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MRI AND MRA CHARACTERIZATION AND PREOPERATIVE EVALUATION OF THYMOMAS IN DOGS

W.H. Adams¹, S. Hecht¹, G.A. Conklin¹, D.R. Reep², P.A. Sura¹. 1Department of Small Animal Clinical Sciences, University of Tennessee; 2Department of Biomedical and Diagnostic Sciences, University of Tennessee, Knoxville, TN, USA

Introduction: CT and MRI are the standard modalities for characterization and preoperative surgical planning of mediastinal masses including thymoma in people.¹–³ Tumors are assessed based on published evaluation schemes to predict neoplasia behavior, invasiveness, and resectability.³ To date, there are two published reports describing CT evaluation of mediastinal masses in case series of dogs and cats.⁴,⁵, but no comparable report utilizing MRI.

Aim: The purpose of this study was to evaluate MR and MRA image characteristics of canine thymomas and to attempt to predict tumor resectability.

Materials and Methods: Dogs undergoing MRI thoracic evaluation followed by thoracotomy or necropsy were included. Imaging sequences using a 1.0 T scanner consisted of precontrast T1, T2, STIR, T1-W gradient echo, True FISP pre- and postcontrast T1-W VIBE, dynamic contrast enhanced 3D gradient echo and post contrast T1. Precontrast images were evaluated for tumor size, contour, lobulation, shape, homogeneity, presence of capsule and septa, presence of high and low signal foci, presence of regional lymphadenopathy, and pleural effusion. Post contrast images were evaluated for tumor vascular supply, deviation/invasion of great vessels, and patterns of contrast enhancement. Angiographic 3D images were reconstructed using maximum intensity projection and digital subtraction.

Results: Five dogs were included. The most characteristic imaging pattern of thymoma consisted of tissue hyperintense to muscle on T1 and T2-W sequences. Masses contained variable numbers of T2/STIR hyperintense foci that were isointense to hypointense to adjacent parenchyma on T1-W images. Post contrast images showed diffuse nonuniform tumor enhancement with small nonenhancing foci variably corresponding to areas of T2/STIR hypointensity. Two of five tumors contained large noncontrast enhancing areas of T1 isointensity and T2 hyperintensity. Tumor blood supply was predominantly from the internal thoracic artery. Great vessels of the cranial mediastinum were deviated without evidence of tumor invasion. Resectability was negatively correlated with tumor lobular extension into the mediastinum.

Conclusion: MRI/MRA was useful in characterizing morphology of thymoma and predicting tumor resectability.


PARASPINAL INFLTRATIVE INTRAMUSCULAR LIPOMA CAUSING SPINAL CORD COMPRESSION IN A DOG

A. Agut, A. Anson, M. Soler, M. Martinez, J. Murciano, A. Navarro, E. Belda, F. Laredo. Department of Animal Medicine and Surgery, Teaching Veterinary Hospital, University of Murcia, Spain

Introduction: Infiltrative lipomas (IL) are uncommon in dogs and rare in cats. Lipomas and IL are found more frequently on the head and neck. Lipoma-like masses infiltrating the vertebral canal and causing neurologic deficits, as the case described here, have been reported only in three cases.¹–³

Aim: The objective of this report is to describe a case of IL causing a femoral nerve dysfunction in a dog.

Materials and Methods: A 12-year-old, intact male Fox Terrier dog was evaluated with a history of abnormal gait of the left pelvic limb of 1 month of duration, without a previous history of trauma. Physical and neurological examinations were performed. Hematological and biochemical analysis was carried out. Imaging study of the lumbar spine was performed.

Results: The physical examination revealed a soft, painful mass of 12 cm of diameter on the left side of the caudal lumbar area. The patient could not bear weight on the left limb and maintained the stifle in a flexed position. Neurological abnormalities included loss of patellar reflex, decreased proprioception of the affected limb, and atrophy of the quadriiceps muscle that was indicative of a dysfunction of the femoral nerve. The ultrasonographic appearance of the mass was consistent with a lipoma that was confirmed by cytological study. Computed tomography (CT) images obtained before and after the IV administration of iodinated contrast medium, showed an expansive well-defined mass within the left epaxial muscles from L3 to L6 level, causing spinal cord compression. The lesion appeared as a homogeneous hypodense mass (–118 UH), similar to subcutaneous adipose structures (–118 UH). Contrast enhancement was not evident. The lesion was diagnosed as an infiltrative intramuscular lipoma that compressed the spinal cord at the level of the L5–L6. A hemilaminectomy was performed and the dog recovered neurologic function within 2 weeks.

Conclusion: In this case, CT imaging determined the location and extension of a mass causing spinal cord compression, and also provided evidence that the mass was fatty origin.


COMPLICATED THORACIC HYDATID CYST IN A CRAB-EATING MACAQUE

Z. Aizenberg,¹ T. Fredman², 1KSVH-Hebrew University-Jerusalem, 2The Israeli Primate Sanctuary, Kfar Daniel, Israel

Introduction: Hydatid cyst is the outcome of infection with the Taenia echinococcus granulosus tapeworm.¹ The canidae family are the definitive hosts of the worm while other animals, including human being and other primates are the intermediate hosts.²,³

Case History: An adult crab-eating macaque, arrived at the Israeli Primate Sanctuary from a research facility. Like many other “experimental” monkeys who came to the sanctuary for rehabilitation it was introduced to other monkeys and acclimatized very well. It had a long history of eye problem that was improved by a long term of low dose of Docycycline without a definite diagnosis. During relocation of monkey groups to larger enclosures a full physical examination, ultrasound examinations, and blood workup were done under anesthesia with ketamine. A large cyst-like structure was imaged in the right side of the thorax by ultrasound after detecting dyspnea. No other abnormalities were found during the ultrasound examination. A volume of 350 ml of clear fluid (like water) was aspirated from the cyst. Mild dyspnea was observed while the patient was hospitalized so the next day it was referred for CT examination to the Veterinary teaching Hospital of the Koret School of Veterinary Medicine, Hebrew University. CT showed that the cystic lesion was air-filled with no sign of...
Abstracts

CT provided unique... and Polyostotic hyperostosis (PH) is estrogen-dependent and... of the approaches and nerve location was demonstrated by the injection of ink around the... US in five fresh feline cadavers using a 4–13 MHz linear array transducer. The accuracy... through the thoracic aorta. Cross-sectional images were obtained in another five forelimbs by introducing red-latex... to be employed to locate and block PN in humans and dogs. To the author’s knowledge,... in the cat. Ultrasound was used... about areas in which radiography and ultrasonography were unrewarding without... to evaluate the liver, biliary system, stomach, and small intestine. Contrast radiography has previously been shown to be helpful in the study of the normal structure and function of the gastrointestinal tract and as a means of diagnosing gastrointestinal disease in the goat.¹ Hepatic, gall bladder, and splenic ultrasonography have also been widely used.¹ The superior contrast resolution of computed tomography (CT) is a potential advantage over conventional radiography.² Aim: The present study was performed to observe the radiographic structure and function of the abdominal organs using contrast radiography, ultrasonography, and CT.

Materials and Methods:
The morphology of the stomach, intestine, liver, spleen, caudal vena cava, portal vein, and gall bladder were examined by contrast radiography, ultrasonography, and CT in 11 feline forelimbs aged 1–1.5 years and weighing 25–30 kg. Results and Discussion:
Contrast radiography demonstrated the various parts of the gastrointestinal tract depending on the distribution of the contrast material (barium sulphate).³ Ultrasonography was used to evaluate the liver, biliary system, stomach, and small intestine.² CT provided unique information about areas in which radiography and ultrasonography were unrewarding without the need for contrast administration.² The diameter of the caudal vena cava, portal vein, and gall bladder decreased from the 9th to the 12th intercostal spaces with ultrasonicographic measurement.

Conclusions:
This study shows that contrast radiography, ultrasonography, and CT are safe, practical, and easily performed in the goat. Radiographic and ultrasonographic procedures were complimentary in the evaluation of the gastrointestinal tract, spleen, and liver. CT provided superior soft tissue differentiation over conventional radiographic techniques.

References:

Ultrasound Imaging of the Brachial Plexus for Regional Anaesthesia in the Cat
A. Anson¹, F. Laredo¹, F. Girì², E. Belda¹, M.O. Ayala², M. Soler¹, A. Aguil¹. ¹Department of Animal Medicine and Surgery, Teaching Veterinary Hospital, ²Department of Anatomy and Comparative Anatomy, University of Murcia, Spain

Introduction:
The recent development of high-resolution electronic broadband transducers has enabled ultrasonography (US) to be an optimal image technique to assess normal anatomy and abnormalities of the peripheral nerves (PN). US-guided techniques are gaining popularity to be employed to locate and block PN in humans and dogs. To the author’s knowledge, there is only information regarding the appearance and ultrasonographic approaches of the sciatic nerve in the cat.

Aim:
To describe the anatomical basis, the US appearance and approaches to the feline brachial plexus (BP) to facilitate its blockade.

Materials and Methods:
(i) Anatomical study: Ten feline forelimbs were used to establish the anatomical landmarks to approach the BP by US. Anatomical dissection of the BP was carried out in five forelimbs. Cross-sectional views in 1 mm thickness were obtained in another five forelimbs by introducing needles through the thoracic aorta. (ii) Ultrasonographic study “in vitro”: The BP was evaluated by US in five fresh feline cadavers using a 4–13 MHz linear array transducer. The accuracy of the approaches and nerve location was demonstrated by the injection of ink around the target nerves. (iii) Ultrasonographic nerve study “in vivo”: five healthy adult experimental cats were employed to perform an US examination of the BP as described in the “in vitro” study. (iv) US-guided block: the BP of five cats was blocked by an axillary approach. Cats were positioned in dorsal recumbency with the forelimb to be blocked abducted 90° and the other forelimb extended caudally. The needle was positioned in plane and lidocaine 2% was injected around of the nerve roots of the BP. The efficacy of the block was assessed by neurological examination every 10 min for 1 h.

Results:
The anatomical landmarks employed to locate the BP by US were the scapulo-humeral joint and the axillary arch. The axillary approach allowed the identification of all the BP roots. The muscular, cutaneous, radial, median, and ulnar nerves were individually identified by the humeral approach and appeared as homogeneous hypoechoic rounded structures surrounded by a hyperechoic rim.¹ The BP US-guided block was successful in four of five cats.

Conclusions:
US is an optimal technique to assess the BP and to guide the technique of BP block in cat.

References:

Surgical Versus Medical Treatment in Dogs with Gall Bladder Mucoceles
L.J. Armbrust¹, D.C. Broehnup¹, N. Belló². ¹Department of Clinical Sciences, ²Department of Statistics Kansas State University, Manhattan, KS, USA

Introduction:
Gall bladder mucoceles in dogs are increasingly diagnosed with ultrasound (US). This condition is generally considered a surgical emergency. Few cases in the literature indicate that dogs with gall bladder mucoceles may be treated medically.

Aim:
The purpose of this retrospective study was to define parameters, such as US, that determine appropriate treatment (medical vs. surgical) and prognostic indicators indicative of long-term outcome.

Materials and Methods:
Forty-four dogs presented to Kansas State University Veterinary Medical Teaching Hospital (2000–2010) with an US diagnosis of gall bladder mucocele were included. Medical records were reviewed for signalment, history, clinical signs, laboratory, and US findings, concurrent disease, medical, and surgical treatment, histopathology, and minimum 6-month follow-up.

Results:
The gall bladder and Cooper Spaniels were over-represented. Twenty-eight dogs were treated surgically, 16 medically. Vomiting was the most common clinical sign. Of the 28 dogs treated surgically, 13 were diagnosed with rupture on US, eight had confirmed rupture at the time of surgery. The most common ultrasound findings consistent with rupture were hyperechoic mesentery, free abdominal effusion, and abnormal gall bladder. Concurrent disease was seen in 11/16 medically treated dogs and 7/28 in the surgical group. The most common concurrent diseases were hyperadrenocorticism, diabetes mellitus, renal disease, and pancreatitis. Five surgical cases died or were euthanized due to complications related to the mucocele within 2 weeks of surgery. All 16 medically treated dogs survived the initial 14 day period. Subsequently, 1 dog was euthanized due to complications related to the mucocele.

Discussion/Conclusions:
Ultrasound overestimated the incidence of gall bladder rupture compared to surgical findings, but the US findings were specific for rupture (Sen 0.54, Sp 0.93, PPV 0.86, NPV 0.70). Breed, sex, and clinical signs were similar between groups and similar to the literature. Concurrent diseases were identified in both groups of dogs, with a higher incidence in the medical treatment group. The mortality rate for dogs undergoing surgery was 17%, which is less than previously reported. If dogs survived the initial 14-day period after surgery or initiation of medical therapy they were unlikely to die due to complications related to the mucocele.

References:

Polyostotic Hyperostosis in Birds: A Radiographic Study of 34 Cases
S.L. Arnaud, A.C.B. Pinto, FdEASt Sterman (in Memoriam). School Veterinary Medicine of University of São Paulo, São Paulo, SP, Brazil

Introduction:
During the preovulatory stage of the egg-laying cycle, female birds normally produce large amounts of medullary bone.¹,² Polyostotic hyperostosis (PH) is estrogen-dependent and associated with follicular development,² but has also been reported in association with ovarian cysts or tumors, oviductal tumors, and also in cases of sertolinomas in male birds.¹–⁴ PH is most frequently seen in budgerigars (Melopsittacus undulatus).²,⁵,⁶

Aim:
The goal of this study was to describe the radiographic findings in 34 birds with polyostotic hyperostosis.

References:
ABSTRACTS


COMPUTED TOMOGRAPHIC QUANTIFICATION OF CANINE ADRENAL GLAND VOLUME BEFORE AND AFTER ADMINISTRATION OF TETRACOSACTIDE

S. Asadi, M. Miziazem, M. Masoudfard, S. Soroori, A. Tavakoli, N. Gharzale. University of Tehran, Faculty of Veterinary Medicine, Department of Veterinary Radiology

Introduction:
The normal volume of the adrenal glands in dogs was previously established by computer tomography (CT), but however, the ability of this method for adrenal gland enlargement, which is the most probable change in the gland diseases, has not been examined yet.

Aim: We conducted a study in presumed normal dogs before and after administration of Tetra-cosactide to determine the adrenal gland volume and the ability of CT in detecting its enlargement.

Materials and Methods:
Two-detector CT analysis of the gland was carried out in 10 adult dogs without evidence of adrenal gland disease before and after 8 days 800 γ/Mg administration of Tetracosactide.

Results:
The mean baseline CT volume = 1.06 ± 0.65 cm³.

Conclusion:
Based on our study, CT is an effective and accurate method for assessing adrenal enlarge- ment in dogs.

REFERENCES:

COMPARISON OF ULTRASONOGRAPHIC OPPOSITE CONTRAST TECHNIQUE WITH LOW-FIELD MRI OF SOUND AND INJURED EQUINE PROXIMAL THIRD INTEROSSEOUS MUSCLE

Audigé F, Coudry V, Jacquet S, Poupot M, Desros J-M. GIRALE – Ecole Nationale Vétérinaire/Allfort – Université Paris Est, USC INRA 957 BPLC, Goussainville, France

Aim: Minimal correlation between routine ultrasonicographic (US) images and MR ones for sound equine proximal third interosseous muscle (PTIOM) has been reported.

A dedicated US approach performed on the fixed limb by tilting the probe to obtain opposite contrast (OC) images has been developed to overcome these limitations. The aim of this study was to evaluate the correlation and diagnostic interest of OC US images compared to MR ones in sound and injured PTIOM.
Materials and Methods:

Sound PTIOM, routine and OC US examination was conducted in six forelimbs and six hindlimbs. The same PTIOM was evaluated on a low-field MR system under general anesthesia. Correlation between transverse MR and OC US images was evaluated and quantified by measuring the interobserver correlation coefficient (ICC). The anterioposterior distance of the heart was measured on transverse US and MR images. The radiographic evaluation of the heart includes subjective and objective analysis. However, the values of the quantitative method in which the heart size is measured by vertebral scale and CT should be considered for the studies of thoracic trauma.

Results:

Sound proximal TIOM: the overall PTIOM was visualized on transverse OC US images. These images correlated morphologically well with the MR aspect of the PTIOM by increasing tissue contrast and differentiating the dense, fibrous, and connective parts of the PTIOM lobes. Correlation between transverse MR and OC US images was evaluated and quantified by measuring the interobserver correlation coefficient (ICC). The anterioposterior distance of the heart was measured on transverse US and MR images. The radiographic evaluation of the heart includes subjective and objective analysis. However, the values of the quantitative method in which the heart size is measured by vertebral scale and CT should be considered for the studies of thoracic trauma.

Discussion:

Dedicated OC examination improves the performance of US in the routine diagnosis PTIOM injuries. MRI represents an excellent complementary imaging technique due to its high contrast resolution and ability to document abnormalities in the bony part of the PTIOM entheses.1,2

References:


TOMOGRAPHIC DIAGNOSIS AND MONITORING OF PULMONARY CONTUSION AND PNEUMOTHORAX IN A GUINEA PIG


Introduction:

Blunt thoracic trauma is a common cause of injuries usually diagnosed with great accuracy by CT.3

Aim:

to describe the CT diagnosis and monitoring of pulmonary contusion and pneumothorax in a guinea pig

Case Report:

A guinea pig presented with dyspnea and a history of trauma on the day before it underwent thoracic CT. The images, a moderate gas collection was observed in the middle and caudal right portions of the pleural space. The left lung lobes had a diffused and slightly heterogeneous opacification, indicating pulmonary contusion. The right lung lobes had a marked homogeneous opacity, and were also reduced in size due to atelectasis secondary to pneumothorax. In a follow-up CT scan performed 72 h after trauma, the pneumothorax had regressed and the opacity of lung lobes had decreased and the right lobes’ size increased, secondary to the improvement of pneumothorax.

Discussion:

CT scan has a great accuracy in the identification of pulmonary contusion.4 It was observed in 20% of the patients by radiology and 100% of the individuals by CT.2 Pulmonary contusion, which usually takes an average of 6 h to be identified, resolves about than 3–10 days.5 In the animal reported, the pulmonary opacity was observed in the initial thoracic assessment, performed after 24 h of injury, and the pulmonary lesions has regressed on the 3rd day. The pulmonary consolidation identified in this type of injury is often observed as a diffuse or focal irregular opacity6 with air bronchograms due to hemorrhage within the airways.7 In the patient reported a diffuse and slightly heterogeneous opacity was identified, presumably due to atelectasis secondary to the pneumothorax in association with the pulmonary contusion.

References:


RADIOGRAPHIC MEASUREMENT OF HEART SIZE BY VERTEBRAL SCALE SYSTEM IN OVINES


Introduction:

The radiographic evaluation of the heart includes subjective and objective analysis. However, the values of the quantitative method in which the heart size is measured by vertebral scale system,1 are not known for animals of several species, including ovines. Aim: The objective of this study was to describe the samples of heart size by vertebral scale system in thoracic radiographs of ovines.

Materials and Methods:

Twelve healthy 6-month-old Bergamácia ovis were included in this study. The thoracic radiographs were made in the right lateral recumbent. The measurements of heart size were performed using the vertebral scale method described by Buchanan and Hitchcock11. The long axis of the heart was measured from the ventral border of the left main stem bronchus to the most distant ventral contour of the cardiac apex, whereas to the maximal short axis measurement of the heart, the calipers were placed in the central region of the third heart, perpendicular to the long axis. The measures were repositioned over the thoracic vertebral beginning with the cranial edge of the fourth thoracic vertebrae (T4). The sum of both measures was considered the value for vertebral heart size.

Results:

The animals presented a weight between 39 and 42.5 kg (mean: 41.04 kg) and a thoracic diameter between 75 and 86 cm (mean: 82.04 cm). The lower and upper limits and the
average of the measurement of the vertebral heart size (VHS) were 8.2, 9.4, and 8.6, respectively.

Discussion: VHS may be very useful for cardiac evaluation since it can increase the accuracy of the diagnosis of heart disease by radiographic examination and it is not dependent on the professional experience.3 Comparing the VHS in ovines with those in canines, it is found that this value is higher in the most canine breeds. The VHS average found in this study (8.6) resembles the lower limit set for German Shepherd dogs (8.7).4 One fact that may contribute to this similarity is the deep chests found in both animals.


CERVICAL AND THORACIC TOMOGRAPHIC FINDINGS IN A DOG WITH TRACHEAL RUPTURE


Introduction: Tracheal rupture, often diagnosed late or even not identified since the clinical signs presented by patients affected by this rare affection are often nonspecific,1 can be diagnosed by CT.1

Aim: In this case report, we describe the cervical and thoracic CT findings of a canine diagnosed with tracheal rupture.

Case Report: A 2-year-old male shih tzu with a history of trauma underwent a cervical and thoracic CT scan because of the suspicion of tracheal rupture since the radiographic examination showed cervical emphysema, pneumomediastinum, and pneumothorax. On CT were seen a focal deformity of the wall of the trachea associated with a decrease of its lumen at the level of the middle portion of the third cervical vertebra. In this examination, pulmonary atelectasis and air-filled cavities with ill-defined limits in cranial lung lobes were also noted, compatible with pneumatoceles. The animal was submitted for a surgical procedure and the presence of the tracheal rupture at the level of the third cervical vertebra was confirmed.

Discussion: In a study in which the CT findings of 14 humans with tracheal rupture and 41 patients with pneumomediastinum but without tracheal injury were compared, the most common CT findings noted in patients with this type of tracheal injury were deep cervical emphysema and pneumomediastinum,3 also identified in the animal of this case report. These patients were also identified with pneumothorax that may have originated from a rupture of the mediastinal pleura or a pneumatocele, which can be formed secondarily to a parenchymatic tear due to trauma.2 In humans, pneumothorax is not a frequent finding in cases of tracheal rupture. In one study, tracheal injury was identified by CT in 71% of human patients, either as a defect or a thickness of the wall of the trachea (70%) or as a tracheal ring fracture or a focal deformity of the wall (14%), as seen in this patient reported.


CONTRIBUTION OF THE ULTRASONOGRAPHIC METHOD IN THE DIAGNOSIS OF PYONEPHROSIS IN A CANINE


Introduction: Pyonephrosis, a rare disease in animals,1 is represented by an accumulation of purulent content in the renal pelvis. The diagnosis of this disease is based on clinical and ultrasonographic findings,2 which is recommended to be performed as early as possible, since the rapid intervention and treatment are extremely important in order to avoid complications.3

Aim: To describe the ultrasonographic contribution to the diagnosis of pyonephrosis in a dog.

Case Report: The ultrasonographic of the animal diagnosed with pyonephrosis, a 3-year-old mixed breed male canine, revealed a mild fluid collection in abdominal cavity and a well-defined structure with thin wall (0.31 cm thick) and tissue extensions to its interior. The structure occupied almost the entire abdominal cavity, and showed highly echogenic content. No signs of vascularization in color Doppler were visualized, suggesting the presence of a fluid collection, high viscosity content was indicated since no movement change of echogenic debris was observed.

Discussion: The imaging method most commonly used to aid in the diagnosis of pyonephrosis is ultrasound.2 It enables the identification of the dilatation degree of renal pelvis, which in severe cases, as in the animal reported, only a thin tissue in the periphery of the organ and some extensions to the interior of the structure are observed.4 This exam also enables the evaluation of the content echogenicity present in the renal pelvis. In the animal reported, an echogenic content that filled completely the renal pelvis was visualized, indicating the existence of a pyonephrosis or a hemonephrosis.3 An ultrasound guided fine needle aspiration can be done in some cases in order to differentiate these two diseases; however, in the animal reported it was not done since the peripheral renal tissue was thin and the content, that possibly could be a septic content, could leak into abdominal cavity. The ultrasound can also be used for the evaluation of secondary changes such as peritoneal and retroperitoneal inflammation and fluid.5 In the animal reported, a mild collection of fluid was observed in the abdominal cavity, however, it could not be aspirated by a fine needle since it was deeply located in abdominal cavity. It is believed that the fluid was originated from a lymphatic compressive process due to the extensive renal dimension since peritoneal and retroperitoneal inflammation, such as the presence of fibrinous material in organs surfaces and edematous and hemorrhagic omentum had not been observed during the surgical procedure.


ULTRASONOGRAPHIC FINDINGS OF EMPSYTOMATOUS HEPATIS IN A DOG


Introduction: Intraparenchymal and mural gas collection may be due to several malignant and benign processes and can affect several organs such as gallbladder, liver, renal parenchyma and pelvis, stomach, pancreas, and urinary bladder.1

Aim: In this report, we describe the ultrasonographic findings of empysematous hepatitis in a dog.

Case Report: A 16-years-old mixed breed female canine presenting ataxia, circling, head tilt, vocalization, mental depression, and ventromedial strabismus in the left eye as clinical signs underwent an ultrasonography due to the suspicion of hepatic encapsulopathies. In the examination of the liver, also presented echogenic focal areas with posterior reverberation and without twinkle artifact scattered throughout the liver parenchyma, more evident in the left lobe, indicating the presence of empysematous hepatitis.

Discussion: Empysematous hepatitis is a disease in which there is a gas accumulation in liver parenchyma, which is rare due to the highly vasculature and reticuloendothelial efficiency of this organ, in portal vasculature and in biliary system.2 This disorder is usually caused by gas-forming infection, which may be originated from distant or nearby sites by hematological or local dissemination, respectively.2 The ultrasonographic findings of empysema has been described in other organs such as gall bladder, kidney, and urinary bladder; however, there were no differences compared to the findings observed in the animal reported. In empysema, highly reflective hyperchoic images with reverberation artifact can be observed.1 A differentiation between intraparenchymal gas collection and mineralization should be done in these cases since a posterior reverberation artifact can occasionally be identified in this latter alteration.1 The twinkle artifact that appears as a turbulent flow in Doppler ultrasound in cases of mineralization may aid in the differentiation of both findings, especially in cases in which radiography and tomography were not made, as occurred in the animal reported. Computed tomography is considered the imaging modality most specific and sensitive to the evaluation of empysematous hepatitis.1 However, ultrasonography can be useful in the identification of those disturbances in some cases.

ULTRASONOGRAPHIC ASPECTS OF DYSPLASTIC KIDNEYS OF THREE DOGS


Introduction:
Renal dysplasia is a disorder resulted from an abnormality in nephrogenesis, which evolves into a chronic kidney disease in young animals.1 Ultrasound, since it allows evaluation of the kidney, may suggest the existence of the nephropathy as well as the prognosis of the animal.

Aim:
In this report, we describe the ultrasonographic aspects of kidneys affected by dysplasia in three dogs.

Case Reports:
Renal dysplasia was diagnosed in: (i) a 2-year-old male doberman pinscher; (ii) a 1-year-old male fasha apo and (iii) a 9-months-old female fasha apo. Ultrason examination of these animals revealed kidneys with reduced size and irregular margins. Absence of normal architecture and increased renal echogenicity were seen in their ultrason examination. In all patients, focal mineralizations were visualized in the renal cortex. In animals 2 and 3, bilateral renal cysts were identified. In patient 2, a mild collection of anechoic fluid was observed in bilateral perinephric region.

Discussion:
The sonographic aspects of renal dysplasia include a variety of features depending on the renal involvement by secondary inflammation and fibrosis. The ultrasonographic aspects of the kidney affected only by dysplasia include loss of corticomedullary differentiation and a cortical hyperechogenicity associated with a generalized increase in echogenicity of the renal medulla. In some multifocal multifollicular cases, when there is already the development of fibrosis, the sonographic findings include changes that were observed in the animals reported here, such as irregular margins and hyperechogenicity of the renal parenchyma with marked loss of corticomedullary differentiation1 and a decrease in their dimensions,2 indicating an unfavorable prognosis. Renal mineralizations that are usually present in senile animals were observed in all animals reported, despite being young.3 The perinephric fluid identified in one animal possibly represents a transudate since it was anechoic. However, this finding is not specific and may be observed associated to several kidney diseases.4 Renal cysts were also seen in two animals, although not characteristic, they are often associated with renal dysplasia in humans too.5

References:

CERVICAL ULTRASONOGRAPHY IN A DOG WITH BILATERAL ACUTE SUPPURATIVE SIALADENITIS OF THE MANDIBULAR GLANDS


Introduction:
Sialadenitis is a rare disease in small animals, which has a number of potential causes. Infectious agents may be involved in cases with suppurative disease.1

Aim:
In this report, we describe the cervical ultrasonographic findings in a dog diagnosed with bilateral acute suppurative sialadenitis of the mandibular glands.

Case Report:
A 7-year-old male mixed-breed dog presented with bilateral swelling of the submandibular region. Cervical ultrasonography was performed which showed an increase in the size of mandibular lymph nodes and a decrease in echogenicity. The mandibular salivary glands had a slightly heterogeneous echotexture and decreased echogenicity. The medullary aspect of the right mandibular salivary gland contained an anechoic, poorly defined area, measuring approximately 0.65 cm in diameter. A hypochoic linear structure measuring 0.14 cm diameter was identified extending from the ventral aspect of each mandibular salivary gland to the mandibular bone, which was consistent with salivary duct. Ultrasound-guided fine needle aspiration of the mandibular salivary glands was performed. Cytological examination was consistent with suppurative sialadenitis.

Discussion:
In cases of acute sialadenitis, the salivary glands may show decreased echogenicity and a heterogeneous echotexture on ultrasonographic examination, which is likely to be the result of edema. The salivary ducts may also be identified if they are distended with suppurative material. Variable well-defined anechoic areas are suggestive of the presence of abscesses.1 In sialadenitis cases, the lymph nodes may also be enlarged, rounded, and have reduced echogenicity due to a secondary lymphadenopathy.2 In this patient, ultrasonography contributed to the diagnosis of suppurative sialadenitis. Based on its accessibility, reliability, and cost,3 ultrasonography should always be considered in the suspected cases.

References:

INTRAPARENCYMAL AND INTRAVENTRICULAR CEREBRAL HEMORRHAGE IN COMPUTED TOMOGRAPHY OF A DEER (OZOTOCEROS BEZOARTICUS)


Introduction:
Intracranial hemorhage, verified most commonly in the intraparenchymal form,3 can be easily diagnosed by computed tomography (CT).1

Aim:
In this case report, we describe the CT findings of a deer diagnosed with intraparenchymal and intraventricular hemorrhage.

Case Report:
An adult male deer (Ozotoceros bezoarticus) underwent a brain CT due to a head injury suspect. In the CT, images were observed with a hyperdense area (60 HU) showing a well-defined and irregular limits and a mild peripheral contrast enhancement in cortical and subcortical left parietal lobe, indicating a cerebral intraparenchymal hemorrhage. In the CT image was also identified an intraventricular hemorrhage since a hyperdense content was observed therein. In its surroundings, there was a hypodense area with ill-defined and irregular edges, indicating a perilesional edema. A mass effect, represented by the displacement of the cerebrum falx and ventricles, was also identified on CT images. The animal was later euthanized and submitted to a necropsy, which confirmed the diagnosis.

Discussion:
The intracranial hemorrhage in the acute phase is easily recognizable due to the great ability of radiation attenuation by globin and fibrin.4 In this stage, the hemorrhagic area appears as a hyperdense image5 with an attenuation value, in Hounsfield units (HU), between 55 and 60.5 In the subacute phase there is a reduction of the density of the hematoma that usually presents the attenuation value ranging from 40 to 60 HU.6 The attenuation values of the intraparenchymal and intraventricular hematomas areas found in deer are within the parameters for the acute and subacute phases.7 However, the contrast enhancement in the parenchymal lesion suggests it was in the subacute phase since the contrast capitation is not seen during the acute phase due to the reduced blood perfusion.8,9 Secondarily to injury of blood capillaries or ischemic necrosis, there is edema formation, seen as a hyperdense area, which associated with the hematoma, result in a mass effect, represented by the displacement of brain structures.4

References:

THORACIC RADIOGRAPHIC AND TOMOGRAPHIC IMAGING OF A FELINE DiAGNOSED WITH LYMPHOIDCYSTIC INTERSTITIAL PNEUMONIA

V.R. Babicsak1, K.M. Zardo1, D.R. Dos Santos1, A.C. Feliôco2, T.R. Fernandes3, M.L.G. Lourenço2, R.L. Amorim2, L.C. Vulcano1, VMdeV Machado1, 1Department of Animal Reproduction and Veterinary Radiology – Botucatu, Faculty of Veterinary Medicine and Animal Husbandry, São Paulo State University and 2Department of Clinical Veterinary Medicine – Botucatu, Faculty of Veterinary Medicine and Animal Husbandry, São Paulo State University, Brazil

Introduction:
A diffuse proliferation of lymphocytes and plasma cells in the pulmonary parenchymal interstitium characterizes a lymphoctic interstitial pneumonia,1 a disease that affects individuals with autoimmune diseases.1

Aim:
In this case report, we describe the radiographic and computed tomographic (CT) findings of a feline diagnosed with lymphoctic interstitial pneumonia.

Materials and Methods:
A 14-year-old mixed breed male cat with dyspnea and appetite loss underwent thoracic radiography. In order to allow a more detailed assessment of this region, a CT scan was later performed.

