2014 American College of Veterinary Surgeons Surgery Summit

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The American College of Veterinary Surgeons (ACVS) Surgery Summit welcomed veterinary surgeons with copious opportunities to attend seminars, laboratories, workshops, and scientific abstract presentations on key surgical topics and techniques.

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Variations of ureteral ectopia in dogs: Lessons learned

Ectopic ureters (EUs) are the most common cause of urinary incontinence in young female dogs and are rarely recognized in cats and other species. Females are overrepresented and present at a younger age than males; however, it is believed EUs may be more common in males than previously thought. Urinary incontinence may be absent in some cases of EU, or can present in varying degrees from mild and intermittent to continuous and severe. Incontinence may worsen in recumbency or with increased activity or water consumption. Delayed-onset urinary incontinence can also occur. Concurrent abnormalities associated with EU can include a short urethra and low urethral closure pressure. Single renal agenesis, renal hypoplasia, and other abnormalities may also be discovered in patients with EU. Surgical repair and clinical success of EU depends on the location of the ureter (intramural vs extramural), and unilateral vs bilateral disease. Breed-specific changes can also affect outcome.—*McLoughlin MA, Chew DJ*

Supraspinatus tendinopathy in 327 dogs: A retrospective study

Canine forelimb lameness is commonly caused by supraspinatus tendinopathy, for which diagnosis and treatment can be challenging. Quantitative ultrasound (QUS) is used to evaluate tendon size and architecture for diagnosis and response to treatment. Performance dogs are over-represented in patients with supraspinatus tendinopathy. In this study, 74.6% of affected dogs failed to respond to NSAID therapy, and 40.8% failed to respond to rehabilitation therapy. Apparent pain on direct palpation of the supraspinatus tendon and during biceps stretch is common, as well as pain or spasm on shoulder extension, flexion, and abduction. Shoulder radiographs may suggest disease by showing mineralization, but this finding is not common. Concurrent disease in the shoulder and/or elbow joint was often found. In this study, regenerative medicine therapy was most effective for resolving lameness, over physical rehabilitation and medical therapy.—*Canapp S, Barrett J, Canapp D, et al*

Bacterial biofilms in chronic wounds

Bacterial biofilms in implant-associated and chronic, non-healing soft tissue infections have been well-documented in human medicine, but they likely play an important role in complicating wound healing in veterinary patients as well. Biofilms are characterized by the presence of bacteria, an extracellular polymeric substance (EPS), and a substrate for bacterial attachment. It is the self-produced EPS layer that protects the bacterial colony from the host immune system, dessication,

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antimicrobials, and environmental threats. Bacterial culture of a biofilm infection using standard agar culture media is often nondiagnostic and unrewarding, partly because of the metabolic quiescence and immobility of the cells within the biofilm. Because of the protected nature of the bacteria in the biofilm, traditional antimicrobial therapy is often ineffective. The treatment of choice for wounds complicated by biofilms in human medicine is surgical debridement; this would likely prove beneficial in veterinary patients as well. Interestingly, biofilms can recover in a very short amount of time, sometimes providing only a 24-hour window for antimicrobial therapy following debridement. Because treating biofilm infected wounds can be difficult, efforts are focused at preventing them. DispersinB, a naturally occurring enzyme produced by *Aggregatibacter actinomycetemcomitans*, destroys polysaccharide intercellular adhesin (PIA) protein, the molecule responsible for cell-to-cell adhesion in a biofilm. DispersinB is effective at preventing biofilm formation and eradicating established biofilms, but further research is required.—*Singh A*

Clinical signs: Is it degenerative lumbosacral stenosis (DLSS)?

Degenerative lumbosacral stenosis (DLSS) is the most common peripheral nerve disease found in elderly medium- to large-breed dogs, typically causing lumbosacral pain and mild neurological locomotor deficits. DLSS is caused by stenosis of the lumbosacral vertebral canal and resulting compression of blood vessels and nerves of the cauda equina. Because the spinal cord ends near the level of the L6 vertebra, a lesion localized at L7-S1 (the lumbosacral region) will cause lower motor signs, affecting the sciatic nerve, the pudendal nerve, the pelvic nerve, and/or the caudal nerves.

