assessment are limited, and comparative analyses of MRI, CT, and ultrasonography (US) of the adrenal glands have not been performed. This prospective, single-centre, method comparison, cadaveric study aimed to assess the performance of different imaging modalities for evaluating the ex-vivo adrenal glands of dogs, using histopathology as the gold standard. The adrenal glands of randomly selected dogs presented for necropsy were examined by ultrasonography (n= 26) and cross-sectional imaging (high-field MRI and CT, n= 31). Additionally, three adrenal masses in dogs who underwent invasive adrenalectomy (including two adrenocortical carcinomas and one pheochromocytoma) were imaged. Subsequently, gross pathology and histopathology of all the specimens were performed and correlated with the imaging findings. The most common pathologic diagnosis was cortical nodular hyperplasia, identified on MRI in only a small number of cases. Non-contrast enhanced CT was deemed the least valuable for identifying lesions compared to MRI and US. MRI provided superior spatial and contrast resolution, identified the largest number of abnormalities, and allowed a clear distinction between the cortex and medulla in the majority of adrenal glands. CT, MRI, and US all underestimated the presence of lesions compared to pathology findings.

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PREVALENCE OF ENDPLATE JUNCTION FAILURE IN DOGS WITH AND WITHOUT SYMPTOMATIC LUMBOSACRAL DISC DEGENERATION

Anna R. Tellegen[1], Martijn Beukers[2], Meropi A. Tryfonidou[1], Stephanie Veraa[1]

[1]Faculty of Veterinary Medicine, Utrecht University, Utrecht, Netherlands. [2]Evidensia Dierenziekenhuis Barendrecht, Barendrecht, Netherlands

Degenerative lumbosacral stenosis is a common cause of low back pain (LBP) in medium to large breed dogs. In humans, studies have implicated the vertebral endplate junction as an alternative site of failure in lumbosacral disc herniation (as opposed to herniation through the annulus fibrosus (AF)). Endplate junction failure (EPJF) can be evidenced by endplate irregularities or bony avulsions on one or both endplates. However, in dogs this has not been previously described. The objective of this study was to report the prevalence of EPJF on CT in dogs with and without a history of LBP. This retrospective study was used to investigate associations between EPJF, CT findings, signalment and the presence of clinical signs. Computed tomographic scans of 333 dogs that included the lumbosacral spine were assessed for EPJF or AF herniation. Other endplate and disc abnormalities were also noted. EPJF was found in 72 dogs (22%), of which 43 (60%) suffered from LBP, versus AF failure in 73 dogs (22%), of which 35 (44%) with LBP. Degenerative changes were more common in older dogs with LBP and both types of herniation. French bulldogs were over represented in the EPJF group. Gender, body weight and chondrodystrophy were not associated with EPJF. In conclusion, EPJF was observed on CT in a subset of dogs with lumbosacral disc herniation and was associated with degenerative changes to the lumbosacral junction and LBP. In at least one dog with EPJF but without disc protrusion, osteochondrosis should be considered as a major differential diagnosis.

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QUANTIFYING THE STRESS IN STRESS-RADIOGRAPHY FOR EARLY CANINE HIP DYSPLASIA DIAGNOSIS: DEVELOPMENT AND VALIDATION OF A MEASURING DEVICE AND A CADAVER STUDY.

Louis M.J. Vandekerckhove[1], Stijn Herregodts[2,3], Jimmy H. Saunders[1], Bart J.G. Broeckx[4]

[1]Department of Morphology, Imaging, Orthopedics, Rehabilitation and Nutrition, Faculty of Veterinary Medicine, Ghent University, Merelbeke, Belgium. [2]Department of Physical Medicine and Orthopaedic Surgery, Ghent University, Ghent, Belgium. [3]Department of Electrical Energy, Metal, Mechanical Construction and Systems, Ghent University, Ghent, Belgium. [4]Department of Veterinary and Biosciences, Ghent University, Merelbeke, Belgium

Objective force guidelines are lacking for stress radiographs, leaving room for errors and fraud. Our objective was to develop an accurate measuring device to quantify the in vivo applied force in real-time during stress-radiographs and to identify associations with the laxity index (LI). Four load cells were incorporated in the original Vezzoni Modified Badertscher Distension Device (VMBDD) and were read by a dedicated computer program. Validation with calibrated weights was performed. Stress-radiographs with increasing force were obtained from 34 cadavers to determine the force-laxity relation, repeatability of cycles of stress and the force necessary to reach sufficient laxity. The overall trueness and precision of the VMBD measuring Device (VMBDmD) were 0.02N (0.02%FS) and 0.52N (0.38%FS), respectively. The curves and the maximal LI (LImax) were not significantly influenced by osteoarthritis, weight, gender and side. The position of the VMBDmD influenced the curve but not the LImax. The force-laxity curve itself as well as the LImax are repeatable, which is indicative for not causing damage to the joint, but also substantiates the practical usability of the procedure. Ninety percent of hip joints reach sufficient laxity at a force of 95.32N, a force which seems to be realistically achievable. The VMBDmD is an accurate measuring device capable to quantify the applied force in real-time during stress radiography and can be used in intact cadavers. Further studies on actual patients are necessary before extrapolating these results and to describe the biomechanics of stress-radiographs further.

COMPARISON BETWEEN ULTRASONOGRAPHY, INCLUDING DYNAMIC EVALUATION OF JOINT INSTABILITY, AND CT ARTHROGRAPHY TO ASSESS THE INJURED STIFLE IN DOGS : A PRELIMINARY STUDY.

Eddy RJ Cauvin[1], Audrey Belmudes[1,2], Caroline Benzimra[1,3], Florian Azoulay[1], Julien Fritz[1]

[1]Azurvet, Saint Laurent du Var, France. [2]OnlyVet, Saint-Priest, France. [3]MICEN VET, Creteil, France

The aim was to compare ultrasonography (US) combined with dynamic evaluation of craniocaudal instability (DUS) with CT arthrography (CTA to diagnose cruciate ligament and meniscal disease in dogs. This is a retrospective review of dogs referred for stifle CTA, having had concurrent US and DUS. Of 95 patient records between 2010 and 2022, 32 dogs fulfilled all the criteria, including 35 stifles. There was excellent agreement between CTA and US to diagnose synovitis. US combined with DUS showed 100% agreement with CTA to detect complete cranial cruciate ligament (CCL) tears. For partial CCL tears or desmopathy, there was good agreement between CTA and US / DUS in 16/17 cases (94%) even though instability was always absent or mild. In 1 case, the CCL was abnormal on US although normal on CTA. There was poorer agreement between the techniques to detect meniscal lesions : 46/70 were detected with US, 18 with CTA. 1 meniscus was abnormal on CTA out of 24 normal on US, but only 17 lesions visible with US were abnormal on CTA. 18/19 complete tears noted on CTA were visible with US. There was good agreement between US and CTA to detect synovitis and CCL tears. DUS allowed to assess instability in all dog formats. Many menisci normal on CTA were abnormal on US but this may represent degenerative changes and partial thickness tears. Further studies are ongoing including surgical appraisal as a gold standard to assess US reliability.

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THE RELATIONSHIP OF RADIOGRAPHIC CHANGES AND PEAK VERTICAL FORCE IN DOGS WITH HIP OSTEOARTHRITIS

Naruepon Kampa[1], Kulrada Tanachockulhron[2], Natcha Jarassaeng[2], Thanaporn Monlhao[2], Jirawan Wisuttikul[2], Supranee Jitpean[1], Duangdaun Kaenkangploo[1], Thanikul Srithunyarat[1], Somphong Hoisang[2]

[1]Division of Surgery, Faculty of Veterinary Medicine, Khon Kaen University, Khon Kaen, Thailand. [2]Faculty of Veterinary Medicine, Khon Kaen University, Khon Kaen, Thailand

Osteoarthritis (OA) causes chronic pain in dogs resulting in lame limbs. The standard method for diagnosis is based on radiography. Gait analysis using force plates can provide accurate quantitative weight bearing and be used as a proxy estimate of joint pain in dogs with OA. The aim was to study the radiographic changes of coxofemoral joints compared to the peak vertical force (PVF) in dogs with hip OA. 84 coxofemoral joints of 42 OA dogs were radiographed and graded using the criteria of Moreau et al. (2003): normal (grade1), mild (grade2), moderate (grade3), and severe (grade4). The dogs were trotted across the force plates and peak vertical force [PVF] values were retrieved. The initial PVF value was normalized to body weight and expressed as a percentage of total body weight (%BW) for each limb. One-way ANOVA was used for statistical analysis. The average PVF in normal joints (grade 0) was 72.73, and in grade 1, grade 2 and grade 3 were 70.11, 62.74, and 61.13 respectively. Dogs with OA grade 1 did not show significant changes in PVF compared to normal groups (grade 0). However, dogs in grade 2 and 3 showed significantly less PVF than dogs in grade 0 and 1. Dogs may be able to resist the pain differently, which makes the expression and the severity of the radiographic changes unrelated. Therefore, the PVF can be used as a further diagnostic tool for OA in dogs with moderate to severe radiographic changes

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ATLANTO-OCCIPITAL OVERLAPPING AND ITS PRESUMED ASSOCIATED FINDING OF INCOMPLETE OSSIFICATION OF THE OCCIPITAL BONE IN SMALL BREED DOGS

Lukas Wess, Akos Pakozdy, Alexander Probst, Alexander Tichy, Sibylle Kneissl

University of Veterinary Medicine Vienna, Vienna, Austria

Atlanto-occipital overlapping (AOO) describes the overlying of the dorsal arch of the atlas and the occipital bone, in respect to the foramen magnum. Incomplete ossification of the occipital bone (IOO) resulting in a keyhole-like shaped foramen magnum was predominantly described in small breed dogs. The purpose of this study is to investigate a presumed association of AOO and IOO in both, occurrence and severity. Sagittal CT and MR images were acquired in sternal recumbency with the atlanto-occipital junction in a neutral 180° position. Bony CT and T1 MR images were classified for absence or presence of AOO (first vertebra lies caudal to (0), within (1), or cranial (2) to the foramen magnum) or IOO (normal foramen magnum (0), mild IOO (1), severe IOO (2)). Participating dogs were examined for neurological disorders applying a standardized neurological examination. Associations between AOO and IOO were statistically analysed. Fourteen adult small breed dogs were included. AOO was diagnosed in 3 (21%) dogs and IOO in 5 (36%) dogs. All dogs with AOO also showed IOO. Neurological symptoms, such as proprioception deficiencies, abnormal gait pattern or epilepsy, were present in 2 out of 3 dogs (67%) with AOO. A positive correlation between the occurrence (P=0.027) of AOO and IOO as well as the severity (P=0.04) was found to be statistically significant. With regard to the small sample size, there is a presumed association of AOO and IOO in small dogs. The clinical relevance of these entities will be investigated using a larger sample.

STEROIDS CAN REDUCE THE GROSS TUMOR VOLUME IN FELINE SINONASAL LYMPHOMA AND IMPACT THE RADIATION THERAPY TARGET VOLUME.

Valerie J Poirier[1], Fernanda Mantovani[2]

[1]Animal Cancer Centre, Ontario Veterinary College, University of Guelph, Guelph, Canada. [2]Veterinary Emergency Clinic, Toronto, Canada

Radiation therapy (RT) is the treatment of choice for feline sino-nasal lymphoma (fsnLSA). Steroids are often used to reduce clinical signs associated with fsnLSA and could lead to change in the gross tumour volume (GTV) for RT. Our hypothesis was that steroids prior to RT planning CT can significantly reduce the GTV and that typical clinical target volume (CTV) expansion used for sino-nasal tumour microscopic target should be sufficient to cover the original GTV. This was a single institution retrospective study. Inclusion criteria were histologically confirmed fsnLSA with a pre and post steroids CT scan. All CTs were imported and fused in the Eclipse planning system. GTV were contoured on pre (GTVPre) and post (GTVPost) CT. A CTV expansion from GTVPost of 0(CTV0), 0.5cm(CTV0.5) and 1cm(CTV1) were created. The GTVPre and GTVPost volume were extracted and the ability of CTV0, CTV0.5 and CTV1 to cover GTVPre was evaluated. Ten cats met the inclusion criteria. The median time between pre and post CT was 26 days (range:16-55 days). The GTVPost was smaller in 8/10 (median:-56%, range:-16% to -96.5%) and larger in 2/10 (+34%, +112%). The GTVPre was only covered in 2/10 by CTV0, 3/10 by CTV0.5 and 4/10 by CTV1. Steroids can lead to significant tumour volume reduction in fsnLSA and typically used CTV expansion might not be sufficient to capture all microscopic disease leading to local recurrence. Effort should be made to import the pre steroids CT for accurate target contouring for RT.