Results:
The thoracic radiographs revealed a reticular interstitial lung pattern. Several cystic air spaces, which had their dimensions markedly increased in an 11-months period, were verified in the ventral portion of lungs. In the CT images, ground-glass opacities, centrilobular, and subpleural nodules, cystic air spaces and thickening of bronchovascular bundles and interlobular septa were identified.

Discussion:
Lymphocytic interstitial pneumonia is an uncommon nonneoplastic inflammatory reaction. Humans affected by this disorder often have immunosuppressive diseases such as Sjögren’s or acquired immunodeficiency (AIDS) syndromes.1 In the animal reported, an infection by feline immunodeficiency virus, the causative agent of feline AIDS, was not confirmed; however it was suspected. Patients affected by this disease usually demonstrate a nonspecific
pulmonary opacification represented by a reticular or nodular interstitial pattern in the radiographic examination,2 as identified in the animal of this case report. The most common CT findings in humans diagnosed with lymphocytic interstitial pneumonia are ground-glass opacities, centrilobular, and subpleural nodules, thickening of bronchovascular bundles and interlobular septa, and cystic airspaces3 (formed from a partial obstruction of airways due to a cellular peribronchial inflammation),4 all of them identified in this case report. A lymph node enlargement, commonly verified in the patients affected, and other alterations that occasionally can be visualized, such as consolidation, emphysema, honeycombing, and pleural thickening, were not observed in the animal reported.5

References:

STANDARD AND GRAY-SCALE REVERSED ALGORITHMS IN THE DIAGNOSIS OF NODULAR INTERSTITIAL PATTERN
C.O. Baroni1, M. Amaku2, R.B. Carmozi2, A.C. Andrea Chemin Santos2, C.B. Fonseca Pinto1, 1Surgery Department – São Paulo, School of Veterinary Medicine and Animal Science, University of São Paulo, SP, Brazil; 2Department of Preventive Veterinary Medicine and Animal Health, São Paulo, School of Veterinary Medicine and Animal Science, University of São Paulo, SP Brazil.

Introduction:
Despite recent advances in cross-sectional imaging of the thorax, thoracic radiographs remain one of the most common exams performed in small animal practice.1 Further studies with digital radiography in veterinary medicine are necessary to show the benefits of the different algorithms.1–4

Aim:
Evaluate the effectiveness of the gray-scale reversed filter (GSRF) for nodular interstitial pattern detection in dogs.

Materials and Methods:
A retrospective evaluation of 23 randomized sets of computed radiographies was performed by two veterinary radiologists and two small animal residents individually. A consensus by two experienced veterinary radiologists was reached in order to select the template for normal and nodular interstitial patterns. Pulmonary nodules were detected in radiographs of 5 of 23 dogs. Two reviewers evaluated each set of three-view thoracic radiographs first in a standard display mode (SD) and then in GSRF. The two reviewers evaluated first in GSRF and after in SD. The observers evaluated all set of images in both display modes consecutively (SD = GSRF) and scored these filters as sc0 = unsatisfactory/sc1 = satisfactory/sc2 = great. The average of sensitivity (Sn), specificity (Sp), and the agreement (determined via a κ statistic) of all observers for each display mode and their association were calculated.

Results and Discussion:
The highest average of sensitivity and specificity was found in the association of SD = GSRF (Sn = 100, Sp = 90%), followed by GSRF (Sn = 80%, Sp = 85–87%) and SD (Sn = 85%–88%, Sp = 86%) suggesting that the combination of filters may reduce the false negatives and increase of true negatives results. SD showed an average of moderate agreement (κ = 0.6), SD = GSRF moderate to substantial agreement (κ = 0.7 and k = 0.8, respectively). The means of the score percentage for the filters SD and GSRF were 77% sc2, 23% sc1, and 56% sc2, 40% sc1, 3% sc0, respectively. These results may reflect the experience and ability of the radiologists to analyze images in SD and a lack of familiarity with new algorithms although; GSRF was classified as great in 56% and satisfactory in 40% of images.

Conclusions:
The use of both filters consecutively to detect the nodular interstitial pattern showed better results increasing the radiologist performance.

References:

SEVERE SUBAORTIC STENOSIS IN A PINSCKER PUPPY: ECHOCARDIOGRAPHIC AND RADIOGRAPHIC FINDINGS
A.F. Belotta1, K.M. Zardo1, D.R. Dos Santos2, CDeA2, D.S. Caramã3, N.M. Rocha2, L.C. Vaccaro1, VMDeV Machado3, 1Department of Animal Reproduction and Veterinary Radiology; 2Department of Veterinary Surgery and Anesthesia; 3Department of Veterinary Clinical Sciences, São Paulo State University, UNESP, Campus Botucatu, Brazil.

Case Report:
A female, 7-year-old Labrador Retriever was referred to Veterinary Hospital with a clinical history of relapsing lameness, cachexia, intermittent pyrexia, and muscular atrophy of the limbs. On bilateral humerus and femur radiographies and CT, all limbs were affected, with lesions in proximal metaphysis of the left humerus: aggressive proliferative periosteal reaction with subperiosteal elevation (Codman triangle) and medullary and cortical destruction in caudal face associated with osteolytic areas. Left and right femurs had slightly lucent areas, with mild periosteal reaction in left femur. Definitive diagnosis was made by cytology of bone content: biopsy material contained bifringent structures with septations consistent with Aspergillus (Aspergillus spp.). CT scans were characterized by periosteal reaction, bone lysis, and destructive lesions in the distal metaphysis of the radius.

Discussion:
Aspergillus infections in dogs are characterized by bone destruction and proliferation.4 CT is superior to its ability to produce multiple tomographic slices that avoid superimposing structures and to define the extension of lesions into adjacent structures.

References:

OSTEOMYELITIS IN A LABRADOR RETRIEVER DOG WITH ASPERGILLOSIS: RADIOGRAPHIC AND TOMOGRAPHIC FINDINGS
A.F. Belotta1, K.M. Zardo1, D.R. Dos Santos2, CDeA2, D.S. Caramã3, N.M. Rocha2, L.C. Vaccaro1, VMDeV Machado3, 1Department of Animal Reproduction and Veterinary Radiology; 2Department of Veterinary Surgery and Anesthesia; 3Department of Veterinary Clinical Sciences, São Paulo State University, UNESP, Campus Botucatu, Brazil.

Introduction:
Canine aspergillosis is mostly restricted to upper respiratory tract, particularly the nasal cavity, but it may also be disseminated as a rare condition.1 A hereditary immune defect might cooperate to pathogenesis.2 Most dogs with disseminated aspergillosis had bone lesions as much in axial appendicular as in skeleton.3–5

Aim:
Tomographic findings of aspergillus osteomyelitis in appendicular skeleton is rarely described.

Case Report:
A female, 7-year-old Labrador Retriever was referred to Veterinary Hospital with a clinical history of relapsing lameness, cachexia, intermittent pyrexia, and muscular atrophy of the limbs. On bilateral humerus and femur radiographies and CT, all limbs were affected, with lesions in proximal metaphysis of the left humerus: aggressive proliferative periosteal reaction with subperiosteal elevation (Codman triangle) and medullary and cortical destruction in caudal face associated with osteolytic areas. Left and right femurs had slightly lucent areas, with mild periosteal reaction in left femur. Definitive diagnosis was made by cytology of bone content: biopsy material contained bifringent structures with septations consistent with Aspergillus (Aspergillus spp.). CT scans were characterized by periosteal reaction, bone lysis, and destructive lesions in the distal metaphysis of the radius.

Discussion:
Aspergillosis is a fungal infection caused by Aspergillus fumigatus. Systemic aspergillosis in dogs is a rare condition.1–5 Systemic aspergillosis is disseminated and is often associated with disseminated aspergillosis in the lungs. CT scans were characterized by periosteal reaction, bone lysis, and destructive lesions in the distal metaphysis of the radius.
CT FEATURES OF METACARPUS (TARSO) PHALANGEAL JOINT PATHOLOGY IN LAMINER HORES (31 CASES: 2010–2011)

H.J. Bergman 1, S.M. Puchalski2, Lingeoeve Diergensiekunde-VetCT, Equine Referral Hospital, Lienden, The Netherlands; 2University of California, Davis, CA, USA

Introduction: Metacarpus(tarsos)phalangeal join (MC(T)PJ) pathology can have a significant effect on the use and athletic competitiveness of a horse. Several ex vivo studies compared findings (including contrast arthrography) with different image modalities (radiography, computed tomography (CT) and magnetic resonance imaging (MRI)) in rachorse. Although CT is routinely used worldwide to assess MC(T)PJ pathology in sporthorse, published data is lacking. This study describes MCT(P)J pathology findings with CT and CT-arthrography in a referral hospital population of lame sporthorses. Overlapping 2.5 mm images were made while the horses were positioned in lateral recumbancy in a 4 slice helical CT scanner. An arthrogram, with nonionic, iodinated contrast medium, was performed in 19 horses (MCPJ n = 15; MTPJ n = 4).

Results: Subchondral bone pathology (SCBP) (lysis and/or sclerosis) was identified in 26 joints. In 19 joints, the subchondral pathology was present in the third metacarpal –metatarsal condyles. Seventeen joints had osseous abnormalities of the proximal phalanges and one had lysis of the proximal sesamoid bones. Other lesions included periarthritis osteophytes (29), central osteophytes (4), synovial lysis (7), osseous fragments (7), proximal phalangeal lysis (6), and a condylar lysis (1). Arthrography identified cartilage lesions in 10 cases.

Discussion/Conclusion: Field joint disease is an important diagnosis in equine lameness practice. Sport horses, although less well described than thoroughbreds, demonstrate a wide range of metacarpal (tarsos) phalangeal joint pathology that can be detected with CT and CT arthrography. In addition to periarticular changes associated with joint disease (osteophytes, synovial lysis), subchondral bone pathology was a common and very important finding. Arthrography further enhanced the diagnostic technique by identifying cartilage lesions within the joint. This study documents the use of CT and CT arthrography for evaluation of fetlock lameness in sport horses.

References:

INTRACAROTID CONTRAST-ENHANCED COMPUTED TOMOGRAPHY OF THE EQUINE HEAD

H.J. Bergman 1, S. Puchalski2, J. Saunders3, Lingeoeve Diergensiekunde-VetCT, Equine Referral Hospital, Lienden, The Netherlands; 2Department of Surgical and Radiological Sciences, William Pritchard Veterinary Medical Teaching Hospital, University of California, Davis, CA, USA; 3Department of Veterinary Medical Imaging and Small Animal Orthopaedics, Faculty of Veterinary Medicine, Ghent University, Meerbeke, Belgium

Introduction: Contrast media is widely accepted and used in computed tomography (CT) imaging of the brain and skull. Intra-arterial delivery to the equine foal during scanning aids characterization of soft tissue lesions. Although CT is useful for skull disorders, it has low sensitivity for identifying inflammatory and parenchymal brain lesions. A technique for timely delivery of contrast media could be useful to better characterize lesions of the equine head.

Aim: This study describes a technique for the delivery of contrast medium to the equine head via the carotid arteries.

Material and Methods: Seven horses with disease of the skull or brain were evaluated in dorsal recumbency under general anesthesia. Ultrasound-guided (5–10 mHz linear probe) carotid catheterization (14 gauge × 80 mm catheter) of both (n = 6) or one carotid artery (n = 1) was performed in the mid to caudal neck after aseptic preparation. The catheters were attached via prefilled extension sets to two pressure injectors holding 180 ml non-iodinated contrast medium (350 mg I/ml, corresponding to a dose of 230 mg/ml). A precontrast study obtaining 1.3 mm contiguous images was made prior to injection and repeated during an infusion of 2 ml/s of contrast medium. The scan extended from the second cervical vertebra to the nose. The catheters were removed and a pressure bandage was sutured over the injection sites. Assisted recovery was performed for all horses. The horses were monitored for 24 h for any complications and the bandages were removed after this period.

Results: Carotid catheterization was successful in all horses. Mild unilateral haematoma formation occurred in two horses and was managed medically. No other complications were noted. Contrast images were high quality and aided in the characterization of regional lesions.

Discussion/Conclusion: Intracarotid contrast administration resulted in diagnostic high quality studies without major complications. This technique provides an additional means of evaluating the brain and soft tissues of the equine head. Further investigation to validate this technique is necessary.

DESMOPATHY OF THE PROXIMAL SUSPENSORY LIGAMENT IN DIFFERENT IMAGE MODALITIES AND POST MORTEM FINDINGS – A CASE REPORT

D. Bernet1, A. Lempe1, C. Mueling2, S. Schoenige3, W. Brehm1, K.K. Gerlach1, L. Large Animal Clinic for Surgery, 2Institute of Anatomy, Histology and Embryology, 3Institute of Pathology, Faculty of Veterinary Medicine, University of Leipzig, Tierkliniken, 04103 Leipzig, Germany

Introduction: Proximal palmar metacarpal pain occurs frequently in horses. For detailed characterization of underlying conditions use of radiography, ultrasonography, nuclear scintigraphy, magnetic resonance imaging (MRI), and computed tomography (CT) has been described.1–3

Aim: To describe a case of a histological confirmed desmopathy of the proximal suspensory ligament (PSL) with metacarpal bone involvement by using different image modalities.

Materials and Methods: A 16-year-old Hanoverian gelding with a left forelimb lameness of 2 months duration was subjected to scintigraphy. Radiographs were taken. Postmortem CT, MRI, ultrasonography, and histological examinations were performed.

Results and Discussion: Scintigraphy located the cause of lameness in the proximal metacarpal region. A radiolucency with a thin sclerotic rim was found in this region on radiographs. Ultrasoundography revealed asymmetric enlargement of the PSL with loss of longitudinal fibre pattern and hypo-anoeic areas and an irregularity of the palmar metacarpus. On MRI, the medial branch of the PSL showed decreased signal intensity also involving the embedded muscle-fat-bundle and enlargement with absence of connective tissue between the PSL and the palmar metacarpus. CT soft tissue window revealed the same findings, but also a small soft tissue structure of the medial part of the proximal metacarpus in bone window. Postmortem histological examinations confirmed the diagnosis of a chronic desmopathy with granulation tissue formation of the PSL and the cortical fracture.

Conclusion: When desmopathies are combined with avulsion fractures, CT-examinations are able to precisely reveal both lesions, extend of soft tissue damage, and possible underlying bone injury.

References:

COMPUTED TOMOGRAPHY OF INCIDENTAL AND NONINCIDENTAL THYROID LESIONS IN DOGS

G. Bertolini, O. Marcon, A. Borseto, S. Finesso, S. M. CalìM, San Marco Veterinary Clinic, Padua, Italy

Introduction: Thyroid cancer accounts for 1 to 4% of all neoplasms diagnosed in dogs. Clinical detectable carcinomas have a high rate of metastasis at the time of diagnosis. Small benign or malignant thyroid masses in dogs remain unnoticed on physical examination and are incidentally discovered during imaging procedures.1–3

Aim: To determine the CT characteristics of incidental and nonincidental thyroid lesions in dogs and to assess the accuracy of computed tomography (CT) in the differentiation of benign from malignant thyroid lesions as compared with pathology.

Materials and Methods: In a prospective study, the thyroid region of dogs underwent 16-multidetector CT examination between August 2008 and March 2011 was routinely investigated. Dogs with thyroid masses and to assess the accuracy of computed tomography (CT) in the differentiation of benign from malignant thyroid lesions as compared with pathology.

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lesions. Based on the findings of this preliminary study, more than 50% of the thyroid masses are incidentally discovered. Most of thyroid masses in dogs are malignant. Conclusion: CT is a useful tool for distinguishing between benign and malignant thyroid lesions in dogs and is essential in assessing the local invasiveness of the tumor, ectopic thyroid tissue, lymph nodes, and distant metastasis.

References:

COMPUTED TOMOGRAPHY, LOW-FIELD MAGNETIC RESONANCE IMAGING AND CROSS-SECTIONAL ANATOMY OF HEALTHY BEARDED DRAGON (POGONA VITTICEPES)

S. Borgonovi1, D.D. Zanl1, M. D’Acienno2, S. Gerosa3, M. Di Giancamillo5, S. Modina5
1Department of Veterinary Clinical Sciences, Milan, Italy; 2University of Milan Faculty of Veterinary Medicine; 3Turro Veterinary Clinic, Milan, Italy; 4Department of Animal Sciences, Faculty of Veterinary Medicine, University of Milan, Milan, Italy.

Introduction: In literature there are many studies about reptiles anatomy1–3 and computed tomography,4 but no anatomical studies on individual species with a significant number of subjects. Aim: To provide a detailed anatomical description of the Bearded Dragon by using computed tomography (CT), core CT (CBCT), and low-field magnetic resonance imaging (MRI), and to compare it with the compilation of corresponding gross anatomical sections.

Materials and Methods: Ten adult clinically normal Bearded Dragons, anesthetized for reasons not connected to our study, were examined with single slice CT scanner (PQ2000S Philips MD S.p.A., Monza, Italy), Cone Beam CT (NewTom 5G, NewTom Q.S.R.L., Verona, Italy), and low-field MRI (1.0T, Vet-MR Esacto S.p.A., Genova, Italy). Each subject was positioned in ventral recumbency with its head and neck extended; CT and CBCT studies were executed during the same anesthesia session. In CT study, 3-mm-thick slices were acquired in transverse planes, with hard and soft convolution filter. For CBCT study, volumetric data was acquired and reprocessed to obtain transverse, sagittal, and dorsal 0.75-mm-thick images. For MRI study, the same Bearded Dragons were positioned inside a volumetric coil; transverse, sagittal, and dorsal 3-mm-thick T1, T2, and Gradient Echo T1-weighted images were acquired. Three dead Bearded Dragons, euthanized for reasons not connected to our study, were positioned and frozen in an ice block at −14°C until solid, and then sectioned at 6-mm-thick intervals with an electric band saw, using the same section planes applied in the imaging studies. Slab sections were then immediately cleaned and photographed. For each cutting plane we gained a good overlap between sections obtained at the same level with the different techniques. The bone window CT images and the CBCT images provided good anatomic detail of hard structures, as did Gradient Echo T1-weighted acquisition. Soft tissue structures were well evaluated with T1- and T2-weighted images, providing detailed information regarding parenchymal organs and central nervous system.

Conclusion: Results of this study can be used as an anatomical guide for evaluating Bearded Dragon with CT, CBCT, and MRI in practice.

References:

COMPUTED TOMOGRAPHY AND HISTOPATHOLOGY OF PRIMARY LUNG TUMORS IN DOGS: A RETROSPECTIVE STUDY

S.A. Borofkowa1,2, E.G. Johnson2, E. Wiser2
1Division of Diagnostic Imaging, Faculty of Veterinary Imaging, Utrecht University, Utrecht, The Netherlands; 2Department of Surgical and Radiological Sciences, Diagnostic Imaging Service, Faculty of Veterinary Medicine, UC Davis, Davis, CA, USA

Introduction: Primary lung tumors (LT) are rare in dogs, but the reported incidence has recently increased. Most canine primary LT are malignant and are most often adenoma or bronchoalveolar carcinoma. Clinical investigation to assess the treatment of choice, so precise preparative tumor staging is important. Mean survival for operable solitary, well-differentiated, primary LT without node involvement is 15–26 mo. Regional lymph node metastasis or the presence of regional pulmonary metastasis at initial diagnosis significantly reduces survival time. Computed tomography (CT) has been shown to be the best diagnostic modality to detect primary lung tumors and to assess regional lung and lymph node metastasis. Aim: To characterize thoracic CT features of dogs with primary LT and correlate those with histological or cytodiagnostic findings.

Materials and Methods: Clinical signalment and CT images of 80 dogs with confirmed primary LT were retrospectively evaluated. Primary tumor size, morphology, and location were defined as was presence of regional pulmonary or lymph node metastasis. CT findings were correlated with histological or cytological findings. Results: LT were classified as papillary carcinoma (21), bronchioalveolar carcinoma (18), adenocarcinoma (16), histiocytic carcinoma (5, adenocarcinoma carcinoma (4), basaloid carcinoma (1), and B-cell lymphoma (1). Regional pulmonary metastasis was present in 22 dogs and lymph node enlargement was detected in nine dogs. CT enabled a precise description of the tumor, pulmonary metastasis, and lymph node enlargement but CT features were not specific enough to accurately determine histological diagnosis.

Discussion/Conclusion: CT offers excellent preoperative tumor staging of primary LT but not for histodiagnostic.

References:

DILATATION OF THE PANCREATIC DUCT AS AN ULTRASONOGRAPHIC SIGN OF FELINE PANCREATITIS

N.D. Bru1,2, M. Prieto1, B. Cuenca1, P. Plaza1
1Centro Médico Veterinario Delicias. 2Facultad de Veterinaria, Universidad Complutense, Madrid, Spain

Introduction: The feline pancreatic duct is identified ultrasonographically as an anechoic 0.5–2.5 mm tube within the pancreas. The diameter of the pancreatic duct increases with age but no correlation has been previously found between increased diameter and pancreatic disease diagnosed by feline trypsin-like immunoreactivity (fTLI). Serum feline pancreatic lipase immuno-reactivity (IPL) determination has proved to be the most sensitive and specific indicator for pancreatitis in cats and is currently the most useful test for the diagnosis of this disease.

Aim: The aim of this study was to retrospectively evaluate whether cats with an ultrasonographic dilatation ≥ 2.5 mm of the pancreatic duct had elevated serum IPL levels.

Materials and Methods: Nine cats with an ultrasonographically pancreatic duct ≥ 2.5 mm with an IPL determination were included. Other ultrasonographic abnormalities were also recorded. Clinical history, physical examination, hematological and biochemical results, treatment, and outcome were reviewed.

Results: Seven of the nine cats included in the study had a low (5.7 μg/l) to severe (49 μg/l) increase of IPL (laboratory reference range > 5.3 μg/l) compatible with pancreatitis. In two of them pancreatitis was confirmed histopathologically. Two cats had normal IPL levels (<3.6 μg/l). Pancreatic duct diameter ranged between 2.5 and 5.5 mm. In eight patients ultrasonography revealed hepatobiliary, gastrointestinal, and/or renal changes besides pancreatitis findings.

Discussion: In human pancreatic duct diameter increases with age and in cases of pancreatitis. Recent studies have shown that pancreatitis has a high incidence in cats and has been under-diagnosed due to the low clinical suspicion. Our results indicate that pancreatic duct dilatation may appear as an ultrasonographic sign of feline pancreatitis and that it may be advisable to determine IPL levels when detected. Evidence of other ultrasonographic find- ings that might explain the clinical signs should not warrant the suspicion of pancreatitis, as concurrent disease is common.


CONTRIBUTION OF THE CT VITUAL ENDOSCOPY ON DETECTION OF INTERVERTEBRAL DISK DISEASE

L.S. Carandina, V.R. Babicsak, L.C. Vulcano, V.M.V. Machado. Universidade Estadual Paulista “Julio de Mesquita” (UNESP- Botucatu), Brazil

Introduction: Intervertebral disk disease is a common neurological problem of dogs. Disk disease can result in extirpation (Hansen’s type I lesion, commonly in nonchondrodystrophic breeds of dogs) or protrusion (Hansen’s type II lesion, typically in small-breed, particularly chondrodys- trophic dogs) of disk material into the spinal canal resulting in cord compression. Most dogs with intervertebral disk disease presents with pain and paralysis. Diagnosis is made by radiography, computed tomography (CT), or MRI. A recent technique, CT virtual endoscopy allows the radiologist to position the point of view inside any structure that has been imaged by CT, and then travel down the structure. Aim: To describe the adaptation of CT virtual endoscopy for diagnosis of protrusion and extrusion of disks.
Methods:
CT was performed on 12 dogs with clinical signs of intervertebral disk disease, followed by CT virtual endoscopy and the findings compared.

Results:
In all animals, both conventional CT and CT virtual endoscopy were conclusive. However, CT virtual endoscopy indicated more precisely the extension of the lesion.

Discussion and Conclusion:
One of the biggest advantages of CT virtual endoscopy is that this exam can predict the extension of the lesion better than CT, because the image is analyzed as a three-dimensional image. The surgeons can better plan the procedure and so, have better indicators for predicting the prognosis of the patient.

References:

ULTRASONOGRAPHIC ELASTOGRAPHY IMPROVES EARLY DETECTION OF HEPATIC FIBROSIS IN AN EXPERIMENTAL MODEL OF NONALCOHOLIC STEATOHEPATIS

C.F. Carvalho, M.C. Chammas1, B. Cogliatti2, CPMDeS Oliveira3. 1Institute of Radiology, University of São Paulo, São Paulo, Brazil, 2Department of Pathology, Faculty of Veterinary Medicine, University of São Paulo, São Paulo, Brazil, 3Department of Gastroenterology, Faculty of Medicine, University of São Paulo, São Paulo, Brazil.

Introduction:
Early detection of focal hepatic lesions is a challenge for ultrasound scanning and becomes even greater in the presence of a diffuse parenchymal disease. Elastography has emerged as a new method to evaluate stiffness of focal lesions and promises to differentiate their malignancy.

Aims:
This study aimed to evaluate the diagnostic performance of ultrasonographic elastography for early detection of malignant hepatic nodules in an experimental rat model of nonalcoholic steatohepatitis (NASH).

Materials and Methods:
B-mode and Doppler ultrasonography was performed weekly in 40 experimental rats, divided in nonalcoholic steatohepatitis (n – 30) and rats without liver disease (controls – n – 10). Animals with NASH developed focal liver lesions with suggestive malignancy. These animals underwent elastography, euthanized, and liver nodules were assessed by histopathology. Tissue stiffness of the nodules on elastography was classified in negative (elastic strain) or positive (hard and no strain) comparing with surrounding liver parenchyma.

Results and Discussion:
Elastograms of positive lesions showed area of high stiffness, which were indicative of malignancy confirmed on histology evaluation, with sensitivity of 90% and specificity of 60%. Pathological changes are generally correlated with changes in tissue stiffness as well. The echogenicity and the mechanical attributes of tissue are generally uncorrelated. In many cases, in spite of the difference in stiffness or mobility, the small size of a pathological lesion and/or its location deep in the body difficult its detection. Moreover, lesions may or may not possess echogenic attributes that make them detectable. Elastography presented high sensitivity and specificity in this research.

Conclusions:
Elastography allows making right diagnosis with high accuracy of well to moderately differentiated hepatocellular carcinomas in an experimental rat model of NASH. Elastography provided promising perspectives for the assessment of malignancy of focal hepatic lesions.

References:

DOPPLER ASSESSMENT OF HEPATIC VEINS IN OBSESE DOGS WITH FAT LIVER DISEASE AND COMPARISON WITH A RODENT MODEL

C.F. Carvalho1, M.C. Chammas1, B. Cogliatti2, C.P.M. DeS Oliveira3, 1Institute of Radiology, University of São Paulo, São Paulo, Brazil, 2Department of Pathology, Faculty of Veterinary Medicine, University of São Paulo, São Paulo, Brazil, 3Department of Gastroenterology, Faculty of Medicine, University of São Paulo, São Paulo, Brazil.

Introduction:
Some conditions can alter waveform of hepatic veins (HV) in dogs and cats.1,2 Obesity is increasingly encountered in pets.3 No prior studies have focused on the effect of fatty liver infiltration on the HV Doppler waveform in a model of nonalcoholic fatty liver disease (NAFLD) or obese dogs.

Aim:
To study the progressive effects of fatty liver infiltration on HV Doppler waveform in rodents and compare with clinical cases of obese dogs with diffuse NAFLD.

Material and Methods:
NAFLD was induced in 100 adult isogenic rats by a choline-deficient high-fat diet and examined weekly by ultrasoundography during 10 weeks (experimental group). At each 4 weeks, in order to follow the development of the NAFLD, a rat was euthanized and the liver was assessed at histology. In a clinical group, 15 obese dogs were selected by ultrasoundography for liver steatosis and underwent hepatic biopsies. Control group consisted by 10 healthy dogs.

Endocrinopathies, cardiac diseases and chronic hepatic diseases were excluded by clinical and biochemical findings in all dogs. B-mode fatty infiltration was classified: (0) normal liver, (1) discrete, (2) moderate and (3) severe fatty infiltration of the liver, corresponding to increasing degrees of hepatic echogenicity with poorer visualization of HV and diaphragm. Also quantitative assessment of liver echogenicity by histogram was performed. The Doppler sonography spectrum of HV was classified into three groups: normal or triphasic waveform, 4 biphasic waveform, and monophasic or flat waveform.

Results and Discussion:
There was a statistically significant difference in the waveform of HV flow between clinical and control groups. The Doppler flow pattern in the right hepatic vein was triphasic in 6/15 (40%), biphasic in 5/15 (33%), and monophasic in 4/15 (26%) obese dogs with steatosis. Control group of dogs presented triphasic in 70% and biphasic in 30% dogs. Both clinical group and experimental group presented an inverse correlation between the sonographic grade of liver fatty infiltration and the phasicity of hepatic venous flow.

Conclusion:
Obese dogs with fatty infiltration of liver presented abnormal right HV Doppler waveform and proposal to hepatic steatosis severity.

References:

QUANTIFICATION OF EXPERIMENTAL LIVER FIBROSIS WITH A NOVEL ALGORITHM METHOD BASED ON STATISTICAL ANALYSIS OF SIGNALS

C.F. Carvalho1, M.C. Chammas1, B. Cogliatti2, C.P.M. DeS Oliveira3, 1Institute of Radiology, University of São Paulo, São Paulo, Brazil, 2Department of Pathology, Faculty of Veterinary Medicine, University of São Paulo, São Paulo, Brazil, 3Department of Gastroenterology, Faculty of Veterinary Medicine, University of São Paulo, São Paulo, Brazil.

Introduction:
Evaluation of liver fibrosis is important in the diagnosis, management and prognostic of patients with chronic hepatic diseases. Conventional ultrasound imaging is sensitive to detect changes in the acoustic properties of tissues that affect their texture. However, it is difficult to detect mild diffuse liver disease and follow-up patients with chronic liver diseases. It is known that diffuse liver diseases have variable subjective sonographic results. Pathologic results on fibrosis liver samples do not always accurately represent the fibrosis grade of the entire organ.

Aim:
To evaluate the development of liver fibrosis in an experimental model by use of a novel method to quantify the homogeneity of the tissue texture on B-mode images.

Materials and Methods:
A prospective study was performed in 20 adult isogenic rats divided into two groups, control and experimental. A model of progressive injury as seen in severe forms of chronic liver diseases was induced in the experimental group with 13–15 mg/dl diethylnitrosamine in the drinking water. In both groups, scans were performed weekly at the same regions of interest (ROI) for 6 weeks. A commercially available acoustic structure quantification software (ASQ) was used to calculate the value of each ROI of all animals. Degree of fibrosis development was classified according to the literature from histological samples.

Results:
The change of the values at ROI 1 was 0.97 (± 0.21) for normal animals, and was 52.40 (± 4.89) for those with NAFLD.

Discussion:
A significant increase in the median peak C2m histogram value was observed according to stage of the progression of fibrosis grade.

Conclusions:
Results with B-mode based algorithm correlate well with fibrosis grade in this experimental model of hepatic fibrosis.

References:
SONOGRAPHIC ASSESSMENT OF DEEP VASCULAR THROMBOSIS IN DOGS
C.F. Carvalho1, L.C. De Pinha1, M.Z. Zanini2, D.S.L. Arnaud1, A.S. Grunkrautz2. 1 Institute of Radiology, University of São Paulo, São Paulo, Brazil; 2 Department of Imaging, PROVET, São Paulo, Brazil

Introduction:
Deep venous thrombosis (DVT) is a relatively common disease in humans, but rare in animals. This could be explained because of the form of the platelets, vascular anatomy, and blood flow in quadruped posture.1,2 Vascular Doppler ultrasoundography (US) allows a noninvasive assessment of the vessels, providing information about its anatomy, characteristics of flow and vascular calibers.2 Currently Doppler US is considered the first choice test in human patients suspected to have TVP, because it is more cost effective than others.4 Aim Evaluate the vascular Doppler US parameters for diagnosis of DVT in dogs.

Method and Materials:
A high-resolution transducer was used to perform US examinations (B-mode, color, and pulsed Doppler) between January 2010 and December 2011 in five selected patients (one female and four male dogs, of several breeds, with ages between 01 and 11 years), with clinical signs of DVT disease. The criteria evaluated through B-mode were (i) lumen deformity when compared with contra lateral vessel; (ii) echogenicity of the lumen suggesting thrombosis; (iii) unchange of vessel diameter characterized by dynamic maneuvers, obtained with transducer in the suspected area (transversal section) and doing a light pressure with the transducer over the region. The criteria evaluated through color and pulsed Doppler were (i) presence of aliasing; (ii) presence of collateral vessels; (iii) significant difference of velocity of blood flow when comparing normal and affected vessels.

