Elbow dysplasia and osteoarthritis in dogs and cats

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Elbow osteochondrosis is a common cause of forelimb lameness in rapidly growing medium to large breed dogs and manifests itself in a variety of different conditions (all listed below). The condition has been shown to have a hereditary basis in certain breeds and therefore one should advise against using affected dogs for breeding if the diagnosis is confirmed. The incidence of each condition is quoted (based on a review of 253 cases) (Denny, 1995):

- Fragmentation of the medial coronoid process (53%)
- OCD of the medial humeral condyle (25%)
- OCD of the medial humeral condyle and fragmented coronoid process (12%)
- Ununited anconeal process (7%)

a) Fragmentation of the medial coronoid process (FCP)

This is a very common cause of elbow lameness especially in growing medium to large dog breeds such as Labrador and Golden Retrievers, Rottweilers and Bernese Mountain Dogs.

Aetiopathogenesis: Current theories on this condition relate to radioulnar incongruity (short radius) whereby the medial part of the coronoid process of the ulna sits just proximal to the radial head where it is subject to shearing forces from the distal humerus and fractures/fragments (Wind, 1986a). Other theories proposed for the cause of FCP include osteochondrosis and humeroulnar incongruity (Wind, 1986b). Microcrack formation leading to fragmentation of the process and loose fragments of cartilage may also play a role in this condition (Danielson, 2006). Radiography has been shown to unreliable in assessing elbow joint incongruity (Mason, 2002) and recent studies have focussed on the use of computed tomography (CT) in its diagnosis (Gemmill, 2006, Kramer, 2006).

Clinical signs: Most dogs show lameness at 5-6 months of age. The condition is commonly bilateral thus the lameness may be subtle and the gait stilted. Clinical examination often shows pain on extension and outward rotation (supination) of the lower limb. Joint effusion may be present but is more obvious in when other manifestations of elbow dysplasia are present.

Diagnosis is often one of exclusion because it is difficult to image the coronoid process because the radial head is superimposed. It has been shown that FCP is easier to diagnose in advanced cases (Meyer-Lindenberg, 2006). Thus one must rule out other diseases common in this age and breed range (e.g. UAP and OCD).

- Radiography: Flexed mediolateral (ML) and craniocaudal (CC) radiographs of both elbows should be taken in all suspect cases (some authors suggest a Cr15L-CdMO view). One should look for the appearance of osteophytes at typical sites - proximal border of the anconeal process, cranial aspect of the radial head, semi-lunar notch, and humeral epicondyles.
- Magnetic resonance imaging (MRI) and CT have been shown to be very sensitive for the diagnosis of FCP when compared with surgical findings.
- Arthroscopy/Arthrotomy is the gold standard in the diagnosis of FCP

Treatment of the condition is controversial: Conservative treatment (6-8 weeks of restricted on-lead exercise, weight management, physical therapy and medical management) may result in 50% of dogs improving over 2-3 months (Read, 1990). Surgical treatment did commonly involve removal of loose fragments with a medial arthrotomy but in the last few years arthroscopically guided removal of the fragment has become more popular. Controversy exists on whether arthroscopy is superior to arthrotomy on terms of morbidity and long term outcome (Bubenik, 2002, Meyer-Lindenberg, 2003) and all dogs will develop OA regardless of treatment. Post-operatively dogs should be rested with increasing on-lead exercise for 4-6 weeks following surgery.

b) OCD of the medial humeral condyle

Aetiopathogenesis: OCD of the medial humeral condyle occurs most frequently in Labrador and Golden Retrievers and is usually bilateral. It is poorly understood but necrosis of the vascular channels within the articular–epiphyseal cartilage complex of the developing joint can lead to joint surface flap formation (Ekman, 1998). It is usually identified in combination with FCP and medial compartment osteoarthritis (OA).

The clinical signs are very similar to FCP. The diagnosis is made with ML, CC and/or oblique radiographs of the elbows where a defect in the subchondral bone (+/- mineralised cartilage flap) will be seen in the mid-point of the medial humeral condyle. Arthroscopy is useful in both the diagnosis and treatment of this condition.

Treatment is by surgical curettage of the lesion via a medi- cal arthroscopy or arthroscopy. The prognosis is fair/good if diagnosed and treated early.
c) Ununited anconeal process (UAP)

Aetiopathogenesis: The anconeal process develops as a separate centre of ossification in some breeds of dog such as the GSD. It appears at 10-13 weeks of age and is fused to the ulna by 18-20 weeks in normal animals (later in GSD than Greyhounds). UAP is failure of this fusion and is seen most often in the GSD (72% in one study (Meyer-Lindenberg, 2006)). It can also be caused by premature closure of the distal ulna growth plate (e.g. in the Bassett Hound) when the radial head exerts extreme pressure on the anconeal process via the humeral head (short ulna).

Clinical signs: Affected animals are usually 4-5 months old. There is pain and reduced range of motion. The condition may be bilateral (40% of cases).

Diagnosis is by fully flexed ML and CC radiographs. Looking for incongruity in the joint between the radius and the ulna is very subjective with radiography (Mason, 2002).

Treatment: Conservative treatment: exercise moderation and medical management for 4-6 weeks. If non-responsive or in more severe cases then surgical treatment should be considered, many techniques are described and to date none have been proven superior to another. They broadly include: removal of the anconeal process, osteotomy of the proximal ulna and fixation of the anconeal process with lagged screw.

MANAGEMENT OF ED/OA IN THE OLD PATIENT

All of the manifestations of elbow dysplasia will result in OA in the older dog referred to be some authors as “medial compartment disease” however this may not present as a clinical problem. Management of these cases can be broadly divided in to medical and surgical management. The elbow was the most frequently affected joint in a prospective study of cats with feline OA (Clarke, 2006).

Medical management consists of weight management, exercise modification, physical therapy, joint specific diets, non-steroidal anti-inflammatory drugs (NSAIDs) and nutritional supplementation (Schulz, 2006) (see lecture).

Surgical management consists of elbow arthroscopy (+ FCP removal if present) and joint lavage, osteochondral autogenous transfer, total elbow replacement (TER) and elbow arthrodesis (see lecture).

References