UTILITY OF COMPUTED TOMOGRAPHY IN THE DIAGNOSIS AND STAGING OF CUTANEOUS AND SUBCUTANEOUS MAST CELL TUMORS IN DOGS

Beatrice Gianni[1], Roberta Franchi[1], Mirko Mattolini[1], Gregorio Carozzi[1], Lisa Nappi[2], Rocchina E. Cammarota[1], Barbara Contiero[3], Federica Rossi[1]

[1]Clinica Veterinaria dell'Orologio, Sasso Marconi, Italy. [2]Centro Oncologico Veterinario, Sasso Marconi, Italy. [3]Department of Animal Science, University of Padova, Legnaro, Italy

Computed Tomography (CT) is frequently used to stage canine mast cell tumors (MCTs) before surgery, indirect CT lymphangiography (CTL) is indicated to identify the first draining (sentinel) lymph-node (SLN). The aims of this prospective, observational study were to describe the CT features of MCTs, to evaluate the performance of CT in distinguishing between cutaneous or subcutaneous MCTs and in identifying one or multiple SLNs. Seventy-two dogs affected by 111 MCTs were included. The recorded parameters were lesion's location (cutaneous or subcutaneous), shape, size, attenuation (HU) compared with the right gluteus muscle and presence of fat stranding. The SLNs were recorded and compared with the regional lymph-nodes. Moreover, additional or incidental MCTs identified during the CT study were registered. MCTs mostly appeared with well-defined margins (89%), round/oval shape (71%), homogeneous enhancement (90%) with a mean density of 62.0±23.4 HU, iso-hypoattenuating compared to the gluteal muscle (86%). Fat stranding was present in 43% of dogs. Considering the nodules evaluated histologically (n=51), CT accuracy in differentiating cutaneous and subcutaneous MCT was 57%, with an interobserver agreement of 88% (three reviewers). CTL showed the SLN in 82/85 of the CTL studies, single in 67 and double in 15 cases. In 68% of the cases, the SLN corresponded to the regional node. Compared to the clinical examination, CT showed supplementary MCTs in 23 dogs (14 additional and 9 incidental). In conclusion, CT cannot precisely predict MCTs location but it is useful to map the SLNs and to identify additional or incidental MCTs.

CHANGES IN PERIPHERAL IMMUNE CELL SUBSETS IN PET DOGS WITH SARCOMAS TREATED WITH STEREOTACTIC BODY RADIATION THERAPY (SBRT).

Jessica Lawrence[1,2], Kimberly Demos-Davies[1], Davis Seelig[1,2], Amber Wolf-Ringwall [1], Lindsey Sloan[3,2], Bruce Walcheck[4,2], Stephanie Terezakis[3,2], Martin Felices [5,2], Jeffrey Miller [5,2], Jianming Wu[4], Daniel Vallera[3,2]

[1]Department of Clinical Sciences, College of Veterinary Medicine, University of Minnesota, St Paul, USA. [2]Masonic Cancer Center, University of Minnesota, Minneapolis, USA. [3]Department of Radiation Oncology, Medical School, University of Minnesota, Minneapolis, USA. [4]Department of Veterinary & Biomedical Sciences, St Paul, USA. [5]Department of Medicine, Medical School, University of Minnesota, Minneapolis, USA

Radiation therapy (RT), particularly stereotactic body radiation therapy (SBRT), induces antitumor immunity through recruitment of natural killer (NK) cells and cytotoxic T-lymphocytes (CD8+ T-cells). RT also promotes an immunosuppressive shift by depleting radiosensitive T-cells, increasing immunosuppressive regulatory T-lymphocytes (Tregs) and myeloid-derived suppressor cells (MDSC), and upregulating immune checkpoints like B7-H3. The purpose of this pilot study was to measure changes in immune subsets in dogs with osteosarcoma or soft tissue sarcoma following SBRT. Seven dogs with sarcoma were prospectively enrolled and received five-fraction SBRT. Peripheral blood was serially analysed for 2 months (mo) by flow cytometry for quantification of CD8+ T-cells, NK cells and Tregs. MDSC and B7-H3 expression were measured in 3 dogs. Plasma cytokines were serially measured for 1mo. Differences were assessed with one-way ANOVA or Friedman test. There were no significant changes in peripheral blood lymphocytes, CD8+ T-cells, NK cells, or Tregs in dogs after SBRT. Of 13 cytokines assessed, IL-7 was significantly ($p=0.02$) decreased after SBRT. Polymorphonuclear MDSC were increased 2 months (mo) post-SBRT ($p<0.0001$). B7-H3+ cells in periphery were increased 2mo following SBRT ($p=0.04$); both B7-H3+ T-cells ($p=0.02$) and B7-H3+ monocytes ($p=0.02$) were increased after SBRT. SBRT did not significantly decrease peripheral lymphocytes, in contrast to lymphopenia reported with conventional fractionation. However, irradiation increased MDSC and immune checkpoint expression in cancer-bearing dogs. SBRT may therefore alter immune responses that impact tumour control and response to immunotherapy. Further study is needed given the rationale to combine RT with immunotherapy.

SUSCEPTIBILITY-WEIGHTED IMAGING FOR IDENTIFICATION AND FOLLOW-UP OF CEREBRAL MICROBLEEDS AFTER BRAIN TUMOR IRRADIATION IN DOGS

Chris Staudinger Resident[1,2], Matthias Dennler[2], Maximilian Körner[1], Valeria S Meier[1], Carla Rohrer Bley[1]

[1]Division of Radiation Oncology, Vetsuisse Faculty, University of Zurich, Zurich, Switzerland.
[2]Clinic for Diagnostic Imaging, Department of Clinical Diagnostics and Services, Vetsuisse Faculty, Zurich, Switzerland

Advanced MRI-techniques represent the current standard of care for monitoring treatment response after radiotherapy. Vascular injury, a possible side effect after radiotherapy can result in cerebral microbleeds (CMB) detectable with susceptibility-weighted imaging (SWI), an MR-sequence sensitive to the hemosiderin-caused iron deposits. In humans, microbleeds seem to occur preferentially in the high-dose area, increase over time and are clinically associated with neurodegenerative decline. The aim of the study was to identify and quantify microbleeds at different dose levels and time points in dogs irradiated for brain tumours. Retrospective, exploratory study. Dogs previously irradiated for brain tumours with a baseline and one follow-up or at least two follow-up scans with a SWI-sequence were included. Extra-tumoral signal voids consistent with CMB were identified and counted as total number as well as densities in 3 discrete peritumoral volumes: low (<20Gy), medium (20-30Gy), or high (>30Gy) dose. A linear mixed-effects model was applied to the data. Thirty dogs with in total 72 MRI-scans were included. In 18 dogs (60%; 95%CI 42-76%), signal voids consistent with CMB were detected. The majority of absolute CMB as well as the highest CMB-density was found in the high-dose volume: at any given time-point, dogs had 40% (95%CI 8-80%, P<0.001) more CMB in the high- compared to the low-dose volume. With each month after treatment, the count increased by 0.09 (95%CI 0.07-0.11, P<0.001). Vascular injury identifiable as cerebral microbleeds can be found in irradiated brain tissue of dogs, is dose-dependent and progressive over time.

FLIPPED CLASSROOM TO FACILITATE DEEPER LEARNING IN VETERINARY UNDERGRADUATE STUDENTS

Sibylle Kneissl[1], Alexander Tichy[2], Sophie Felicia Mitlacher[3]

[1]Diagnostic Imaging, University of Veterinary Medicine, Vienna, Austria. [2]Bioinformatics and Biostatistics Platform, University of Veterinary Medicine, Vienna, Austria. [3]E-Learning & New Media, University of Veterinary Medicine, Vienna, Austria

In a flipped classroom learners study at home and do the 'homework' in class. This approach respects limitations of memory and allows more interaction between learners. The overall vision is self-paced activities for learners with decreased boredom and greater task value, which should facilitate deeper learning. All veterinary undergraduate students used an existing eLearning platform to access relevant text and selected image examples before radiology class. Only for the randomly selected students in flipped classroom (FC), this content was amended with purposeful audios and concrete tasks. Further, FC learners discussed their opinions in an online class forum. To measure the educational change, a pre- and post-class formative test as well as standardized questionnaire for students in FC versus in traditional classroom (TC) were performed. To assess engagement, students were invited to measure all corresponding learning activities, categorized into attendance, self-study, or research. The FC consisted of 20 students, the TC of 40. Mean pre-class scores difference of students FC versus TC was +1/20 point, mean post-class scores difference was +3/20 points. The questionnaire revealed more satisfaction and greater task value in the FC compared to TC ($P=0.048$). FC students invested on average 21 hours into the course, TC students 16 hours. The results of this pilot agree with previous reports: Higher scores, greater task value and more positive emotions are observed in the FC compared to the TC. Higher measures of learning time are not expected to affect exam results but indicate more engagement.

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REASONS FOR REQUESTING A SECOND OPINION OF TELERADIOLOGY REPORTS

Christopher R Lamb, Jennifer L Bouma, Lisa S Ziemer

Antech Imaging Services, Fountain Valley, CA 92708, USA

Teleradiology services aim to provide prompt and accurate reports that facilitate patient management, and routinely monitor quality using various metrics, including the frequency and reasons why primary clinicians request a second opinion (i.e. another report of the same images by a different radiologist). The predominant reasons for second opinions (SOPs) represent targets for quality improvement. Retrospective review of the reasons for 131 consecutive SOP requests by 2 investigators reaching a consensus. Reasons were divided into: a) Clinician dissatisfied with radiology report, and b) Clinician requests more information. Review of patient history was done only if considered necessary to reach consensus. The identity of radiologist producing the original report, other case details, and diagnosis were not reviewed. Prevalence of reasons for SOPs were: a) Clinician dissatisfied with radiology report (63%), including 'believes a lesion has been missed' (27%), 'believes radiologic diagnosis is wrong' (11%), 'concerned about a feature radiologist did not mention' (8%), 'presentation of report not acceptable' (8%), 'report findings inconsistent with conclusions' (4%), other (5%); and b) Clinician requests more information (44%), including 'original radiologist not on duty' (11%), 'clinical question was not clearly stated before SOP' (11%), 'unsubstantial' (9%), 'report did not address the clinical question' (7%), 'wants measurements' (2%), other (3%). The SOPs reviewed included examples of potential false-negative errors and left-right errors, but numerous SOP requests were based on clinicians querying normal imaging findings, post hoc clinical information, and unsubstantial reasons, or because the original radiologist was not immediately available for comment. The data presented are derived from the company for which I work and which is a sponsor of this meeting.

VIRTUAL NON-CONTRAST IMAGES OF DETECTOR BASED SPECTRAL COMPUTER TOMOGRAPHY IN 44 HEALTHY DOGS: A PROMISING ALTERNATIVE TO TRUE NON-CONTRAST IMAGES IN VETERINARY MEDICINE.

Philipp Lietz, Adriano Wang-Leandro, Sebastian Meller, Holger A. Volk, Kristina Merhof

Department of Small Animal Medicine, University of Veterinary Medicine, Hannover, Germany

In veterinary medicine abdominal CT examinations regularly require a minimum of two scans with a native scan (true unenhanced [TUE]) being a reference for the subsequent contrast-enhanced CT scan after application of an iodine-based contrast agent. Spectral-detector-CT [SDCT] technology offers the possibility to calculate virtual non-contrast [VNC] images from post contrast scans. Purpose of this study was to assess the reliability of VNC images for abdominal organs in 44 dogs without abdominal pathologies by evaluating its quantitative and qualitative parameters compared to TUE images. Our hypotheses were that the subtraction of iodine from the administered contrast agent is sufficient in the VNC series compared to the TUE series and that the overall image quality of SDCT images is superior to conventional CT images. The difference in corresponding CT numbers between TUE and VNC images was less than 10 HU in 78,7 % of 572 compared ROIs and the two one-sided t-test implied equivalence of both modalities for the majority of the assessed abdominal organs. Image quality of SDCT images was rated superior to conventional CT images in the subjective assessment, which was mostly supported by the calculated signal-to-noise ratio. VNC images calculated from SDCT data have potential as an alternative to conventional TUE images in abdominal CT scans of canine patients, offering the possibility to reduce time under general anaesthesia and to minimize radiation exposure. Further studies will need to evaluate the use of VNC images in patients with abdominal diseases and test their reliability in different anatomical regions.