Results and Discussion:
All dogs had peripheral DVT (four in pelvic members and one in the thoracic). In order to define the best parameters, we evaluated sensitivity and specificity for each criterion. We found that changes of vessel caliber and/or deformity of the lumen were the best criteria in B-mode, whereas parameters together with Doppler information improved sensitivity and specificity values obtained. We also found others useful parameters: the presence of collateral vessels (tortuous and abnormal) adjacent to the point of venous occlusion (revascularization) and loss of valve’s wall movement distal to the point.

Conclusions:
A combination of parameters could be used to provide the best sensitivity and specificity values to produce conclusive diagnosis of DVT.

References:

EVALUATION OF RADIOGRAPHIC FINDINGS IN NORMAL COWS AND COWS WITH LAMINITIS
N. Celimli1, G. Cecen1, D. Seyrek-Intas1, H. Salci2, A. Demire2, H. Nisbet3, G. Caliskan1, D. Misirlioglu1, O. Gorgol1. 1 Department of Surgery; 2 Department of Pathology, Faculty of Veterinary Medicine, Uludag University, Bursa, Turkey; 3 Department of Surgery, Faculty of Veterinary Medicine, Ondokuz Mayis University, Samsun, Turkey

Introduction:
It is suggested that most claw diseases causing lameness in cows are related to laminitis.5 Although there are some visible changes in claws with subclinical or clinic laminitis, determination of the real prevalence of laminitis is difficult.1,2 Radiography provides valuable information confirming diagnosis, determining prognosis and to follow up dynamic changes of laminitis.1,3

Aim:
The aim of this study was to evaluate radiographical findings in normal and laminitic bovine claws and to find out if any differences are significant.

Materials and Methods:
Claws of 60 animals (n = 480) provided from the slaughterhouse (experimental study), and claws of 20 dairy cows (field study) suspicious of laminitis (n = 160) were enrolled for the study. Claws were examined clinically, radiographically (all groups) and histopathologically (Groups 1–3). According to histopathological diagnosis claws were classified with respect to laminitis as “affected claws”—group 1, “unaffected claws” of cows with laminitis in other claws—group 2, and “completely sound”—group 3. Animals in the field study with visible signs of clinical laminitis comprised group 4. The distribution of radiographic findings in healthy and laminitic claws was evaluated and the accuracy of radiographic examination in diagnosing laminitis was determined. Findings were evaluated as “related to laminitis” and “not related to laminitis”.

Results:
Most radiographic changes occurred in group 3 with sound cows. Most encountered radiographic findings known as not related to laminitis in group 1, 2, and 3 (n = 39, n = 79, n = 115, respectively) were osteophytes on the axial site of the pedal bone (P3). The most encountered radiographic finding related to laminitis in group 1, 2, and 3 (n = 22, n = 56, n = 71, respectively) was inactive solar osteitis of P3. Inactive solar osteitis (n = 51) and “ski jump” sign (n = 14) were the most common findings in group 4. “Ski jump” did not occur in any other group.

Discussion/Conclusion:
The radiographic findings related to laminitis are not always compatible with histopathologic diagnosis. Sound cows might have suffered laminitis before and recovered afterwards or histopathological criteria mentioned in the literature maybe inaccurate to diagnose laminitis in cows.

References:

TRANSCRANIAL ULTRASONOGRAPHY IN HEALTHY DOGS: TECHNIQUE STANDARDIZATION AND ANATOMIC DESCRIPTION
T.C.F. Cinta1,2, C.F. Carvalho1, J.C. Carola1, A.C. Nepomuceno1. 1 Universidade Estadual Paulista, Faculdade de Ciências Agrárias e Veterinárias, Jaboticabal, Brazil; 2 Universidade de São Paulo, Instituto de Radiologia, São Paulo, Brazil

Introduction:
Transcranial ultrasonography (TCUS) has the advantage of being a noninvasive and low-cost method when compared to Magnetic Resonance Imaging.1,2 The temporal bone has been used as an acoustic window in TCUS in humans.3,4

Aim:
To correlate transcranial ultrasonographic images obtained through the temporal and occipital windows with healthy dog’s encephalic anatomy, identifying the brain structures in the image and standardizing the technique.

Materials and Methods:
A total of 37 adult mongrel dogs weighting up to 10 kg: 30 animals in vivo and 7 cadavers. TCUS was performed using a microconvex transducer (4–7 MHz) initially positioned perpendicularly to the temporal bone to obtain a median dorsal plane, then rotated clockwise to obtain caudal dorsal-oblique planes and finally rotated counter-clockwise to obtain cranial dorsal-oblique planes. For the occipital window, longitudinal, dorsal, and dorsal-oblique planes were done. The cadaver’s heads were sectioned according to the insonation angle and the sonographic images were correlated to the corresponding anatomical plane for identification and quantification of the brain structures visualized in the TCUS. Data analysis was accomplished by the nonparametric Wilcoxon test.

Results and Discussion:
The number of brain structures visualized in the TCUS in vivo, when compared to that observed in the anatomical planes of cadavers, had statistically significant (P < 0.05) differences between dorsal and caudal dorsal-oblique planes through the temporal window. Otherwise, it did not have significant differences (P > 0.05) for cranial dorsal-oblique planes through the temporal window and also for the planes visualized through the occipital window. In the dorsal and caudal dorsal-oblique planes the number of identified structures in the ultrasonographic images were lower (P < 0.05) than observed in the anatomical planes, due to significant attenuation of the ultrasound beam through the bone surface in the skull. However, it was possible to visualize some anatomic landmarks with good statistical agreement.

Conclusions:
TCUS was able to obtain detailed images with good definition to evaluating brains of dogs weighing up to 10 kg, without the need to anesthetize the patient.

References:

CRITICAL POINTS IN ULTRASONOGRAPHIC APPROACH TO THE DYSURIC DOG
M.D. Codreanu MD1, F.E. Grosu2. 1 Faculty of Veterinary Medicine, Spl. Independenţei No.105, 060097; 2 Laboratory of Veterinary Radiology SCAVET, Rasaptitori No.30, 020548 Bucharest, Romania

Introduction:
In dysuric dogs, ultrasound (US) allows evaluation of the urinary bladder and adjacent organs in order to determine the cause.

Aim:
To establish the relevant signs of the US examination in dogs with dysuria.

Methods:
US investigations were performed on 37 dogs with dysuria, of different age, sex: 26 males (70%) and 11 females (30%), breed: 18 from small breeds (49%), and 19 from large/giant breeds (51%). The causes were confirmed using classic ultrasound technique (and additional X-ray exams).

Results and Discussion:
The US examination confirmed the diagnosis of the cause of the dysuria, the main features changes being related to the bladder’s topography and content, and adjacent structures. Eleven cases had US changes indicating paralysis: paralytic/hydropnic features correlated with the distension degree, content changes (corpuscular elements in suspension/sediment, stones, cysts), wall thickness and uniformity and ratio of parietal layers. 19 Twenty-nine pre- sented primary or secondary bladder changes (retention, hypotonia and inflammation), in 19 cases due to prostate diseases (of which were cysts in five cases, abscesses in three,
Computed tomography thoracic CT features in naturally occurring aelurostrongylosis.

CT ASSESSMENT OF LUMBSACRAL REGION IN DOGS AFFECTED BY CAUDA EQUINA SYNDROME

C. Daraban1, G. Mennonna G2, D.O. Travetti1, G. Fatone1, D. Giarciamillo3, V. Vulpe1, F.F. Bocanell1, L.L. Mezzarotto2, 1Faculty of Veterinary Medicine, Naples, Via F. Delpino, 1 – 80137, Italy; 2Faculty of Veterinary Medicine, Milan, Via Celoria, 10 – 20133, Italy; 3Faculty of Veterinary Medicine of Ghent, Salisburylaan 133 B-9820, Meirebeke, Belgium

Introduction:
Cauda equina syndrome (CES) is a neuropathy secondary to compression and reduced blood supply of the nape roots at the level of the lumbosacral junction (LSJ).1 Computed tomography (CT) is one of the most common used methods for imaging of LSJ.

Aim:
Retrospective evaluation of CT images for the presence of bone and soft tissue changes in dogs with CES.

Materials and Methods:
Between 2006 and 2012, 72 dogs of different breeds, clinically diagnosed with CES underwent to CT exam. There were 50 males and 22 females, mean age 7.5 years and mean weight 31.2 kg. The exams were performed using two CT scanners on dogs under general anesthesia and in dorsal recumbency with LSJ in neutral, flexed, and extended position.2,3 The evaluation of the CT studies was performed on transverse slices and on multplanar reconstructions (MPR) using both bone and soft tissue windows.

Results:
The most frequent revealed lesions were spondylosis (72.2%), foraminal stenosis (55.6%), Hansen type II herniation or dorsal longitudinal ligament hypertrophy (52.8%), and articular process bone spurs or thickened articular processes (47.2%). Degenerative disc disease (i.e. vacuum phenomenon), Hansen type I herniation, spondylolisthesis, vertebral malformations, Schmor’s nodes, etc., had a prevalence lower than 40%. In stress position, compression/stenosis showed no changes in 39.3% of cases, it increased in 55.4% in the extended position, and in 5.3% in the flexed series.

Discussion/Conclusions:
Spondylosis, stenosis of the vertebral canal and foramina, Hansen type II herniation or dorsal longitudinal ligament hypertrophy are the most frequent lesions associated with CES. Stress position series are recommended since they significantly increase the sensitivity of CT exam.

References:

TUMORS IN THE THORACIC cavity are frequently found in association with pleural effusion, pericardial effusion, or pleural plaques.1,2 A wide variety of neoplasms can involve the thoracic cavity, including primary neoplasms of the chest wall, lung, thymus, heart, mediastinum, diaphragm, and pericardial cavity.3,4

AELUROSTRONGYLUS ABSTRUSUS

Six healthy young cats were inoculated with low and high dose of A. abstrusus, CT was performed before inoculation, and both CT and CR at day 48 and 81 after inoculation. CT pre- and postcontrast, as well as CT angiography was included. Radiographic criteria included presence, degree, and distribution of bronchial and pulmonary changes, presence of pleural disease, cardiovascular changes, and signs of lymphadenomegaly. From the CT imaging results were described according to a classification system previously reported. Quantitative assessment of the bronchial dimensions and pulmonary artery caliber was performed on CT. Vessel tortuosity, luminal filling defects together with size, shape, and attenuation of the intrathoracic lymph nodes were noted. Histopathology of the accessory lung lobe and one tracheobronchial lymph node was done and compared with the imaging findings.

References:
EXPERIENCES WITH THORACIC MRI IN SMALL ANIMALS

R. Dennis. Centre for Small Animal Studies, Animal Health Trust, Lanwades Park, Kentford, Newmarket, Suffolk, UK CB8 7UU

Introduction: CT is generally considered to be the imaging modality of choice for thoracic lesions in small animals due to its excellent resolution and relative lack of motion artifact. MRI images are degraded by movement, due to noise and ghosting artefact in the phase-encoding direction that may render the images nondiagnostic.²,³ Although cardiac and respiratory gating techniques can be used in man², they may be less successful in dogs and cats. MRI is therefore not generally considered for thoracic investigations in small animals.

Aim: The aim of this retrospective study was to review the use and value of thoracic MRI in a clinical small animal population.

Materials and Methods: MRI records were searched for cases of thoracic MRI during the period when a high-field (1.5 T) MR scanner has been present on site. Cases were categorized according to the area imaged and the diagnosis. The MR images were assessed for their diagnostic value and compared with that produced by radiography. Techniques that were used to reduce the effect of motion artifact were noted.

Results: During a 12-year period (April 2000–April 2012) 67 patients (55 dogs, 12 cats) were recorded as showing significant thoracic pathology on MR images. Approximately 80% were elective thoracic scans but in 20% cases unexpected thoracic pathology was diagnosed during MRI performed for other reasons. The anatomical areas affected were the chest wall (25%), mediastinum (17%), lung (16%), thoracic inlet and stenosis (4%), pleura or pleural space (4%), oesophagus (4) and diaphragm (1); three patients showed lesions in more than one area of the Department of Veterinary Radiology and Neuroradiology. In 65/67 cases. The MR studies were all considered to be diagnostic; they always yielded more information than radiography alone although the techniques were complementary. Motion artifact was minimized by careful RF coil selection, patient positioning, choice of RF pulse sequences, and phase-encoding direction, and by the use of saturation bands.

Discussion: MRI may be a useful tool for thoracic imaging, although studies are required comparing MRI and CT in order to provide guidance regarding modality choice when both techniques are readily available.

References:
1. Parker DJ, R. Dennis. Centre for Small Animal Studies, Animal Health Trust, Lanwades Park, Kentford, Newmarket, Suffolk, UK CB8 7UU.

RADIOGRAPHIC AND TOMOGRAPHIC ASPECTS OF OSTEOARTICULAR LESIONS IN A DOG WITH VISCERAL LEISHMANIAIS

A.R.S. Da Silva¹, M.J. Mampring³, B.F.M. De Almeida¹, L.D.R. P. Ciarin², P.P.C. Ciarin², W.L. Ferreira², ¹Department of Animal Reproduction and Veterinary Radiology, College of Veterinary Medicine and Zootechnics, São Paulo State University, Botucatu, Brazil; ²Department of Animal Reproduction and Veterinary Radiology, College of Veterinary Medicine of Aracatuba, São Paulo State University, Aracatuba, Brazil

Introduction: Visceral leishmaniasis (VL) is a cause of inflammatory polyarthritis in dogs, and about 30–45% of them have orthopedic disorders.²,³ These lesions can be detected on radiographic examination, although they are not pathognomonic.²,³

Aim: This study is aimed to describe, by means of radiographic (XR) analyzes, computed tomography (CT) and syovial fluid (SF), the detection of abnormalities of the joints of a dog with VL.

Case Report: A Cocker Spaniel, aged 7, with difficulty chewing and cachexia, was examined at College of Veterinary Medicine of Aracatuba, São Paulo State University. Clinical findings were generalized lymphadenopathy, weight loss, and periarticular swelling. Given these signs and the origin of the animal, examinations were performed for the detection of leishmaniasis, and evaluation of the elbow, carpus, stifle and tarsus, by cytology SF, XR, and CT.

Results: In the radiological examination of the lymph nodes were observed amastigotes of Leishmania spp. within macrophages. The biological examination of the LS revealed polyarthritis with the presence of Leishmania spp. macrophages, neutrophils. The color of the cloudy SF was straw to yellow, to red (10%) did not show abnormalities, and >10 to 100% of polymorphonuclear cells. XR examination showed discrete osteolytic areas, with bilateral trabecular bone, subchondral sclerosis, and joint collapse, more evident in the distal joints. CT revealed affected areas of osteolytic, with adjacent sclerosis, periosteal new bone formation, and heterogeneous bone density.

Discussion: Although the patient had no coartication, osteoarticular lesions observed on XR and CT were suggestive of polyarthritis, distal joints being the most affected as published.²,³ The analysis confirmed the synovitis and amastigotes of Leishmania spp., as described in the literature.¹–³

Conclusion: The presence of osteoarticular lesions in a dog with VL drew attention to this condition. LV should be included in the differential diagnosis list osteoarthropathies in dogs, considering the spread of endemic areas.

References:

RESISTIVE INDEX AND PULSATILITY INDEX IN DOGS AND CATS AT DIFFERENT STAGE OF CHRONIC KIDNEY DISEASE

P. Di Donato¹, R. Novellæs², E. Dominguez³, M.M.R. Del Almø³, ²R. R. De Gopegui³, ²Y. Espada³, ³Department of Veterinary Medical Science, University of Bologna, Alma Mater Studiorum, Bologna; ³Universitat Autónoma de Barcelona, Facultat de Veterinaria, Departament de Medicina i Cirugia Animals, Hospital Clinic Veterinari-Barcelona

Introduction: Resistive index (RI) and pulsatility index (PI) provide information of blood flow resistance within an artery. In humans, RI and PI are related to the severity and progression of chronic renal failure.¹,² In veterinary medicine correlations have been found between RI and parameters of renal function.³ The International Renal Interest Society developed the IRIS staging system for the diagnosis and assessment of progression of chronic kidney disease (CKD) in small animals.

Aim: To assess if RI and PI correlate with the IRIS scale and if they could be used to assess the severity of the disease.

Materials and Methods: Ultrasound reports of dogs and cats at different stages of CKD presented between 2006 and 2011 were reviewed. RI and PI, clinical signs, complete blood work and urinanalysis, including urine protein/creatinine ratio, systolic blood pressure, and ultrasonographic findings were recorded. Staging using the IRIS system was performed. A General Linear Model Procedure (PROC GLM) was used to evaluate significant differences (P < 0.05) among stages, whereas the LIFETESTS procedure was used to list the mean differences.

Results: Thirty dogs and 10 cats were included. IRIS stage 1 and 2 were grouped together due to the small number of animals in stage 1. Results are expressed as mean ± SD. Twelve dogs belonged to IRIS 4 (RI: 0.77 ± 0.02, PI: 1.92 ± 0.11), 13 to IRIS 3 (RI: 0.71 ± 0.02, PI: 1.55 ± 0.11), and 6 to IRIS 1–2 (RI: 0.70 ± 0.03, PI: 1.40 ± 0.15). Three cats belonged to IRIS 4 (0.81 ± 0.04, PI: 2.96 ± 0.27), five to IRIS 3 (0.78 ± 0.03, PI: 1.68 ± 0.21), and two to IRIS 1–2 (0.74 ± 0.05, PI: 1.49 ± 0.33). A tendency for increasing vascular indices with the IRIS staging was detected. However, the difference was only significant between P of stages 1–2 and 4 in dogs.

Discussion: Some relationships have been demonstrated in previous veterinary studies between the indices and renal function. A tendency for increasing RI and PI with increasing IRIS stage was observed in our patients. However, this was only significant for PI between stage 1–2 and stage 4 in dogs. More studies should be performed including a larger number of patients to confirm these findings.

References:

CO-NEUM BECOMED COMPUTED TOMOGRAPHY (CBCT): CLINICAL APPLICATIONS IN DOGS AND CATS EXTRACRANIAL DISEASES

M. Di Giancammillo, M. Miscoli, D.D. Zani, S. Silvia Marches, S. Borgonovo. Department of Veterinary Clinical Sciences, Faculty of Veterinary Medicine, University of Milan, Milan, Italy

Introduction: Cone Beam CT (CBCT) has been recently introduced in veterinary medicine for dentomaxillofacial imaging studies.¹,² The hard tissues relatively high isotropic spatial resolution increases diagnostic quality, providing a three-dimensional representation of maxillofacial structures, with minimal distortion and short scanning times.³

Aim: The aim of this study was to assess clinical applications of CBCT for dentomaxillofacial and extracranial studies in dogs and cats.

Materials and Methods: A new generation of CBCT (NewTom G5, NewTom QR S.R.L., Verona, Italy) has been employed. It features seven flexible FOVs, which comply with the diagnostic imaging requirements of multiple orthodontic and extracranial diseases of small animals. The machine is provided of a pass-through gantry.

Forty-five patients, 27 dogs and 18 cats, have been positioned in internal recumbency under general anesthesia or deep sedation. The overall scan time was 18 s. Slice thickness ranged from 150 to 300 μm. Seven to fifteen patients (15.6%) did not show abnormalities. The most frequent lesions were otitis, observed in 15 animals (33.3%); four external otitis, eight middle ear diseases, two middle and external otitis, and only one presented involvement of inner and middle ear. Eight animals (17.8%) revealed rhinitis: five neoplastic rhinitis and three non-neoplastic rhinitis. Six animals (13.3%) showed traumatic fractures. Five animals (11.1%) presented orthodontic diseases. Four animals (8.9%) showed neoplastic diseases on
EFFECTS OF INTRAVENTRICAL ALPHAXALONE OR ETOMIDATE ADMINISTRATION ON UMBILICAL ARTERY DOPPLER INDICES IN PREGNANT EWE S

E. Domínguez E, M.M.R. Del Álamo R, Novellas É, Espada L, Santos F, García L, Fresno Departamento de Medicina i Cirugía Animals, Universitat Autònoma de Barcelona, Spain

Introduction: The pregnant sheep is widely used as an animal model for the study of human pregnancy. Some of the experimental procedures in the pregnant ewe require the administration of anaesthetic agents, which could have cardiovascular and respiratory depressive effects on both mother and fetus. 1,2 Alphaxalone and etomidate are proved to produce minimal soft-tissue contrast resolution. Both agents are drugs of choice in general surgery and small animal practice because of their characteristic is unable to provide a good soft-tissue contrast resolution. 3

Aim: To determine the effects of alphaxalone and etomidate on umbilical vascular indices (UA) of the fetal sheep.

Material and Methods: Twenty-one pregnant Ripollse sheep were included in the study ([A] alphaxalone (n = 10); [B] etomidate (n = 11); mean gestational age: 101.6 ± 5.3 days and 98.4 ± 4.5 days, respectively). Noninvasive color and pulsed Doppler evaluation of UA was performed in each sheep before (baseline) and 1, 2, 5, 10, 15, 20, 30, 40, 50, and 60 min after administration of a single IV dose of 2 mg/kg alphaxalone or 1 mg/kg etomidate. Recorded data included velocities (peak systolic velocity-PSV, end-diastolic velocity-EDV, and time-average maximum velocity-TAMX), and umbilical indices (pulsatility index-PI, and resistive index-RI). Results are expressed as mean ± SD.

Results: At baseline time, PSVA was 66.84 ± 30.84 cm/s and PSVB 45.27 ± 12.87 cm/s; EDVA was 18.87 ± 12.30 cm/s and EDVB 14.05 ± 7.40 cm/s; TAMXA was 39.23 ± 24.17 cm/s and TAMXB 27.89 ± 9.00 cm/s; PIA was: 1.23 ± 0.17 and PIB was: 1.16 ± 0.19; RIA was: 0.72 ± 0.06 and RIB was: 0.7 ± 0.07. Alphaxalone or etomidate administration induced no statistically significant changes on the vascular indices.

Discussion/Conclusion: The UA waveform analysis has been reported to be an essential noninvasive technique for the evaluation of foetalplacental blood flow. 4,5 According to our results, alphaxalone and etomidate did not cause any detrimental hemodynamic effects on foetoplacental circulation due to lack of significant changes on Doppler ultrasound evaluation. Although further studies should be performed to widely assess these parameters in both anesthetics in the foetalmaternal unit, both anesthetics agents are apparently safe drugs to use during pregnancy.


RADIOGRAPHIC ASSESSMENT OF RENAL SIZE IN HEALTHY FERRETS (MUSTELA PUTORIUS FURIO)

E. Domínguez E, De Los Santos R, Novellas É, Espada L, Martorell. Departamento de Medicina i Cirugía Animals, Universitat Autònoma de Barcelona, Spain

Introduction: Abdominal radiography is a noninvasive imaging technique that allows the evaluation of renal size, shape, and contour, and is frequently used in the diagnosis of ferret renal disease. Normal radiographic renal size compared with the length of the second lumbar vertebra (L2) has been reported in dogs and cats.2-3 However, information about normal radiographic renal size in ferrets is not available.

Aim: To provide normal reference radiographic values for kidney size related to L2 in adult ferrets.

Materials and Methods: A total of 200 ferrets (122 females, 78 males) were retrospectively reviewed. Patients with renal disease, based on clinical history, physical examination, and blood work were included. Ven- trodorsal abdominal radiographs were acquired in conscious ferrets or under mild sedation. Renal size (L), length (L1), and renal size standardized for body weight (BW) were measured. The ratio between renal length and L2 (L2) (distance from the cranial to the caudal vertebral endplate in a mid-sagittal plane) were measured. The ratio between renal length and L2 was calculated. Results are expressed as mean ± SD.

Results: One hundred and seven radiographic studies from 59 healthy adult ferrets were evaluated (53 entire males, 13 castrated males, 16 entire females, 7 neutered females). Female body weight (BW) ranged between 345–1180 g (759.25 ± 261.25 g) and male BW ranged between 600–1660 g (1153.08 ± 296.56 g). Left kidney length was 2.88 ± 0.38 cm and right kidney length was 2.92 ± 0.4 cm. Left RI L2 ratio was 2.35 ± 0.26 and right RI L2 ratio was 2.36 ± 0.25. Based in this study, a normal radiographic renal size ratio value of 1.85–2.85 could be used in adult ferrets.

Discussion/Conclusions: Kidney disease is frequent in ferrets, with many ferrets older than 4 years having chronic interstitial nephritis. Infectious diseases, toxins, neoplasia, and urinary tract calculus are frequently described in these patients.4 Even if radiography is one of the first imaging techniques used in exotic pet practice, normal reference data for kidney size is not available. This study provides normal reference values for ferret kidney size assessed radiographically. These values are similar to those described macroscopically (2.4–3 cm length).5 Further studies evaluating the effect of gender, neutering state, body weight, and age in renal size should be performed.


IN VIVO NONINVASIVE MEASUREMENT OF CARDIAC OUTPUT IN MICE USING HIGH FREQUENCY TRANSTHORACIC ULTRASOUND


Introduction: Mice have increasingly been used as models of human cardiovascular diseases in the last years. However, noninvasive monitoring of cardiovascular parameters, such as cardiac output, in small animals is difficult. On the other hand, the gender effect in these parameters has not been completely studied in mice.1-3

Aim: We evaluated the use of 40-MHz pulsed Doppler ultrasound to measure hemodynamic parameters of the ascending aorta in intact anesthetized mice of either sex, with the objective to provide normal values for these parameters and to describe possible gender associated differences in them.

Materials and Methods: High frequency (40 MHz) B-Mode and pulsed Doppler ultrasound scans were performed in the ascending aorta of 27 C57BL/6 healthy, adult mice (2 months old) of either sex. Mice were anesthetized with isoflurane and respiratory rate, ECG, and rectal temperature were monitored and maintained under physiological values. Aortic diameter (D) and area (A), heart rate (HR), stroke volume (SV), stroke index (SI), cardiac output (CO), and cardiac index (CI) were calculated in four cardiac cycles. Results were obtained before and after normalization for body weight (BW) to detect differences related to gender and/or BW. Results are expressed as 95% confidence interval mean (95% CI).

Results: No differences were found between male and female in the diameter (1.51–1.62 mm) and area (1.8–2.4 mm²) of the ascending aorta, neither in the HR (442.9–469.6 bpm), SV (66.67–82.26 mm³), and CO (29.39–31.59 ml/min). Both SI and CI were statistically lower in male (m) than female (f) (m: 2185.12–3510.61 mm³/kgBW; f: 3761.72–4980.08 mm³/kgBW. Cim: 1014.62–1467.05 ml/min/kgBW). However, after normalization for BW, these differences disappeared.

Discussion/Conclusions: Although mice are widely used as models of cardiovascular diseases, there is little information of normal References for murine hemodynamic parameters. Particularly, gender related differences in cardiovascular values have not been completely studied in mice, even knowing that such differences exist in human beings. Results obtained in this study can be used as normal values in further murine cardiovascular studies. Furthermore, they suggest that if male and female mice of the same strain and age are to be compared, values should be standardized for BW.1

Prevalence of Nutritional Secondary Hyperparathyroidism and Rickets in Iran: Retrospective Radiographic Study of 699 Cases

S. Eltekhari¹, M. Masoudifard¹, A.A. Vajhi¹, S. Soroosh¹, M. Molazem¹, M.M. Pournoury²
¹Department of Surgery and Radiology, Faculty of Veterinary Medicine, University of Tehran; ²Student, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

Introduction:
Nutritional secondary hyperparathyroidism is seen in young animals fed on meat, which has a low calcium and high phosphorus content. The resulting hypocalcemia stimulates increased production of parathyroid hormone and consequently bone resorption and generalized decreased bone opacity. Clinically, the condition presents with signs of locomotor impairment. The bones are painful, and folding fractures are common. Feeding a balanced diet results in rapid remineralization of the bones but deformities may persist. 1,2 Rickets is characterized by a failure of mineralization, particularly at the physis. It may be due to a deficiency of calcium, phosphorus, or vitamin D. In animals with rickets, the phonemes become deeper. The metaphyseal edge of the bone at the physis becomes wide and concave. 3

Materials and Methods:
From March 21, 2011 until March 19, 2012, 3034 cases were referred to department of radiology in small animal hospital, university of Tehran. The clinical records and radiographs of 699 cases were randomly reviewed and the cases affected by NISH and rickets were reevaluated.

Results:
In 699 reviewed cases, 62 cases (8.87%) with NISH and 18 cases (2.58%) with rickets were found. Of 62 cases affected by NISH, most cases of NISH were diagnosed in cats (34 cases, 54.84%), birds (7 cases), dogs (7 cases) and rabbits (7 cases). In 18 cases affected by rickets, 11 cases (61.11%) were cats and 5 cases (27.78%) were squirrels. In most cases affected by rickets (17 cases, 94.44%) radiographic signs of NISH were also evident. In pets affected by NISH, other accompanying diseases were pneumonia, megacolon, and rickets.

Discussion:
This research shows the majority of cases affected by NISH and rickets in Iran were cats. Lack of knowledge of the owners about the diet and husbandry may be the most important cause. The majority of cases affected by rickets, showed the signs of NISH, which emphasizes on the same conditions for occurrence of rickets and NISH.

References:

Radiographic Diagnosis of SwinBladder Distention due to Systemic Bacterial Infection in an Ornamental Fish (Flower Horn Species)

S. Eltekhari¹, M. Molazem¹, H. Rahmati-Holasosco²
¹Department of Surgery and Radiology, ²Department of Aquatic Animal Health, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

Introduction:
A male Flowerhorn fish (a hybrid cichlid) with abnormal swimming posture was referred to the Radiology Department, Small Animal Hospital, Faculty of Veterinary Medicine, University of Tehran. The ventral part of the fish's abdomen was floating on the surface of the water causing the fish an abnormal swimming posture. The fish had been transmitted to a new aquarium 2 weeks earlier and had not been eating ever since. It was reported to have physical conflict with other fishes as well.

Materials and Methods:
Radiographs were taken in lateral and dorsoventral views the first day. Two days later, the radiography was repeated to monitor the response to treatment. Ultrasonography was also performed to evaluate the fish's internal organs. Under the guidance of ultrasonography, gas from swim bladders was evacuated. Another lateral radiograph was taken afterwards.

Results:
First day radiographs revealed the distention of swim bladders with gas three times bigger than normal limits, which is a rare finding. Abnormal swimming posture was suggested to be the result of distention of swim bladders. Antibiotic therapy was initiated by adding Tetracycline to the water of the aquarium and injecting Oxitetracycline in the dorsal muscles. Third day radiographs revealed no signs of swim bladders, but the fish still could not swim normally. After the aspiration, the size of swim bladders became normal and the fish sank under water but it could not swim yet. A week after the treatment was initiated the fish died as a result of a general infection.

Discussion:
Abnormal swimming posture in ornamental fishes could be due to swim bladder problem, such as inflammation and infection. Diagnosis of these problems is performed by radiographic, virologic, bacteriologic, and pathologic methods. The treatment of choice in this situation is administration of anti-inflammatory agents and antibiotics. 5 Bacteria are responsible for majority of the infectious diseases diagnosed in captive fishes. These bacteria mostly act as secondary opportunistic invaders that take advantage of diseased animals by overwhelming their natural host defense response. Opportunistic bacteria represent a threat every time a fish is exposed to a stressful event. 6

References:

Imaging Findings in Horses with Phyrrgeal Squamous Cell Carcinoma

A.J. Etienne¹, L. Evrard², G. Bolen³, G. Esman⁴, S. Gruke⁵, V. Buson⁶
¹Diagnostic Imaging Section, ²Large Animal Surgical Section, Faculty of Veterinary Medicine, University of Liège, Bouverd de Colonster, 20, Bât. B41, Sart-Tilman, 4000 Liège, Belgium

Introduction:
Squamous cell carcinoma (SCC) has been occasionally reported in the equine pharyngeal region. 1-3 The aim of this poster is to describe imaging findings in four cases of pharyngeal SCC.

Materials and Methods:
Four horses, mean age 19.5, two females and two geldings, were referred for dyspnea (three of four) and/or dysphagia (three of four). Because of dyspea radiographs were realized prior to endoscopy. Ultrasound (US) was performed in all cases by ventral and lateral approach using a linear 7.5 MHz transducer. A postmortem computed tomography (CT) of the head was performed in one case (16 slices CT, Somatom 16, Siemens).

Results:
Radiographic opacity of the pharyngeal region was increased in all cases. A soft tissue mass was also visible in the caudal maxillary sinuses in one horse. The epiglottis was either not recognized or difficult to see with an abnormal shape. Pharyngeal lipogistic distance and vertebrae diameter were normal in all cases. The soft palate was either thinned or impossible to be outlined, with an irregular surface. In one case it was dorsally displaced. The dorsal pharyngeal wall looked unevenly thickened or impossible to be outlined ventrally due to border effacement. No bony damage was identified on radiographs. A hypoechoic heterogenous mass was visualized at US in two cases and an enlargement of the mandibular swelling was observed in three cases. Lymphoid nodes had also heterogenous echogenicity and increased Doppler signal in one case. Oral and pharyngeal endoscopic examination confirmed a pharyngeal mass in two cases, but was unsuccessful or incomplete because of intense reaction in two. CT revealed maxillary bone lysis in the horse with a mass in the maxillary sinus. Histopathological examination of local biopsies or necropsy revealed pharyngeal SCC invading epiglottis, pharyngeal wall and soft palate in the four horses and the maxillary sinuses in one.