Lumbosacral pain is a persistent and important clinical factor in DLSS. Early in the course of disease, the client may not notice pain in their pet as much as exercise intolerance and reluctance to jump or climb stairs; however, examination may reveal pain on palpation of L7-S1 and during hyperextension of the tail or hind limbs. Later in the disease process, pain and weakness are evident, and may appear in the form of hindlimb muscle atrophy, low tail carriage, mild proprioceptive deficits, and reduced hindlimb reflexes. It is important to recognize that DLSS causes only mild neurologic deficits, and if severe ataxia or paresis is present with or without lumbosacral pain, other pathologies such as chronic disc herniation and degenerative myelopathy should be considered.—*Forterre F*

Decision making with the pancreas

The pancreas has both exocrine and endocrine functions. The exocrine portion produces digestive enzymes and secretes bicarbonate. The endocrine portion secretes insulin and glucagon from the islet cells. The pancreas of dogs and cats vary in appearance and blood supply; the anatomic variability in arterial supply and venous drainage between individuals and species are particularly important if surgery becomes necessary. Pancreatic surgery is challenging and, historically, pancreatic biopsies were avoided because of high complication risk.

This risk has now been shown to be negligible. If a biopsy is required, tissue is to be handled gently and the surgeon is to lavage frequently. Because pancreatic lesions can be localized or multifocal, multiple biopsies should be taken if no lesions are obvious. Fluid or tissue samples are recommended for culture or sensitivity and histopathology. Ultrasound can also be used for evaluation, disease tracking, and other procedures. When necessary, partial pancreatectomy of up to 75%–90% of the pancreas is possible without affecting endocrine or exocrine function—provided the ductal system remains intact. Rapidly absorbable suture should be avoided. Total pancreatectomy should be avoided to prevent damage to shared blood supply to the duodenum. Insulinoma, gastrinoma, and glucagonoma can all be treated with concomitant partial pancreatectomy surgery and medical management; however, it must be noted that 72% of canine gastrinomas have metastasized by the time of surgical intervention. Surgery is not usually an option for pancreatic adenocarcinomas because of its often advanced stage and organ spread by the time of diagnosis.—*Kirpensteijn J, Buishand F, van Nimwegen B*

Prevalence & etiology of DJD in cats

The relationship between radiographic findings and histological appearance of joints was evaluated: 100 cats were randomly selected, and the whole axial skeleton and every appendicular joint were radiographed. Whereas 91% of cats had radiographic evidence of degenerative joint disease (DJD) in at least one appendicular joint, 55% had axial skeleton DJD. Radiographic findings were mild and differed in appearance from dogs. Only age was significantly associated with DJD. An estimated 50%–87% of osteoarthritis (OA) is primary in cats. The frequent bilateral presentation of DJD may be a result of bilateral congenital malformations, systemic or neurogenic factors, chronic overuse, or possibly primary OA. One case report suggests osteochondromatosis as an important cause of DJD in cats, while another associated meniscal calcification with cartilage damage in stifles. Scottish fold osteochondrodysplasia and mucopolysaccharidosis are 2 recognized primary forms of OA.

More studies are needed to elucidate all causes of DJD; documented secondary causes currently include nutritional, hip dysplasia, and noninfectious and infectious polyarthropathies. Hypervitaminosis A results in new bone formation on vertebrae, thus resulting in ankylosing spondylosis. Only sparse

evidence and no studies exist linking trauma to subsequent DJD. A causal relationship between obesity and DJD in cats has not been proven.—*Lascelles BDX*

Fracture revisions

Fracture revisions are uncommon, often resulting from bone and/or implant failure. Surgeon technical error may be related to multiple factors, leading to poor reduction. Adequate preoperative imaging—including radiographs, CT scans, or MRIs—is imperative to proper preoperative planning. Improper implant selection is often related to misunderstanding of fracture and implant biomechanics. The implant must effectively counteract disruptive forces at the implant site in order to allow for stable osteosynthesis and early functional recovery. Adherence to basic and advanced surgical principles includes loco-regional anatomic knowledge and understanding of the least invasive surgical approaches and techniques, including minimally invasive osteosynthesis (MIO), and gentle manipulation of the surrounding soft tissue envelope, including fracture hematoma.