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DELAYED POSTCONTRAST COMPUTED TOMOGRAPHY: HEPATIC EXCRETION OF CONTRAST MEDIUM LEADING TO OPACIFICATION OF THE CYSTERNA CHYLI AND THORACIC DUCT IN CATS

Daniele Della Santa[1], Marta Amendola[1], Michelangelo Benvenuti[1], Simonetta Citi[2]

[1]Vet Hospital H24, Firenze, Italy. [2]Dipartimento di Scienze Veterinarie - Università di Pisa, Pisa, Italy

CT lymphangiography of the thoracic duct is commonly performed in cats for the evaluation of chylothorax but in some cases its opacification cannot be obtained, thus reducing the diagnostic yield of the study. Aim of this study is to describe the pertinent imaging findings observed in delayed CT scans after intravenous contrast administration in cats. In cats undergoing a total body CT scan, a delayed scan covering from the mid-abdomen to the thoracic inlet was performed ten minutes after intravenous iodinated contrast medium administration in addition to the standard study protocol. Evaluated imaging findings include: visualization of the periportal space and of the duct connecting the hepatic hilus with the cisterna chyli, degree of enhancement of the cisterna chyli, maximal number of ramifications of the thoracic ducts detectable in a single image. 92 studies were included in the study. Contrast enhancement was observed in the periportal space in 94% of cases, in the cisterna chyli in 96% (with a mean attenuation of 161 HU) and in a connecting duct in 91%. The thoracic duct showed contrast enhancement in 94% of cases (1-5 ramifications visible with an average of 2.1) In most cats delayed computed tomography is able to depict lymphatic excretion of iodinated contrast medium after intravenous administration from the liver to the cisterna chyli and into the thoracic duct. Addition of a delayed scan to the standard study protocol is indicated to increase the likelihood of obtaining a diagnostic thoracic duct lymphangiography in cats.

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COMPUTED TOMOGRAPHY APPEARANCE AND CHARACTERISTICS OF PRESUMPTIVELY NORMAL BRACHIAL PLEXUS IN DOGS

Iris Hummel

Medisch Centrum voor Dieren, Amsterdam, Netherlands

Little information concerning CT characteristics of the canine brachial plexus is available. The objective of this study was to describe size measurements and CT characteristics of the brachial plexus in dogs, and investigate correlations between these measurements and patient characteristics to provide guidelines for clinical interpretation. Retrospectively 23 thoracic CT studies were analysed and grouped according to weight; ≤10kg, 10.1-25kg and ≥25.1 kg and breed type (chondrodystrophic/non-chondrodystrophic). A defined anatomic location of the brachial plexus was evaluated. The size (cross-sectional area (mm2), height and width (mm)), attenuation (HU), subjective conspicuity and amount of interlaying fat tissue were recorded, as well as laterality, age and sex. Intrarater reliability was tested on all size measurements of the plexus. A strong positive correlation between weight and all sizes of the brachial plexus was observed (p< 0.0001). All size measurements have optimal reliability (ICC 0.92-0.96). Age was negatively correlated with size, but this association was confounded by weight. Laterality or breed type did not have a clinically significant effect on size or attenuation of the brachial plexus. The subjectively estimated amount of fat was significantly associated with minimum pre-contrast attenuation values and had a possible clinically relevant effect on the conspicuity of the brachial plexus, though not statistically significant: blurred appearance of the brachial plexus was observed in dogs with more interlaying fat. Brachial plexus descriptive characteristics are provided in this study to aid interpretation. The conspicuity of the brachial plexus differs in dogs. The relationship of conspicuity, fat and size requires further investigation.

COMPUTED TOMOGRAPHY FEATURES OF THE NORMAL SPLEEN IN RABBITS (ORYCTOLAGUS CUNICULUS DOMESTICUS)

Chavdar N Chernev, Ingrid Isaac, Tessa Procter, Bronwyn Koterwas, Kevin Eatwell, Jenna Richardson, Tobias Schwarz

The Royal (Dick) School of Veterinary Studies, Edinburgh, United Kingdom

Computed tomography (CT) is commonly used to investigate abdominal disorders in the rabbit. The authors have identified cases with pathologic splenomegaly, but there is no CT study providing normal reference values for the rabbit spleen. Aims of this retrospective study were to document the visibility, size and shape of the normal rabbit spleen and potential correlations with signalment. Institutional imaging archives were reviewed for diagnostic-image-quality abdominal CT studies of rabbits. Medical records of identified cases were reviewed and all cases excluded with pathology that could influence the spleen. Conscious abdominal CT studies were reviewed for pre- and post-contrast visibility of the spleen (not visible/suspected/confidently visible), volume, shape and length.   Linear regression analysis was used to investigate the relationship between splenic volume, sex, age and body weight. In 116 cases the inclusion criteria were met. On pre-contrast images, the spleen was not visible in 15/116, suspected in 60/116 and was confidently identified in 41/116 cases. On post-contrast images, the spleen was not visible in 1/116, suspected in 16/116 and was confidently identified in 99/116 cases. There was a significant positive relationship between splenic volume and body weight but not age or sex. The rabbit spleen can be more reliably identified on post-contrast CT images, which underlines the usefulness of contrast-enhanced CT. Body weight should be taken into consideration when differentiating between normal splenic size and splenomegaly. Further studies are required to establish CT features of splenic abnormalities in the rabbit.

QUANTITATIVE CT EVALUATION OF LUNG VOLUME AND DENSITY IN SEDATED AND ANESTHETISED RABBITS

Roberto FJ[1,2], Inês O Tomé[1,2], Filipe C Silva[1,2], Mário MD Ginja[1,2]

[1]Department of Veterinary Sciences, University of Trás-os-Montes e Alto Douro, Vila Real, Portugal. [2]CECAV-AL4AnimalS, Centre for Animal Sciences and Veterinary Studies - Associate Laboratory for Animal and Veterinary Sciences, University of Trás-os-Montes e Alto Douro, Vila Real, Portugal

Fourteen 3-month-old male New Zealand white rabbits, considered healthy, were acclimated to a cardboard box and sedated with midazolam and butorphanol. A computed tomography (CT) exam of the thorax was performed inside the cardboard box in sphinx position. Animals were anaesthetized with dexmedetomidine and ketamine for a new thoracic CT exam in sternal recumbency, with spontaneous breathing. Thoracic CT evaluation was performed via 3D Slicer extension Chest Imaging Platform and a 3D reconstruction with threshold limits of -1000 to -200 HU was applied excluding all structures surrounding the lung. Right, left, and total lung volumes (TLV) and mean lung density (MLD) were obtained from this automatic segmentation. In sedated animals, mean volumes (in cm3) of right and left lungs and TLV were 34.14±3.87, 33.38±4.40, and 67.52±7.46, and, under anaesthesia were 19.61±3.08, 16.99±3.75, and 36.57±6.24, respectively. Under sedation, the paired T-test showed no statistically significant difference between the mean volumes of the right and left lungs. In contrast, a high statistically significant difference (P=0.003) was found in rabbits under anaesthesia. MLD (in HU) of right and left lungs registered during sedation were 610.97±34.95 and -634.17±22.60, increasing to -542.43±38.40 and -538.48±43.47, under anaesthesia (P<0.05, in paired T-test).These results suggest that CT evaluation of the rabbit lung is feasible and recommendable under sedation, as it is associated with a more significant accumulation of pulmonary air, which improves the contrast and the possibility of diagnosing diseases related to small changes in opacity.

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3D MODELING AND PRINTING OF CANINE EXTRAHEPATIC PORTOSYSTEMIC SHUNTS

Susanne M Stieger-Vanegas, Aileen Jordan

Oregon State University, Corvallis, USA

Currently the availability of training models for understanding the anatomy of extrahepatic portosystemic shunts in dogs are limited. Surgical intervention is often the method of choice correcting extrahepatic portosystemic shunts requiring a precise understanding of the shunt conformation. Understanding the complexity of a shunt can be challenging. The goal of this study was to establish digital and printed three-dimensional (3D) models of the most commonly occurring extrahepatic shunts in dogs. The medical database was searched for dogs that had undergone a multidetector computed tomography angiography (CTA) study of the abdomen and a diagnosis of extrahepatic portosystemic shunt from 2010-2022. A total of 68 total cases were identified and classified by their extrahepatic shunt configuration. 8 cases were selected, and their CTA data imported in a designated computed aided design software (Materialise, Leuven, Belgium, Europe) for creation of digital 3D models. These digital 3D models were then exported as stereolithography files for 3D printing using ABS plastic and fusion deposition modelling. A total of eight shunt types were 3D modelled in detail including the branches of the aorta, portal vein and systemic veins. Their vasculature was colour coded and 3D printed. Through 3D volume and surface rendering, the vascular anatomic anomaly of each extrahepatic shunt in each dog was identified in detail. These 3D models may in the future provide an advantage over alternative learning resources by enhancing the visuospatial, tractile and 3D understanding of the complex anatomical architecture of extrahepatic portosystemic shunts in dogs.

B-FLOW AND CONTRAST ENHANCED ULTRASOUND (CEUS) FEATURES OF SUBCUTANEOUS NODULAR LESIONS IN DOGS.

Andrea De Bonis, Francesco Simeoni, Andrea Paolini, Laura Bongiovanni, Martina Rosto, Francesca Del Signore, Roberto Tamburro, Amanda Bianchi, Massimo Vignoli

Faculty of Veterinary Medicine, University of Teramo, Teramo, Italy

Subcutaneous nodules in dogs are common in clinical practice. This prospective clinical study aims to compare B-flow ultrasound and CEUS techniques for the characterization of subcutaneous nodules evaluating their usefulness to distinguish benign subcutaneous nodules from potentially malignant ones. Dogs were prospectively enrolled and ultrasound cine-loops were achieved in B-mode, Colour Doppler, Power Doppler, B-Flow and CEUS. Lesions vascularisation highlighted through B-Flow and CEUS were classified into five patterns: P1, absence of contrast uptake; P2, enhancement only in the peripheral area of the lesion; P3, thin (<2 mm) and few vessels (<5/field) P4, thinner (>2 mm) and more numerous vessels (>5/field); P5 enhancement with a reticular aspect and both thick and thin bands inside. Patterns highlighted with B-flow and CEUS were compared to a histological diagnosis. 16 dogs and 22 subcutaneous nodules were included and divided into three groups: 4 non-neoplastic, 11 benign tumours (8 lipomas, 3 haemangiomas) and 7 malignant tumours (4 soft tissue sarcoma, 2 Mast Cell tumours and one carcinoma). Pairwise comparison test displayed a p-value of 0.02 for B – flow and 0.037 for CEUS to differentiate benign tumours from malignant tumours. There were no differences either with CEUS or B-flow to compare non-neoplastic nodules to malignant and benign tumours. B–flow and CEUS had an agreement of 86%. This study showed that B–flow and CEUS could differentiate benign tumours from malignant ones. B-Flow and CEUS displayed similar ability to evaluate different patterns and could be helpful in the evaluation of subcutaneous nodules.