Discussion/Conclusion:
Because endoscopy can be impaired by the size of the mass, radiology is helpful in estimating the extent and invasiveness of the process and US to confirm lymphadenopathy. However, because of its relatively low sensitivity and the local increased opacity, radiographic examination may underestimate bone lysis.

References:

Radiographic Diagnosis of SwinBladder Distention due to Systemic Bacterial Infection in an Ornamental Fish (Flower Horn Species)
A STUDY OF THE CAECO-COLIC VESSELS AND LYMPH NODES AT TRANSABDOMINAL ULTRASONOGRAPHY

L. Evvard, M. Esman, A. I. Etienne, G. G. Bolten, T. Tersö, G. De La Rebière De Poudy, V. Busoni, D. Diagnostic Imaging, E. Equine Sport Medicine, E. Equine Surgery, Faculty of Veterinary Medicine, Department of Clinical Sciences of Companion Animals and Equids, University of Liège, Liège, Belgium.

Introduction:
The lateral caecal vessels run adjacent to the abdominal wall while colonic vessels are located axially to the large colon.1,2 Caecal lymph nodes follow the caecal vessels’ path.1,3 The visualization of additional mesenteric vessels at ultrasound (US) has been described as a sign of right dorsal colon displacement.3

Aim:
This study aims to describe normal and abnormal transabdominal US features of equine caecocoele vessels and lymph nodes in healthy horses and horses with symptoms related to digestive tract disease.

Materials and Methods:
Transabdominal US images of the right abdomen were obtained prospectively on eight healthy horses. Mesenteric blood vessels were followed and topography and size recorded. Visible caecal lymph nodes were evaluated. US images from horses with digestive tract disease and visible additional mesenteric vessels (nine) and/or visible caecal lymph nodes (eight) were retrospectively reviewed.

Results:
In healthy horses, caecal vessels were visualized adjacent to the body wall from right midparalumbar fossa extending to ventral midline. Caecal lymph nodes were difficult to see. One additional mesenteric vessel was seen in two healthy horses emerging from the caecal vein and running caudocranially on a short length. Only two of the sick horses with additional visible mesenteric vessels had right dorsal colon displacement confirmed either at surgery or at post-mortem. The seven other cases resolved medically; one had colic due to gastric impaction while six had weight loss and diarrhea without any sign of colic. Four out of the last six showed colonic wall thickening at US, due to eosinophilic colitis. Horses having easily visible caecal lymph nodes along caecal vessels had US evidence of large (seven) and/or small (two) intestinal wall thickening.

Conclusions:
Visualization of additional mesenteric vessels in the right abdomen at transabdominal US is not only associated to right dorsal colon displacement but may happen in medical cases. Easily visible caecocoele lymph nodes are suggestive of inflammatory enteropathy.

References:

CHARACTERISTIC BONE MARROW METASTASIS OF A PANCREATIC ISLET-CELL CARCINOMA

Fernandez M, Dominguez E, Espada V, Novellas R, Fundació Hospital Clinic Veterinari, Universitat Autònoma de Barcelona, Animal Medicine and Surgery Department, Universitat Autònoma de Barcelona, Barcelona, Spain

Case Report:
A 10-year-old spayed female Boxer was referred for a 3-month history of lethargy and bilateral udder refractory to immunosuppressive therapy. The results of the hematology and biochemistry were consistent with steroid administration. Serological screening for endemic infectious diseases was negative. Radiographs of the thorax and abdomen were first performed. The larynx in a Shetland pony. Equine Vet Educ 2002;14:60–62.

Based on the case presented above, the case reported here and the one described by Pickens et al., polycystic, transitional cell carcinoma and lesions affecting the bone marrow of long bones should prompt the investigation of a primary tumor, paying particular attention to neuroectodermal carcinomas of the pancreas.

References:

ULTRASOUND-GUIDED BRUSH CYTOLGY OF BLADDER AND URETHRAL LESIONS IN DOGS: TECHNIQUES AND RESULTS

M. Finck, V. Busoni, F. Biller, A. Hamaïd, G. Bolten, Diagnostic Imaging Section, Small Animal Internal Medicine Section, Small Animal Surgery Section, Department of Small Animal and Equine Clinic, Faculty of Veterinary Medicine, University of Liège, Belgium

Introduction:
Bladder wall thickening is a common ultrasonographic (US) finding in dogs with bladder neoplasia.5,6 Severe chronic cystitis or mural hematoma may mimick US appearance of blad-
tumours.1,2 Histological diagnosis is crucial for the prognosis and treatment planning. US-guided catheter biopsies of the lower urinary tract for histological examination have successfully been used,2,5,7 but metastatic spread along needle tract after fine needle aspiration has been reported.8 Endoscopic brush cytology is considered reliable to diagnose transitional cell carcinoma in humans.5

Aim:
The aims of this study are to describe the procedure of US-guided brush cytology (USBC) of bladder and urethral lesions in dogs and to evaluate diagnostic quality of USBC sampling.

Materials and Methods:
Twenty-one dogs that underwent bladder or urethral USBC were included. The technical procedure and the results of the cytologic examination were reviewed.

Results:
A urinary catheter was brought caudally to the lesion under US guidance to serve as protection for the passage of the sheath containing the brush (Disposable 3 mm Gastroscopy Cytology Brush®). In small dogs, no catheter was used. The brush tip was positioned on the lesion and moved back and forth several times under US control. The couple brush-sheath was pulled out of the urinary catheter and the brush tip rolled on glass slides. The procedure was repeated at least three times. The bladder was reassessed for signs of haemorrhage. Based on cytology reports samplings were of good to high diagnostic quality in 18/21 cases and of moderate quality in 2/21. Neoplasia was cytologically diagnosed in 12/21 dogs and inflammation in 8/21. Bladder bleeding occurred in one patient.

Conclusion:
USBC of bladder and urethral lesions in dogs can be easily performed and provides samples of good diagnostic quality. Complications remain rare.

References:

RADIOGRAPHIC AND COMPUTED TOMOGRAPHIC ASSESSMENT OF BALLISTIC HEAD INJURIES IN SEALS (HALichoerus Grypus)

E. Fragal-Manteiga1, S. Dennison-Gibbon2, A. Brownlow3, T. Schwarz1, 1Royal (Dick) School of Veterinary Studies, Edinburgh, UK; 2Marine Mammal Radiology, San Francisco, USA; 3Scottish Agricultural College Wildlife Unit, Inverness, UK

Introduction:
Ballistic head injuries have a high mortality in humans and animals. Radiography and computed tomography (CT) are used to localize shrapnel and injury to the head. However, the presence of strongly attenuating objects causes typical a rebound artifact in computed radiography and streak artifacts in CT, affecting image quality. The purpose of this study is to compare conventional radiography and CT for assessment of penetrating ballistic injuries in seals and to compare different imaging settings for artifact magnitude.

Materials and Methods:
Different types of ammunition (including rifle shots and shotgun) were fired to the frontal region of eight seal (Halichoerus grypus) cadaver heads from a distance of 5–50 meters. Dual small animal and lateral computed radiographs (CR) and helical CT (1.5 mm slice width, 168 mA, 120 and 140 KVP) were performed. The CT images were reconstructed using different algorithms. Posterior fossa optimization (PFO) filter and extended CT scale technique (ECTS) were also used and evaluated as potential tools to reduce metal streak artifacts. CR and CT images were subjectively assessed for image quality degradation due to rebound (CR) and metallic streak artifacts (CT). CT artifact size was measured in all reconstructions.
This study was undertaken to clarify morphological comparison of PET and PET/CT images of brain, liver, and spleen 90 min after FDG injection. These data suggest it is better to carry out the PET study at 120 min after FDG injection rather than 60 or 90 min to distinguish the physiologic and pathologic accumulation. Moreover, we obtained some clinical examples, including splenic hemangioma and myeloma.

References:

EVOLUTION AND DOMESTICATION: SKELETAL MORPHOLOGICAL DIFFERENCES BETWEEN WOLF (CANIS LUPUS) AND DOG (CANIS FAMILIARIS) REVEALED BY COMPUTED TOMOGRAPHY

G. Galateanu1, T.B. Hildebrandt1, F. Görß1, K. Löhrs2, K. Rasmussen3, K. Kiønig1,1, F. Gropp1, K. Kim4, K. Rasmussen5, 6, R. Francke6, M.H. Shamir1, 1, 2, 7, Louis Leitz Institute for Zoo and Wildlife Research, Alfred-Kowale-Straße 17, 10315 Berlin, Germany; 2 Tierärztliche Klinik für Klein- und Heimtiere, Alter Biesdorf 22, 12863 Berlin, Germany

Introduction: In the light competition between wolves, coyotes, jackals and other wild canids, the wolf still does not advocate the status of domestic dog’s ancestor. Morphological comparison between dog and different wild canids may provide the answer to the puzzling question concerning the dog’s origin.

Aim: To conduct skeletal comparison between wolves and dogs by means of computed tomography (CT), enhancing the existing data based predominantly on subjective inspection and restricted to skull.

Materials and Methods: A morphological comparison between dogs and wolves using state-of-the-art tools of high-resolution, 128 slices computed tomography (CT) to analyze CT images of 31 wild European wolves from Germany and 76 dogs of different breeds. For the skull evaluation, only dolicocephalic dogs were used (32/76 dogs).

Results: Analysis of the CT images revealed morphologic differences not only on the skull, but also on the limbs. Skull’s morphological differences were related to presphenoid bone, vomer, supraoccipital foramen, petro-occipital fissure, incisive canal, pterygoid process of the maxilla, exoccipital, and tympanic bullae. Distal hind leg morphologic differences were found in the fourth tarsal bone, plantar processes of tarsal bones, metatarsals and dorsal metatarsophalangeal sesamoids. Distal front leg morphologic differences include the first digit, intermetacarpal carpal bone, accessory carpal bone, and metacarpals.

Discussion/Conclusions: The most compelling explanation for the different morphological characters of dogs and wolves is that these differences represent adaptations to dissimilar selection forces. Differences attributed to relaxed selection under domestication may explain why dogs have smaller skulls with smaller tympanic bullae, the auditory acuity being less vital than in wolves. Furthermore, the appendicular skeletal traits in wolves indicate an adaptation to high velocity and durable canicular locomotion, traits that are less vital for domesticated dogs. In conclusion, computed tomographic morphological analysis of skeletal features in wolves and dogs depict obvious influences of evolution and domestication.

References:

COMPUTED TOMOGRAPHIC STUDY AND NEW MORPHOMETRIC METHOD TO DESCRIBE THE CAUDAL CRANIAL FOSSA IN FELIDS

G. Galateanu1, T.B. Hildebrandt1, F. Görß1, C.A. Szenk1, B. Frey2, B. Levent1, K. Kim4, K. Rasmussen5, K. Löhrs2, R. Francke6, M.H. Shamir1, 1, 2, 7, Louis Leitz Institute for Zoo and Wildlife Research, Alfred-Kowale-Straße 17, 10315 Berlin, Germany; 2 Blue Pearl New York Veterinary Specialists, 410 West 55th St. New York, 10019 NY, USA; 3 Givskud Zoo, Loveparkvej 3 Givskud, DK-7323 Give, Denmark; 4 Tierärztliche Klinik für Klein- und Heimtiere, Alter Biesdorf 22, 12863 Berlin, Germany; 5 Neurology Department, Koret School of Veterinary Medicine, The Hebrew University of Jerusalem, Israel

Introduction: The caudal cranial fossa (fossa cranii caudalis) hosts the cerebellum, pons, and medulla oblongata representing an important landmark of the skull, being of particular interest for veterinary medicine. In addition to Chiari-type malformation in Cavalier King Charles Spaniels, one of the most significant pathologies at this level and a subject of concern for many zoological gardens is the “stargazing syndrome” or caudal cranial fossa stenosis, primarily in lions, that leads to severe neurological signs and frequently even to death. It is hypothesized that malformation of the bones surrounding the caudal fossa, with resulting compression of the brain tissue, is the cause of neurological malformation. Despite its importance, to date no osteometric studies of the caudal cranial fossa in felines have been published.

Aim: This study was designed to establish the exact anatomical definition of the caudal cranial fossa in felines, determine the aspect, size, and location of caudal cranial fossa structures, and to evaluate modus operandi for a reliable morphometric method.

ESTIMATION OF THE APPROPRIATE SCAN TIME OF FDG-PET BASED ON SUV TIME PROFILE IN DOGS

H. Fukuda1, M. Natsuho1, T. Tomohiro Bandai2, K. Kazuaki Sasaka2, M. Minoru Shimoda2, K. Ono3, H. Hiroyuki Ogawa1, 1, 5, 3, 4
1Japan Animal Referral Medical Center (JARMeC), Kawasaki, Japan; 2Tierärztliche Klinik für Klein- und Heimtiere, Alter Biesdorf 22, 12863 Berlin, Germany; 3Department, Koret School of Veterinary Medicine, The Hebrew University of Jerusalem, Israel; 4Tierärztliche Klinik für Klein- und Heimtiere, Alter Biesdorf 22, 12863 Berlin, Germany; 5Tierärztliche Klinik für Klein- und Heimtiere, Alter Biesdorf 22, 12863 Berlin, Germany

Introduction: Most positron emission tomography (PET) studies utilize 18F-fluorodeoxyglucose (FDG), which is a radiopharmaceutical glucose analog. There are only a few reports about FDG distribution patterns about normal or tumor dogs. This study was undertaken to clarify pharmacokinetic (PK) parameters and distribution profile of FDG as well as to establish the best time of PET study after FDG injection in dogs.

Materials and Methods: Five healthy male beagle dogs were used for PK study. FDG was administered 5 MBq/kg intravenously. Blood samples were taken before and after FDG injection via cannulating catheter in a fixed time schedule. The blood samples were immediately separated to plasma and each radioactivity was measured. The standard uptake values (SUV) of major oragan at 30, 60, 90, 120 min after FDG injection were estimated. The PK parameters were estimated by two-compartment open model.

Results and Discussion: Based on the parameter, plasma FDG concentration was reduced to 1/4 – 1/5 within 1 h after injection. The total clearance was 37.8 – 7.34 ml/min. Brain, liver, and spleen showed SUV mean peak about 60 – 90 min after FDG injection. These data suggest it is better to carry out the PET study at 120 min after FDG injection rather than 60 or 90 min to distinguish the physiologic and pathologic accumulation. Moreover, we obtained some clinical examples, including splenic hemangioma and myeloma.

References:
Materials and Methods: A total of 128 slices, high-resolution, computed tomography (CT) was performed on skulls and heads of 81 flelds, including 34 domestic cats (age range: 11 month to 17 years), and 47 wild flelds belonging to 11 different species (lion, tiger, leopard, cheetah, puma, lynx, ocelot, fishing cat, serval, leopard cat, and Geoffroy’s cat).

Results: Analysis of the CT images revealed a distinctive relationship between terrtorium ossesus cerebelli, dorsum sellae, tuberculum sellae, and orbital fissures. In order to determine the relationship, a quantitative approach, the exact anatomical landmarks and accurate sectional planes for both linear and volumetric measurements of carotid cranial fossa and its related structures were established.

Discussion/Conclusions: It is indisputable that dissimilar techniques and different anatomical coordinates in quantitatively approach of cranial caudal structures in flelds will lead to reporting inconsistency. Any comparison of the already scarce data will thus be impossible. This study ends with detailed anatomical description of the cranial caudal fossa in flelds and provides a new morphometric approach for a more standardized, precise and reliable assessment, useful for both clinical and research applications.

References:

RHINOCEROS FOOT STEPS OUT OF A RULE-OF-THUMB: A SYNCHRONIZED COMPUTED TOMOGRAPHY AND DIGITAL RADIOGRAPHY

G. Galateau1, R. Potter,2 T.B. Hildebrandt1, A. Maillo3, A. Godefroy4, C. Kemper5, R. Hermes6, 1Leibniz Institute for Zoo and Wildlife Research, Alfred-Kowallek-St. 17, 10315, Berlin, Germany; 2ZooParc de Beaumont, 57360 Amnéville-les-Thermes, France; 3Parc zoologique de La Ba-ber (Pélicas), France; 4Tierpark Hellabrunn, Tierparkstraße 30, 81543 Munich, Germany

Introduction: Currently, radiography is the only imaging technique used to diagnose bone pathology in wild animals situated under ‘field’ conditions. Foot pathology is a major health concerns for captive elephants and rhinoceroses, the two largest terrestrial mammals.1,2 Yet, unlike in elephants1,2,4 and for the rhinoceroses there are no established, documented imaging procedures. Chronic disease state in captive rhinoceroses represents a tremendous clinical challenge. Without improved knowledge on foot radiographic imaging techniques, clinical management will remain under the rule-of-thumb.

Aim: This study was designed to identify the relevant radiographic views and proper exposure parameters for accurate depiction of normal anatomy and pathological changes in the rhinoceros foot.

Materials and Methods: Using state-of-the-art tools of high-resolution, 128-slices computed tomography (CT), quantitative CT (QCT), and digital radiography, we imaged and analyzed eight distal feet from two southern white rhinoceroses (Ceratotherium simum simum) and one Indian rhinoceros (Rhinoceros unicornis). Our investigations led to a pioneering approach based on X-ray projections derived from tridimensional CT reconstructed images, applying CT-digital radiography synchronization.

Results:
Both normal anatomical features and pathological findings, such as fractures, periosteal reaction, cortical sclerosis, and reduced bone mineral density, were revealed by CT, QCT, and digital radiography. These pathological findings were not detected previously by standard radiography. Based on CT-digital radiography synchronization, relevant radiographic projection views were ascertained and confirmed by digital radiographs. Subsequently, an optimal exposure chart was established for adult rhinoceros distal feet. By assessing eight digital radiographs per foot (four orthogonal and four oblique radiographic views), the number of projections was defined for each projection. The data revealed that the radiological status of both front and hind autopodial elements that can be depicted with maximal detail and minimal superimposition was optimally investigated with four orthogonal and four oblique radiographic views.

Discussion/Conclusion: High resolution CT-digital radiography synchronization provided major advances in diagnostic imaging of the rhinoceros foot. The technique has set new standards for clinical management of rhinoceros foot problems and opened new possibilities for veterinary management and animal welfare.

References:

PRESENCE OF ATLANTOAXIAL LIGAMENTOUS ABNORMALITIES ON MAGNETIC RESONANCE IMAGES IN DOGS WITH AND WITHOUT CHIARI-LIKE MALFORMATION

E.B. Garcia1, L.N. Radnamcher2, A. Shores2, L. Gaschen L1, 1Louisiana State University School of Veterinary Medicine, Baton Rouge, LA, USA; 2Mississippi State College of Veterinary Medicine, Starkville, MS, USA

Introduction: Chiari-like malformations (CM) in toy breed dogs are associated with multiple cranial malformations, including decreased caudal fossa to cranial cavity volume ratio.1,2 In people, thickening or mineralization of periodontoid tissue has been identified in patients with clinical Chiari I malformations.2 Abnormalities of the occipitoatlaslantaligaments in toy breed dogs with or without CM and atlantoaxial instability has not been described. No correlations have been made regarding ligamentous abnormalities and clinical signs in dogs with CM.

Aim: Evaluation of the craniovertebral junction for the presence of occipitoatlaslantaligamentous abnormalities with magnetic resonance imaging (MRI) and to determine their association with CM and clinical signs.

Materials and Methods: A total of 104 small and toy breed dogs with MRI of the craniovertebral region were divided into CM positive and negative groups based on established criteria.1,3 Measurements of the apical, and transverse ligament, mid-sagittal cranial and caudal fossae areas, and brain or spinal cord parenchymal changes were analyzed statistically. Comparison of the findings with the clinical signs was also performed.

Results: Thirty-eight dogs were CM positive with a mean age of 6 years and 66 were CM-negative with a mean age of 7.6 years. Maltese, Shi Tzu, Yorkshire, and Boston terriers were the most commonly breed. Atlantoaxial (AA) luxation was identified in five dogs. Twenty-one percent (22/104) of dogs had one or more measurements that could not be performed because of poor visualization or absence of the appropriate sequence. Dorsal spinous ligament length and transverse ligament width were statistically significantly longer in dogs with AA luxations. Significantly more dogs with AA luxations had ligament border irregularities or thickening. No difference in ligament changes or clinical signs existed between CM and non-CM dogs. CM dogs had a greater degree of AO overlapping compared to non-CM dogs.

Discussion: Ligaments were significantly thicker or longer in dogs with AA luxation. Ligament abnormali- ties do not appear to be correlated to clinical signs in CM dogs. AO overlap is significantly greater in CM dogs, possibly due to instability from malformation or hypoplastic supraoccipital bones.


EVALUATION OF ELECTROCARDIOGRAPHY AND THORACIC RADIOGRAPHY FOR IDENTIFICATION OF CARDIAC ENLARGEMENT IN THE CANINE PATIENT: A RETROSPECTIVE STUDY

M.C. Gaunt, A.P. Carr, J.W. Pharr JW, Department of Small Animal Clinical Sciences, West- ern College of Veterinary Medicine, University of Saskatchewan, Canada

Introduction: Radiographic assessment of cardiac size is often determined based on subjective assessmen- ts. Electrocardiography (EKG) and thoracic radiography are two commonly used tools to more objectively evaluate cardiac enlargement in veterinary patients. EKG measurements have been shown to change in well-trained dogs due to physiological hypertrophy and may not always reflect cardiac disease. The vertebral heart score (VHS) is a technique for evalu- ating heart size intended to serve as an objective standard method of cardiac size evaluation on thoracic radiographs in dogs and cats.

Aim: To evaluate the correlation between EKG measurements, VHS, and thoracic radiograph changes as methods of measuring cardiac enlargement. To compare agreement between EKG and VHS measurements between a novice veterinarian and an experienced internal medicine specialist.

Materials and Methods: Medical records between the years 2000 and 2007 were searched for cases that had EKG and thoracic radiographs performed. P wave and QRS amplitude and duration were measured and the VHS calculated by both an experienced internal medicine specialist and a novice veterinarian. Measurements were compared to one another and to an experienced board certified radiologist’s subjective interpretation of thoracic radiographs to evaluate for the presence or absence of cardiac enlargement.

Results:
For the prediction of cardiac enlargement increased P wave amplitude has 10.7–16.7% sensitivity and 96.3–99.7% specificity, with moderate agreement between observers. Prolonged P wave duration has 28.1–50% sensitivity and 56.7–83.3% specificity, with fair agreement between observers. Increased R wave amplitude has 34.5–35.1% sensitivity and 70–73.3% specificity, with poor agreement between observers. Prolonged QRs duration has 30.9% sensitivity and 90% specificity, with poor agreement between observers. VHS has 64.3– 70.2% sensitivity and 55.2–78.6% specificity, with good agreement between observers.

Discussion: VHS is the most sensitive indicator of cardiac enlargement on thoracic images of the measurements evaluated and demonstrates the best agreement between observers.
ACCURACY OF ULTRASOUND IN DIAGNOSING MEDIAL CORONOID DISEASE (MCD) IN DOGS

I. Gielen, B. Van Rijssen, H. Van Bree. Department of Medical Imaging and Small Animal Orthopaedics, Veterinary Faculty, Ghent University, Belgium

Introduction:
The radiographic signs used to diagnose MCD include periarticular osteophyte formation (DJD). Other common radiographic signs of MCD are blunting of the cranial edge, abnormal shape of the medial coronoid process (MCP), and subtrochlear sclerosis.1 Unfortunately, radiographic findings are not specific for MCD and are often inconclusive for a diagnosis.

Aim:
To investigate the sensitivity and specificity of the radiographic detection of MCD compared to CT and using arthroscopy as a gold standard. Radiographic criteria used were DJD, shape of the MCP and subtrochlear sclerosis.

Materials and Methods:
Retrospectively, radiographs of 150 elbows were examined for evidence of osteophyte formation. These 150 elbows were arthroscopically examined for evidence of MCD and all lesions were listed. Sensitivity and specificity were determined using the radiographic findings as gold standard. Another radiographs of 160 elbows were examined for evidence of MCP delineation and trochlear sclerosis. Then CT and arthroscopy were performed. Afterwards the CT and arthroscopic findings were statistically compared. Sensitivity and specificity of the radiographic findings were then determined.

Results:
The sensitivity and specificity of the radiographic presence of DJD was 82% and 20.5% using arthroscopy as a gold standard. The correlation between the CT and arthroscopic findings was 99.2% meaning that the CT findings could be used as gold standard. The sensitivity and specificity of the radiographic evaluation of the MCP delineation and trochlear sclerosis was 97.2% and 94% using the CT findings as gold standard.

Discussion:
The low specificity and only moderate sensitivity of radiographic signs of DJD in diagnosing MCD makes this an unreliable radiographic sign. The high sensitivity of radiographic signs of MCP delineation and trochlear sclerosis in diagnosing MCD was comparable with a previous study2 although false positive results still present a problem.

References:

HYPERTROPHIC OSTEOPATHY IN FIVE DOGS

F. Grosu1, M.C. Codreanu2. 1Laboratory of Veterinary Radiology, SC 4 VET, Rasaptiuliori No.30, Bucharest, Romania, 020548; 2Faculty of Veterinary Medicine, Splaiul Independentei No.105, Bucharest, Romania, 050097

Introduction:
Pulmonary hypertrophic osteopathy (Marie’s disease) is typically characterized by a bilaterally symmetrical florid periosteal reaction affecting the distal long bones. The periosteal reaction is usually palisading but can also be smooth and solid. It is a rare pathological condition in animals.

Aim:
We describe two-dimensional (2D), contrast, and Doppler echocardiographic features of nine calves of supraventricular TAPVC draining into the left aygous vein. Methods: Nine calves (eight Japanese Black and one Holstein) with subsequent necropsy confirmation of TAPVC were studied between September 1983 and February 1992. Predominant clinical signs included anorexia, weakness, poor growth, dyspnea, jugular venous distension, right- or left-sided systolic murmur.

Results:
TAPVC was not correctly diagnosed in the first case; however, in the subsequent eight cases, a precise diagnosis was obtained. 2D-echocardiographic findings consisted of an enlarged right ventricle and right atrium with the atrial septal bulging into the left atrium and an abnormal echo-free space (presumed pulmonary venous confluence (PVVC) lying dorsal to the left atrium in the absence of the pulmonary venous entry into the left atrium. By
tilting the transducer, a distal part (presumed left azygous vein) of PVC then connected to a tubular structure; this tubular structure was connected to a small vessel. Doppler echocardiography, contrast echoes filled the right atrium and right ventricle with subsequent filling of the left atrium and left ventricle due to right-to-left interatrial shunting through a patent foramen ovale, but did not fill any of the structures representing the PVC, left azygous vein, and coronary sinus. Doppler echocardiography indicated right-to-left interatrial shunt flow across the patent foramen ovale and tricuspid regurgitant flow.

Conclusions: Our experience with a limited number of cases suggests that bovine TAPVC to the left azygous vein can be diagnosed by 2D, contrast, and Doppler echocardiography. 

References:

ULTRASONOGRAPHIC AND ANATOMIC BIOMETRIC AND STRUCTURAL ASSESSMENT OF THE OSTRICH (STRUTHIO CAMELUS) EYE

M. Hamid1, F. Hamidreza2, V. Alsbaz2, G. Hassan4, A. Mohammad3, M. Rouzbeh2.

1Department of Clinical Sciences, 2Department of Surgery, 3Department of Diagnostic Imaging, 4Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran

Introduction: Ostrich ophthalmology has become an important part of medical investigation of this group of animals and ultrasonographic imaging of anatomical peculiarities of the eye is important in oculary investigation to reach appropriate diagnoses.

Aim: The objectives were to describe the ultrasonographic appearance of the normal ostrich eye and to compare ultrasonographic and anatomic biometric measurements in order to evaluate the effectiveness and accuracy of ostrich ultrasonic biopsy in this species. Both eyes of 10 normal ostriches were examined.

Materials and Methods: Twenty transcorneal ultrasonic images were performed using a 10 MHz linear transducer. Images of eyes from healthy ostriches. Measurement included the distances between the anterior and posterior faces of the cornea (D1), between the cornea and anterior lens capsule (D2), between the anterior and posterior capsules of the lens (D3), between the posterior lens capsule and optic disc (D4), the axial diameter of the eye (D5), the height of the pecten (D6), and the length of pecten (D7). The same intraocular and axial measurements were made on transsected frozen eyes with the caliper as had been made by ultrasonography.

Results: Ultrasonographic biometry determined the measurements D1–D7 as being 0.95 ± 0.08 (D1-30 kg), 0.90 ± 0.08 (D1-10 kg) at T4; 4.41 ± 0.50 (D6), and 10.44 ± 0.96 and 34.32 ± 16.70 mm at the level of T4 and T9.

Discussion/Conclusions: Ultrasonographic biopsy can be used in ocular biometry and for assessment of the structure of the eye in ostriches.


MAGNETIC RESONANCE IMAGING (MRI) SPINAL CORD AND CANAL MEASUREMENTS IN NORMAL DOGS

S. Hecht1, M. Monica, M.H. Huerta1, R.B. Reed2. 1Department of Small Animal Clinical Sciences and 2Department of Biomedical and Diagnostic Sciences, College of Veterinary Medicine, University of Tennessee, Knoxville, TN, USA

Introduction: Magnetic resonance imaging (MRI) is feasible in large felids and provides important information in the clinical evaluation of a variety of intracranial and spinal diseases.

Aim: The goal of this study was to establish MRI reference ranges for spinal measurements in normal dogs. The hypothesis was that an increase of spinal cord and spinal canal diameter would be noted with increasing weight, and that the spinal cord to spinal canal ratio would remain constant between different weight groups.

Materials and Methods: A total of 40 dogs (1–10 kg, 11–20 kg, 21–30 kg, >30 kg; 10 dogs per category) underwent spinal MRI. (1.0T Siemens Magnetom Harmony). Spinal measurements were performed on sagittal T2-W images at the level of T4, T9, and L3. One-way ANOVA or Kruskal–Wallis ANOVA on Ranks was used for comparison between groups. A P-value < 0.05 was considered significant.

Results: No significant increase in spinal canal diameter was noted with increasing weight, no significant differences in spinal cord diameter between weight groups. The spinal cord to spinal canal ratio was significantly smaller in large dogs. These findings are important when using MRI to evaluate patients with suspected degenerative spinal cord disease.

Discussion/Conclusions: Ultrasonographic biometry determined the measurements D1–D7 as being 0.95 ± 0.08 (D1-30 kg), 0.90 ± 0.08 (D1-10 kg) at T4; 4.41 ± 0.50 (D6), and 10.44 ± 0.96 and 34.32 ± 16.70 mm at the level of T4 and T9.

MAGNETIC RESONANCE IMAGING (MRI) OF THE CENTRAL NERVOUS SYSTEM IN LARGE FELIDS

S. Hecht, E.C. Ramsay, J. Schumacher, W.B. Thomas, W.H. Adams, G.A. Corlkin. Department of Small Animal Clinical Sciences, College of Veterinary Medicine, University of Tennessee, Knoxville, TN, USA

Introduction: To date, reports describing CNS disorders in large felids and their diagnosis have been limited to a few papers detailing the use of radiographs, myelography, and computed tomography (CT).2,3 MRI findings have been reported in lions with hypoxanthinuria A3–4 and in a tiger cub following hypoxic arrest during general anesthesia.5 Is our knowledge, MRI findings in a varied population of large felids with CNS disease have not been reported.

Aim: To describe MRI findings in large felids presented to UTVMC with brain or spinal disorders.

Materials and Methods: The MRI database was searched for large nondomestic cats in which MRI of the brain or spine was performed. The scans were reviewed. The medical records were evaluated and signalement, history, clinical signs, and diagnosis/outcome were recorded.

Results: Fourteen MRI scans in 13 animals were available for review. All scans were performed using a 1.5T scanner (Siemens Magnetom Symphony). Patients included five tigers (Panthera tigris), one lion (Panthera leo), and one each of cheetah (Acinonyx jubatus), bobcat (Lynx rufus), caracal (Felis caracal), and leopard (Panthera pardus). Median age was 14 years (range, 6 months–17 years). Areas imaged included the head/brain (n = 11), cervical spine (n = 1), and thoracolumbar spine (n = 2). Six cats are alive at the time of this submission, six animals had been euthanized. MRI sequences used for evaluation of the head included T2-W, T1-W, fluid attenuated inversion recovery (FLAIR), T2-W GRE, and postcontrast T1-W. MRI sequences used for evaluation of the spine included T2-W, T1-W, short tau inversion recovery (STIR), and half-Fourier acquisition-single shot turbo spin-echo (HASTE). Diagnoses based on imaging findings were severe otitis media and cellulitis with intracranial extension (n = 1), meningeal inflammation (presumed hypoxanthinuria A) (n = 1), hydrocephalus and ependymal contrast enhancement due to intracranial bластома (n = 1), normal brain MRI examination (n = 7), and intervertebral disc herniation (n = 3).