Critical evaluation of postoperative radiographs and patient function are important; potential causes of failure can usually be identified with thorough review of the postoperative radiographs. Radiographs should be evaluated for implant positioning and fixation, limb alignment, and fracture reconstruction. Immediate revision should be considered if any of these factors are inadequate. Identification of the cause of repair failure is essential to revision planning. Revision carries a higher risk for soft tissue morbidity than primary fracture repair. Soft tissue trauma and dissection during revision create a poor healing environment, increasing risk for implant failure. MIO techniques may mitigate these risks. Honing of surgical skills and continuing education are essential in minimizing repair failures. An assessment of the true cost of fracture revision must include financial and biologic costs as well as the cost of personal reputation.—*Déjardin LM, Marturello DM*

Indications and outcome for pulmonary metastasectomy

Selection criteria for pulmonary metastasectomy in humans include: controlled primary tumor, controllable distant disease, disease-free interval (DFI) >3 years, and limited number of pulmonary nodules. The goal is to preserve as much normal lung tissue as possible with clean margins. Thoracoscopy provides excellent visualization of pleural surfaces with decreased pain and hospitalization period, but thoracotomy allows palpation of the entire lung for detection of additional metastases. Stapled wedge resection is the most common method employed.

In dogs, pulmonary metastasectomy has been evaluated for osteosarcoma in one study. Dogs with visible metastatic nodules <300 days from initial diagnosis had a median DFI of only 58 days after metastasectomy compared with 128 days for dogs with metastases found >300 days after initial diagnosis. Dogs with <3 nodules removed at surgery had median DFI of 95 days while dogs with ≥3 nodules had a median DFI of 53 days. Median overall survival time was 487 days and median survival time from the metastasectomy was 176 days (range, 7–1495 days) in this study of 36 dogs. In another unpublished study, dogs undergoing metastasectomy had an overall median survival time of 862 days compared with 236 days in dogs without metastasectomy, with no difference in DFI. Selection criteria for metastasectomy in dogs with osteosarcoma have therefore been defined as: controlled primary tumor, no untreatable distant metastases, DFI of ≥300 days, and <3 nodules to be removed.—*Séguin B*

Rehabilitation therapy following stifle surgery

Rehabilitation therapy following cranial cruciate ligament (CCL) surgery in dogs improves muscle mass, decreases atrophy, restores range of motion (ROM), reduces the progression of OA, and may decrease the probability of future CCL injury in the contralateral limb. The goal is to return the patient to pre-injury activity levels as safely and quickly as possible, with therapy tailored to each patient's needs.

There are 4 phases of rehabilitation. Phase I (acute) lasts 1–3 weeks. The goal is to control the effects of inflammation, minimize the effects of immobilization, manage pain, and protect healing tissue. Cryotherapy (ice compresses), laser therapy, passive or active-assisted ROM exercises, low-load sustained stretching, and slow, low-impact exercises such as short, controlled leash walks are common interventions. Phase II (intermediate) occurs 4–6 weeks postoperatively once ROM and gait are improving. Goals are enhancement of mobility and proprioception. Exercises resemble those in Phase I but focus more on strength and endurance. Phase III (advanced strengthening) usually occurs at 7–11 weeks when there is full, non-painful ROM, the surgery site is healed, implants are static, and strength and muscle mass have reached 70% of baseline. Higher intensity training is introduced, such as walking on inclines. Wobble boards help improve dynamic stability. Underwater treadmill therapy is highly efficacious. Phase IV (return to activity and sport) usually occurs 12 weeks postoperatively, when there is full, non-painful return to function of the surgical limb. Agility drills or other sport-specific exercises are gradually phased in until full off-leash or competition-level activities are achieved.—*Canapp D* ■ cb