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ULTRASOUND FINDINGS IN 12 CASES OF PANCREATOLITHIASIS IN THE CAT

Margaret M Costello[1,2], Laura D Bree[3], David M Neilson[3]

[1]Vision Diagnostic Imaging, Gloucester, United Kingdom. [2]Rowe Veterinary Referrals, Bristol, United Kingdom. [3]London Vet Specialists, London, United Kingdom

Pancreatolithiasis is a rarely reported finding in cats with few reports in the literature. The database of a specialist peripatetic ultrasound practice was searched over a five year period (2017-2022) for cats with an ultrasound diagnosis of pancreatolithiasis (calculi in the pancreatic ductal system). The appearance and size of the pancreas and dimensions of the pancreatic ducts were reviewed. Concurrent abnormalities of the hepatobiliary tree and other abdominal findings were also recorded. Twelve cats fulfilled the criteria for inclusion. Breeds were domestic shorthair (9), domestic longhair (1), exotic shorthair (1) and British shorthair (1). Ages ranged between 6 and 16 years with a mean age of 10.6 years. Eight cats were male castrated and four were female spayed. Ten cats had ultrasound findings compatible with a diagnosis of pancreatitis. Of the remaining cats, one had a pancreatic mass and one had an adrenal mass. Pancreatic duct size was normal in seven cats and duct distension (>2.5mm) was present in five cats (range 2.7-6mm). A distended common bile duct was present in three cats. Pancreatic size was abnormal in all cats, eleven cats had an enlarged pancreas and one had an atrophied pancreas. Concurrent cholelithiasis/choledocholithiasis was present in nine cats. Of the three cats without cholelithiasis, one had an adrenal mass, one had a pancreatic mass and one had evidence of cholangitis and cholecystitis. Pancreatitis and cholelithiasis were associated with pancreatolithiasis in this series. Pancreatic duct distension was an inconsistent finding.

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POINT SHEAR WAVE ELASTOGRAPHY STUDIES ON CANINE RENAL AFFECTIONS

Biswadeep Jena[1], Jitender Mohindroo[1], Shashi Kant Mahajan[1], Randhir Singh[2], Kuldip Gupta.[3]

[1]Department of Veterinary Surgery and Radiology, College of Veterinary Science, Gadvasu, Punjab, Ludhiana, India. [2]Department of Teaching Veterinary Clinical Complex, College of Veterinary Science, Gadvasu, Punjab, Ludhiana, India. [3]Department of Veterinary Pathology, College of Veterinary Science, Gadvasu, Punjab, Ludhiana, India

Renal disease in dogs frequently presents a guarded to poor prognosis; early diagnosis may facilitate appropriate treatment. Histopathology is the gold standard for the diagnosis and differentiation of renal disease, but renal biopsy is invasive and may result in complications. Ultrasound-based point shear wave elastography (pSWE) may provide a non-invasive means to assess renal tissue stiffness as an indication of fibrosis in dogs. The objectives of this study were to evaluate Young's modulus (kPa) and shear wave velocity (m/sec) values in healthy dogs and dogs with renal disease. The study population consisted of 130 dogs of varied age, breed, gender, and body weight. The dogs were assessed as healthy (n = 30) or as having renal disease (n = 100) based on clinical and laboratory findings. Dogs with renal disease were further classified into IRIS stages. B-mode ultrasonography followed by pSWE evaluation of both kidneys was performed in all dogs. The results were expressed in Young's modulus stiffness score (kPa) and shear wave velocity (m/sec) using ElastPQ stiffness software (Philips Healthcare). The pSWE values of healthy kidneys and stages of diseased kidneys were calculated. pSWE results correlated with clinical status of healthy and stages of diseased kidneys. Median values of pSWE in diseased kidneys (6.535 kPa and 1.46 m/sec) were significantly higher ($P<0.05$) than healthy kidneys (2.81 kPa and 0.97 m/sec). pSWE provides a non-invasive tool to quantitatively evaluate renal status in healthy dogs and dogs with renal disease.

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USE OF STRAIN ELASTOSONOGRAPHY IN THE CHARACTERISATION OF SUBCUTANEOUS SOFT TISSUE LESIONS IN DOGS

Eleonora Daga[1], Giulia Nicolini[2], Sabrina Manfredi[1], Mattia Bonazzi[1], Martina Fumeo[1], Francesca Miduri[1], Giacomo Gnudi[1], Antonella Volta[1]

[1]Department of Veterinary Science, University of Parma, Parma, Italy. [2], Chiavari (GE), Italy

The aim of this study is to supplement recent reports of elastosonographic characterisation of superficial soft tissue lesions in dogs. Records were searched for dogs, which underwent strain elastosonography and cytology/histology of superficial soft tissue lesions (2017-2020).All examinations were performed by the same operator with the same equipment. Elax-t%SFT (the percentage of softness) and Elax-t%HRD (the percentage of hardness) were measured. Elasticity score on the Elax-t%SFT was created: 1) >70%: soft, <70% >50%: 2) mostly soft; 3) <50% >30%: intermediate; 4) <30% >20%: mostly hard; 5) <20%: hard. Elax-t%SFT and Elax-t%HRD were compared between benign and malignant lesions with Student t-test. Elax-t%SFT and Elax-t%HRD were compared with ANOVA and Tukey test, considering tumours, non-tumours, lipomas. Mann-Whitney U test was used to compare the semi-quantitative score with the nature of the lesion (benign vs. malignant). A P value <0.05 was considered significant. Ninety-two dogs (56 females, 36 males, mean age 8.75 ± 3.41 years) were included. Ninety-two lesions were considered, 53 benign (12 benign neoplasms, 20 lipomas and 21 non-neoplastic lesions) and 39 malignant (19 mast cell tumours, 16 sarcomas, 4 carcinomas). Elax-t%HRD value was higher in malignant lesions. Elax-t%SFT value was higher in benign lesions. There were significant differences in Elax-t%SFT and Elax-t%HRD between tumours and non-tumours, tumours and lipomas. No significant difference was found between lipomas and non-tumours. Conclusion: malignant lesions were harder than benign lesions. Non-neoplastic lesions and lipomas were softer than neoplastic lesions.

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USING AN ARTIFICIAL INTELLIGENCE ALGORITHM TO IDENTIFY UROLITH COMPOSITION THROUGH ABDOMINAL RADIOGRAPHS IN THE DOG - A PILOT STUDY

Mariana Carvalho[1], David W Ramilo[1], Jolle Kirpensteijn,[2], Jody Lulich[3], Ana Lima[1], Rute Canejo-Teixeira[1,4]

[1]Faculdade de Medicina Veterinária, Universidade Lusófona Humanidades e Tecnologia, Lisbon, Portugal. [2]Hill's Pet Nutrition, Topeka, USA. [3]MN Urolith Center, St. Paul, USA. [4]Escola Superior de Saúde, Proteção e Bem Estar Animal, Lisbon, Portugal

In small animal practice, patients often present with lithiasis or even obstruction of the urinary tract, and prediction of the composition of the uroliths is essential to determine appropriate treatment and preventive measures for each patient. It is possible to identify the presence of radiopaque uroliths and predict their mineral composition with radiography. This prediction is complex, requiring the consideration of many different variables, a situation that is tailor-made for the use of artificial intelligence (AI). The Minnesota Urolith Center, in partnership with Hill's, has developed an AI algorithm within a smartphone application, the MN Urolith Center, that allows for the preliminary assessment of a urolith. This algorithm provides the probability of a urolith being composed of struvite from an image taken from an abdominal radiograph. The present study represents the first attempt to evaluate the accuracy of the calculator from the MN Urolith Center application applied to quantitative urolith analysis radiographed in dogs. Ten dogs diagnosed with urolithiasis by abdominal radiography and with a quantitative analysis of radiographed uroliths were included in the study. The results obtained with the calculator were compared to the analysis. The agreement between application and quantitative analyses reached 90% accuracy, showing that this application calculator evaluated here can be effectively used to predict urolith composition in dogs, helping the clinician to decide between medical and surgical management of the patient. The use of the MN Urolith App is another example of the usefulness of AI in helping veterinarians make clinical decisions in patient care.

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AUTOMATIC DETECTION OF BODY AREAS IN CANINE COMPUTED TOMOGRAPHY (CT) USING ARTIFICIAL INTELLIGENCE (AI)

Julien Labruyere [1], Anjie Le [2], James Bang[2], Michael Roberts[2]

[1]VetCT, Cambridge, United Kingdom. [2]Department of Applied Mathematics and Theoretical Physics, University of Cambridge, Cambridge, United Kingdom

CT is crucial in the diagnosis of conditions in dogs across all body areas. There is a need to improve imaging workflows efficiencies in practice and the image quality submitted to radiologists. AI research in veterinary medicine lags far behind the exponential growth in human health, currently there is a lack of reliable AI tools in veterinary CT. The goal of this study is to develop a prototype object detection deep learning algorithm capable of recognising body areas in CT. The retrospective study included 160 normal Jack Russel Terrier CT scans from the VetCT database. Image labels were obtained after placing a 3D bounding box around each body area using MITK[1]. Images pre-processing steps included de-identification, normalisation, resampling, Hounsfield Units clipping and rescaling. YOLOv5[2] was used as an object detection model, with standard settings. The model was trained using Graphics Processing units (GPUs) provided by Google Colab pro+. Our AI model provided accurate detection of the head with metrics showing that the model converged. However, other body areas such as pelvis, thorax and abdomen were not detected with the same level of accuracy. The presence of overlapping body areas (e.g., spine and shoulder) were a complication during image pre-processing.This project confirmed the feasibility of training AI models using the VetCT dataset. A robust tool will have positive implications in Veterinary CT. Future directions include training the model using larger datasets, experimentation with other object detection models, use semi-supervised learning methods, and assessment of generalisability.

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CLINICAL APPLICATION OF NON-ECG- AND ECG-GATED, HIGH-SLICE CARDIAC COMPUTED TOMOGRAPHY IN DOGS

Junyoung Kim[1], Siheon Lee[2], Jeongyeon Hwang[2], Junghee Yoon[1]

[1]College of Veterinary Medicine and the Research Institute for Veterinary Science, Seoul National University, Seoul, Korea, Republic of. [2]Helix Animal Medical Center, Seoul, Korea, Republic of

The characteristics of non-electrocardiography- and electrocardiography-gated multidetector computed tomography have not been extensively studied in veterinary clinics but it can be useful for cardiac imaging. This study aimed to ascertain the differences between non-electrocardiography- and electrocardiography-gating methods and to establish their clinical utility based on patient history. Six client-owned dogs (two with patent ductus arteriosus, two with heart base tumour, one with pericardial mesothelioma, and one with normal health) were included in this study. All the dogs were examined using a non-electrocardiography-gated scan, followed by a retrospective electrocardiography-gated scan. Images were reviewed to determine the optimal scan timing and R-R interval in non-electrocardiography- and electrocardiography-gated images, respectively, for detailed coronary artery imaging, diagnostic quality of the best coronary artery visualisation in non-electrocardiography- and electrocardiography-gated images through visual assessment of the main coronary artery branches, and branching patterns of the left coronary artery. Further, we compared the size and margin demarcation of the heart or pericardial lesions in non-electrocardiography- and electrocardiography-gated images obtained from patients with heart or pericardial tumours. The optimal scan timing and R-R interval were the second-scan timing and end-diastole (70%–90%), respectively. Second-scan non-electrocardiography-gated images allowed coronary artery evaluation, indicating high-grade quality in visual assessment, except for the septal branch. Electrocardiography-gated images, but not non-ECG-gated images, clearly revealed pericardial nodules in two dogs. Our findings suggest the respective clinical utilities of non-electrocardiography- or electrocardiography-gated imaging using high-slice cardiac computed tomography based on patient history.