Discussion/Conclusions: MRI is feasible in large felids and provides important information in the clinical evaluation of a variety of intracranial and spinal diseases.

References:
DETECTION OF ABNORMAL GAS ACCUMULATION ON COMPUTED TOMOGRAPHY EXAMINATION OF SMALL AND LARGE ANIMALS

H.G. Heng¹, K. Lee², ¹Department of Veterinary Clinical Sciences, College of Veterinary Medicine, Purdue University; ²College of Veterinary Medicine, Chonbuk National University, Jeonju, 561–756 Republic of Korea

Introduction: A small amount of vascular air embolism has been detected on Computed Tomography (CT) examination of humans as an incidental finding secondary to intravenous administration of contrast material. Aim: The purpose of this study was to describe the prevalence and location of abnormal gas accumulation detected on routine CT examinations of both large and small animal patients. Materials and Methods: A retrospective study of CT examination from Nov 2010 to Oct 2011 at Purdue University was performed. All CT examinations were carefully evaluated for any abnormal gas accumulation, and if any, the amount of gas was estimated and location was noted. Results and Discussion: A total number of 257 dogs, 33 cats, and 6 horses and 4 other species were examined during this period of time. Abnormal gas accumulation was detected in 67 locations; 17 were intravascular, 9 were detected as vacuum phenomenon, 3 were in the anal sacs and the remaining 38 were mainly found in the muscle and subcutaneous tissue. For those with intravascular gas, the gas was detected in both pre and postcontrast studies in 10 cases. Gas was only present in the precontrast study and was not seen in postcontrast studies in three cases. Gas was only present in postcontrast studies alone in four cases. Most of the gas was located in the axillary vein with only one detected in the caudal vena cava. As for the vacuum phenomenon, six were detected in the intervertebral disc spaces, three were in the synovial joints in which one was at the costovertebral joint. The cause of the intravascular gas was most likely iatrogenic secondary to intravenous administration of drugs and contrast material. Due to the small amount of gas detected in the various tissues, this normally does not lead to clinical complications such as air embolism. The presence of gas in the muscle and subcutaneous tissues were mainly secondary to trauma, subcutaneous injection or biopsy. References: 1. Groell R, Schaffer GJ, Rienmüller R, Kern R. Vascular air embolism: location, frequency, and cause on electron-beam CT studies of the chest. Radiology 1997;202:459–462.

LOW-FIELD MAGNETIC RESONANCE IMAGING TO DETERMINE THE RELATIONSHIP BETWEEN FOOT CONFORMATION AND FOOT LESIONS IN LAME HORSES

K. Holroyd¹, J.J. Dixon², T. Marj³, N. Bolas⁴, D.M. Boll⁵, F. David⁶, R. Weisell⁷, ¹The Royal Veterinary College, Haggerston Lane, North Myrm, Haffield, Herts. AL9 7TA; ²Rainbow Equine Hospital, Rainbow Farm, Old Malton, Malton, North Yorkshire, Y017 6SG; ³Bell Equine Veterinary Clinic, Butchers Lane, Mereworth, Maidstone, ME18 5GS; ⁴Hallmarq Veterinary Imaging Ltd, Unit, SBridge Park, Guildford, Surrey, GU4 8BF, UK

Introduction: Foot conformation is commonly thought to be associated with lameness, however scientific evidence is scarce. It has been shown in biomechanical studies that foot conformation does influence the forces acting on the different structures in the foot, but no correlation could be found between foot conformation and risk of disease.² Conformation assessment in those studies was based on radiographs, which are prone to measurement as well as interpretation errors.³ The aim of this study was to determine the relationship between foot conformation and different types of lesion within the foot in lame horses based on magnetic resonance images (MRI). It was hypothesised that certain conformation parameters differ significantly between different types of foot lesions. Material and Methods: Conformation parameters were measured on magnetic resonance images in the midsagittal plane of 179 lame horses with lesions of their deep digital flexor tendon (DDFT), navicular bone (NB), collateral ligaments of the distal interphalangeal joints and other structures. Results: MRI based foot conformation measurements resulted in smaller measurement errors compared to radiographs. Conformation parameters differed significantly between lesion groups. A larger sole angle decreased the likelihood of combined DDFT and NB lesions, but not NB lesions alone. A more acute angle of the DDFT round the NB was associated with DDFT and NB lesions, and a decrease in heel height index with DDFT injury. The larger the sole angle the smaller the likelihood of a DDFT or NB lesion with odds ratios of 0.86 and 0.90, respectively. Foot conformation is different in horses with deep digital flexor and navicular bone lesions, and foot conformation should hence be optimized as a preventive/therapeutic precautionary measure. References: 1. Eliashar E, McGuigan MP, Wilson AM. Relationship of foot conformation and force applied to the navicular bone of sound horses at the trot. Equine Vet J 2004;36:431–435. 2. Dyson SJ, Tranquille CA, Collins SN, Parkin TD, Murray RC. An investigation of the relationships between angles and shapes of the hoof capsule and the distal phalanges. Equine Vet J 2011;43:285–301. 3. Groth AM, May SA, Weaver MP, Weller R. Inter- and intraobserver agreement in the interpretation of navicular bones on radiographs and computed tomography scans. Equine Vet J 2009;41:124–129.

USING MRI HEAD CONFORMATION APPEARS TO INFLUENCE THE CRANIAL FOSSAE IN DOGS

A.J. Hussein, J. Penderis, M.M. Sullivan. University of Glasgow, School of Veterinary Medicine, UK

Introduction: Cranometry can define the different shape and size of dog heads, and thus might contribute to the identification of those animals that are susceptible to certain intracranial diseases¹; meningiomas in dolichocephalics, astrocytomas, and choroid plexus neoplasia² in brachycephalics. Aim: To investigate if there was a relationship between head conformation and the cranial fossae. Materials: Forty-eight dogs [36 brachycephalics; 8 mesaticephalics, and 4 dolichocephalics] with no clinical pathological changes to the cranial cavity were selected. Using a 1.5 Tesla magnet (T1-W/2-T2-W images) on midline sagittal plane, the following measurements were made (i) Head conformation parameters: Evans, Stockard indices, and olfactory bulb angulation. (ii) The rostral, middle, and caudal fossae areas, (iii) ethmoidal fossa area, each corrected for brain area. Results: (i) Significant correlations were found between head conformation [Evans and Stockard indices and olfactory bulb angle] and the areas of rostral, middle [P < 0.0001 for all of the parameters] and caudal fossae [P = 0.0229, 0.0242, and 0.0420 for head conformation parameters]. (ii) significant correlation between body weight and areas of the above fossae (i) Using a 0.0407, 0.1269, respectively), (iii) correlation also existed between the rostral, middle, but not the caudal fossae and head conformation, but no correlation was established with body weight when the above parameters were compared in brachycephalic breeds, (iv) The ethmoidal fossa of the rostral fossa was most impacted by head conformation. Conclusion: It is suggested that head conformation is the factor affecting cerebrum size, but not cerebellar area.

SINGLE DIMENSION PARAMETERS FOR DETERMINING THE DEGREE OF HEAD CONFORMATION IN DOGS USING IN VIVO MRI

A.K. Hussein, J. Penderis, M. Sullivan. School of Veterinary Medicine, University of Glasgow, UK

Introduction: MRI is useful for specific physical characteristics, by dog breeders, has resulted in over expression of certain related but undesirable phenotypes in some breeds. One of these features is extreme brachycephalic skull conformation that is commonly associated with secondary conformational changes affecting airways, eyes, and central nervous system¹ (CNS). Subjectively, one CNS feature that varies with skull conformation, and which can be determined by magnetic resonance imaging (MRI) is the position of the olfactory bulb. Aim: Is using in vivo MRI one-dimensional parameters, instead of the classic two, feasible for determining the degree of skull conformation? Material and Methods: A total of 44 dogs, representing a spectrum of skull conformation, with no clinical signs or pathology of either cranial or olfactory bulb were recruited. The following measurements were made using T1-W/2-T2-W images: (i) on transverse and sagittal—the cephalic index using historical formula²,³, (ii) on sagittal—the olfactory bulb position and orientation relative to the rest of the cranium were calculated. Results: There were (i) a significant association between olfactory bulb angulation and both Stockard and Evans indices [P < 0.001]; (ii) significant correlation between body weight and areas of the rostral and middle but not the caudal fossae [P = 0.0019, 0.0047, and 0.1269, respectively]. Conclusions: Using one-dimensional parameters, i.e. the olfactory bulb position and orientation, is feasible for determining the degree of the skull conformation (ii) The two parameters may be a useful tool for selection of appropriate breeding animals in breeds with a skull conformation phenotype at the extreme brachycephalic end of the spectrum. References: 1. Hendricks JC. Brachycephalic airway syndrome. Vet Clin North Am Small Anim Pract 1998;14:115–133. 2. Stockard GR. The genetic and endocrine basis for differences in form and behavior. Philadelphia: Wistar Institute, 1941. 3. Evans HE. The Skeleton. In: Miller ME (ed): Miller's Anatomy of the dog, 3rd edn. Philadelphia: Saunders WB, 1993. 4. Bagley RS, Gavin PR. Seizures as a complication of brain tumors in dogs. Clin Tech Small Anim Pract 1998;13:179–184.

MAGNETIC RESONANCE IMAGING CHARACTERISTICS OF SUSPECTED VERTEBRAL INSTABILITY ASSOCIATED WITH FRACTURE OR SUBLUXATION IN ELEVEN DOGS

Johnson PJ¹, Beltman E¹, Dennis R¹, Taeymans O², ¹Animal Health Trust, UK, ²Tufts University, MA, USA

Aim: The imaging assessment of traumatic vertebral fractures and subluxations in dogs has only been described previously in radiographic and computed tomographic studies¹,² This paper
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2) or nonambulatory tetraparesis (n = 2). Seven dogs had thoracolumbar spondylosis-fracture-subluxation or subluxation and presented with paraplegia with intact nociception (n = 2) or non-ambulatory tetraparesis (n = 2). Seven dogs had thoracolumbar fracture-subluxation or subluxation and presented with paraplegia with intact nociception (n = 2). A three-compartment model was applied to the interpretation of both the radiographic and MRI studies.3,4

Results:
Radiography identified compartmental disruption suggestive of spinal instability in seven out of the nine cases radiographed. On MRI the sites of trauma were all associated with rupture of the affected soft tissue structures and/or fracture in at least two compartments. Nine cases had spinal cord changes on MRI including signal intensity changes, swelling, compression, and intramedullary hemorrhage. Each injury was associated with paravertebral muscle intensity changes, which could be used to help identify sites of trauma.

Discussion/Conclusion:
MRI was found to provide information on the supportive soft tissue structures associated with spinal stability and enabled assessment of spinal cord injury in vertebral fracture and subluxation.

References:

SPIOCRECA LUPI ASSOCIATED VERTEBRAL CHANGES: A RADIOLOGIC-PATHOLOGIC STUDY

R.M. Kirberger1, S. Cifì2, E. Dvir1

Introduction:
Spirocerca lupi is a nematode of worldwide distribution with the dog being the definitive host.2 Pathognomonic thoracic radiographic changes are a caudodorsal mediastinal mass with or without aorta aneurysm formation and spondylitis.1,2

Materials and Methods:
Eleven dogs with S. lupi spondylitis. Some dogs had associated spondylitis and aortic changes. At necropsy the affected vertebral column was removed, radiographed, and then processed for histological examination. Five dogs had selected additional samples examined by electron microscopy.

Results:
Radiologically 35 vertebras had spondylitis (T5 – T1, T6 – 4, T7 – 6, T8 – 9, T9 – 5, T10 – 8, T11 – 2). Histologically most of these had varying degrees of irregular, metaplastic vertebral end plate and disc space. In three dogs histologically and an additional two dogs on electron microscopy convincing evidence of inflammation (lymphocytes, plasma cells, oedema, and fibrin) was seen. In a single microscopic section Spirocerca larvated eggs were seen adjacent to the ventral vertebral body but were not associated with any pathology.

Discussion:
Inflammatory changes of the vertebral body were seen in 6 of 11 dogs confirming that the term spondylitis is an appropriate description of the radiological changes. Additional inflammatory changes may have been present in the paravertebral soft tissues in more dogs but could have been lost during specimen preparation.

References:

THE RADIOGRAPHIC AND CT FINDINGS OF SPIROCEROSIS-INDUCED AORTIC CHANGES

R.M. Kirberger, N. Stander, E. Dvir. Department of Companion Animal Clinical Studies, Faculty of Veterinary Science, University of Pretoria, Private Bag X04, Onderstepoort, 0110, South Africa

Introduction:
Spirocerca lupi (S. lupi) is a nematode of worldwide distribution with the dog being the definitive host.2 Pathognomonic thoracic radiographic changes are a caudodorsal mediastinal mass with or without aorta aneurysm formation and spondylitis.1,2

Materials and Methods:
A total of 42 cases in which benign or malignant S. lupi associated oesophageal nodules were diagnosed. Each dog had DW and PRL thoracic radiographs made as well as postcontrast thoracic CT. Radiographs and CT examinations were evaluated independently for visibility, extent, and location of aortic mineralization or aneurysm formation. Additionally for postcontrast CT images aortic thrombi were recorded.

Results:
Aortic wall mineralization, 1–3 mm thick, was seen on radiographs in 2 dogs versus 18 dogs on CT with no circumferential aortic involvement for the largest aneurysm were T2 and T5–T12 with T4–T7 making up 76% of cases. The height of aneurysm protrusion beyond the borders of the aorta varied from 3 to 24 mm. A significant number (P = 0.002) of the mineralization’s were associated with neoplastic transformation of the oesophageal nodule but not so for the aneurysms. Aortic thrombi were seen in two dogs.

Discussion/Conclusion:
Aortic mineralization is commonly seen on CT and rarely on radiographs and may be associated with oesophageal nodule neoplasia. Aneurysm formation appears to be over diagnosed on radiographs. Unsuspected aortic thrombosis may be present in up to 5% of cases.

References:
Introduction: Abdominal swellings in bovine animals located ventrolaterally are difficult to evaluate for its contents due to its ventral location, massive size, and temperament of the animal. Ultrasonography has been used to evaluate umbilical masses, 1 body wall in cattle, 2 or abdominal wall hernias in humans. 3

Aim: Differential diagnosis of massive abdominal swellings in bovine.

Materials and Methods: This study included adult cows (n=8) and buffaloes (n=7) with massive abdominal swelling in ventrolateral or in prepubic area. Palpation of it was done in standing and semidorsal recumbency. Ultrasonography of swelling and adjoining healthy wall was done. Animals were divided into four groups: group A (Prepubic tendon rupture or PPTR: six buffaloes, four cows), group B (Fibroinocystic swelling: one buffalo and two cows), group C (Abscess: one cow), and group D (Inflammatory swelling: one cow). Diagnosis was confirmed by palpation in semidorsal recumbency, needle aspiration or surgery.

Results and Discussion: Abdominal swellings were soft on palpation except in one cow where it was firm. In group A, hernia defect was palpated in standing cows (n=2) and a buffalo. In semidorsal recumbency, hernia defect was found in all the animals. In animals of group A, B and C, sonographically, muscle layer separated skin at the margin of swelling creating a gap between the two. In this gap, detection of loops of intestine close to skin indicated PPTR (group A), fluid and fibrin shreds indicated fibrinocystic swelling (group B), and echogenic contents indicated abscesses (group C). Intact muscle layer was followed upto the hernia ring (group A) or below the swelling (group B and C). Mean ± SE abdominal wall thickness at healthy site (2.27 ± 0.2 cm) was significantly more compared to that of the hernial swelling (0.98 ± 0.1 cm) in group A. In group D, ultra in the inguinal type showed gradual increase in the total abdominal wall thickness over the swelling and abdominal viscera was seen away from the transducer indicating inflammatory swelling.

Conclusion: Ultrasonography is a useful imaging technique in evaluating massive abdominal swellings in standing position. It differentiates PPTR from fibrinocystic, abscess or inflammatory swelling in bovine animals.


RADIOGRAPHY AND ULTRASOUND AS SCRETTING TOOLS IN THE DETECTION OF LUNG AND LIVER CYSTS IN BOVINE

A. Kumar1, N.S. Saini1, J. Mohindroo3, B.B. Singhi3, V. Sangwan2, N.K. Sood3, 1Department of Veterinary Surgery and Radiology, 2School of Public Health and Zoonoses, 3Department of Veterinary Pathology, College of Veterinary Science, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India

Introduction: Hydatidosis is an emerging zoonotic disease causing significant economic loss worldwide. 1 Bovine suffering from hydatid cysts usually remain asymptomatic2 and diagnosed at necropsy. 3 Antemortem diagnosis of this condition may determine prognosis and prevent contamination of slaughter house. Scanty literature is available on radiography4 and ultrasonography4.5 of lung/liver cysts in cows and buffaloes.

Aim: To investigate and compare radiography, ultrasonography, and cytology in the diagnosis of hydatidosis in bovine animals.

Materials and Methods: Study was conducted on female buffaloes (n=12) and cows (n=2). History, clinical examination, and radiography were conducted. Ultrasonography of liver and lung region was performed with 2.0–5.0 MHz convex transducer. Ultrasonography guided fine needle aspiration cytology (USGFNAC) was performed in buffaloes (n=7). Diagnosis of echinococcosis was confirmed on postmortem and cytology in two buffaloes.

Results and Discussion: Mean age of the animals was 8.31 ± 0.73 years. Partial (n=5) or total anorexia (n=9) upto 4 weeks, persistent tympany (n=4), brisket/ventral edema (n=3), and open mouth breathing (n=5) were recorded. Lateral radiographs detected round, discrete, multiple lesions of soft nature in liver region of 78.6% animals (nine buffaloes, two cows). Radiography and ultrasonography detected lung cysts in five buffaloes (37.5%). Radiography is a good tool for examining lung lesions but it is not possible to image bovine liver with radiography. Ultrasonography is an alternate imaging modality for evaluation of liver in bovine. Ultrasonography detected single/multiple anechoic cavitary lesions4.5 in liver; occasionally, degenerated, irregular or calcified, in 10 buffaloes and two cows. Animals with single/multiple cysts showed hyperechogenic and elevated liver enzymes. USGFNAC showed no parasites, indicating sterile hepatic/lung cysts. However, cytology of cyst fluid and cyst wall scrapings in two buffalos cadavers confirmed echinococcosis.

Conclusion: Radiography and ultrasonography complemented each other for detecting lung cysts whereas ultrasonography is reliable for detecting hepatic cysts. Ultrasonography is recommended as a preliminary screening tool for hydatidosis in bovine animals.

ASSOCIATED HUMAN ADRENOCORTICOTROPIN (ACTH) LEVELS WITH BONE MINERAL DENSITY IN DOGS WITH HYPERADRENOCORTICISM

S. F. Lau1, C. F. Wolschijn2, H. A. H. Hazewinkel3, G. Voorhuis4, 1Division of Diagnostic Imaging, 2Department of Pathobiology, Division of Anatomy and Physiology, 3Department of Clinical Sciences of Companion Animals, Faculty of Veterinary Medicine, Utrecht University, Utrecht, The Netherlands

Abstract 3

Introduction: Hyperadrenocorticism (HAC) is a common heritable disease in large breed dogs, encompassing pathological changes both of the articular cartilage and the subchondral trabecular bone. Implementation of an ionic contrast agent together with microcomputed tomography (EPIC-µCT), is a contrast imaging technique that has been reported to have high precision and accuracy in assessing the morphology of articular cartilage.

Aim: The aims of this study were to assess quantitatively the articular cartilage and subchondral trabecular bone changes in the early stage of MCD in growing Labrador Retrievers.

Materials and Methods: Twenty-eight unis were collected from 14 Labrador Retrievers at different ages. The proximal one-third of each ulna was immersed in the contrast agent (Hexabrix 320, Guerbet Ned- erland B.V.) before scanning in a prototype in-vivo µCT system (SkyScan 1076, SkyScan). The interpretation of the results was performed using SkyScan software.

Results: EPIC-µCT was able to detect the changes in articular cartilage in the very early stage of MCD, which was clinically and radiographically silent. The measurements of mean X-ray attenuation from three different anatomical locations of articular cartilage (lateral, dorsal, and medial aspect of MCP) were highly correlated with each other and in general, the highest mean X-ray attenuation of articular cartilage was obtained from the lateral aspect of MCP. There was a significant correlation between disease status and changes in mean X-ray attenuation in all three anatomical locations (P < 0.01), including the lateral aspect of MCP, which corresponded to the anatomical location of MCD development. Significant increases in mean X-ray attenuation especially in the diseased group indicated that glycosaminoglycans (GAGs) content started to deplete in the early stage of MCD. In contrast, the micromorphological parameters of the subchondral trabecular bone (BV/TV, BS/TV, and Tb.Th) were affected significantly (P < 0.01) by difference in body weight (<20 kg, 20–25 kg, 25 kg), rather than disease status.

Conclusion: Further investigation of the clinical applicable CT and MRI arthrography might be valuable for the early detection of MCD.

References:


THE VALUE OF COMPUTED TOMOGRAPHY IN THE DIAGNOSIS AND TREATMENT OF ORTHOPEDIC DISEASES IN ALPACAS


Introduction: The value of computed tomography (CT) examinations in veterinary medicine is confirmed by numerous small animal and equine studies. In general, there is only little experience in diagnostic imaging in the alpaca and CT-examinations are only described for diseases related to the head.1,2 The use of this imaging modality for diagnosis of orthopedic diseases is not yet reported for this species.

Aim: To describe the importance of computed tomography for diagnosis and preoperative planning of orthopedic diseases in alpacas.

Materials and Methods: Clinical records from 2008–2012 were reviewed for CT and radiographic examinations related to orthopedic reasons in the alpaca species. Cases are presented and discussed in a case series.

Results and Discussion: In the defined period 22 alpacas were presented to the hospital for evaluation of orthopedic injuries. Radiography was performed in all, followed by a CT examination in 6/22. CT findings included luxation of the cervical column (2/6), septic femorocoxal osteoarthritis (1/6), scapular necrosis (1/6), luxation of the talocalcaneal articulation with fracture of the medial malleolus (1/6) and septic metacarpophalangeal arthritis with comminuted fracture of a proximal sesamoid bone (1/6). Treatments were performed in four of six which three had a successful outcome.

Conclusion: With increasing numbers of alpacas referred to the veterinary hospital, a CT examination is considered as an important diagnostic technique for correct diagnosis and precise preoperative planning. The short examinations time and the ability to examine the entire animal with this three-dimensional imaging modality are superior to conventional radiography, which also requires general anesthesia in most cases.

References:

ULTRASOUND-GUIDED CERVICAL FACET JOINT INJECTION IN THE DOG

M. Levy1, A. Leroux2, H. Bragula3, N. Rademacher1, L. Gaschen1. 1Veterinary Clinical Sciences, Diagnostic Imaging, 2Comparative Biomedical Sciences, Louisiana State University, Baton Rouge, Louisiana

Introduction: Ultrasound-guided cervical facet joint injection is a well-established procedure in both humans and horses for neck pain resulting from osteoarthritis, but it has not been described in dogs.1,2 Spondyloepiphyseal dysplasia, a common disease in dogs due to both disc disease and osseous lesions of the cervical spine, is a source of neck pain.

Aim: To describe the sonographic anatomy and landmarks for facet joint injections in the dog and develop a technique for injections. Determine the accuracy of injections and the factors that may influence it. Perform injections in affected dogs and assess clinical outcome.

Materials and Methods: Bony landmarks for each cervical facet joint from C2–3 to C7-T1 were established using a linear ultrasound probe on a skeleton in a water bath. Using 11 canine cadavers (3.5–24.2 kg

Abstracts

A COMPARISON OF TRANSTHORACIC ECHOCARDIOGRAPHIC M-MODE MEASUREMENTS TO ALLOMETRIC SCALING DERIVED VALUES IN CLINICALLY NORMAL ADULT DACHSHUNDS

C.K. Lim1, R.M. Kirberger2, G.T. Fogstate1. 1Department of Companion Animal Clinical Studies; 2Department of Production Animal Studies, Faculty of Veterinary Science, University of Pretoria, South Africa

Introduction:
Mitral valve prolapse (MVP) in Dachshunds is associated with progressive myxomatous mitral valvular degeneration.1-3 Allometric scaling is currently used to predict normal M-Mode cardiac measurements in adult dogs.4 However, many studies have reported that breed and body conformation influences canine echocardiographic measurements.5 Aim: To compare transthoracic echocardiographic M-mode measurements to allometric scaling derived values in clinically normal adult Dachshunds.

Materials and Methods:
A total 43 standard Dachshunds, aged 1–7 years, weighing ≥ 5 kg underwent physical examination, chest radiographs, blood samples, and ultrasound (2.5 – 5.0 MHz). Echocardiographic M-mode measurements were obtained. A total of 100 measurements were obtained and the mean value was used for the study. The allometric measurements, obtained by multiplication of the equation of a straight line, were derived from the normal range of the measured values. Allometric measurement values were compared to true values using Pearson’s correlation coefficients that fell within the estimated ranges and its 95% confidence interval (CI). Average allometric scaling values were also compared to true values using Pearson’s correlation coefficients (r), paired t-tests and Bland-Altman plots.

Results:
The correlation coefficients (r) and paired mean differences were significant (p < 0.05). The mean differences were within the limits of agreement. The average allometric scaling values were significantly different from the true values. The mean differences between the measured and allometric values were significantly different from zero in 12 of the 20 cardiac measurements obtained.

Discussion/Conclusion:
A total of 43 normal Dachshunds were compared to the allometric values predicted by the allometric equations. The average allometric scaling values were different from the true values. The differences were not within the limits of agreement. The correlation coefficients (r) and paired mean differences were significant. The mean differences were within the limits of agreement. The average allometric scaling values were significantly different from the true values. The mean differences between the measured and allometric values were significantly different from zero in 12 of the 20 cardiac measurements obtained.
Discussion and Conclusion: The excessive secretion of IL-18 is due to hypocellularity in chronic kidney disease. Beside the laboratory exams, radiography is necessary to an appropriate assessment of the axial and appendicular skeleton. An early radiographic diagnosis assists in a better prognosis of the disease and in the correct and immediate quality of life. With industrial and balanced animal food, this kind of disease has become rare really.

References:

COMPUTED TOMOGRAPHIC VERSUS RADIOGRAPHIC DIAGNOSIS OF MULTIPLE MYELOMA IN A DOG—CASE REPORT

ASDeM Lima, 1 A. Sendlay, C.S. Kronflö, 2 R.F. Giglio, 3 LdosS Arnaut, 4 L.C. De Pina, 5 PCDeo Faria, 1 PROVET, São Paulo, Brazil; 2 Autonomous – São Paulo; 3 Universidade Cruzeiro do Sul – São Paulo e Hospital Veterinário Cães e Gatos 2H – Osasco, Brazil

Introduction: Multiple Myeloma (MM) is a neoplasia, characterized by proliferation of malignant plasma cells, involving the bone marrow and extra-osseous structures, in a multifocal and asymmetrical pattern. 1

The diagnosis is based on the presence of plasmocytes in the bone marrow, multifocal moth-eaten type osteolysis, mainly on the axial skeleton, and also Bence-Jones proteinuria. 1

Case Report: A 6-year-old, male Boxer dog, weighing approximately 30 kg, was evaluated at a private veterinary clinic for hyporexia and apathy. At the clinical exam, the dog had high sensitivity to palpation at different sites of the spine. On a radiographic study of the spine, ventral spondylolisthesis at L7-S1 was identified, but no evidence of osteolytic areas was seen. In order to gather more information, computed tomography (CT) study of the spine was performed. In the seventh cervical vertebra, multifocal, and asymmetrical osteolytic areas were seen on the vertebral bodies with associated decreased bone density. No multilobar compressive lesions were identified, even after a myelogram. After 6 days, the dog died and necropsy was made. At this investigation, bone lysis of C7, and congested and swollen lungs were identified. At the histopathological exam, C7 had lysis and plasmocyte proliferation. The cause of death was speculated as endotoxic shock, and the interpretation of the anatomicopathological samples was consistent with MM.

Discussion: MM is a fatal disease, which could have a quick and painful course, if early diagnosis and adequate supportive care are not provided. 2 Radiographic studies of patients with MM may show no alterations, as significant degree of bone loss is necessary to be radiologically detectable. The characteristic multifocal ostetelytic lesions may be missed, especially in early stages of the disease. 3, 4 In this case reported, CT enabled detection of multifocal lytic bone lesions. However, due to its availability, the radiographic exam is most frequently used as initial screening. This case study shows that a negative radiographic examination does not rule out MM. MM should be considered as a differential diagnosis in cases of spinal pain, renal failure, anemia and neurological symptoms.

References:

CT SCAN FEATURES OF CEREBROVASCULAR HEMORRHAGIC INFARCTION IN A DOG WITH CUSHING’S DISEASE (HYPERADRENOCORTICISM)

L. Liotta1, R. Cavrenne1, D. Peeters2, J. Mennes2, G. Bolien3. 1Diagnostic Imaging Section, Department of Small Animals and Equine Clinic; 2Internal Medicine Section, Faculty of Veterinary Medicine, University of Liege, Belgium.

Introduction: Brain stroke is the most common clinical presentation of cerebrovascular disease in human, but it is still considered rare in dogs.

Aim: This poster describes computed tomography features of a presumed haemorrhagic infarct in a dog with hyperadrenocorticism.

Case Report: A 9-year-old, intact male, Brie’s shepherd dog, was referred for a 10 days history of depression and tachypnea of acute onset. The initial clinical examination showed obtundation and superficial tachypnea. A complete blood count, biochemistry, blood gas analysis, and urinalysis were within normal limits except for a mild increase in serum GGT, ALT and cholesterol. Thoracic radiographs were unremarkable. Three days later, he developed central neurological dysfunction with right-sided amarsus, ventro-medial stigmatisation of the left eye and left-sided Homer’s syndrome. Sixteen MCT (multislice computed tomography) scans pre- and postcontrast studies of the brain were performed. An intra-axial homogeneous well-circumscribed lacunar haemorrhage (i.e. −62 HU) and mildly contrast-enhancing area was observed in the rostral part of the mesencephalon with mild mass effect on the surrounding structures. This finding was highly suggestive of a hemorrhagic event of unknown etiology. Additional complementary exams performed led to the exclusion of coagulopathies and the diagnosis of puitary-dependent hyperadrenocorticism. A control CT scan exam was performed 30 days later. It showed the almost complete resolution of the lesion, which correlated with the clinical improvement observed in that patient. In both CT examinations, the pituitary gland appeared within the normal limits.

Discussion: Brain stroke has sudden and abrupt onset of focal neurological deficits. It is the result of an intracranial arterial obstruction and can be categorized as ischaemic or hemorrhagic. In previous studies hyperadrenocorticism was cited as a potential underlying cause of cerebrovascular accident in dogs, but the actual incidence is not known. The underlying pathogenesis is believed to be caused by the conjuction of a hypercoagulable state and mild-to-moderate hypertension leading to vascular lesions. The greater availability of computed imaging modalities in veterinary medicine can ease the diagnosis and the follow up of brain stroke in dogs.

References:

SONOGRAPHIC EVALUATION OF PARTIAL RUPTURE OF PATELLAR LIGAMENTS IN A DEER (BLASTOCERUS DICHIOMUS)

VMD’eV Machado1, A.F. Belotta1, K.M. Zardo1, H.S. Oliveira1, G.D.P. Soares2, C.R. Teixeira2, C.A. Hussner2, L.C. Valencia3, 1Department of Animal Reproduction and Veterinary Radiology, São Paulo State University, UNESP, Campinas, Brazil; 2Department of Veterinary Medicine, University of São Paulo, Brazil; 3Department of Veterinary Medicine, University of São Paulo, Brazil.
Animal Surgery and Anesthesiology, Campus Botucatu, São Paulo State University, UNESP, Brazil

Introduction:
There are few literature report of stifle diseases in deer, particularly in diagnostic imaging. Some authors reported arthropathies in white-tailed deer but did not report on radiographic or ultrasonic studies. Patellar fractures are a direct result of impact to the patella, and are associated with the distractive forces placed on the patellar ligaments. Fracture configurations that have been described include sagittal, transverse, comminuted, and avulsion.

Aim:
To report radiographic and ultrasonographic features of patellar fracture and patellar ligament injuries in a deer and to correlate the applicability and imaging findings by both methods on evaluation of the deer stifle.

Case Report:
A pregnant adult female deer (Blastocerus dichotomus), presented with right hindlimb lameness for two months and clinical history of trauma, was referred for imaging diagnosis. Cranio-caudal, medio-lateral, flexed medio-lateral, and cranioproximal-craniodistal oblique (skyline) radiographic views were performed. The following changes could be seen: a sagittal patella fracture with medial and lateral displacement of fragments, loss of definition of patella with several bone fragments, and a mild cranial displacement of tibia relative to femoral condyles. Ultrasound examination showed irregular hyperechoic surfaces forming acoustic shadows at medial and lateral femorotibial joints preventing visualization of the ligaments and menisci. Intermediate, medial, and lateral patellar ligaments had homogeneously disrupted linear fiber pattern and adjacent anechoic effusion, suggesting partial ligament rupture. Collateral lateral and medial and patellar ligaments were homogeneously hypoechogenic, suggesting desmitis.