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COMPUTED TOMOGRAPHY OF CORRELATION OF CRANIOMETRY WITH ESOPHAGEAL HIATAL CROSS-SECTIONAL SURFACE AREA BETWEEN BRACHYCEPHALIC AND NON-BRACHYCEPHALIC CATS

Uhjin Kim[1], Dongwoo Chang[1], Jinhwa Chang[2], Sojin Kim[1], Jiwoon Park[1], Jaepung Han[1], Songyi Kim[1], Changgyu Lim[1], Hearang Lim[1], Mincheol Kim[1], Jiyoung Ban[1]

[1]College of Veterinary Medicine Graduate School, Chungbuk National University, Cheongju, Korea, Republic of. [2]Korea animal medical center, Cheongju, Korea, Republic of

In humans and dogs especially brachycephalics, enlargement of the oesophageal hiatus and insufficiency has been correlated with decreased lower oesophageal sphincter pressure, and increased frequency of gastroesophageal reflux. In cats, it has been suggested that gastroesophageal reflux occurs frequently with upper airway obstruction including brachycephalics. Therefore, the purpose of study was to determine whether the oesophageal hiatal cross-sectional surface area (EH-CSA) differs between brachycephalic and non-brachycephalic cats. Clinical records and computed tomographic (CT) images of cats that underwent thoracic and abdominal and/or entire skull CT at multiple centres between January 2015 and September 2022 were retrospectively reviewed. Oesophageal hiatal parameters (EH-CSA, EH-long axis diameter and EH-short axis diameter) and craniometric indices (cranial index, skull index and facial index) were measured by using multiplanar reconstruction and the correlation of craniometry with EH-CSA was investigated. Ninety eight cats (group 1; 56 non-brachycephalic cats and group 2; 42 brachycephalic cats) were included. EH-CSA in brachycephalic cats was significantly larger than that in non-brachycephalic cats. And the EH-CSA significantly increased with the craniometric indices tending to increase with brachycephalism. The present study contributes to the veterinary literature by providing the EH-CSA as anatomical evidence that could likely correlate to gastroesophageal reflux predisposition in brachycephalic cats.

COMPUTED-TOMOGRAPHY (CT) FINDINGS IN DOGS AND CATS WITH PARTIAL LUNG LOBE TORSION

Noemi Gómez[1], Elisabet Dominguez[2], Miriam Martinez [3]

[1]Hospital Veterinario De referenceia UCV, Valencia, Spain. [2]Anicura Ars Veterinaria Barcelona, Spain. [3]Proronvet, London, United Kingdom

It is not uncommon to observe an abnormal position of the lung lobes (LL) in CTs of patients with pleural alterations and the clinical relevance is uncertain. There is only one article describing partial lung lobe torsion (PLLT) in veterinary literature. The aim of the study was to describe CT findings in patients with PLLT. This is a retrospective, multicentre, case-series study. The inclusion criteria were presence of pleural changes and PLLT in the CT report. CT features recorded were number and which LL were affected, lobar bronchi direction and degrees of rotation, "swirling sign", "antler sign", lung pattern, enhancement, abnormal fissure position and pleural changes. Eleven dogs and one cat were included. Eighteen LL were included, with no clear anatomical predisposition. All the affected LL showed partial malposition, with dorsal displacement of the ventral aspect (14 with dorsolateral and 4 with dorsomedial deviation), bronchial rotation (14 with 90° and 4 with 180°), "antler sign", abnormal fissure position and normal enhancement. Swirling sign was seen in 5, atelectasis in 16, and bronchial obstruction in 2 LL. All cases had pleural effusion. Thoracotomy was performed in 7 patients. In 2/7, complete lung lobe torsion (LLT) was observed (surgery performed 2 and 6 weeks after the CT). Both CTs showed dorsomedial deviation of ventral aspect of the LL, 180° bronchial rotation, swirling sign and normal lung parenchyma. PLLT may be an incidental finding seen in patients with pleural alterations, however PLLT with dorsomedial deviation of ventral aspect could precede LLT.

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ECG-GATED CARDIAC MULTIDETECTOR CT EVALUATION OF THE NORMAL PULMONIC VALVE AND RIGHT VENTRICULAR OUTFLOW TRACK IN DOGS

Chiara Massarenti[1], Marta Croce[1], Massimiliano[2], Oriol Domenech[1], Eric Zini[1], Edoardo Auriemma[1]

[1]AniCura Istituto Veterinario di Novara, Granozzo con Monticello (NO), Italy. [2]Università degli Studi di Torino, Grugliasco (TO), Italy

With rapid advancement in imaging technology, ECG-gated cardiac multidetector computed tomography (MDCT) could be used for anatomic evaluation and assessment of pathologic changes of the pulmonary valve in dogs. The evaluation of the pulmonary valve is done primarily by echocardiographic examination, although its bidimensional nature could make a thorough exploration difficult. Hence, the aim of this study was to describe computed tomographic findings of the normal right ventricular outflow track (RVOT) in dogs. A total of 20 dogs were included. All dogs underwent a ECG-gated cardiac MDCT and a complete echocardiographic examination to exclude pulmonary valve abnormalities. A multiplanar reconstruction of the pulmonary valve was obtained. Three hearts were collected from dogs that were euthanized. Different macroscopic dissections and histological sections of the RVOT were obtained from each heart. Gross and histological findings were compared to the CT images. The visualisation of the pulmonary valve through CT was possible in all dogs. CT provided good visualisation of the sinotubular junction, anatomic ventriculo-arterial junction and the haemodynamic ventriculo-arterial junction. In all dogs the short axis view of the pulmonary valve anatomy resembled the "Mercedes-Benz sign" of the aortic valve. CT provides valuable information on the pulmonary valve anatomy. High spatial resolution and multiplanar data reconstructions are major advantages of the ECG-gated cardiac MDCT and help provide detailed evaluation of the RVOT anatomy in dogs.

COMPUTED TOMOGRAPHIC FEATURES OF FELINE INFECTIOUS BRONCHOPNEUMONIA

Plamena Pentcheva[1,2], Anna Orekhova[1], Petra Cerna[1,3], Tizianna Liuti[1], Danielle Gunn-Moore[1], Tobias Schwarz[1]

[1]Royal (Dick) School of Veterinary Studies, University of Edinburgh, Edinburgh, United Kingdom. [2]University of Sassari, Sassari, Italy. [3]Colorado State University, Colorado, USA

Lower respiratory tract infection is a common and important condition in dyspnoeic cats with *Mycoplasma* spp, *Bordetella bronchiseptica*, feline herpesvirus (FHV-1), feline calicivirus (FCV) and *Aelurostrongylus abstrusus* being among the most common pathogens.[1] Thoracic computed tomography (CT) in a restraining device (VetCatTrap™) allows fast, high-quality imaging of dyspnoeic conscious or sedated cats in a minimal-stress environment.[2] Aims of this study were to characterise typical CT features of feline bronchopneumonia and to investigate potential correlations between CT features and specific pathogens. Institutional archives were searched for thoracic CT studies of cats with bronchopneumonia, confirmed by culture, cytology or PCR. Studies were scored for bronchial and pulmonary abnormalities in different lung areas. Statistical evaluation included frequency distribution of CT features of bronchopneumonia and correlation analysis between single-genus-*Mycoplasma*-pathogen bronchopneumonia (group 1) and mixed-or-single-other-pathogen bronchopneumonia (group 2) regarding their CT features. Thirty-three cats met the inclusion criteria. CT features included normal (60.9%) and abnormal lung areas (39.1%). Abnormal lung areas were most presented by bronchial wall thickening (31.6%), parenchymal subpleural bands (13%), ground-glass opacity (8.5%), lung collapse (7.5%), consolidation (7.3%), plate-like-alveolar pattern (5.3%) and hyperlucent enlarged lungs (4.3%). For single-genus-*Mycoplasma*-spp-pathogen bronchopneumonia, there was weak correlation with reticulonodular lung pattern (0.303), cavitary nodules (0.268), and broncholithiasis (0.225). Typical CT features of feline bronchopneumonia are generalised bronchial wall thickening and parenchymal changes in a few lung areas. This is different from other species, where parenchymal changes are often seen more widespread.[3] Single-genus-*Mycoplasma*-bronchopneumonia is not significantly different from other types of bronchopneumonia.

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EFFECT OF BODY CONDITION SCORE ON THE INTEROBSERVER VARIABILITY OF VERTEBRAL HEART SCALE ASSESSMENT IN DOGS.

Karin Bruining -Staal[1], Niek Beijerink[2], Ilse Tiemessen[1], Johannes C.M. Vernooij[3]

[1]Anicura Drechtstreek, Dordrecht, Netherlands. [2]Veterinaire Specialisten, Vught, Netherlands. [3]Department of Farm Animal Health, Faculty of Veterinary Medicine, Utrecht University, Utrecht, Netherlands

The Vertebral Heart Scale (VHS) is widely known and used as an objective standard for evaluation of cardiomegaly on thoracic radiographs. It plays therefore an important role in assessing the severity of canine heart disease. The Body Condition Score (BCS) is a nine-scale body condition scoring system used to objectively document the body condition in dogs. Obese animals might have a widened precardiac and postcardiac mediastinum, fat deposits between the sternum and lungs or heart, as well as increased pericardial fat that could complicate cardiac silhouette evaluation. These factors could result in a higher interobserver variability in the assessment of VHS in obese dogs. The purpose of this study was therefore to investigate if obese dogs (BCS 7/9, 8/9 and 9/9) have more variability in the interobserver VHS measurement compared to dogs with a normal BCS (BCS 4/9 and 5/9). The VHS was measured by 3 trained observers in right lateral radiographs of 18 obese dogs and 33 dogs with a normal BCS admitted to a private referral centre for different medical reasons. No statistical significant difference in variability between the 3 observers was seen in dogs with a normal BCS versus obese dogs.In conclusion, BCS does not affect reliability of vertebral heart scale assessment among veterinarians.

IN SILICO CORRELATION OF COMPUTED TOMOGRAPHY BRONCHIAL PATTERN WITH AIRWAY RESISTANCE IN CATS: A PILOT STUDY

Carla Zamora-Perarnau[1,2], Mauro Malvè[3], Rocío Fernández-Parra[2]

[1]Doctoral School, Catholic University of Valencia San Vicente Mártir, Valencia, Spain.
[2]Veterinary Referral Hospital UCV, Catholic University of Valencia San Vicente Mártir, Valencia, Spain. [3]Department of Engineering, Public University of Navarre (UPNA), Pamplona, Spain

Asthma is a common lower-airway inflammatory disease in cats. In computed tomography (CT), a bronchial pattern can be seen. Computational fluid dynamics (CFD) is a non-invasive technique that analyse flow characteristics starting from geometrical reconstructions based on CT scans. The aim of this study is to evaluate and compare lower airway resistance in cats with a bronchial pattern and normal thoracic CT using CFD. Thoracic CT scans of cats with bronchial patterns (n=5) and with non-pulmonary disease (n=5) were included. For each case, a three-dimensional geometry of the trachea and the lobar bronchi was reconstructed. Each model was discretised with tetrahedral volumes and in silico simulations were performed. A peak inspiratory/expiratory flow of 110 ml/s was imposed. Resistance was computed for each case. A Mann-Whitney U-test was used to compare the medians of the resistances. Values of p<0.05 were considered statistically significant. No significant differences were observed between inspiratory/expiratory resistances (p=1.00, p=0.54 respectively) between groups. Median expiratory resistance was similar for bronchial pattern (-0.0044 [-0.0058-0.0031]) and non-pulmonary disease (-0.0038 [-0.0057-0.0028]) groups. Cats with bronchial disease have lower expiratory flow rates and increased airway resistance. CFD provides additional information about changes in airway resistance that correlates with the spirometry, the gold standard to assess the respiratory function. In the present study no significant differences were observed in inspiratory/expiratory resistances due to low sample size. CFD is an emerging technique in veterinary medicine for airway assessment and can provide useful information as widely performed in human medicine.

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THORACIC INLET HEART SIZE, AN ALTERNATIVE APPROACH TO MEASURE THE CANINE HEART ON THORACIC RADIOGRAPHS.

David Marbella[1,2], Debora Saavedra[3], Maria J Perdigón[3], Alexis J Santana[3], Alberto J Montoya-Alonso.[1]

[1]Faculty of Veterinary Medicine, University of Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain. [2]CEU Animal Hospital, Alfara del Patriarca, Valencia, Spain. [3]Anicura Albea, Las Palmas de Gran Canaria, Spain

The Vertebral Heart Size (VHS) is recommended to classify dogs with myxomatous mitral valve disease (MMVD) but, varies with dog breed, mid thoracic vertebral anomalies and transformation into vertebral units. We assessed the feasibility of measuring the dog heart size by indexing its axes length to the thoracic inlet length (TI). We also studied whether this method could discriminate between clinically healthy dogs and dogs with different MMVD stage. On a right lateral projection, the heart long and short axes were measured following the VHS method. Those lengths were summed and divided by the TI, the distance between the cranioventral aspect of the first thoracic vertebra and the craniodorsal manubrium at its highest point. A Thoracic Inlet Heart Size (TIHS) value was obtained.155 dogs were included in the study. A control group of 50 clinically healthy dogs with a normal echocardiography. A MMVD group of 105 dogs diagnosed with echocardiography; 35 in Stage B1, 30 Stage B2 and 40 Stage C. TIHS value for the control group was 2.91 ± 0.23 (IC 95% 2.84-2.98), 2.99 ± 0.36 (2.87-3.11) Stage B1, 3.25 ± 0.34 (3.09-3.39) B2, and 3.53 ± 0.36 (3.42-3.64) C. The difference was statistically significant between MMVD Stages and between MMVD Stage B2 and C and the control group, $p<0.01$. TIHS is a feasible method to measure the dog heart size radiographically. In the studied population TIHS discriminated between dogs with a normal heart and dogs with MMVD and, between dogs in different MMVD Stage.