Discussion and Conclusion:
At impact of the patella while jumping, the stifle joint is partially flexed and the patella is fixed in the femoral trochlea. The more prominent medial trochlear ridge, acting as a wedge, may have caused fracture of the medial aspect of the patella. Injuries leading to a quick and intense pull of the quadiceps muscle have also been reported to create a fracture, especially if the patella is in an upward fixed position.

References:

MORPHOMETRY OF SHEEP LUMBAR SPINE

M. Mageed1,2, D. Berner2, W. Brehm3, H. Jülke1, G. Hohaus3,4, K. Gerlach1

1Department of Surgery and Anesthesiology, Faculty of Veterinary Medicine, University of Kiel, Kiel, Germany; 2Large Animal Clinic for Surgery, Faculty of Veterinary Medicine, University of Leipzig, Germany; 3Microsurgery and Animal Models Core, Translational Center for Regenerative Medicine, University of Leipzig, Germany; 4Department of Neurosurgery, BG Hospital Bergmannstrost, Halle, Germany

Introduction:
There have been used as models for human spine research. However, human specimens are difficult to obtain them fresh especially from the healthy population and in large quantities in order to obviate the wide scattering effect associated with biological variability. Sheep are accepted as model in orthopedic research, due to similarities with humans in weight, sex, bone and joint structure, and bone remodeling process. A few data are available about morphometry of normal sheep lumbar spine.

Discussion:
To clarify morphometry of lumbar vertebrae in sheep used in computed tomography and to compare the generated result with human data.

Materials and Methods:
Computed tomographic scanning was carried out in five healthy Merino sheep (2 years, 62 ± 5.3 kg) under general anesthesia. Transverse images were acquired with 1-mm slice thickness from the cranial level of L1 through L5, and images were reconstructed in sagittal plane. A total of eight parameters on CT images of each vertebra were measured. The current results were compared with human published data.

Results:
Sheep vertebrae bodies were wider than deep. The pedicles were higher and longer than wide. Intervertebral disk thickness decreased towards caudal lumbar vertebrae, whereas the other vertebral measurements increased. Compared to the human vertebrae, there were several differences in the ovine lumbar vertebrae including smaller, taller, and narrower vertebral bodies, shorter and narrower pedicles and thinner intervertebral disk.

Conclusion:
The data from this study can serve as a CT reference for ovine lumbar morphology. It may be also helpful for using sheep spine as a model for human spine orthopedic research such as testing implants, if these differences are taken into account.

References:

THE USE OF CT VIRTUAL ENDOSCOPY FOR PROGNOSIS ON CASES OF SPINE FRACTURE

VMDeV Machado, L.C. Da Silva, A.F. Belotta, L.C. Carlos Vulcano. Department of Animal Reproduction and Veterinary Radiology, Campus Botucatu, São Paulo State University, UNESP, Brazil

Introduction:
A fracture can be considered an emergency when there is brain or spinal cord compression, or when there is pneumothorax. In cases of spine fractures, there is an imminent risk of spinal cord compression. The use of computed tomography is of great importance since it is the unique exam in its ability to image a combination of soft tissue, bone, and blood vessels at high resolution. With CT is possible do a recent technique, virtual endoscopy. Virtual endoscopy allows the radiologist to position the point of view inside any structure that has been imaged with CT, and then, travel down the structure.

Aims:
To describe a recent veterinary technique, CT virtual endoscopy, applied to surgical planning and prognosis in fractures of the spine. With this technique it is possible to travel inside the spinal cord and examine a spine fracture, allowing more accurate prognosis.

Methods:
CT and CT virtual endoscopy were performed in five animals presented with spine fracture. The extent of bone marrow lesions were examined with the aid of the program Voxar 3D. On CT, cuts of 1 mm were made, followed by 3D reconstruction and virtual endoscopy.

Results:
In all animals, the CT virtual endoscopy was conclusive to predict the extension of lesion. Comparing standard CT and the CT virtual endoscopy, although the results were the same, the virtual endoscopy provided better spatial resolution of the medullary canal, allowing a more accurate prognosis.

Discussion and Conclusion:
Using CT virtual endoscopy, the surgical planning were performed with better success compared to the surgeries performed without the CT virtual endoscopy, and thus can provide more accurate predictions.

References:
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DO LOW-FIELD MAGNETIC RESONANCE IMAGING ABNORMALITIES CORRELATE WITH MACROSCOPIC AND HISTOPATHOLOGIC CHANGES WITHIN THE EQUINE DEEP DIGITAL FLEXOR TENDON?

T. Maz1,2, C. Sherlock1, J. Ireland1, T. Blunden2, Bell Equine Veterinary Clinic, Kent, UK. 2Animal Health Trust, Suffolk, UK

Introduction:
High-field MR (magnetic resonance) signal intensity changes correlate well with histopathologic changes within the deep digital flexor tendon (DDFT). However, low-field systems use different imaging parameters from high-field systems that may alter lesion detection.

Aim:
The aim was to correlate signal changes on low-field MR imaging with macroscopic and histopathologic DDFT findings.

Materials and Methods:
Cadaver feet from lame horses with DDFT lesions diagnosed on low-field MR imaging and that underwent macroscopic and microscopic evaluation of the DDFT were selected. The DDFT was divided into four anatomic locations and the MR imaging findings were graded, macroscopic abnormalities were detailed, and histopathologic findings were graded. Spearman’s rank correlation coefficients were used to assess the degree of association between MR imaging and histopathology grades and Kappa statistics were calculated to estimate the agreement between MR imaging and histopathology grades.

Results:
Twenty-eight cadaver limbs from 20 lame horses were evaluated. The location of the lesions detected on MR imaging were consistent with the position of the lesions detected grossly and histopathologically. The MR imaging grade (median 2; IQ 1–3) was not significantly different from the histopathology grade (median 2.5; IQ 2–3) (P = 0.1). There was a strong correlation between MR imaging and histopathology grades (rs = 0.76, P = 0.001). Using Stata weighting of 50% to 1 grade difference and 0% to >1 grade difference, there was moderate agreement (0.52) between MR and histopathology grades.

Discussion:
This study demonstrates that lesions identified on low-field MR imaging are consistent with those identified on macroscopic evaluation of the DDFT. There is a strong correlation between the presence and severity of DDFT lesions identified and graded on MR imaging and validated and graded on histopathology. Overall, there is moderate agreement between the MR imaging grades and histopathology grades within the equine DDFT. The study therefore supports the use of low-field MR imaging for diagnosis of DDFT lesions within the feet of lame horses.

References:
ULTRASOUND EXAMINATION OF FEMORAL HEAD IN YOUNG NORMAL AND DYSPLASTIC LABRADOR RETRIEVERS

S. Manfredi1, A. Volta1, M. Bonazzi2, F. Di Ianni1, F. Ferri1, C. Bartolo2, G. Grudì1.
1Department of Animal Health, University of Parma, Italy; 2Clinica Veterinaria San Gemi-
ano, Modena, Italy; 3Private Practitioner, Modena, Italy

Introduction:
Canine hip dysplasia is a common orthopedic disease. The onset of mineralization of femoral head is delayed in dysplastic hip joints. Ultrasound is able to show mineralization signif-
ically earlier than radiography.

Aim:
The aim of the study is to assess ultrasonographic features of the femoral head in normal and
dysplastic Labrador Retriever puppies.

Materials and Methods:
Thirty-four Labrador Retriever underwent ultrasound examination of the hip joints at 19 days of
age. A 12 MHz linear probe was used. Hip joints were scanned in dorsal and longitudinal planes.
The area and volume of the femoral head and the area of the ossific nucleus were evaluated.
Ultrasonographic parameters were correlated to conventional radiographic hip dysplasia clas-
dification at 12 months. Spearman’s and Pearson correlation coefficients and Fisher’s test were
considered.

Results:
The FCI scoring mode for hip dysplasia was used. Fourteen dogs were judged dysplastic,
while 20 normal. There was a mild negative correlation between the area and volume of the
femoral head and the grade of dysplasia at 12 months and a moderate negative correlation be-
tween the area of the ossific nucleus and hip dysplasia. A femoral head area less than
75 mm² and an ossification centre area less than 3 mm² were associated with hip dysplasia.
A strong positive correlation between the areas of the ossific nucleus and the femoral head
was present.

Discussion/Conclusions:
Ultrasonography can be useful to evaluate canine femoral head morphology at an early age. A
small size of the femoral head and its ossific nucleus was associated with hip dysplasia in
this series of cases. A small ossific nucleus could indicate a delayed mineralization of
the proximal femoral epiphysis. A small femoral head could predispose to joint instability.
Further investigations are needed on a larger number of dogs.

References:
1. Todhunter RJ, Zachos TA, Gilbert RJ, et al. Onset of the epiphyseal mineralization and
growth plate closure in radiographically normal and dysplastic Labrador Retrievers. JAVMA
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epiphyseal mineralization and subluxation in Labrador Retrievers. Vet Radiol Ultrasound

16-MULTIDETECTOR COMPUTED TOMOGRAPHY ANGIOGRAPHY IN TRACHEMYS SCRIPTA ELEGANS

O. Marcon1, A. Mariacher1, S. Rota1, T. Giorgi1, G. Bertolini1.
1 San Marco’ Veterinary
Clinic, Padua, Italy; 2Centro Veterinario Specialistico (CVS), Rome, Italy

Introduction:
Because of limits of physical examination in cheloniens, imaging procedures are often
necessary to determine the vascular anatomy. Ultrasound examination is routinely performed in
turtles, although the use of these techniques in cheloniens is compromised by the shell. Computed
tomography and magnetic resonance imaging have been recently reported as useful tools for
the examination of cheloniens.

Aim:
The purpose of this study was to develop a computed tomography protocol for in vivo study of
the vascular anatomy in Trachemys scripta elegans.

Materials and Methods:
Twelve Trachemys scripta elegans (body weight from 710 to 1280 g), underwent 16-MDCT
examination for various reasons. Anaesthetized patients were placed in ventral recumbency
on the CT table. Scanning parameters were: 0.625 mm slice thickness, pitch 0.562:1,
0.7 s a rotation, 120 kVp, 160–200 mAs. For enhanced scans, ioxianol (320 mg I/kg) was
injected at a rate of 0.5 ml/s through the jugular vein. Postprocessing techniques, multiplanar
reconstruction (MPR), maximum intensity projection (MIP), and volume rendering (VR) were
used to analyze the original data set.

Results:
The most important result of this study was that this protocol provides an excellent arterial
and venous opacification allowing high quality in vivo imaging of the heart and vasculature in
each turtle. Two-dimensional MPR and 3D VR models provided detailed maps of arterial and
venous normal anatomy and variants. The following vessels were identified: right aorta and its
branches to the head and forelimbs (brachycephalic trunk, subclavian, and carotid arteries);
left aorta and its arteries to the coelomic organs (superior mesenteric, gastric, and the
celiac arteries), arteries from the dorsal aorta to the caudal part of the body (costal arteries,
gonadal, adrenal, renal, and epigastric arteries) and rarelimbs. Left and right precava and their
tributaries; postcava, left hepatic vein, renal and hepatic portal systems.

Conclusion:
Despite the small size of Trachemys scripta elegans, MDCT-angiography combined with
postprocessing techniques provided high level of detail and excellent 3D maps of the vessels
in these turtles. Noninvasive vascular imaging may represent a valid tool for investigating
their normal anatomy and variants. MDCT examination could provide additional information in
cheloniens, which cannot be visualized by standard imaging techniques.

References:
1. Martorell J, Espada Y, Ruiz de Gopegui R. Normal echoanatomy of the red-eared slider

USE OF COMPUTED TOMOGRAPHY TO ASSESS STAGE OF PRESENTATION OF CANINE NASAL TUMOURS IN A REFERRAL POPULATION IN THE UNITED KINGDOM

S. Mason, T. Maddox, S. Lillis, L. Blackwood. School of Veterinary Science, Teaching Hos-
pital, University of Liverpool Small Animal, Leahurst CH64 7TE, UK

Introduction:
Canine nasal tumours are locally invasive but infrequently metastasize. Diagnosis is poor
without treatment but median survival times of 15 months are reported with definitive ra-
diotherapy (RT).1 Advanced stage at presentation is a poor prognostic indicator. Computed
tomography (CT) is more sensitive than radiography and preferred for MRI for staging nasal
tumours.2 Several CT staging systems have been reported and American and Japanese
studies report that 48–61% of dogs are presented with late stage tumours (CT stage 3–4).3,4

Aim:
To determine the stage of nasal tumours presented in a UK referral population, and assess
whether stage at diagnosis is associated with likelihood of pursuing treatment, and
documented survival times with RT.

Materials and Methods:
CT studies and clinical records of 78 dogs with CT diagnosis of a nasal tumour were staged
using the modified Adams CT system.

Results:
Two dogs were excluded from staging due to prior debulking surgery. Ten of 76 (13%) dogs
were classified as stage 1–2, and 66/76 (87%) dogs as stage 3–4. Median time from initial
presentation to CT diagnosis in 62 dogs was 52 days. Time from presentation to referral
for CT did not correlate with late tumor stage, but all dogs diagnosed more than 5 months
from initial presentation had late stage tumors (5/62). Twenty-two dogs received definitive

MAGNETIC RESONANCE IMAGING ANATOMY OF SLIDER TERRAPINS (TRACHEMYS SCRIPTA)

J.M. Martorel, R. Novellas, L. Vilalta, E. Dominguez, Y. Espada. Departament de Medicina
I Ciuriga Animals, Facultat de Veterinaria Universitat Autonoma de Barcelona, Spain

Introduction/Purpose:
Advanced diagnostic imaging techniques are nowadays more frequently used for the di-
agnosis of diseases in exotic animals. In the slider terrapin the carapace can impair the
examination of the coelomic cavity, due to superposition in radiography or due to the small
size of the accessible windows in ultrasonography. Although the use of magnetic resonance
imaging (MRI) has been reported in some cases,3,4 there are few descriptions of the normal
appearance of the anatomic structures in reptiles.

Aim:
The purpose of this study was to describe the normal anatomy of the slider terrapin (Tr-
achemys scripta) using MRI.

Material and Methods:
Four adult male and one young male slider terrapins were evaluated. Females were between
12–15 years old, weighed between 850–1200 g and the male was 6-year-old and
weighed 350 g. The animals had been living outdoor for 5 years in an artificial lake. Before the
studies, the animals were acclimated in an aquarium where the temperature initially was 16°C,
increasing to 28° C in 10 days. All the animals were anaesthetized with alfaxalona 10 mg/Kg
IM. A low-field MR (0.2-Tesla) was used to evaluate and describe the normal appearance of
the anatomic structures of the coelomic cavity of the terrapins. Imaging examination of the
cavity included T2- and T1-weighted sagittal, dorsal, and transverse sequences.

Results:
The liver and gallbladder could be easily and completely visualized in all its extension.
Gastrointestinal tract, especially the oesophagus and stomach, could also be identified
and examined. The kidneys were visible in the caudalcoeliac coelomic cavity, although their
margin was not very well defined. These organs presented signal intensities similar to
those described for other small animals. When present, follicles were seen as well-defined
spherical structures, which showed a hypointense signal in both T1 and T2 compared to the
soft tissue organs.

Discussion/Conclusion:
MRI allowed identification of most coelomic organs.3,4 MRI is a good diagnostic imaging
technique in terrapins, and in some cases, it can allow a better assessment of the coelomic
cavity than radiography and ultrasonography.

References:
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for detection of internal tumors in green turtles with cutaneous fibropapillomatosis. J Am Vet
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nance imaging features of coelomic structures of loggerhead sea turtles. Am J Vet Res
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Abstracts

RT, including 16/21 (76%) of dogs with late-stage tumors. Late stage did not reduce the likelihood of tumor control. Median survival time for definitive RT dogs was 431 days versus 123 days for dogs receiving palliative treatment.

Discussion/Conclusion: In this UK population, the frequency of late stage presentation is higher than in previous reports. Owners and veterinarians should be aware of the clinical signs of sino-nasal neoplasia and dogs with signs of nasal disease consistent with a nasal tumor should have prompt investigations. Further studies will be needed to see if these results are consistent with better outcomes. Definitive radiotherapy remains a valid treatment option for dogs with late-stage nasal tumors.


Image Classification Using an Artificial Neural Network

F.J. McEvoy, University of Copenhagen, Faculty of Health and Medical Sciences, Denmark

Introduction: Classification of images by region or of images from one region into normal or abnormal is a common task in radiology. Computer-assisted image classification is well established in the public domain, e.g., image-based searches and automated face recognition. The algorithms that provide this technology may have many uses in veterinary radiological diagnosis, research, and teaching.

Aim: To apply an algorithm commonly used for face recognition in a veterinary setting to classify images according to anatomical region.

Materials and Methods: VO pelvis radiographs from dogs were used to create 44 × 44 pixel images of the hip joint and other similarly sized images that do not include the hip. One hundred and twenty images of hips and 80 images without were used to train an artificial neural network (ANN) to classify an image as containing a hip or not. A further 36 images of hips and 20 without were used to test the ANN. Accuracy, sensitivity, and specificity were determined for the model on both the training and test image sets. The effect on performance of training size and the number of iterations in the training cycle was examined.

Results: The ANN could be trained in 200 iterations to achieve an accuracy of 94.5% on the training set (96% sensitivity and 88% specificity) and an accuracy of 91.1% (85% sensitivity and 100% specificity) on the test images. The trained ANN performed the classification in a mean of 2.19 ms per image. Accuracy on the training set continued to improve up to the maximum number of iterations tested (500) but performance on the test set was static above 200 iterations. Training set accuracy was always greater than test set accuracy for all magnitudes of iteration and sample size.

Discussion: The classification performance achieved is impressive given that raw image data (pixel values) were used as input and the number of images in the training set was relatively low. More demanding classification, such as discriminating normal from diseased joints would likely require large well-classified training sets, the extraction of relevant features, and input from experts in radiology and machine learning.

Conclusion: Image pixel values can be used as input into neural networks for classification.


Comparison Between Pre- and Post Contrast Fluid-Affiliated Invasion Recovery Sequences (FLAIR) in MRI of Intracranial Lesions in Dogs and Cats

K. Menhorn1, S. Dürr2, J. Lang3, D. Gorgas1. 1Department of Clinical Veterinary Medicine; 2Department of Clinical Research and Veterinary Public Health, Vetsuisse Faculty Berne, Switzerland

Introduction: The FLAIR sequence is essential for the examination of intracranial lesions and the postcontrast FLAIR was shown to be superior to T1-weighted postcontrast sequences.1 In people, contrast-improved lesion detection2 and border definition and distinction from perilesional edema compared to precontrast FLAIR,3 in veterinary medicine, a possible benefit of contrast administration in FLAIR sequences has not been examined.

Aim: In this prospective study, pre- and postcontrast FLAIR were compared concerning detection and characteristics of intracranial lesions in dogs and cats. M&M: 108 dogs and 21 cats underwent MRI of the brain including a pre- and postcontrast FLAIR, using low field in 60, high field in 41 in a total of 131 examinations. FLAIR images were evaluated in consensus by two radiologists for lesion number and conspicuity, border definition, signal intensity, and pattern. Sequences were evaluated independently and in direct comparison. The FLAIR sequence was compared to the standard contrast of the complete MRI study, the radiology report, and histopathological examination in 15 cases. The level of significance was set at P < 0.05.

Results: The total number of lesions was 88. Sensitivity to detect lesions in precontrast FLAIR was 85.2%, in postcontrast FLAIR 90.9%. In postcontrast FLAIR more extra-axial lesions were detected (73 vs. 89%) and lesion borders became significantly more irregular. In direct comparison border definition improved, and signal intensity was higher in postcontrast sequences (P < 0.05). Signal intensity was significantly influenced by contrast uptake in T1, and field strength. In extra-axial lesions, lesion size was larger in the postcontrast FLAIR (P < 0.05). There was no difference in the distinction between lesion and perilesional edema.

Discussion: In agreement to the literature, mainly extra-axial lesions did profit from the postcontrast FLAIR,4 possibly due to the location outside the blood brain barrier leading to strong contrast enhancement. Differences between both sequences in signal intensity, border definition, and lesion size were only apparent in the direct comparison and the benefit of an additional postcontrast FLAIR sequence does, therefore, not justify a prolongation of anesthesia and examination time.


B-mode Ultrasonography of the Normal Eye in Persian Cats

A. Mirshahi1, S. Salahi2, M. Azzizadeh1, 1Department of Clinical Sciences, 2DVM student, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran

Introduction: Ocular ultrasonography is a routine procedure in veterinary ophthalmology to evaluate the intracranial structures of the eye, especially when severe swelling of the eyelid, keratitis, cataract, and intraocular hemorrhage prevent direct ophthalmic examinations.1–3 To the best of our knowledge, no study has documented Persian cat ocular biometry.

Aim: The purpose of this study was to describe the normal ultrasonometric biometry of Persian cat's eyes using B-mode ultrasonography.

Materials and Methods: Twenty healthy adult Persian cats with no history of previous ophthalmic disease (11 males and 9 females) with average weight of 3.015 kg were examined. Ultrasonographic examination was performed using an 8 MHZ linear transducer, PIE medical ultrasound machine, and transpalpebral. Ocular biometry of the left and right eyes was evaluated by B-mode ultrasonography. Comparison of average measurements between left and right eyes and between vertical and horizontal approach performed using paired sample t-test.

Results: Mean ± standard deviation of ocular structures of 40 eyes for corneal thickness, anterior chamber, lens thickness, vitreous chamber, and anterior to posterior dimension of the globe were 0.23 ± 0.04, 4.14 ± 0.67, 7.72 ± 0.54, 8.21 ± 0.39, and 20.68 ± 0.97 mm, respectively.

Conclusions: No significant difference was found between the ocular biometry of the left and right eyes and horizontal and vertical approach. Regarding to the high rate of referred ophthalmic problems in Persian cats, the present study provide baseline information for further clinical investigations of ocular abnormalities using B-mode ultrasonography.


Radiography of the Carpus, Metacarpus, Digit and Tarsus in Healthy 4-Yr-Old Cattle Using Multidirectional Radiography

K. Miyahara1, 2, O. Hohmura1, 2, M. Miyoshi1, 2, M. Nakagawa2, K. Inoue2, M. Satoh1, 2Animal Medical Center, Obihiro University of Agriculture and Veterinary Medicine; 2Nakagawa Animal Hospital; 3Seikiguchi Animal Hospital; 4Professor emeritus at the Obihiro University, Obihiro, Hokkaido, Japan

Introduction: Radiography has been recognized as a very important examination in cattle, but it has not been used often. Because the film-screen radiography was a traditional development method, it was not only complicated but also difficult to set radiographic conditions. Repeated radiographic examinations are not always performed in bovine clinical practice because there is no darkroom at a farm. Radiographic examination became widely available in tandem with the penetration of computed radiography in bovine clinical practice in Japan. Unfortunately,
there is no multidirectional radiograph of healthy cows for comparison with that of pathological cows.

**Aim:**
To obtain radiographs of healthy cows in order to compare to that of pathological cows.

**Materials and Methods:**
Radiographic examination was carried out to define the radiographic anatomy of the distal regions of the forelimb and hindlimb in 62 healthy cows from newborn to 20 months of age.

**Results:**
In these studies, the multidirectional radiographic anatomy of the carpus, metacarpus, digit and tarsus of healthy cows at various time points between newborn and 20 months of age were described.

**Discussion/Conclusion:**
These multidirectional radiographs of healthy cows will be helpful for radiographic diagnosis.

**References:**

**DIAGNOSTIC IMAGING OF TARSUS PLANTER ASPECT DISORDERS IN HORSES**
M. Mohamed, S. Ashrafal, I. Ahamed, Department of Veterinary Surgery Anaesthesiology and Radiology, Faculty of Veterinary Medicine, Cairo University, Egypt

**Introduction:**
Diseases of the equine tarsus have been diagnosed using a combination of clinical, radiography, and ultrasonography. Planter soft tissues swelling were included the long planter ligaments (DDF) tendonitis in three horses. The visualization of the soft tissues remains a major limitation of radiology. A combination of ultrasonography and radiology allows most planter soft tissues tarsal injuries to be diagnosed successfully.

**Purpose:**
The purpose of this study was to assess the soft tissue disorders at the planter aspect of the horse tarsus radiographic ally and ultrasonographically.

**Materials and Methods:**
Fourteen horses in different ages and sex with soft tissue disorders and lameness were diagnosed. Clinical, radiographic and ultrasonography for soft tissue disorders were evaluated and recorded.

**Results:**
The ultrasonographic abnormalities of the plantar soft tissues identified were thickening and decreased echogenicity of the superficial flexor tendons (SDF) and deep digital flexor tendons (DDFT) tendinitis in three horses. Thoroughpin had accumulation of an echoic fluid both a Sonosted Titan with microconv. transd. from 5–8 MHz; GE Vivid E with a microconv.

**Conclusion:**
The planter tarsal area represents an imaging challenge to the veterinarian. The visualization of the soft tissues remains a major limitation of radiology. A combination of ultrasonography and radiology allows most planter soft tissues tarsal injuries to be diagnosed successfully.

**References:**

**COMPUTED TOMOGRAPHY INVESTIGATION OF AN EGYPTIAN CAT MUMMY**
M. Moioli1, S. Borgonovi1, S. Malgora2, M. Di Giancamillo1, 1University of Milan Faculty of Veterinary Medicine, Department of Veterinary Clinical Sciences, Milan, Italy; 2Egyptian Museum of Buonconsiglio Castle, Trento, Italy

**Introduction:**
Application of CT diagnostic imaging to investigate archeological mummy animals is not a common procedure. Archeologists have employed radiology to study mumified human, but there are only few reports regarding radiological examinations of mummy cat.

**Aim:**
The aim of this study was to understand the characteristics of mummy cat, the cat’s age, and to try to discover which was the exact methodology to prepare it.

**Materials and Methods:**
The mummy was submitted to CT examination with a third-generation multislice scanner (Philips Brilliance CT 64-channel, Philips MD S.p.A., Monza, Italy), acquiring transversal 1-mm-thick slices, with an index of 0.5 mm and a pitch of 0.5, with both hard and soft convolution filter. Cutting plane was from axial projections for the body (thorax and abdomen), and from dorsal projections for the head due to the position of cat’s head. Appendicular skeleton was carried out by MPR in order to evaluate the grow plates. The mummy was entirely covered by multiple layers of material, showing high negative Hounsfield units value.

**Results:**
The cat’s skeleton was complete and the body position appeared the typical one of a feline seated on his rear paws. The neurocranium appeared empty with multiple fractures in both frontal and orbital regions. Tympanic bullae were normal and filled with air, cochlea was preserved as well as the ossicular chain. The upper and lower teeth were evident. Dental buds of lower molar and first upper molar were present, entirely contained in the alveoli.

**ADRENA L GLAND VOLUME MEASUREMENT IN DOGS USING THREE-DIMENSIONAL ULTRASONOGRAPHY**
M. Molazem, S. Asadi, M. Masoufiard, S. Scorori, Department of Veterinary Radiology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

**Introduction:**
Most diseases of the adrenal gland increase its size. The most common method of assessing adrenal size is by measurement of the diameter of the gland using two-dimensional (2D) ultrasonography.

**Aim:**
The purpose of this study was to determine the feasibility of using three-dimensional (3D) ultrasonography to measure adrenal gland volume.

**Materials and Methods:**
Ten mixed-breed dogs of similar weight (15−3 kg) with normal serum cholesterol and alkaline phosphatase levels and which had no clinical signs of adrenal disease (e.g., were not polycyclic or polygeneric) were used. Three-dimensional images of the adrenal glands were obtained using a GE Voluson 730-Pro ultrasound machine and the volume of the glands was measured using VOCAL® 4D viewing software created by GE services.

**Results:**
The mean (+ /− standard error) volume of the left and right adrenal glands was 0.539 cm3 (+ /− 0.020) and 0.548 cm3 (+ /− 0.050), respectively. Acquiring 3D data of the adrenal gland was easy to perform and takes less time than two-dimensional evaluation; however, analysis of the raw data for volume determination was time consuming.

**Discussion:**
This study shows that using 3D ultrasonography to evaluate the size of the adrenal glands is feasible. It is likely that volume measurement would be able to detect enlargement at an earlier stage than 2D measurements but further research is needed to determine the reliability of this technique.

**References:**

**ULTRASONOGRAPHY OF URINARY TRACT LITHIASIS IN DOGS TREATED WITH ALLOPURINOL FOR LEISHMANIASIS – A 30 CASE REPORT**
C. Monteiro1,4, V. Miriam4, R.L. Ferreirao2, M. Lestriniro2, M.M.R.E. Nitzo5, E. Ceceot – Ecografia Veterinária Móvel, Lisboa, Portugal; 2 Sombra Acústica, Ecografia Veterinária Móvel, Lisboa, Portugal; 3 Azevet, Clínica Veterinária Brezoi de Azeleito, Brezo Azeleit; Portugal; 4Departamento Clínico, Faculdade de Medicina Veterinária, Universidade Lusofona de Humanidades e Tecnologia, Lisboa, Portugal; 5CITIUS/Faculdade de Medicina Veterinária, Universidade Técnica de Lisboa, Portugal

**Introduction:**
The aim of this study is to evaluate the ultrasonographic findings in the urinary tract of 30 dogs treated with allopurinol for Leishmaniasis.

**Materials and Methods:**
Between 2008 and 2012 a record was made of the ultrasonographic findings in the urinary tract of 30 dogs during treatment with allopurinol for Leishmaniasis (15 days to 4 years). Seven of these dogs had a nephropathy before starting treatment. All animals had BUN and creatinine serum levels measured and urinalysis. The animals had a complete abdominal ultrasound by three ultrasonographers (CM, MV, RF) with either a Sonosted Titan with microconv. transd. from 5–8 MHz, GE Vivid E with a microconv. transd. from 5–9 MHz, or Esacote My Lab with a microconv. transd. from 5–9 MHz.

**Results:**
Eleven animals had BUN (>50 mg/dl) and creatinine (>1.2 mg/dl) serum concentrations elevated. All dogs had mobile focal hypercholetic structures in the bladder, between 1–3 mm, with acoustic shadowing. Twenty-three dogs had bilateral focal hypercholetic structures, in
their renal pelvis and diverticula, 1–20 mm, with acoustic shadowing. Three of these last groups also had piectasia. Twelve dogs had diffuse hypercoecency of the renal cortex. "Amorphous" crystals in urine compatible with xanthine crystals were found in all dogs. The kidney calciuli removed were xanthine in origin. In 12 dogs, the reduction in the allipolip therapy resulted in a decrease in the amount of crystals xanthias observed on ultrasound.

**Discussion/Conclusion:**
Xanthine lithiasis is very infrequent, and its natural occurrence in dogs is extremely rare. Allipolip therapy is directly related to the development of xanthine urolithiasis in dogs. With a higher prevalence and rate of complications (associated kidney failure, obstruction, and cystitis) than previously reported. There is not a direct correlation between analytical evidence of renal failure and degree of lithiasis found. However, a reduction in the allipolip therapy causes a reduction of the urolithsis. Ultrasound can easily access the urinary tract and play a major role in detecting and monitoring xanthine urolithiasis, especially in dogs that have a renal altered disease, therefore helping to balance the allipolip therapy.

**References:**

**SPLENIC ULTRASOUND FINDINGS IN 26 CATS WITH HEMOTROPIC HEMOPLASOMASIS – A PRELIMINARY STUDY**
C. Monteiro C1,2, M. Vistas M1, 1Ecovet – Ecografia Veterinária Móvel. Lisboa, Portugal; 2Departamento Clínico, Faculdade de Medicina Veterinaria, Universidade Lusofona de Humanidades e Tecnologia, Lisboa, Portugal.

**Introduction:**
The aim of this study is to evaluate the splenic ultrasound changes in cats with clinical and cyctological or PCR evidence of feline hemotropic hemoplasmosis (FHH).

**Materials and Methods:**
All cats with clinical signs compatible with FHH, a complete blood count, tested for FIV/FeLV and/or positive cytological or PCR evidence of Haemoplasma between 2008 and 2012 were included in the study. All cats were treated with resolution of their clinical signs associated with this disease. The animals had a complete abdominal ultrasound by two ultrasonographers (CM, MV) with either a Sonosite Titan with microconvex transducer from 5–8 MHz; GE Vivid E with a microconvex transducer 5–9 MHz, and Esaote MyLab with a microconvex transducer 5–9 MHz.