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COMPUTED TOMOGRAPHIC FEATURES OF CANINE INTRAMURAL URETERAL STENOSIS IN THREE DOGS

Tobias Schwarz[1], Marisa F Ferreira[1], Silke Salavati Schmitz [1], Tiziana Liuti[1], Glynn Woods[1], Alisdair Boag[1], Kathryn Pratschke[1], Jimmy Saunders[2], Kelly L Bowlt Blacklock[1]

[1]Royal (Dick) School of Veterinary Studies, The University of Edinburgh, Roslin, United Kingdom. [2]Faculty of Veterinary Medicine, Ghent University, Merelbeke, Belgium

Stenosis of the intramural portion of the ureter (StIMU) has rarely been reported in dogs[1,2] but has been observed in our excretory urinary computed tomography (EUCT) caseload. Purpose of this study was to investigate the prevalence and EUCT features of StIMU in dogs. Single institutional archives were searched for dogs with EUCT-identified, surgically confirmed StIMU. The urogenital tract was assessed for size, shape, mineralisation, excretion and peristalsis in EUCT. Two-hundred-ninety-three EUCT studies were identified. Three dogs met the inclusion criteria, a 1-year-old male Miniature-Schnauzer-Poodle cross with urinary incontinence (case 1), a 3-month-old male Newfoundland dog with haematuria (case 2) and a 4-year-old male Newfoundland dog with pollakiuria (case 3). EUCT examination revealed renal pyelectasia, hydroureter and an abnormal intramural portion of the ureter. Intramural ureteral abnormalities included lack of peristaltic distension, ectopia and aberrant lateral course. Surgical exploration revealed bilateral ureteral stenosis and unilateral ectopia (case 1), bilateral ureteral stenosis and ectopia (case 2) and unilateral stenosis without ectopia (case 3). Stenosis of the intramural portion of the ureter is rarely seen, with young male dogs overrepresented, and should be included in the differential diagnosis of hydroureter.[1,2,3] This may represent a congenital malformation or a fibrotic inflammatory reaction but is not necessarily associated with ureteral ectopia. Concurrent urinary tract infection needs to be considered as potential cause or result of StIMU. EUCT may be of value for treatment planning. Further investigation for breed predisposition in Newfoundland dogs is warranted.

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CORRELATION BETWEEN MRI AND TENOSCOPIC FINDINGS OF THE DEEP DIGITAL FLEXOR TENDON LESIONS AND SYNOVIAL MASSES WITHIN THE NAVICULAR BURSA: RETROSPECTIVE STUDY OF 59 HORSES

Maria Elisabetta Giorio[1], Robyn J. Graham[2], Dagmar Berner[1], Bruce M. Bladon[3]

[1]Royal Veterinary College Equine Referral Hospital, Hatfield, United Kingdom. [2]Equine Hospital, Royal (Dick) School of Veterinary Studies, University of Edinburgh, Midlothian, United Kingdom. [3]Donnington Grove Veterinary Group, Newbury, United Kingdom

Focal hyperintense lesions within the navicular bursa protruding from the dorsal border of the deep digital flexor tendon (DDFT) are often found on T1 weighted magnetic resonance images (MRI) and can cause lameness in horses. Navicular bursoscopy has been described as a treatment option for these lesions known as synovial masses. The aim of this study was to investigate the correlation between MRI and navicular bursoscopy findings. It was hypothesised that the prognosis following surgery would be proportional to the degree of damage to the DDFT. In this retrospective study horses that underwent standing low field MRI and navicular bursoscopy over a 15-year period were included. A subjective grading system was developed to classify the size of any synovial mass and lesions of the DDFT on MRI and at surgery. Generalized estimating equations were used to evaluate the association between MRI findings and surgery and between outcome and tendon injury. Fifty-nine horses that had 1 year of follow-up were included, with 90 navicular bursae examined both on MRI and endoscopically. There was strong correlation between the size of masses and tendon lesions on MRI and bursoscopy (P = 0.001). Size of tendon lesions and mass had no impact on prognosis, which was guarded (30.5% return to previous level of exercise). MRI correctly predicts presence and size of synovial masses and tendon lesions with no false positives. Size of the synovial masses or tendon lesions does not influence prognosis following navicular bursoscopy.

COMPUTED TOMOGRAPHIC (CT) AND CLINICAL FEATURES OF MIDDLE EAR EFFUSION IN HORSES

Tiziana Liuti, Tobias Schwarz

Royal (Dick) School of Veterinary Studies, Edinburgh, United Kingdom

Otitis media (OM) is a rare but clinical debilitating disease in horses. Clinical signs may include head shaking, head tilt, vestibular and facial nerve dysfunction. Aims of this study are description of CT and clinical findings of equine OM. Medical and imaging archives were searched for equine CT head studies with evidence of tympanic bullae containing fluid or soft tissue. Age, gender, breed, clinical signs were recorded. CT imaging criteria relating to ear disease were reviewed and recorded by a board-certified radiologist. 490 CT equine head studies were reviewed, and six horses met the inclusion criteria. In 6/6 cases the middle ear effusion was unilateral; 2/6 showed a lytic tympanic bulla wall, 1/6 showed periosteal reaction of the temporohyoid joint and stylohyoid bone and 1/6 showed loss of normal cochlea bony outlined. Brain contrast enhancement was seen in 1/6 horse. 4/6 cases had a normal external ear canal and wall. 2/6 cases had complete occlusion of the ear canal lumen and 1/ 2 had a thickened ear canal wall. In 3/6 cases, there were no associated clinical signs whilst in the other 3 cases clinical signs of OM were present. In 2 cases with follow-up, signs of OM persisted despite aggressive medical treatment. Middle ear effusion is uncommon in horses and usually unilateral. CT features include fluid-filled tympanic bullae with lysis. Middle ear effusion is easy to recognise on CT and may correlate with clinical findings of OM.

COMPARISON OF CONE-BEAM AND FAN-BEAM COMPUTED TOMOGRAPHY AND LOW-FIELD MAGNETIC RESONANCE IMAGING FOR DETECTION OF PROXIMAL PHALANX DORSOPROXIMAL OSTEOCHONDRAL DEFECTS

Szu-Ting Lin[1], Nicholas M. Bolas[2], David R. Sargan[1], Olivier Restif [1], Vanessa G. Peter [3], Rachel Pokora[3], Hayley E. Patrick[4], Alastair K. Foote MA[3], Rachel C. Murray[3]

[1]Department of Veterinary Medicine, University of Cambridge, Cambridge, United Kingdom. [2]Hallmarq Veterinary Imaging, Guildford, United Kingdom. [3]Rossdales Equine Hospital and Diagnostic Centre, Newmarket, United Kingdom. [4]Swayne and Partners Veterinary Surgeons, Bury St Edmunds, United Kingdom

Dorsoproximal osteochondral defects are a common pathology affecting the proximal phalanx, but information about detection on computed tomography (CT) and magnetic resonance imaging (MRI) is limited. The study aimed to describe CT and MR images of osteochondral defects at dorsomedial and dorsolateral eminences of the proximal phalanx, and assess diagnoses and measurements using macroscopic pathology as a gold standard. Thirty-five cadaver limbs underwent standing cone-beam (CB) CT, fan-beam (FB) CT, low-field MR imaging and pathological examination. On CBCT and FBCT, osteochondral defects appeared as saucer-shaped subchondral defect/irregularity on frontal/sagittal images. On MRI, osteochondral defects were a combination of articular cartilage defect/loss of continuity on frontal images and subchondral irregularity/flattening on sagittal images. Fifty-six defects were seen over seventy potential locations. Compared to pathological examination the sensitivity, specificity, positive predictive value, and negative predictive value of diagnosis were 86%, 64%, 91%, and 53% for FBCT; 64%, 71%, 90%, and 33% for CBCT; and 52%, 71%, 88%, and 28% for MRI. Sensitivity of all modalities increased with defect size. Macroscopic defect dimensions were strongly correlated with CBCT (r=0.76) and moderately correlated with FBCT and MRI (r=0.65). Macroscopic measurements were significantly greater than all imaging modality dimensions (p <0.001), potentially because macroscopy included articular cartilage pathology but imaging focused on osseous defect size. Osteochondral defects could be visualised using both CT and MRI with sensitivity increasing with defect size. Diagnostic performance was best using FBCT, followed by CBCT then MRI, but CBCT-measured defect size best correlated with macroscopic examination.

PREVALENCE AND ASSOCIATION OF ULTRASONOGRAPHIC AND COMPUTER TOMOGRAPHIC FINDINGS IN EQUINE SACROILIAC JOINT CADAVERS

Andrea Bischofberger[1], Hans Geyer[2], Rebecca Mathys[3], Thomas Schmitz[3], Stefanie Ohlerth[1]

[1]Clinic of Diagnostic Imaging, Department of Clinical Services, Vetsuisse-Faculty, University of Zurich, Zurich, Switzerland. [2]Institute of Veterinary Anatomy, Vetsuisse-Faculty, University of Zurich, Zurich, Switzerland. [3]Equine Hospital, Equine Department, Vetsuisse-Faculty, University of Zurich, Zurich, Switzerland

Ultrasonography (US) is useful for diagnosing sacroiliac joint (SIJ) pathology, however only the ventral caudomedial aspect may be assessed. The objective was to describe, quantify and associate US and computed tomographic (CT) findings in the SIJ of middle-aged Warmblood cadavers. Sixteen specimens were obtained from 9 horses (mean, 13.3 years; SD, 3.3 years). On rectal US, osteophyte/entheseophyte formation, effusion, sacrum/ilium modelling, and ventral SI ligament changes were evaluated. On CT, osteophyte/entheseophyte formation, sclerosis, subchondral bone lesions and sacrum/ilium modelling were assessed. Findings on US and helical CT scans were scored (total score of 15 points each for US, CT of the caudal third and of the complete SIJ). Frequencies of US and CT findings were calculated and correlated. In total, 2, 1 and 0 SIJs were normal (score 0) with US, CT of the caudal third of the SIJ and CT of the complete SIJ, respectively. The remaining joints showed mild (31%, 63%, 44%), moderate (44%, 19%, 44%) or severe (13%, 13%, 13%) abnormalities. The most common US and CT findings were osteophyte formation (88% US, 100% CT), effusion (81% US), and sclerosis (88% CT). A significant positive trend ($p<0.07$) was found correlating US and CT scores of the caudal third ($rs=0.49$) and the complete SIJ ($rs=0.46$). SIJ findings are common in middle-aged horses. US appears to correlate with CT findings of the caudal third and of the complete SIJ, however, a larger study population is needed to prove this hypothesis.

DIAGNOSING BONE LESIONS IN THE PROXIMAL ORIGIN OF THE EQUINE THIRD INTEROSSEUS MUSCLE: HALLMARK SIGNS OF CORTICAL RESORPTION AND/OR AVULSION FRACTURE ON STANDING MRI.

Stijn Hauspie, Elodie Dufay, Lothar Vanslambrouck, Tom Mariën, Zoë Joostens

Equitom by Equine Care Group, Lummen, Belgium

Insertional desmopathy of the third interosseus muscle is a common cause of lameness in horses. Exact characterization of lesions is imperative for accurate treatment and sport career longevity. For this retrospective study, studies of patients with lameness localized to the proximal origin of the third interosseus muscle by diagnostic analgesia were reviewed. Only studies of patients having both a standing magnetic resonance imaging (sMRI) and standing cone beam computed tomography (sCBCT) exam were retained. sCBCT was used as golden standard for detection of bone lesions at the proximal origin as it has excellent bone resolution. A total of 12 patients were available. sCBCT demonstrated different types of pathology: normal cortical bone (3), early cortical resorption (3), advanced cortical resorption (3) and avulsion fractures (3). sMRI demonstrated clear intracortical T1/T2 FSE and T2* oW hyperintensity in all cases of advanced cortical resorption and avulsion fracture. In some of the avulsion fracture cases, the fragment was visualized as a T1 hypointensity surrounded by a rim of T1 hyperintensity. No cortical signal alterations were detected in the cases with early onset cortical resorption or normal cortical bone. This study clearly demonstrated that cortical bone pathology is easily missed on sMRI and that even minor cortical signal changes on sMRI can be clinically significant. Minor intracortical signal alterations on sMRI should therefore be interpreted with care, especially in cases where sCBCT or conventional multislice CT is not available for confirmation as these type of lesions will have a significant influence on treatment and prognosis.

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CHARACTERIZATION OF TARSAL LESIONS USING 18F-NAF PET CT IN A CLINICAL POPULATION OF HORSES

Mathieu Spriet[1], Pablo Espinosa[2], Gabriel Manso Diaz[3]

[1]UC Davis School of Veterinary Medicine, Davis, USA. [2]Ontario Veterinary College, University of Guelph, Guelph, Canada. [3]Complutense University of Madrid, Madrid, Spain

Combining the excellent structural information provided by computed tomography (CT) with the functional information of 18F-NaF Positron emission tomography (PET) has the potential to provide outstanding characterization of tarsal lesions in a clinical population of horses. Horses with lameness localized to the tarsal and proximal metatarsal regions that underwent 18F-NaF PET/CT were included in this retrospective descriptive study. 18F-NaF PET and CT images were independently evaluated by three observers using 113 anatomically defined regions of interest. The median score was used for further analysis. 46 limbs from 25 horses were included. The three most common sites of increased 18F-NaF PET uptake were the plantar subchondral bone of the third metatarsal bone, the dorsodistal subchondral bone of the central tarsal bone and the dorsoproximal subchondral bone of the third tarsal bone with prevalence of 34.8, 26.5 and 26.5% respectively. The lateral metatarsal attachment of the suspensory ligament was the most common CT abnormality (32.8%), but only had increased 18F-NaF uptake in 15.2% of the tarsi. The dorsoproximal and plantaroproximal subchondral bone of the third tarsal bone were the second and third most common CT abnormalities, with prevalence of 30.4 and 28.3% of the tarsi respectively. This study highlights the previously poorly recognized high prevalence of abnormalities at the plantar aspect of the distal tarsal joints. The lower prevalence of 18F-NaF uptake compared with CT abnormalities at the proximal attachment of the suspensory ligament demonstrates that many horses have chronic inactive changes in this area.

PARASAGITTAL LYSIS AND SCLEROSIS IS ASSOCIATED WITH INCREASED RISK OF CONDYLAR FRACTURE IN RACING THOROUGHBREDS

Cathy Beck, Peta L Hitchens, R. Chris Whitton

University of Melbourne, Melbourne, Australia

The metacarpophalangeal/metatarsophalangeal joint (MC/TPJ) is the most common site of injuries in the Thoroughbred (TB) racehorse. The majority of injuries arise from the accumulation of microdamage thus identifying pre-existing injury may aid in flagging horses at risk. We investigated associations between pathology of the MC/TPJ seen on CT imaging and fractures of the lateral and medial metacarpal/tarsal condyles in order to aid identification of horses at risk of fracture. Post-mortem CT images of horses euthanised on Victorian racetracks between 2017 and 2022 were reviewed. Images were graded using a semiquantitative grading scale. Univariable generalised linear models accounting for clustering at the horse level were generated. Odds ratios and their 95% confidence intervals (95% CI) are presented. CT images from 367 MC/TPJ of 157 TB racehorses were reviewed. The presence of parasagittal lysis in either or both lateral and medial parasagittal grooves (OR 13.11; 95% CI 6.98-24.64; P< 0.001) and greater depth of sclerosis at the lateral parasagittal groove (OR 1.11; 95% CI 1.05-1.18; P= 0.009) was associated with condylar fracture in that horse. There was no association between presence of palmar osteochondral disease and fracture (P=0.981). The presence of parasagittal lysis and increased depth of sclerosis at the lateral parasagittal groove may aid identification of horses at risk of condylar fracture using CT imaging as a screening tool. Further work is currently being undertaken to determine CT features that may identify horses at risk of proximal sesamoid bone fracture.

BONE MARROW EDEMA LIKE CHANGES DUE TO A REST PERIOD IN THE FORE FETLOCKS OF STEEPLECHASERS

Fabrice Audigie, Claire Moiroud, Lélia Bertoni, Sandrine Jacquet-Guibon, Audrey Beaumont, Amélie Tallaj, Jean-Marie Denoix, Nathalie Crevier-Denoix

CIRALE, USC 957 BPLC INRAE, Ecole nationale vétérinaire d'Alfort, Goustranville, France

Bone marrow edema like (BMEL) lesions characterized by an increased signal on fat suppressed MR images are usually considered as a pathological sign associated with bone injuries[1-3]. Our hypothesis was to consider that such changes can also be observed in bones of athletic horses undergoing a marked reduced activity. Standing MR images of both fore fetlocks of 9 steeplechasers presenting an acute superficial digital tendonitis were acquired in the month following injury (M1) and about 2.5 months [range: 66-94 days] after the first examination (M3). Horses underwent reduced activity (beginning of rehabilitation) between both examinations. MR images were analysed subjectively and quantified by calculating the ratio of the mean metacarpal condyle signal with respect to that of the deep digital flexor tendon (Mc-Cd/DDFT). CT images of the injured forelimb were acquired at the same periods and the mean fetlock bone density (HU) calculated. Quantitative analysis was performed using ImageJ and statistical analysis using Student-t tests. Comparing M3 to M1, a diffuse increased signal on STIR images and a significant increase of Mc-Cd/DDFT were found in both fetlocks of 7 horses. In the other 2 horses, 3 fetlocks showed no STIR signal changes and one had a Mc-Cd/DDFT decrease. The fetlock bone density was significantly decreased in 8 horses with a mean demineralisation of 7.4% [range: 4.6-16.0 %]. This study demonstrates that BMEL changes can be induced by a rest period in athletic horses. These alterations should be considered when interpreting follow-up examinations.

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MRI APPEARANCE OF MEDIAL SUBCHONDRAL BONE INJURIES OF THE PROXIMAL PHALANX GLENOID IN WARMBLOOD HORSES

Maxime Vandersmissen[1], Valeria Busoni[1], Fabrice Audigié[2], Laurence Evrard[1]

[1]University of Liège, Faculty of Veterinary Medicine, Diagnostic Imaging Unit, Liège, Belgium.
[2]CIRALE-EnvA, USC INRAE 957 BPLC, Goustranville, France

There is growing evidence that medial glenoid subchondral bone (SCB) damage occurs in the proximal phalanx (P1) in Warmblood horses[1,2]. This retrospective study aims to describe the magnetic resonance imaging (MRI) appearance of these lesions in a clinical case series examined in a standing low-field MRI unit. Horses with MRI evidence of medial glenoid SCB injury of P1 were included. Lesions were characterized according to their configuration, including signal and extent. Concurrent lesions of the metacarpal condyle and periarticular soft tissues were recorded, as well as follow-up data when available. Ten horses (12 forelimbs) met the inclusion criteria. MRI changes included SCB plate thickening, trabecular sclerosis and enlarged vascular channels (12/12); bone marrow lesion (10/12), SCB resorption (10/12), and periosteal reaction (8/12). Distribution of SCB resorption in the transverse plane was linear (6/10), or ill-defined (4/10). All limbs had concurrent metacarpal condyle abnormality, osteophytosis and joint effusion. At recheck MRI (ranging 8 weeks to 2 years from initial examination), SCB lesions were static (3/6), improved (2/6) or worsened (1/6). One horse encountered a comminuted fracture of the affected P1 18 months after the last MRI examination. The MRI appearance of medial glenoid SCB injuries of P1 in this case series is consistent with chronic bone overload or stress injuries, as observed in CT[2]. The linear configuration of some lesions suggests short incomplete stress fractures. Medial SCB overload may play a role in the development of P1 fractures and possibly be prodromal for catastrophic injury.

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COMPUTED TOMOGRAPHIC APPEARANCE OF SINUS PNEUMOCELE IN TWO HORSES

Alexandre Charles[1], Maxime Vandersmissen[1], Alexandra Salciccia[2], Thomas van Bergen[3], Valeria Busoni[1], Laurence Evrard[1]

[1]Imaging Section, Department of Clinical Sciences of Equids, Faculty of Veterinary Medicine, University of Liège, Liege, Belgium. [2]Surgery Section, Department of Clinical Sciences of Equids, Faculty of Veterinary Medicine, University of Liège,, Liege, Belgium. [3]Equine Surgery, Clinic of Acy-Romance, Acy-Romance, France

Pneumocele is a rare slow-growing paranasal sinus expansion reported in humans and horses associated to bone thinning or erosion of the sinusal walls [2,3]. The rarity of the condition and the paucity of reports in horses give relevance to the knowledge of its imaging features. This poster describes the computed tomography (CT) appearance of a sinus pneumocele in two horses. Two 15-year-old equids, a pony mare (Case1) and a Selle-Français gelding (Case2) were presented for CT investigation of a firm progressive left-sided facial swelling (maxillary in Case1, orbital in Case2). In Case2 there was an associated ipsilateral epiphora. CT identified an expansile sinus deformity (maxillary in Case1, conchofrontal in Case2) with lateral displacement, irregular thinning and scalloping of the lateral bony sinus wall. There were thin supernumerary sinus septa. The lacrimal canal was deviated medially. No mass was present and nasomaxillary opening was pervious. Histopathology performed in Case1 identified bone lysis, granulation tissue and a flat epithelium overlying the normal respiratory sinus epithelium. Aetiopathogenesis of sinus pneumocele remains obscure. In humans, several causes have been proposed, including a one-way valve mechanism with air-flow obstruction, trauma, and drainage of mucocele [1,3]. No sinonasal obstruction was identified in the two cases, though additional septa may have caused partial sinus compartmentalisation. Spontaneous drainage of a sinus mucocele has been proposed to explain a pneumocele in an equine case report with histopathological findings similar to Case1 [2].

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COMPUTED TOMOGRAPHIC FEATURES OF BRONCHIAL GRASS AWN FOREIGN BODY IN THE DOG: A RETROSPECTIVE STUDY

Mattia Bonazzi, Martina Fumeo, Eleonora Daga, Sabrina Manfredi, Francesca Miduri, Manuel Dall'Aglio, Giacomo Gnudi, Antonella Volta

Department of Veterinary Science, University of Parma, Parma, Italy

The purpose of this study is to supplement recent reports of computed tomographic (CT) findings in dogs with bronchial grass foreign bodies in comparison with endoscopy. Database was screened for dogs presented between 2014-2022 with grass awn bronchial foreign body diagnosis, which underwent CT examination of the thorax and bronchial endoscopy. Images were assessed for thoracic lesion characteristics. Twenty dogs of different breeds were included (11 males, 9 females, mean age 4.4 +/-1.8 years). A total of 30 bronchial grass awns were retrieved by endoscopy: 13 dogs had 1 grass awn, 7 dogs had multiple grass awns. Ten grass awns were located in the right and left caudal lung lobes, 4 in the accessory lobe, 2 in the right middle, in the left cranial and in the right cranial lung lobes. Grass awn foreign bodies were characterized by a hyperattenuating linear intraluminal inclusion, mixed with fluid density material, sometimes with internal gas. The affected bronchi showed signet ring sign, representing ectasia, in all cases. Eighty-five % showed bronchial wall thickening and/or tree in bud pattern, 65% focal alveolar consolidation and pleural thickening or striation, 55% regional lymphadenopathy, 30% focal ground glass opacity and pleural/lung abscessation, 20% pleural effusion. One dog had pneumothorax. Endoscopy confirmed the presence and number of grass awn foreign bodies in all cases. CT was a valuable diagnostic tool to identify the location and number of bronchial grass awn foreign bodies. Bronchiectasis and alveolar consolidation were the most frequent concomitant abnormalities.

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COMPUTED TOMOGRAPHY DACRYOCYSTOGRAPHY IN DOGS AND CATS: CASE SERIES AND LITERATURE

Hannah Shing, Lorraine Fleming, Ruth Dennis

Dick White Referrals, Cambridge, United Kingdom

Computed tomography dacryocystography (CT-DCG) is a useful tool in the evaluation of the lacrimal system. The purposes of this retrospective, descriptive study and literature review were to appraise the technique, highlight ways to reduce technical challenges and describe the findings in patients presenting for investigation of epiphora and ocular discharge. CT-DCG results of twenty patients were reviewed. Recorded parameters included success or failure of CT-DCG; presence, location and margination of contrast filling defects, stenoses or dilations; regional osseous changes; and nasolacrimal duct deviation. Technical complications were also recorded. Unsuccessful CT-DCG occurred in four cases and was due to kinking of the instillation catheter, rapid contrast washout, nasolacrimal duct agenesis and proximal foreign body obstruction. Simultaneous instillation of contrast medium into the contralateral nasolacrimal duct was useful as a control for comparison of anatomy and aided assessment of contrast flow. Final diagnoses included dacryocystitis (10), vegetative foreign body (5), dacryops (1), nasolacrimal duct agenesis (1), nasolacrimal duct tortuosity (1), and obstruction of the nasolacrimal duct by nasal adenocarcinoma (1) and pyogranulomatous rhinitis (1). A vegetative nasolacrimal foreign body was identified in five patients and presented as a focal, irregularly marginated, contrast filling defect on CT-DCG. Four out of five (80%) were identified within the lacrimal sac and one (20%) in the intraosseous part of the nasolacrimal duct. CT-DCG is useful in defining the anatomy of the lacrimal system, localising nasolacrimal obstructions, excluding obstruction secondary to nasal or orbital disease, and facilitating preoperative planning.

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THE MAGNETIZATION TRANSFER RATIO OF THE POST-MORTEM CANINE INTERVERTEBRAL DISC IS POSITIVELY CORRELATED TO PFIRRMANN GRADING ON HIGH FIELD 3.0T MRI

Antonin Martenne-Duplan[1], Corentin Tricou[2], Marlène Finck[1], Benjamin Cartiaux[2,3], Germain Arribarat.[3], Giovanni Mogicato[2,3]

[1]Centre Hospitalier Vétérinaire Massilia, Animedis, IVC Evidensia, Marseille, France. [2]Ecole Nationale Vétérinaire de Toulouse, Toulouse, France. [3]Institut National de la Santé et de la Recherche Médicale (Inserm), Toulouse, France

Intervertebral disc degeneration (IVDD) in chondrodystrophic dog breeds is an early pathological process. Standard magnetic resonance imaging (MRI) sequences permit the appreciation of IVDD and of its consequences on adjacent neurological structures. In human medicine, quantitative MRI sequences, such as magnetization transfer ratio (MTR) sequences, are developed to detect early IVDD. This prospective comparative analytical study aimed to evaluate the correlation between a qualitative Pfirrmann MRI grading and the MTR values of the intervertebral disc (IVD) in chondrodystrophic dogs. Eight cadaver vertebral columns of young adult Beagles were imaged in T2-weighted and MTR sequences using a 3.0T high-field MRI. These sequences were reviewed by two observers. There were 138 intervertebral discs analysed: 29/138 (21.0%) IVD were grade I, 74/138 (53.6%) grade II, and 35/138 (25.4%) grade III. Inter-observer agreement for Pfirmann grading was good (r=0.79). Inter-observer agreement for delineation of IVD ROI was fair (r=0.54) but inter-observer agreement of mean MTR value within the ROI was very good (r=0,89). Mean MTR values were 1645.9 (1003.05-2109.5) for grade I, 1888.8 (1007.5-2724) for grade II, and 2281.3 (1257-3176) for grade III. The mean MTR value was significantly different between each Pfirrman grade: between grades I and II (p<0.005), grades II and III (p<0.05), and grades I and III (p<0.005). There was a significant moderate positive correlation between Pfirrmann grading and mean MTR values (r=0.516). The magnetization transfer ratio seems to be an objective reproducible method to detect early intervertebral disc degeneration via quantitative analysis.

DWI AND ADC MRI FINDINGS WITH AN EMPHASIS ON T2 BLACKOUT/T2 WASHOUT PHENOMENA OF PRESUMED HEMORRHAGIC BRAIN LESIONS AND A BRAIN MASS IN DOGS.

Robert Cruz-Arambulo

VetsChoice Radiology, Northbrook, USA. University of Guelph (Occasional Locum), Guelph, Canada

To describe T2 blackout and T2 washout effects in cases of brain haemorrhagic lesions and a case of presumed brain tumour. Patients referred to the Neurology Service of the Ontario Veterinary College at the University of Guelph were evaluated for various acute, peracute, and subchronic central neurological signs including seizures, partial blindness, pacing/circling behaviour, and stupor. A brain MRI was performed with a 1.5 T magnet. Magnetic susceptibility was noted on T2*WI in six patients suggestive of a haemorrhagic CVA/hematoma. On DWI and ADC images, localized and pinpoint void signals were noted. T1 post-contrast images demonstrated two lesions with no contrast enhancement (CH), one lesion with mild heterogeneous CH, and three lesions with mild peripheral CH pattern. One patient was thrombocytopenic. One patient had one monthly MRI recheck showing substantial resolution of the lesion. In one patient, the lesion was isointense on DWI and ADC images and mildly hyperintense on T2, a characteristic of a T2 washout, this lesion was enhanced on T1-post-contrast images prompting the diagnosis of an intra-axial mass. To the author's knowledge, this is the first report in veterinary literature describing the T2 effects on DWI. T2 blackout refers to hypointensities on DWI caused by hypointensities on T2WI. T2 washout is described as isointense on DWI due to balanced hyperintensities in T2WI and increased ADC. The T2 blackout effect has been associated with hematomas, whereas T2 washout has been associated with vasogenic oedema and intracranial space-occupying lesions in human literature.

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INTRAARTICULAR CONTRAST IMAGING OF THE FETLOCK JOINT - COMPARISON OF TRUE NON-CONTRAST, CONTRAST, AND VIRTUAL NON-CONTRAST IMAGES OBTAINED USING SPECTRAL IMAGING IN DUAL-ENERGY COMPUTED TOMOGRAPHY (CT)

Małgorzata Domino, Katarzyna Skierbiszewska., Tomasz Jasiński, Bernard Turek

Department of Large Animal Diseases and Clinic, Institute of Veterinary Medicine, Warsaw University of Life Sciences, Warsaw, Poland

Intraarticular fractures or osteoarthritis in fetlock joint are common causes of lameness in horses. Dual-energy computed tomography (DECT) was applied here to differentiate the density and atomic number Z of the fetlock joint. The study aimed to compare the attenuation value (AV) of the non-contrast and contrast images of normal fetlock joints. The study was conducted on cadaverous legs (n=8). The fetlock joints were subjected to biphasic imaging using Dual-energy CT scans (64-row Revolution CT, GE, USA). The iodine contrast (30mL) was injected into the fetlock joints. True non-contrast (TNC), contrast (C), and virtual non-contrast (VNC) images were acquired, reconstructed in mono/MD 70keV, and evaluated in Iodine(calcium)/MD window. The minimal and maximal AV (mean±SD) were returned. Data pairs were assessed with a paired t-test or Wilcoxon rank-sum test. Min AV was lower (p=0.008) on TNC (20.9±36.6 HU) than C (2847±517 HU) images and on VNC (-1239±543 HU) than C images. Similarly, Max AV was lower (p=0.008) on TNC (86.3±43.4 HU) than C (3043±79 HU) images and on VNC (-727±458 HU) than C images. Both min AV (p=0.0003) and max AV (p=0.001) were higher in TNC than in VNC images. For fetlock joint, AV differed between investigated images when advanced spectral imaging was applied. As the differentiation in the fetlock joint material composition was confirmed before and after contrasting, the DECT seems to be a promising tool for advanced imaging of equine fetlock joint diseases.

ADVANCEMENT IN COMPUTED TOMOGRAPHIC (CT) EVALUATION OF NAVICULAR SYNDROME IN A HORSE - APPLICATION OF DUAL-ENERGY CT

Tomasz Jasiński, Katarzyna Skierbiszewska, Bernard Turek, Małgorzata Domino

Department of Large Animal Diseases and Clinic, Institute of Veterinary Medicine, Warsaw University of Life Sciences, Warsaw, Poland

Navicular syndrome is responsible for approximately one-third of cases of chronic lameness of distal phalanx in horses, thus is an important target of advanced equine diagnostic imaging. The study aimed to compare the CT attenuation number of the normal navicular bursa between true non-contrast (TNC) images, contrast (C) images, and virtual non-contrast (VNC) images. The study was conducted on 8 cadaverous legs, scanned using Dual-energy CT protocol (Revolution CT, GE, USA). Iodine contrast agent was injected into the navicular bursa using plantar midline approach with x-ray control. The mono/MD 70 keV reconstruction and MD Iodine(calcium) window were used to the annotated ROI in the navicular bursa and returned minimal and maximal attenuation values (AV) (mean ± SD). Differences in min AV and max AV between data pairs were assessed with a paired t-test or Wilcoxon rank-sum test for the $\alpha = 0.05$. Both min AV and max AV were lower (p=0.008) on TNC (43.9±24.6 HU; 88.4±10.8 HU) than C (3036±8 HU; 3071±0 HU) images and lower (p=0.008) on VNC (-1592±284; -1100±459) than C images. Moreover, min AV (p<0.0001) and max AV (p=0.0002) were higher on TNC than VNC images. For the navicular bursa, VNC attenuation values obtained by DECT imaging were not overlapping with that of TNC and C images. Thus DECT is a promising tool for advanced imaging of equine distal phalanx and its utility in the navicular syndrome evaluation should be further investigated.

EQUINE DORSAL METACARPOPHALANGEAL/METATARSOPHALANGEAL BONE INJURY DETECTED ON MAGNETIC RESONANCE IMAGING MAY BE ASSOCIATED WITH PALMAR/PLANTAR SOFT TISSUE PATHOLOGY

Soledad Guiñón , V. G. Peter, R. C. H Pokora Imaging Technician, R. C Murray

Rossdales Equine Diagnostic Centre, Exning, United Kingdom

Hyperextension of the equine metacarpophalangeal/metatarsophalangeal joint may be associated with dorsal bone injury and/or palmar/plantar soft tissue damage. We hypothesised that soft tissue injuries would be more frequently present in horses with dorsal bone injury than those without. We aimed to investigate relationships between dorsal fetlock bone injury occurrence (dorsoproximal proximal phalanx; dorsodistal third metacarpal) and palmar soft tissue injuries detected using magnetic resonance imaging (MRI). Reports from horses undergoing standing fetlock MRI examination (2020-2022) were retrospectively reviewed. Location/severity of proximal phalanx dorsoproximal and third metacarpal/metatarsal dorsodistal signal changes, suspensory and distal sesamoidean ligament pathology were recorded. Soft tissue lesion occurrence was compared between limbs with and without dorsal bone pathology. Of 234 reports, 77% (181/234) had dorsal bone pathology among which 59.3% (108/181) had abnormalities within the suspensory branches and/or distal sesamoidean ligaments. Of the 22% (52/234) that did not have dorsal bone pathology, 44% (23/52) had concurrent palmar/plantar soft tissue injuries. Strong trend to significantly higher occurrence of soft tissue injuries in limbs with dorsal bone pathology was present (p=0.0587). Severity of dorsal lesions was not related to frequency of occurrence of soft tissue lesions, and severity of soft tissue lesions did not differ between dorsal bone pathology presence/absence. Dorsal bone abnormalities are common findings in fetlock MR examination, and there is indication that there may be relationship to palmar/plantar soft tissue injury, so it is recommended that soft tissues are evaluated carefully when dorsal bone injury is detected.