**Results:**
The clinical signs were intermittent fever (n = 23) with weakness/lethargy (n = 20), normal (n = 5) to anemic (n = 21). All were FIV negative with eight FELV-positive cats. Two animals had slightly elevated BUN and creatinine. Sixteen of the cats had a cyctological or PCR evidence of Haemoplasma between 2008 and 2012 and were included in the study. All cats were treated with resolution of their clinical signs associated with their renal failure. On ultrasonography, the spleen was found to be moderately to severely enlarged with an average thickness of 12 mm in the middle portion of the spleen, margins were smooth, but slightly rounded, with normal parenchyma and homogeneity of its parenchyma, except for two cats that had small ill-defined hypoechoic focal lesions spread out through it parenchyma. Sixteen also had cortical hyperechogenicity of the kidneys with no other changes that the authors attributed to feline hypertension. The animals had a normal kidney cortex. Two cats also had smaller kidneys with partial loss of the corticomedullar definition, associated with the beginning of chronic kidney disease.

**Discussion/Conclusion:**
Splenic ultrasound findings in cats with hemotropic hemoplasmosis, does not commonly include a spleen with a mottled appearance. The spleen is more often diffusely enlarged, with rounded margins and homogenous parenchyma.

**References:**

**RADIOLOGICAL, COMPUTED TOMOGRAPHIC AND MAGNETIC RESONANCE IMAGING FEATURES OF PYOGRANULOMATOUS OSTEOMYELITIS OF THE OLECRANON CAUSED BY ADIASPIROMYCOSIS IN A PONY**
R. Morgan,1 P. Johnson.2 Fellowes Farm Equine Clinic, Abbots Ripton, Cambridgeshire, PE28 2LL; 2Centre for Small Animal Studies, Animal Health Trust, Lanwades Park, Newmarket, CB8 7UU, UK

**Introduction:**
Adiaspiromycosis caused by Emmonis cresmas is primarily a respiratory disease affecting small mammals.1 Adiaspiromycosis has been detected in the lungs of two dogs and one goat.2,4

**Case History:**
A New Forest pony mare presented with moderate left forelimb lameness and a 5-cm-diameter solid mass on the caudalateral aspect of the left elbow. The mass progressively grew (10 cm diameter) subsequently causing nonweight bearing lameness. Lateromedial roentgenograms revealed an oval, poorly defined mass with hypoattenuated areas on the lateral edge. CT revealed a well-defined mass with a marked surrounding hyperdense rim and geographic state. MRI was performed. A definitive diagnosis of pyoGRANULOMATOUS OSTEOMYELITIS OF THE OLECRANON CAUSED BY ADIASPIROMYCOSIS IN A PONY.
VERTEBRAL HEART SIZE IN LITTLE SPOTTED CATS


Introduction:
Thoracic radiographs are commonly used in dogs and cats to determine the dimensions of the cardiac silhouette. Age difference, anatomic conformation, phase in the respiratory, and cardiac rhythms make it more difficult to distinguish normal from abnormal hearts. Various methods have been used to estimate or measure heart size. The Vertebral Heart Size (VHS) method is based in the sum of the heart length and width that is translated into the length of thoracic vertebrae. Thus, the method provides an objective measure of heart size relative to body, but studies using nondomestic cats are few.

Aim:
The aim of this study was to determine the VHS values for sound little spotted cats (Leopardus tigrinus) in captivity.

Materials and Methods:
Eight adult little spotted cats (Leopardus tigrinus) of similar size and bodyweight were used. The animals had no signs or known disease process that could affect the present study. Under general anesthesia, a right lateral and ventrodorsal thoracic radiographs were taken. Both projections were used for VHS measurements according to Buchanan and B.

Results and Discussion:
VHS values obtained ranged from 7.67 ± 0.57 vertebrae in right lateral view, and 8.08 ± 0.72 vertebrae in ventrodorsal view. Only two radiographic projections were used since a previous study in adult stray domestic cats observed no difference between right and left lateral views, or between dorsoventral and ventrodorsal views. The values obtained in the present study were comparable to reported for healthy stray cats, 7.3 ± 0.49 vertebrae in right lateral and 7.5 ± 0.52 vertebrae in ventrodorsal.

Conclusion:
The VHS values may be useful for sound little spotted cats. Other studies must be performed using animals of different sizes.

References:
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2. Silverman S, Suter PF. Influence of inspiration and expiration on canine thoracic radio-
3. Tombs JP, Ogburn PN. Evaluating canine cardiovascular silhouettes: radiographic meth-
4. Buchanan JW, Bücheler J. Vertebral scale system to measure canine heart size in radio-

ULTRASONOGRAPHIC FINDINGS OF UTERINE NEOPLASMS IN NINE DOGS

M.N. Patikas1, P.L. Papadopoulou1, C. Soutian1, L.G. Papazoglou2, G.M. Kazakos3, C. Berberidis3, N.G. Papaioannou4. 1Section of Diagnostic Imaging; 2Section of Surgery and Obstetrics; 3Section of Anesthesiology and Intensive Care, Medicine, Department of Clinical Sciences, 4Department of Pathology, School of Veterinary Medicine, Aristotle University of Thessaloniki, Greece.

Introduction:
Uterine neoplasms are relatively rare in dogs comprising 0% to 0.4% of all canine tumors with the site of origin including uterus horn, body, and cervix. To the authors’ knowledge no studies describing the ultrasonic characteristics of uterine neoplasms in dogs have been reported.

Aim:
Describe the ultrasonic findings observed in different types of uterine neoplasms in nine dogs and to evaluate the usefulness of ultrasonography to delineate the origin of the uterine masses.

Materials and Methods:
Nine female intact dogs with histologically confirmed uterine neoplasms were included in this study. Ultrasonographic lesions were reviewed for the location, size, margination, and echogenicity.

Results:
Ultrasonography detected a well-demarcated mass at the dorsal aspect of the bladder in seven dogs; in those dogs a uterine body mass in six and a uterine cervix mass in one dog were confirmed on surgery. In two dogs, an ill demarcated mass in the midventral abdomen was detected; the origin of the mass was ultrasonographically delineated from the uterine horn in one dog and uterine horn mass was included in differential diagnosis in the other. In those two dogs, uterine horn masses were confirmed at surgery. In all cases the size of the mass measured ultrasonographically varied from 3 to 12 cm in diameter. The mass was characterized as solid in three cases (three leiomyomas), solid with cystic component in four (two adenocarcinomas, one fibromyo, one leiomyoma), and cystic in two (two leiomyomas). Diffuse hyperchoic lori in the mass were observed in two cases (one fibromyo and one leiomyoma with dystrophic calcification).

Discussion/Conclusion:
Ultrasonography is a reliable method in demonstrating the uterine body-cervix neoplasms. The type of the neoplasm is by taking a biopsy of the mass.

References:

ASSESSMENT OF CONTRAST-ENHANCED ULTRASONOGRAPHY AND CONTRAST-ENHANCED COMPUTED TOMOGRAPHY FOR THE EVALUATION OF ADRENAL TUMORS IN DOGS

P. Pey1, R. Rossii2, M. Vignio3, O. Travetti1, L. Marescau3, J.H. Saunders4. 1Department of Medical Imaging of Domestic Animals and Orthopedy of Small Animals, Ghent University, Belgium; 2Clinica Veterinaria dell’Orologio, via Gramsci 1/2, 40037 Sasso Marconi (BO), Italy. 3Clinique Vétérinaire Oncocent, Avenue Paul Langervie, 59650 Villeneuve d’Ascq, France.

Introduction:
Abdominal ultrasonography (US) and computed tomography (CT) constitutes a crucial step in the diagnostic workup and therapy planning of adrenal tumors.1, 5

Aim:
The aim of this study was to assess contrast-enhanced ultrasonography (CEUS), and contrast-enhanced computed tomography (CE-CT) in the evaluation of adrenal lesions compared to surgery and histopathology, i.e. identification of vascular invasion, identification of adjacent organs invasion, detection of malignancy potential and characterization of histologic type.

Materials and Methods:
Patients with unilateral or bilateral adrenal lesions underwent US, CEUS, CT, and CE-CT, before surgical adrenalectomy and histopathology. Patients were injected with an intravenous bolus of Sonovue® for CEUS and nonionic iodinated contrast medium for CE-CT.

Results:
Fourteen canine patients with 16 adrenal lesions (carcinoma (n = 10), adenoma (n = 3) and pheochromocytoma (n = 3)) met our inclusion criteria. Concerning the ability to detect adjacent tissue invasion or identify thrombus, percentages of correct assessment were 75, 76, and 87.5% for US, US/CEUS, CT/CE-CT, respectively. They could correctly predict malignancy potential of lesion in 56, 94, and 62% of the cases, and tumor type in 25, 75 and 97.5%. Regional blood volume was lower in carcinomas and pheochromocytomas compared to adenomas (P = 0.014 and P = 0.005). Mean transit time was shorter in carcinomas and pheochromocytomas than in adenomas (P = 0.045 and P = 0.048).
CONTRAST ENHANCED ULTRASONOGRAPHY IN DOGS WITH ACTH DEPENDENT HYPERADRENOCORTICISM RECEIVING TRILOSTANE TREATMENT: A PRELIMINARY STUDY

P. Pey1, S. Daminne2, P.M. Smets2, J.H. Saunders1. 1 Department of Medical Imaging of Domestic Animals and Orthopedics of Small Animals; 2 Department of Small Animal Internal Medicine, Ghent University, Salisburylaan 133, 9820 Merebeke, Belgium

Introduction: Several cases report histopathologic evidence of necrosis in the adrenal parenchyma following treatment with trilostane. Moreover, modifications of the echotexture of adrenal parenchyma in dogs treated with trilostane have been reported.1,2

Aim: We hypothesized that contrast-enhanced ultrasonography (CEUS) might show necrotic areas in patients treated with trilostane.

Materials and Methods: Five client-owned dogs with untreated ACTH-dependent hyperadrenocorticism (ADHC) were included in the study. CEUS of both AGs was performed according to a previously described method3 with intravenous injections of Sonovue. Dogs were presented at the endocrinology consultation at the diagnostic time and for control of trilostane treatment over 6 to 12 months. Blood results were confronted with CEUS and US findings.

Results: The height of the caudal poles of the left and right adrenal glands measured 7.7 ± 1.9 mm at diagnosis, and was 8.5 ± 2.1 mm after 6 to 12 months. Besides diffuse enlargement, no US changes were observed in adrenal echogenicity, echotexture or contours. On CEUS, there was no difference observed in enhancing pattern between diagnosis and control times in four of five dogs. In one patient, a large central band in the left adrenal gland did not show any contrast uptake during all CEUS examinations, whereas adjacent adrenal parenchyma displayed a normal enhancement. On blood work, only the former patient presented a relapse and failure to respond to trilostane treatment, as clinical signs of ADHC were present and post-ACTH cortisol was too high. No clinically relevant abnormalities were present and post-ACTH cortisol was too high. No clinically relevant abnormalities were present and post-ACTH cortisol was too high.

Conclusion: A larger study might assess whether CEUS is a reliable technique to monitor and screen those patients for adrenal necrosis.

REFERENCES:

COMPARATIVE STUDY ON PROSTATE DIAMETER MEASUREMENT USING TRANSABDOMINAL ULTRASOUND AND MAGNETIC RESONANCE IMAGING IN INTACT DOGS

S. Ponglohpwaman1, P. Thiangthennan1, N. Kampaa2, S. Chuthepat2. 1 Department of Obstetrics Gynecology and Reproduction, Faculty of Veterinary Science, Chulalongkorn University, Bangkok 10330 Thailand; 2 Department of Surgery and Theriogenology, Faculty of Veterinary Medicine, Khonkaen University, Khon kaen, 40002 Thailand; 3 Department of Surgery, Faculty of Veterinary Science, Chulalongkorn University, Bangkok 10330, Thailand

Introduction: The canine prostate is routinely evaluated by transabdominal ultrasound (T-ABD) scan providing information on dimension, shape and parenchymal texture of left and right prostatic lobes. Magnetic resonance imaging (MRI) is an accurate method to measure prostatic size and become more common in veterinary practice. This study aimed (i) to evaluate reproducibility of T-ABD measurements for prostatic size, and (ii) to compare prostatic size and volume measured by T-ABD and MRI.

Materials and Methods: Six intact beagles without clinical signs related to enlarged prostate were used. Left and right prostatic lobes were judged symmetrical on rectal palpation. Dogs were placed in dorsal recumbency and the prostate size was measured ultrasonographically. The greatest cranio-caudal (L), transverse (W), and dorsoventral (D) diameters were measured.2 Of each animal, measurements of the prostatic diameter were done five times. Repeatability of a specific measurement was evaluated by ANOVA. Four of six beagles had both T-ABD and MRI scan. MRI was done while the anesthetised dogs were placed in right lateral recumbency; the legs were fixed and coil was placed. Prostate scanning was performed by a 1.5 Tesla MR scanner.2 Maximal diameters of the prostates were determined as: L = W × D ÷ 1.8.1 (W and D). The prostatic volume was estimated: volume = 1/2 × L × W × D. Prostatic dimension and volume obtained by T-ABD and MRI were compared using independent t-test.

RESULTS: No significant differences in L, W, or D of the prostates measured by T-ABD scan were found. Comparing between T-ABD and MRI showed that the greatest dimension of prostatic L and W obtained by the two modalities did not differ (P > 0.05). When dorsoventral diameter of prostatic lobes was compared separately, significant differences between T-ABD and MRI measurement of the right lobe were found (P = 0.03). Prostatic volume calculated from L, W, and D measured by either modality did not differ significantly.

CONCLUSION: Our findings suggested that T-ABD measurement of prostatic dimension is reproducible. Prostatic dimension measured by T-ABD and MRI appeared to be reliable. Differences in depth of the right prostatic lobe possibly resulted from different scan position and degree of UB distension.

REFERENCES:
LET’S GET PHYSICAL: ADVANTAGES OF PHYSICAL MODELS OVER 3D COMPUTER MODELS IN LEARNING MRI ANATOMY

D. Preece, R. Weller. Department of Veterinary Clinical Sciences, Royal Veterinary College, Hawkshead Lane, North Mymms Hatfield, Herts, AL9 7TA, UK

Introduction:
Three-dimensional (3D) information plays an important part in medical healthcare, with recent advances in diagnostic imaging technologies leading to an even greater dependence on 3D images. Appreciating complex 3D spatial relationships requires strong foundational understanding of anatomy and 3D mental visualization skills, especially when utilizing advanced imaging technologies such as magnetic resonance imaging (MRI). Recent pedagogical advances have lead to the development of novel learning resources in an attempt to address the need for more 3D orientated teaching. However, objective evaluation of their efficacies is largely absent from the literature.

Aim:
This study developed, implemented, and evaluated the use of a novel physical model in demonstrating the complex anatomical spatial relationships of the equine foot, comparing its efficacy as a visuospatial learning experience to both traditional and modern teaching modalities.

Materials and Methods:
Third year veterinary students at The Royal Veterinary College London were randomly assigned to one of three teaching aid groups (physical model; textbooks; 3D computer model). The comparative efficacies of the three teaching aids were objectively assessed through students’ abilities to identify anatomical structures on MRI, and subjectively assessed through student feedback.

Results:
Overall mean MRI assessment scores were significantly higher in students in the physical model group (86.99%) compared with students in the textbook (62.61%) and computer model groups (63.21%), with no significant difference between the textbooks and 3D computer model groups (P = 0.09). Student feedback was also significantly more positive in the physical model group compared with both the textbook and 3D computer model groups (P < 0.05).

Discussion:
Our results suggest that physical models hold a significant advantage over alternative learning resources in the teaching of complex anatomy, and that 3D computer models as well as textbooks, have significant limitations with regards to 3D learning. With the availability of cadavers in decline, physical models may provide the necessary hands on 3D teaching essential in modern medical teaching.

References:

EFFECT OF ELBOW FLEXION ON HUMEROULNAR INCONGRUENCE

P. Proks, L. Stehlik, R. Smec, P. Fedorova, A. Necas. Faculty of Veterinary Medicine, University of Veterinary and Pharmaceutical Sciences Brno, Czech Republic

Introduction:
Elbow joint incongruity is believed to contribute to the pathogenesis of elbow dysplasia. A role of humero-ulnar incongruity (HUI) in dogs with elbow dysplasia is controversial. It is proposed that HUI is physiological in large breeds.1 However, significant difference was detected between the left and right forelimbs when utilizing advanced imaging technologies such as magnetic resonance imaging (MRI). Recent pedagogical advances have lead to the development of novel learning resources in an attempt to address the need for more 3D orientated teaching. However, objective evaluation of their efficacies is largely absent from the literature.

Aim:
The purpose of this study was to establish the influence of the degree of elbow flexion on appearance of HUI in vivo study.

Materials and Methods:
Sixteen elbows of sixteen heavily sedated dogs with HUI detectable on standing angle (ML 135° extension) were used in the study. Mediolateral elbow radiographs in different position (ML 45°, 90°, 100°, 110°, 120°, 135°, 145°, 155°) was made in each joint. HUI was measured in different joint angles using a previously reported method of subluxation index (SI).2 Subluxation index was measured in the above mentioned positions of the elbow blindly by one evaluator. Humero-ulnar SI in all the elbow positions was compared. For statistical analysis ANOVA test was used.

Results:
Influence of the degree of elbow flexion on the size of humero-ulnar SI. Angle of elbow flexion 45° (SI 0.1), 90° (SI 0.100), 110° (SI 0.110), 120° (SI 0.220), 135° (SI 0.272), 145° (SI 0.230), 155° (SI 0.220). The biggest SI was found in elbows with 135° of extension. Significantly smaller angles (P < 0.05) were found in elbows with 45°, 90°, 100°, and 110° of flexion in comparison with the joint with 130° angle of extension. No significant differences (P < 0.05) were found between elbows with 135° and 120°, 145°, 155° of extension.

Discussion/Conclusion:
Elbow flexion influences the measurement of humero-ulnar incongruence in vivo. Elbow flexion reduces the radiographic recognition of HUI. For radiographic examination of HUI standing angle (135° extension) is recommended. Minimal angle of elbow extension should not be less than 120°.

References:

B-MODE AND POWER DOPPLER ULTRASONOGRAPHY OF THE SUSPENSoRY LIGAMENT BRANCHES IN SPORT HORSES

S. Rabba1,2, S. Gruike1, G. Dervenilgh2, G. Bolen3,4, V. Buson1,5, Imagerie Médicale; 2Chirurgie-Anesthésie, Pôle Equin, Faculté de Médecine Vétérinaire Université de Liège, Belgium; 3Clinica Veterinaria Maggiora, Novara, Italy

Introduction:
B-mode ultrasonography (US) is routinely used to achieve the diagnosis of suspensory ligament desmopathies.1,2 In human medicine, the presence of Doppler signal is reported in painful tendinopathies.3,4 A previous study has suggested the same pattern of Doppler activity in both humans as horses.5 The aim of this study was to compare B-mode ultrasonographic findings with Power Doppler (PD) ultrasonographic findings in equine suspensory ligament branches (SLBs).

Materials and Methods:
Nineteen hindlimbs and 15 forelimbs of 13 horses were examined for a total of 68 SLBs. Of the 13 horses included, 5 were free of lameness, and 8 had a lameness condition related to pain in the region of the SLBs based on the clinical examination and local analgesia. All branches were assessed by B-mode US and PD US using an Aloka 5300 US machine equipped with a 7.5 MHz linear transducer. PD US was realized on the non weight-bearing limb. PD and B-mode US images were obtained at three levels in each branch. PD US images were scored using a 4-point scale and images with maximal color activity were selected for analysis. B-mode images were classified as normal or abnormal based on shape, size, architecture, and echogenicity changes and B-mode abnormalities were classified as mild, moderate, or severe. B-mode and corresponding PD US images were subjectively compared. PD score was compared in lame versus nonlame limbs, in acute lameness versus chronic lameness and in SLBs with mild B-mode abnormalities versus SLBs with moderate to severe abnormalities.

Results:
Forty-three SLBs were abnormal in B-mode US and 25 had B-mode US abnormalities. The PD signal was detected in 23 of the 43 SLBs abnormal at B-mode US. In 20 SLBs with mild heterogeneity at B-mode US, PD signal was not detected. None of the 25 SLBs classified as normal at B-mode US showed PD signal. PD score was higher in the lame limb, in acutely lame horses and in SLBs with more severe abnormalities at B-mode US.

Discussion/Conclusion:
This study demonstrates the absence of PD signal in SLBs with normal B-mode US in nonexercised horses. The results also suggest a correlation between PD signal and clinical symptoms, with PD signal being more evident in branches more severely affected at B-mode US in lame horses.

References:

ULTRASONOGRAPHIC EVALUATION OF THE URINARY BLADDER, URINE RETENTION AND BLADDER RUPTURE IN THE DROMEDARY CAMELS (CAMELUS DROMEDARIU5)

R.O. Ramadan, A.J. Almubarak, M.F Al-Salman. Department of Clinical Studies, College of Veterinary Medicine and Animal Resources, King Faisal University, Saudi Arabia

Introduction:
Literature on urine retention in camel is very meager. However, a few clinical reports showed that obstruction is caused by urethritis or urolithiasis.1 Thereafter imaging of the urinary systems were described in conjunction with abdominal distention.2

Aims:
The aim of the present study was to evaluate the bladder in healthy camels and compare them with distended or ruptured bladder secondary to obstructive urethritis, or urethral stenosis.
Materials and Methods:
Ten male dremane calves (three male normal; three distended bladder; four ruptured bladder) with a mean body weight of 678 kg, mean age 7.7 years (5–12 years) was included in the study. Camels were judged to be normal based on results of physical examination, serum biochemistry, and urinanalysis. Obstructive urolithiasis caused reduced activity, decreased appetite, side-to-side rolling associated with anorexia. When rupture occurred, the animal’s appetite improved but the abdomen was severely distended. Urine samples were obtained through cystostomy per rectum or abdominocentesis. Camels were examined in the sternal recumbent position. The bladder was assessed by rectal examination. Thereafter ultrasonographic assessment was performed using linear transducer fitted with 7.5 MHz probe.

Results:
Ruptured bladder produced increased thickness in the bladder. Wall layering appeared as hyperechoic bands and the lumen was a slit-like anechoic structure. The spleen was floating over the abdominal fluid. Urinary distention caused increased volume of the bladder. There was anechoic appearance on its upper part and an increased echogenicity toward the lower two-third.

Discussion and Conclusions:
Differences between distention and rupture of the urinary bladder depends on presence of urethral pulsation. The test is positive before rupture. Ultrasound is essential to assess bladder volume and measure its thickness and thereafter the amount of abdominal fluid.

References:

IMAGING DIAGNOSIS: RADIOGRAPHIC EXAM OF RICKETS IN A DOG
C.F. Rezende 1, P.J.R. Frazao 1, E.A.S. Pereira 1, A.S. Mattos 2, R.A.S.M. Toyota 1, M.R. Soares 1, C. Luzvitto 1, C.T. Pereira 1, R.F. Giglio 1, Hospital Veterinário César e Gatos 24 h, São Paulo, Brazil 2, Hospital Veterinário César 24 h, Osasco, Brasil e Universidade Paulista UNIP, Campinas, Brazil 4, Hospital Veterinário César e Gatos 24 h, Osasco, Brasil e Universidade Cruzeiro do Sul, São Paulo, Brazil

Introduction:
Rickets is a young growing dog disease, rare nowadays in Brazil. 1,2 It occurs due to deficiency of vitamin D, calcium, or phosphorus in blood. Main causes are nutritional deficiency of these elements, inability of vitamin D absorption, metabolism or utilization, renal diseases, and intestinal absorption deficiency. 3,4 Moreover, its presentation occurs mainly due to imbalance of dietary Ca-P, which is uncommon at the present time because of the large availability of commercial foods. Affected animals can present bone deformities and fragility, joint swelling, dental disorders, and appetite disturbance. 5–8 Radiographic signs include general loss of bone density, generalized widening of physeal lines, joint swelling, angular limb deformities, thoracic deformities, and costochondral joint swelling, known as rachitic rosary. 5 In this report, we present a case report with radiographic images compatible with rickets.

Case Report:
A 3-months-old male mixed-breed dog, presented with intense loss of weight, and multifocal swollen and painful joints was submitted to radiographic exam of fore and hind limbs. A 3-months-old male mixed-breed dog, presented with intense loss of weight, and multifocal swollen and painful joints was submitted to radiographic exam of fore and hind limbs.

Discussion and Conclusions:
In dogs, the mainly differential diagnosis for rickets includes nutritional secondary hyperparathyroidism (NSHP) and chondrolysis. However growth plate disorders are not usually seen and hyperparathysemia is expected in cases of NSHP. Concomitant phsyseal widening and epiphyseal changes are expected in cases of chondrolysis. On other hand, rickets do not show epiphyseal changes, just physeal widening and long bone bowing. Therefore, the presented case is compatible to rickets, due its clinic presentation, and radiographic and blood work findings, even though it is considered a rare disease.

References:

EVALUATION OF A PROTOCOL FOR AWAKE VERSUS SEDATED CONTRAST-ENHANCED MULTIDETECTOR HELICAL CT OF THE ACUTE ABDOMEN IN CANINE PATIENTS
M. Shananan, S. Hartman, R. O’Brien. University of Illinois, Urbana, Champaign, USA

Introduction:
Contrast-enhanced multidetector computed tomography (CE-MDCT) is the current modality of choice in the evaluation of acute abdominal pain in the human emergency patient. CT imaging of canine patients with acute abdominal signs was of particular interest given the clinical instability of these patients.

Materials and Methods:
Eighteen client-owned dogs presented with acute abdominal signs were enrolled as part of a separate ongoing prospective comparative imaging study of canine patients with acute abdominal signs. Eight dogs were scanned awake while 10 were given minimal sedation.

Results:
Sixteen of 18 scans were considered fair to excellent in diagnostic quality with no statistical difference in distribution of diagnostic quality noted when comparing awake and sedated patients. One of the poorly diagnostic scans was the result of severe beam hardening due to previously administered barium contrast agent and the second the result of severe motion artifact in two of the three scan phases. No intravenous contrast-related adverse events were noted.

Conclusion:
We conclude that this dual-phase MDCT protocol can be performed rapidly, safely, and with excellent diagnostic quality in both awake and minimally sedated patients presented with acute abdominal signs.

References:

COMPARISON OF THE GRAY MATTER-WHITE MATTER RATIO IN NORMAL DOGS AND DOGS WITH VENTRICULAR ENLARGEMENT. A MORPHOLOGIC STUDY BASED ON MAGNETIC RESONANCE IMAGING (MRI)
M.J. Schmidt, Justus Liebig Universität Giessen Klinik für Kleintiere- Chirurgie Frankfurt Str. 108 353982 Giessen Germany
Introduction:
Variation of lateral ventricular size has been reported in dogs. Ventricular enlargement is frequently observed in small toy breeds and dogs with brachycephalic head morphology. A trend between increasing ventricular volume and decreasing body size was suggested. Due to this variation, the assessment of a normal ventricular size can be challenging in veterinary medicine. It is well known in neurobiology, that a constant allometric relation between cerebral white matter (WM) and gray matter (GM) exists, which increases with general body size of all mammals. We calculate the WM/GM ratio in relation to body weight in a large group of dogs, and use these results to identify a possible loss of WM in dogs with “enlarged ventricles.”

Materials and Methods: MRI scans of 91 dog brains were retrospectively analyzed. Group 1 included 35 brachycephalic dogs and 35 mesaticephalic dogs of different size with no apparent changes in brain morphology. Group 2 included 21 brachycephalic breeds in which subjectively enlarged cerebral ventricles were noticed in their MRI examination. Quantifying WM and GM volume was achieved using graphical software that allowed manual segmentation of WM and GM of the cerebrum. The slopes of the regression lines between body weight and WM: GM ratio of group 1 and 2 were compared, testing the null hypothesis that their slopes are identical.

Results: The slopes of the regression lines were significantly different between groups (P = 0.007). Regression line of group 2 showed a less increase of the WM: GM ratio with increasing body weight. This indicates that a loss of WM occurred in the dogs with enlarged ventricles.

Discussion: The current definition of hydrocephalus requires an excessive accumulation of fluid within the cerebral ventricles. What constitutes the word “excessive” accumulation of fluid in the cerebral ventricles was never determined in the dog. In contrast to hydrocephalus, enlarged ventricles have been usually assessed as having no apparent clinical significance. However, if the enlargement is associated with a loss of WM it might be a consequence of elevations of the intraventricular pressure, which gradually falls but still maintains a slightly elevated level. This is referred to as normal pressure hydrocephalus (NPH) in human medicine, which does not produce the classic signs of hydrocephalus but can lead to other neurological dysfunctions.

Conclusion: Our study suggests that the enlargement of the cerebral ventricles in brachycephalic dogs is not a normal variant of ventricular volume as this accumulation is associated with a loss of white matter tissue appearing in the ventricles. This finding may represent a canine analogue of human NPH.

References:

MULTISLICE CT PROTOCOL FOR THE DIAGNOSIS OF URINARY INCONTINENCE IN DOGS
T. Schwarz, M. Esmans. Royal (Dick) School of Veterinary Studies, Edinburgh, UK

Introduction: CT has been used for the diagnosis of urinary incontinence in dogs3–5 with repeated scanning to demonstrate the ureters. The examination protocols did not investigate the entire urinary system. Aim: To develop a helical CT protocol for the entire female and male canine urinary tract with minimal patient preparation.

Material and Methods: A 4-slice CT unit and IV contrast medium with 400 mg iodine/kg were used.2 Dogs were positioned in ventral recumbence with the pelvis elevated without enema preparation or bladder catheterization. A survey, parenchymal and excretory phase were performed, followed by 1–3 30 s dynamic CT uroterography using 4–5 mm-wide detectors over the bladder neck and cranial urethra. A positive contrast retrograde CT vaginogram in females or a CT-uretherogram in males was if others causes of incontinence were suspected.

Results: A total of 14 dogs were included in the study, 2 male castrated, 4 females, 8 female neutered. Twenty-seven kidneys were seen, one had been removed, six kidneys showed abnormalities. A total of 27 ureters were identified, one had been removed, 19 were normotopic, 8 were ectopic with a termination in the caudal bladder in 5 and in the urethra in 3 ureters. The mean time of ureteral jet arrival was 2.6 s, with a range of 1 to 13 s, with similar timings for left/right, normo/ectopic ureters. In two dogs the fecal distended colon impeded on the visibility of the ureters. The urinary bladder was normal in 11 dogs and intrapelvic in 3 dogs. In nine dogs a retrograde CT-vaginogram and in one dog a retrograde CT-uretherogram was performed. The male urethra was normal six dogs had vaginal abnormalities.

Discussion: Multislice helical CT offers an efficient one-stop examination of the entire urinary tract. The parenchymal phase postcontrast CT demonstrates the renal architecture and mucosal enhancement of ureters, bladder, urethra, and vagina. To visualize the course and ending of the ureters a combination of excretory phase and dynamic CT is ideal. A confident diagnosis of the ureteral endpoint is possible, when the caudalmost point of the ureter is identified as well as a visible jet in the bladder or urethral filling. A 15 s dynamic CT series is sufficient to identify the ureteral jet. A minimal enema preparation is recommended.

References:

PLAIN RADIOGRAPHY VERSUS COMPUTED TOMOGRAPHY FOR THE DESCRIPTION OF THE SCAPULA IN GIANT ANTEATERS
N. F. Sesoko, R. V. Santos, Z. Bortolini, S. C. Rahul, L. C. Vucano, C. R. Teixeira CR. School of Veterinary Medicine and Animal Science, Univ Estadual Paulista (UNESP), Botucatu, SP, Brazil

Introduction: The giant anteater, Myrmecophaga tridactyla (Linnaeus, 1758), belongs to the Class Mammalia, Order Xenarthra, and Family Myrmecophagidae. The anteaters have forelimbs morphologically adapted for obtaining food, defense, and locomotion.2 These special features of the giant anteater forelimbs are associated with its classification as a specialized fossorial mammal, whereas it is adapted for opening walls of termite nests. Few anatomical descriptions have been made about this uncommon species.1,3

Aim: For this, the aim of this study was to describe the bone morphology of the scapula in giant anteater of different ages using plain radiography and computed tomography (CT), and to compare the accuracy of the imaging modalities for scapula evaluation.

Materials and Methods: Two adult cadavers, one young adult cadaver, and one young giant anteater (Myrmecophaga tridactyla) were used to obtain the images. Laterolateral and caudoradiological projections and CT scans of both scapulae were performed for the description. Sequential transverse sections were acquired on a spiral scanner (Shimatsu SCT-7800CT). The scanning parameters were 120 kVp, 100 mA, with a slice thickness of 2.0 mm, pitch of 1.0, and 1 s rotation. The images were reconstructed using the Voxar 3D software.

Results and Discussion: Radiographs and CT images revealed two spines of scapula, described as greater spine and lesser spine.3–5 CT reconstruction allowed an adequate visualization of the acromion, which ended in a hamate process that arched forward and medially rather high above the shoulder joint. The humeral could not be adequately visualized radiographically due to the overlapping. In the young giant anteater there was a scapular notch situated caudal to the supraglenoid tubercle. This structure was gradually closed according to the animal’s age and became the foramen of scapula. However, the epiphyseal line could be observed in young adult animal.

Conclusion: By eliminating overlapping tissue inherent in conventional plain radiography, CT was more sensitive to evaluate the scapula morphology. The knowledge of these special features of the scapula allows estimation of the age in giant anteater.

References:

CT CORRELATES VISCERAL FAT WITH ADVERSE CARDIAC CHANGES IN CANINE OBESITY AND WEIGHT LOSS
T.I. Silver, J.I. Adolphe, L.P. Weber. Western College Veterinary Medicine, University of Saskatchewan, SK, S7N 5B4, Saskatoon, Canada

Introduction: Obesity and cardiovascular disease are strongly connected in humans, but are poorly understood in dogs.1 Heart rate and cardiac output elevations are associated with dog obesity2,3, however, whether visceral fat quantity predicts these changes and whether weight loss normalizes them have not been investigated.

Aim: To evaluate effects of fat distribution during obesity and weight loss on cardiac structure and function in dogs.

Methods: Hemodynamic variables were measured before and after weight gain, then again after weight loss in beagles (N = 8). After baseline measurements in lean body condition, free access to a commercial diet resulted in obesity after 12 weeks. Then, restricted food portions normalized weight within 8–16 weeks. Cardiac structure and function were measured using echocardiography while blood pressure was measured using high definition oscilometry.3 Computed tomography (CT) scans were used to quantify visceral and total fat distribution in dogs while obese and after weight loss.4

Results: Baseline mean body weight was 9.8 ± 0.6 kg, but weight increased to 12.1 ± 0.7 kg (123 ± 3% ideal body weight) during obesity. Heart rate, cardiac output, and left ventricular free wall thickness at systole (LVFWs) significantly increased while total peripheral resistance significantly decreased with obesity. At this point of obesity visceral fat significantly correlated with LVFWs. Food restriction decreased weight to 10.2 ± 0.7 kg (105 ± 2% above baseline). Hemodynamic variables that increased with obesity normalized after weight loss with values tending to remain higher than, but not statistically different from, baseline. An exception was LVFWs that decreased to an even lower level than baseline. Weight loss negated the correlation between visceral fat and LVFWs.
Discussion:
Increased in LVFWs thickness and heart rate likely reflect hyperdynamic cardiac function, versus structural change, in short term canine obesity. Weight loss helped to normalize most measures of cardiac baseline function, but the effect on cardiac function of further reducing LVFWs thickness below baseline is unknown. Using CT to measure visceral fat shows promise in predicting detrimental changes in canine cardiac function; particularly during weight gain, but not weight loss.

References:

RADIOGRAPHIC AND PATHOLOGIC FEATURES OF OSTEARTHRITIS OF THE FELINE ELBOW JOINT
M.Z. Sti, P. Johnston, G. Hammond, D. Bennett. School of Veterinary Medicine, University of Glasgow, UK

Introduction:
Feline osteoarthritis (OA) is a common disease. Cats affected with OA show changes in behaviour and lifestyle rather that overt lameness. 

Aims:
The purpose of this study was to define the radiographical features of elbow OA and to relate the radiographical findings to the gross pathological features.

Materials and Methods:
Thirty adults cats euthanized for reasons unrelated to this study were recruited. All medio-lateral radiographs of the elbow were evaluated for the presence of OA and scored using an OA Radiographic Score. The same joints were dissected for visual inspection of changes indicative of OA and the macroscopic findings were scored using an OA gross pathological score.

Results:
Twenty-eight cats were affected with elbow OA (26 cats bilateral, 2 cats unilateral) as diagnosed by the presence of gross pathological changes of the articular cartilage. There were 10 castrated males, 7 females, and 11 spayed females. The mean age was 5.98 years. The mode global radiographic score of the left and right elbows were 1 (range 0–3). Thirty-eight (70.4%) of the 54 elbows had radiographic osteophytes, 39 (72.2%) had increased radio-opacity beneath the ulnar notch, 10 (18.5%) had areas of abnormal mineralization, 29 (53.7%) had a radiographically detectable supinator sesamoid bone, 25 (46.3%) had changes in joint space, and 14 (25.9%) had joint remodelling. Joint incongruity was observed in 6 (11.1%) elbow joints. Two joints were radiographically normal. All elbows with increased radio-opacity beneath the ulnar notch including those with equivocal change had cartilage changes. The mode global gross pathological score of the left and right elbow were 2 and 3, respectively (range 1–4). All elbows with a radiographically apparent supinator sesamoid bone had gross pathological signs of OA although 25 joints with no visible sesamoid did show gross pathology. None of the six normal joints had a visible supinator sesamoid bone. The gross pathological scores were significantly different between left elbows with a radiographically visible supinator sesamoid bone and left elbows without a radiographically supinator sesamoid bone (P = 0.0060). A similar finding was also observed in the right elbow (P = 0.0127).

Conclusions:
Cartilage pathology can occur with minimal or no radiographic changes in the elbow joint but could not definitively be identified on the radiograph.

References:
1. Bennett D, Stiti M, Johnzon P, Osteoarthritis in the cat: 1. How common is it and useful indicator of elbow OA and is more reliable than in other species.

RADIOGRAPHIC CHARACTERIZATION OF ENLARGED STEMLYNCH NODES IN 71 DOGS AND 13 CATS
K. Smith 1, R. O’Brien 2
1. University Place Veterinary Hospital, University Place, WA, USA.
2. Department of Veterinary Clinical Medicine, University of Illinois at Urbana-Champaign, Urbana, IL 61802, USA

Materials and Methods:
In this retrospective study, radiographically enlarged sternal lymph nodes were evaluated in 71 dogs and 13 cats for average size, location, and most representative radiographic view. Concurrent clinical diagnoses were also noted and grouped into one of three categories: neoplastic, inflammatory, or hematological.

Results:
There were no statistically significant differences in size between lateral views within each breed. Enlarged sternal lymph nodes were more cranially positioned in dogs than cats. No statistical difference was noted between lateral views for reliable for sternal lymph node discernment. Neoplastic disease (78.9%) was the most prevalent condition seen in association with lymph node enlargement in dogs, followed by primary infectious or inflammatory diseases (14.1%), and various hematological conditions (7.0%). In cats, neoplasia was most common (69.2%), followed by inflammatory diseases (30.8%). No hematological conditions were noted in cats. The most common etiologic agent seen concurrently with enlarged sternal lymph nodes in both dogs (33.8%) and cats (38.5%) was malignant lymphoma.

Conclusions:
The results of this study provide a clinically useful representation of the average size and location of radiographically enlarged sternal lymph nodes for dogs and cats. The diseases represented demonstrate the wide spectrum of potential causes of sternal lymphadenopathy.

References:

COMPUTED TOMOGRAPHIC IMAGING OF AWAKE CATS WITH UPPER AIRWAY OBSTRUCTION
K. Stadler, R. O’Brien. Department of Veterinary Clinical Medicine, University of Illinois at Urbana-Champaign, Urbana, IL 61802, USA

Materials and Methods:
Ten cats with clinical signs of upper airway obstruction underwent computed tomography (CT) imaging without sedation or anesthesia. CT was performed using a 16-slice helical CT with the cats placed in a positional device. Three-dimensional (3D) internal volume rendering was performed on all image sets and 3D external volume rendering was performed on cats with evidence of mass lesions. Diagnostic definition and etiology of upper airway obstruction was achieved using visual laryngeal examination, endoscopy, fine needle aspirate, biopsy, and necropsy.

Results:
Seven cats were diagnosed with intramural upper airway masses, two with laryngotracheals and one with laryngeal paralysis. The CT and 3D volume rendered images was performed on cats with evidence of mass lesions. Diagnostic definition and etiology of upper airway obstruction was achieved using visual laryngeal examination, endoscopy, fine needle aspirate, biopsy, and necropsy.

Conclusions:
CT imaging of awake cats with upper airway obstruction is a noninvasive, clinically useful diagnostic technique.

References:

COMPARATIVE CROSS-SECTIONAL IMAGING OF THYROID CARCINOMA IN DOGS
O. Taeymes. Section of Medical Imaging, Department of Clinical Sciences, Cummings School of Veterinary Medicine, Tufts University, North Grafton, MA, USA

Materials and Methods:
This study describes the ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI) characteristics of 16 prospectively, and 7 retrospectively recruited dogs with suspected thyroid tumors. Of these, 17 were confirmed thyroid carcinoma, while 6 were initially misdiagnosed. These were four carcinoid tumors, one para-epithelial abcess, and one undifferentiated squamous cell carcinoma.

Results:
This study is the first report of carcinoid tumors and thyroid carcinoma using MRI and CT, and magnetic resonance imaging (MRI) characteristics of 16 prospectively, and 7 retrospectively recruited dogs with suspected thyroid tumors. Of these, 17 were confirmed thyroid carcinoma, while 6 were initially misdiagnosed. These were four carcinoid tumors, one para-epithelial abcess, and one undifferentiated squamous cell carcinoma.

Conclusions:
This study describes the ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI) characteristics of 16 prospectively, and 7 retrospectively recruited dogs with suspected thyroid tumors. Of these, 17 were confirmed thyroid carcinoma, while 6 were initially misdiagnosed. These were four carcinoid tumors, one para-epithelial abcess, and one undifferentiated squamous cell carcinoma.

References:
Conclusion: We therefore consider ultrasound as a routine screening tool for suspected thyroid carcinoma, but recommend either CT or MRI for better staging these tumors.

References:

COMPARISON OF CLINICAL, OTOSCOPIC, RADIOGRAPHIC AND ULTRASONOGRAPHIC FINDINGS IN DOGS WITH OTITIS EXTERNA: PRELIMINARY REPORT

E.P. Tore1, N. Celini1, H. Sabi1, M.O. Ozgyil2, B. Evbayancagaz3, D. Seyer-iksin4.
1Department of Surgery; 2Department of Pathology; 3Department of Microbiology, Faculty of Veterinary Medicine, Uludağ University, Bursa, Turkey

Introduction:
Otitis externa in dogs is diagnosed by clinical and otoscopic examinations but all details are not always visible. Adenoidal examination methods are needed. Radiographic examination is one of the additional diagnostic methods as well as ultrasonography. Radiography and ultrasonography provide an insight to deeper structures beyond the bony ear canal wall.

Materials and Methods:
Twelve dogs of different breeds, ages, and sexes presented with ear problems to the Animal Hospital of Uludag University, Faculty of Veterinary Medicine were included in the study. Clinical, otoscopic, radiographic, and ultrasonographic examinations were performed, respectively. Ultrasonographic examination was done before and after saline application in order to create an acoustic window. Longitudinal and transverse scanning was made and the results were recorded.

Results and Discussion:
All dogs showed typical clinical signs related to otitis externa. Unilateral and bilateral otitis externa were observed in five and seven dogs, respectively. Clinical examination revealed narrowing of the external ear canal in 10 cases. Foreign body was detected in one case. Some changes related to the horizontal canal wall and tympanic membrane were not clearly visible due to narrowing of the ear canal during otoscopic examination. Occlusion of the ear canal cartilage was seen radiographically in three cases. All tympanic bullae were normal on radiographic and ultrasonographic examinations. Narrowing of the ear canal was confirmed by ultrasonographic examination in six cases. Abnormal cerumen (n = 3), proliferative tissue (n = 2), foreign body (n = 1), and inflammatory changes related to the external ear canal and surrounding tissues (n = 6) were observed on ultrasound. This preliminary report with a low number of animals precluded statistical evaluation of results. Further comparisons will be made between diagnostic tools for otitis externa.

Conclusion:
Although the results are only preliminary, ultrasonography appears to facilitate the diagnosis of soft tissue changes in dogs with otitis externa.

References:

LOW-FIELD MR ARTHROGRAPHY OF THE CANINE SCAPULOHUMERAL JOINT

1Faculty of Veterinary Medicine, Ghent University, Merelbeke, Belgium; 2Ospedale Veterinario Città di Pavia, Pavia, Italy; 3Facolta di Medicina Veterinaria, Università degli Studi di Milano, Milano, Italy

Introduction:
Compared to MR, MR arthrography (MRA) has the benefit of joint distension, providing better delineation of several intra-articular structures. A limitation of MR MRA in low-field deals with the tradeoff between slice thickness and scan time. However, as low-field MR systems are more frequently available, an evaluation of this technique is still required.

Aim:
Investigate the execution time and the visibility of intra- and periarticular structures performing MRA of three extended2 canine cadaveric scapulohumeral joints in a 0.2 T unit.

Materials and Methods:
Three millimeter slices Gradient Echo (GE) T1-Weighted (T1-W), High Resolution Gradient Echo Short T1 Inversion Recovery (HRGE STIR), and High Resolution Turbo Spin Echo (HR-TSE) sequences were performed. The dogs were then injected with gadodiamide diluted in NaCl (0.5 mmol/1) and scanned in GE T1-W, HRGE STIR, and SE T1-W sequences. The limbs were cut along the same planes for anatomical comparison.

Results:
The infraspinatus, supraspinatus, and subscapularis muscles and insertion tendons, teres minor, and biceps brachii tendons, joint capsule, lateral and medial glenohumeral ligaments were visualized and their identity was confirmed. A slice thickness of 3 mm allowed satisfactory delineation of all the clinically relevant structures. The overall scan time (MR + MRA) was 129 min.

Discussion/Conclusion:
Obtaining a satisfactory delineation of the shoulder’s clinically relevant structures with low-field MRA requires a long but still realistic time. The STIR sequence provided the best capsule delineation, but was inferior compared to GE T1-W in tendons depiction. Compared to high-field, low-field MRA allowed obtaining equal sized slices, with comparable conspicuity of intra- and periarticular structures but longer scanning time.

References:

CANINE SHOULDER CT AND CT ARTHROGRAPHY

R. Uysoye, H.R. Silva, D. Clements, G. Bergkrist, T. Schwarz. Royal (Dick) School of Veterinary Studies, Roslin, UK

Introduction:
High-field-strength MRI has become the gold standard for imaging of the canine shoulder joint.1–3 However this remains an expensive, time consuming procedure with limited availability. Computed tomography (CT) has been shown to be effective for the canine shoulder.4 There is currently no information available regarding the optimal positioning and arthrographic contrast medium concentration for shoulder CT. It has not been described which relevant anatomical structures can be identified.

Aim:
To identify relevant anatomical structures of the shoulder region in different joint angles with and without positive contrast medium arthrography. To determine the optimal contrast medium concentration for CT arthrography.

Materials and Methods:
Nine cadaver thoracic limbs from dogs without previous history of thoracic limb lameness were used. Test tubes with 10 ml of nonionic iodinated contrast medium in concentration of 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100 mg ml/l were scanned and evaluated for optimal brightness. The optimal concentration was used for shoulder CT arthrography. Shoulders were imaged with a helical 4-slice CT with bone and soft tissue algorithm in three different angles (140°, 90°, 70°) flexion) as survey CT and CT arthrography. The anatomical structures of the shoulder region were scored for image detail. Curvilinear reconstructions of the biceps tendon were performed to demonstrate its relationship with neighbouring structures.

Results:
A total of 60 mg/ml was determined as the optimal concentration. The muscles of the shoul-der region were visible in all angles, but best in extension. Only CT arthrography provided excellent visualization of the subscapularis tendon insertion, medial, lateral glenohumeral and transverse humeral ligaments. Curvilinear biceps tendon reconstructions demonstrated an impairing effect of the supraspinatus tendon on the biceps tendon in the flexed position.

Discussion:
CT provides excellent detail for imaging of the canine shoulder joint. The extended position is most beneficial allowing maximal image detail and avoiding positional artifacts that could be confused with tendon pathology. Using CT arthrography at 60 mg ml/l, excellent visualization of the shoulder ligaments can be achieved.

References:

DETECTION OF PORTOSYSTEMIC SHUNTS IN CATS BY ULTRASOUND GUIDED TRANSPLENIQUE INJECTION OF 99MTC-PERTECHNETATE

E. Vandermeulen1, A. Combens, C. De Boeck, I. Polis2, J. Saunders1, K. Peremans1.
1Department of Veterinary Medical Imaging and Small Animal Orthopaedics; 2Department of Medical and Clinical Biology of Small Animals, Faculty of Veterinary Medicine, Ghent University, Belgium

Introduction:
Portosystemic shunts (PSS) are relatively rare in cats. Abdominal ultrasound (US) is often the first choice imaging modality for PSS detection. In dogs with an inconclusive US result, scintigraphy is helpful. Diagnosing PSS, Arrival of pertechnetate (99mTcO4-) in the heart prior to the liver is diagnostic for PSS. The shunt fraction (SF) can be calculated, it is an indication for the size of the PSS and can be used for followup after surgery.
Effect of region of interest selection and uptake measurement on glomerular filtration rate estimation using 99mTc-DTPA in normal cats.

E. Vandermeulen1, K. Debruyne1, A. Dobbeleer1, I. Poes1, J. Saunders2, K. Peremans1.
1Department of Veterinary Medical Imaging and Small Animal Orthopaedics, 2Department of Medicine and Clinical Biology of Small Animals, Faculty of Veterinary Medicine, Ghent University, Merelbeke, Belgium.

Introduction:
Scintigraphic imaging with 99m-Tc labeled diethylene pentaacetic acid (99mTc-DTPA) is frequently used to evaluate the equine stifle joint. Some soft tissue structures such as the lateral collateral ligament are likely to be clinically important. Mild changes can be seen in the stifles of sporthorses. Lesions in the menisci, the tendinous portions of the popliteus muscle, long digital extensor muscle, or peroneus tertius muscle or the lateral collateral ligament are likely to be clinically important.

References:

ANATOMIC VARIATIONS OF THE EQUINE CERVICAL VERTEBRAL COLUMN: AN EX VIVO CT EVALUATION

I.D. Veraa1, A. Wijnberg2, A. Grone3, A. Wijnberg3, A. Wijnberg4, W.V. Backx5, A. Wijnberg4. 1Division of Diagnostic Imaging; 2Department of Equine Sciences; 3Department of Pathology, Faculty of Veterinary Medicine, Utrecht University. Yalelaan 1, NL-3584 CL, Utrecht, The Netherlands; 4Department of Surgery and Anesthesiology of Domestic Animals, Faculty of Veterinary Medicine, Ghent University, Salisburylaan 133, B-9820 Merelbeke, Belgium.

Introduction:
Cervical vertebral pathology in horses has been related to neurological deficits and/or lameness, 1Radiography of the vertebral column is part of the routine examination of these patients but can be challenging due to superposition. Patient size has been a limiting factor for computed tomography (CT) of the entire cervical vertebral column in vivo and only limited post-mortem studies have been performed. 2

Aim:
To evaluate the entire cervical vertebral column of healthy and ataxic adult horses using computed tomography. 3

Materials and Methods:
Post-mortem CT examination of the cervical vertebral column (C1-T2) of healthy (6) and ataxic (21) adult horses (20 KWPN, 2 Friesian, 6 other breeds) of a median age of 8 years and 10 months was performed. Images were reviewed, compared with the described normal anatomy and scored for number of cervical vertebrae and morphology.

Results:
Variations of the described anatomy were mostly present in C6 and C7, while fewer changes were seen in C1–C5. Variations encountered were asymmetry in size of cranial and caudal articular processes when comparing left to right (1 × C2, 2 × C3, 3 × C4, 5 × C5, 11 × C6, 5 × C7), asymmetry between left and right transverse processes due to a differing shape and position (8 × C6, 3 × C7), absence or asymmetry of the ventral lamina of the transverse process in C6 (8) and presence of a ventral lamina in C7 (13). The transverse canal diameter was slightly asymmetric in several vertebral of 13 cervical columns and present in C7 (4). Most horses (27) had a normal number of seven cervical vertebrae and only one (ataxic) horse had eight cervical vertebrae. Asymmetry of articular processes, transverse processes, transversal canal diameter, ventral lamina in C6 and presence of a ventral lamina in C7 were seen in healthy horses (1, 2, 3, 1, 1) and ataxic horses (26, 9, 10, 7, 12).

Discussion:
The findings in this preliminary study are yet of unknown clinical significance. Important, however, is the fact that varying conformation in size, shape, and position of different parts of the cervical column in healthy and ataxic adult horses have been confirmed and should be kept in mind when reviewing radiographs of the equine cervical vertebral column.

References:
We demonstrated that low-intensity ultrasound also disrupted tumor growth in mice. The results further suggest that ultrasound can be used as an additional tool in cancer treatment.

R. Weller, J. Bryars, V. Unt, T. Pfau. Department of Veterinary Clinical Sciences, Royal Veterinary College, Hawkshead Lane, North Mymms Hatfield, Herts. AL9 7TA, UK

INTRODUCING A NOVEL TECHNIQUE TO IMAGE THE SKELETAL SYSTEM DURING LOCOMOTION USING HIGH-SPEED FLUOROSCOPY

V. Vulpe, C-A. Vulpe. Department of Radiology, Veterinary Faculty Iasi, Romania

INTRODUCTION:
Conventional radiographic examination of the digestive tract of the pig has been shown to be limited by the presence of the large air sacs.1,2

AIM:
The aim of this study was to further investigate the distribution and propagation of contrast through the various parts of the digestive tract of the pig.

MATERIALS AND METHODS:
Contrast radiographic studies were performed on six pigs using barium sulphate. A lubricated cannula was used to introduce 2 ml of contrast at each of the following sites: the base of the beak, the inguinal area, and the cloaca. Radiographs were taken immediately for assessment of the esophagus, glandular and muscular stomach. After assessment of the inguinal region repeated administration of contrast was necessary every 3–4 min. Exposures were made after 15, 30, 60, and 120 min for visualization of the intestine. The intestine and cloaca were also assessed with radiographs taken immediately after contrast administration into the cloaca.

RESULTS AND DISCUSSION:
The barium sulphate solution passed too quickly through the glandular and muscular stomach for contrast to be seen in the radiographs and this was thought to reflect stress from handling. Thus, we administered ketamine to one of the pigs.

CONCLUSION:
For accurate examination of the inguinal repeated administration of contrast is necessary resulting in distension of the gizzard and the visualization of two symmetrical lateral compartments. The crop area is well delineated. The two rudimentary caeca of the pigeon are also evident and are tubular in shape.

REFERENCES:

ENDOVASCULAR TREATMENT AND/OR EVALUATION OF CANINE INTRAHEPATIC PORTOSYSTEMIC SHUNTS: SHORT- AND LONG-TERM EXPERIENCE IN 100 DOGS

C. Weisse1, A. Beretzi2, K. Todk2, J. Solomon2. 1Animal Medical Center, NY, USA; 2University of Pennsylvania, Philadelphia, PA, USA

INTRODUCTION:
The purpose of this study was to retrospectively evaluate the results following endovascular management of canine intrahepatic portosystemic shunts.

MATERIALS AND METHODS:
A total of 100 dogs with congenital IHPSS received 112 procedures (80% had one treatment, 15% had >1 treatment, and 5% had 0 treatments due to excessive portal-central venous pressure gradient). Invasive vascular access and angiography identified right hepatic, right caudal, left lateral, and central hepatic orifices (5 reported) of which 9% were complex/multiple shunts. Partial shunt attenuation was performed in 92 cases using celiac stent placement and thrombogenic coils within the shunt while monitoring portal blood pressure.1,2,3 Complete acute shunt occlusion was possible in three cases. Major intraoperative complications (21/12; 2%) included temporary severe portal hypertension in one dog and GI hemorrhage in one dog. Major perioperative (>1 week postop) complications (12/10; 11%) included seizures/HE (6%), cardiac arrest (2%), jugular site bleeding (2%), pneumonia (1%), and acute death (1%). Median follow time for treated cases was 828 days (range 0–3411). Median survival time for treated dogs was 2204 days (range 0–3411) with 93% 60 days, 83% 1 year, 74% 2 year, and 63% 3 year survival rates. Outcome was considered excellent (48/90; 53%) or good (19/90; 21%) in 74% of treated dogs.

DISCUSSION/CONCLUSION:
Endovascular treatment for canine intrahepatic shunts may result in lower peri-operative morbidity and mortality rates with similar success rates when compared with previously reported reports.4,5 To our knowledge, this study extends the population of dogs and lifelong gastroprophylactic medications are now recommended by the authors. Refereces:

ANTIVASCULAR ULTRASOUND THERAPY IN MICE WITH IMPLANTED MELANOMAS

A.K.W. Wood1, B.J. Levenback2, S. Hum3, H. Scholler2, C.M. Seghal2, 1Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania, 3900 Delac ey Street, Philadelphia, PA 19104, USA; 2Departments of Radiology and Medicine, 3School of Medicine, University of Pennsylvania, PA, USA

INTRODUCTION:
Antivascular cancer therapy has been studied extensively with a focus on the use of pharmacological agents.1 We demonstrated that low-intensity ultrasound also disrupted tumor neovascularization in the presence of a circulating microbubble-containing ultrasound contrast agent.2

AIM:
To study the growth of a melanoma following a single episode of antivascular ultrasound therapy, and to develop a mathematical framework for describing the microbubble-induced heating that occurred.3,4

MATERIALS AND METHODS:
Following the intravenous injection of 0.2 ml ultrasound contrast agent (definity), ultrasound therapy (n = 15) was performed on 1 murine melanomas for 3 min(3 Hz; contin- uous, 2 W cm−2 [SATA]); control mice (n = 17) received a sham treatment. Mice were euthanized once the tumor had reached 3 ml and survival percentage versus time curves were plotted. Biological tissues were modeled as an inhomogeneous continuum of mobile and immobile cells, and internal fluids with compressibility equal to the sum of the compressibility of each component.

RESULTS:
The median survival time for the treated group was 23 days and for the control group was 18 days (P < 0.0001). Mathematical simulations showed that the absorption of ultrasound waves by viscous damping of the microbubble oscillations induced significant local heating of the tissue vasculature. The extent and the rate of temperature increase not only depended on the properties of the microbubbles (including number and peak density radius) and the sonication parameters (frequency and intensity), but were also influenced by blood flow. Discussiion:
Antivascular ultrasound therapy reduced the growth rate of an implanted melanoma and increased survival time. Modeling showed that slow blood flow conditions lead to higher tissue temperatures due to a stronger interaction between microbubbles and ultrasound and reduced heat dissipation. Because tumors have slower blood flow than healthy tissue, the microbubble induced ultrasound antivascular therapy is likely to affect cancerous tissue more extensively than healthy tissue, providing a way to selectively target the vasculature of cancers. Further, the tissue response to thermal, mechanical, or sonochemical injuries by antivascular ultrasound could stimulate an immune response and induce endogenous vaccination.

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BMODE AND COLOR DOPPLER SONOGRAPHIC FINDINGS OF AN INJECTION-SITE FIBROSARCOMA IN A PANTHERA LEO

K.M. Zardo, M.L. Mamprim, V.R. Babcsik, Universidade Estadual Paulista Julio de Mesquita Filho, FMVZ, Botucatu, Sao Paulo, Brazil

Introduction:
Fibrosarcoma is a tumor commonly expressed at injection sites in felines with a high probability of recurrence and metastases.1 The diagnosis is made by histopathologic examination2 and the treatment of choice is surgical.3 The macroscopic appearance is often of a large mass with a central cystic cavity surrounded by necrotic tissue and microvessels.1 Imaging studies, such as ultrasound, are often performed for staging purposes to help decide upon the most suitable therapeutic protocol and to determine the prognosis.1

Aim:
We describe the B-mode and color Doppler ultrasonographic findings of an injection-site fibrosarcoma in the interscapular region in a Panthera leo.

Case Report:
An adult P. leo was admitted to the Animal Medical and Research Center, presented with a soft tissue swelling in the interscapular region. An ultrasound examination was performed to evaluate local extent of the mass and search for metastasis. Ultrasound revealed a cavity mass within the interscapular muscles, measuring 22.0 cm × 17.0 cm × 9.0 cm, with heterogeneous and echogenic tissue and anechoic fluid, which contained some suspended echogenic material. The periphery of the mass, which measured 0.11-cm thickness, contained numerous small blood vessels on color Doppler images. Ultrasound-guided fine needle aspiration of the mass (and collection of fluid from the cystic area) was performed and submitted for cytological analysis. There was no ultrasonographic imaging evidence of abdominal metastasis. Subsequently, surgical excision of the mass was performed and the mass was sent for histopathological examination. The cytological and histopathological diagnosis was fibrosarcoma.

Discussion:
Ultrasound provided useful information about the extent and morphology of the fibrosarcoma and the ultrasonographic and macroscopic pathological findings of the mass were consistent. Although in this case the diagnosis of fibrosarcoma was confirmed by histopathological examination, cytological analysis can differentiate neoplastic from inflammatory processes.2 Ultrasonography was also useful to allow safe and accurate sampling of the two distinct regions of the tumor.

References:

TOMOGRAPHIC FINDINGS OF AORTIC DISSECTION IN A DOG: CASE REPORT

K.M. Zardo, M.L. Mamprim, V.R. Babcsik. Universidade Estadual Paulista Julio de Mesquita Filho, FMVZ, Botucatu, Sao Paulo, Brazil

Introduction:
Intima, middle layer, and adventitia are the layers of the aortic wall.1 In cases of aortic dissection (AD), a sudden tear in intima is developed, resulting in the exposition of the middle layer to the intraluminal blood’s pressure. The blood enters into the tear and accumulates between the middle layer and intima, forming a false lumen of variable length.2 Imaging studies can confirm the diagnosis of this rare disease by allowing the visualization of the double aortic lumen.3

Aim:
In this report, we describe a case of AD diagnosed by computed tomography (CT) in a canine asymptomatic for cardiovascular disease.

Case Report:
A 2-years-old female rottweiler with a leiomyosarcoma in the urinary bladder underwent to an aurotomography to assess the ureteral integrity. In tomographic images, a double aortic lumen was visualized into the caudal portion of thoracic aorta, both filled with contrast and separated by a flap. In the precontrast phase, the attenuation value found of both lumens was 29 Hounsfield units (HU). In the postcontrast phase, a density value of 81 HU was found in one lumen (considered the true lumen), whereas in the other one an attenuation value of 76 HU was identified (false lumen). The apparent size of AD was 0.7 cm width, 0.9 height, and at least 3.0 cm long. It was unable to establish the region of origin of the double lumen since the CT scan began in the tenth intercostal space. These findings were consistent with AD in the descending aorta.

Discussion and Conclusion:
Imaging techniques are important to the AD diagnosis and its monitoring since it is a progressive disease that can lead to a sudden death. CT proved to be efficient in the AD...
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diagnosis in dogs. A few reports were found in the literature, suggesting that this disease rarely affect animals and humans. However, as described in the animal of this report, the AD in dogs can be asymptomatic and therefore it may be underdiagnosed in veterinary medicine.

References:

COMPUTED TOMOGRAPHY (CT) AND ULTRASOUND IN THE EVALUATION OF THE LIVER IN A SNAKE (BOA CONSTRICTOR AMARALI)

R.M.I. Zulim1, F.F. Geller1, R. Andrade2, G.S. Cardoso1, P.M. De Souza1, M.J. Mamprim2, S.C. Rahal1.
1School of Veterinary Medicine and Animal Science, Univ Estadual Paulista (UNESP), Botucatu, SP, Brazil; 2Universidade Federal Rural da Amazônia, Instituto de Saúde e Produção Animal, Belém do Pará, Brazil

Introduction:
The liver is the largest organ in the coelomic cavity in reptiles. Snake liver is elongated and flattened, and the vena cava and portal vein are located between the two lobes of the liver. The liver has homogeneous parenchyma with well-defined contours, and hypoechoic.1,4 Ultrasound is considered a noninvasive method of diagnosis.5 Percutaneous liver biopsy using an ultrasound-guided route has been successfully used in snakes.2

Aim:
The aim of this report was to evaluate the liver of a healthy snake using ultrasound and CT examinations.

Materials and Methods:
A captive healthy male snake (Boa constrictor amarali) measuring 1.23 m in length and 5.5 cm in diameter was examined. The ultrasound examination was performed with the snake in ventral recumbency, using physical restraint. A GE ultrasonographic device (Logic 3 model) was used with 10 MHz linear probe. The abdominal organs were identified and the parenchymal texture of the liver was evaluated. A CT examination was performed under general anesthesia that was induced and maintained with isoflurane. Sequential transverse images of the body were obtained using a helical Scanner (Shimadzu SCT-7600CT) with the snake positioned in ventral recumbency. The scanning parameters were 120 kVp, 120 mA, with a slice thickness of 2.0 mm, pitch of 2.0, and 1 s/rotation.

Results and Discussion:
Ultrasonographically, the liver appeared elongated, well defined, with hypoechoic parenchyma and echotexture homogeneous, and located at the end of the proximal third of the snake’s body. The vena cava and portal vein were visualized. These findings were similar to previously described by other authors.3,4 On CT, the liver showed hypodensity compared with stomach, mean value of 6.5 HU. The inferior vena cava and portal vein showed hyperattenuation compared with the liver and isodensity compared to stomach, mean values of 56 HU and 3.0 HU, respectively. The combination of the two imaging techniques allowed a better evaluation of the snake’s liver. More cases are necessary to obtain a pattern of normal values.

References: