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ELBOW DYSPLASIA
UPDATE ON AETIOPATHOGENESIS, DIAGNOSIS AND CURRENT TREATMENT CONCEPTS

Elbow dysplasia is the most common cause of thoracic limb lameness in large- and giant-breed dogs. Several large epidemiological studies have examined the genetic basis of elbow dysplasia, which appears to be inherited differently in different breeds. There is also evidence that the different manifestations of elbow dysplasia could be inherited independently. It is a multifactorial disease process with a genetic predisposition and secondary environmental influencing factors such as high-energy diets or excessive exercise. Recent evidence has supported various forms of joint incongruity as the most likely mechanism, causing different pathologies (more than one of these problems may occur in the same elbow joint at the same time):

1. Medial Coronoid Disease (MCD) This is the most frequently diagnosed component of the elbow dysplasia pathology group comprising medial coronoid sclerosis, coronoid microfracture, coronoid fragmentation or fissuring, and cartilage damage to the coronoid process, with or without joint incongruity. The term fragmented medial coronoid process has fallen from favour as CT and arthroscopy have revealed that coronoid fragmentation is only part of the pathology present with MCD.

2. Osteochondrosis (OC)/Osteochondritis dissecans (OCD) play a role in the development of cartilage injury in elbow dysplasia in some dogs, but the prevalence is relatively low. Cartilage loss within the joint is more often due to conflict between the contacting joint surfaces, leading to local damage, resulting in a ‘kissing lesion.

3. Ununited anconeal process (UAP): The anconeal process, which should normally be fused by 20 weeks of age, fails to fuse with the ulna during the growth phase. Typical breed to be affected is the German Shepherd Dog, but also giant breeds or chondrodystrophic breeds like Bassets might be affected.
4. Medial compartment disease: This is the most serious form of elbow dysplasia. The main feature is severe cartilage disease of the humeral trochlea and coronoid area together with medial coronoid disease and, possibly, detectable joint incongruity.

CLINICAL EXAMINATION

In most cases, orthopaedic examination reveals pain on medial palpation of the elbow with the elbow flexed and the antebrachium supinated. In cases affected by severe osteoarthritis, a restricted range of movement of the joint is also generally noted.

INVESTIGATIONS

The diagnosis is made on the basis of imaging and arthroscopy findings. UAP and OCD can often be diagnosed based on radiographs, but MCD, kissing lesions and medial compartment disease require a CT scan and arthroscopy for a detailed diagnosis. CT has the advantage over arthroscopy of being able to diagnose any changes that do not reach the cartilage surface. Arthroscopy, though, has the advantage of enabling direct visualisation of the cartilage surface, and the possibility to treat some pathologies in the same session, and therefore these two modalities are complementary.

TREATMENT

For decision-making the use of an algorithm can be helpful (see example, according to current evidence and concepts, below).

1. Medial Coronoid Disease (MCD): Treatment can be conservative or surgical. Conservative treatment includes weight control, exercise management, hydrotherapy and physiotherapy, nutraceuticals and multimodal pain management. In cases where conservative treatment fails, arthroscopic fragment retrieval and/or subtotal coronoidectomy (SCO) are considered. Biceps ulnar release (BURP) might be considered in cases with suspected radio-ulnar conflict.

2. Osteochondritis dissecans (OCD): Treatment involves arthroscopic removal of the cartilage flap, osteostyxis to promote resurfacing with fibrous cartilage or placement of an osteochondral graft (OAT).

3. Ununited anconeal process (UAP): In young dogs (under 8 months of age) the ununited anconeal process is re-attached to the ulna with a lag screw and a dynamic ulna osteotomy is performed to stimulate fusion and counteract the abnormal forces acting on the anconeal process. Older dogs may be treated with conservative management (weight control, exercise management, hydrotherapy and physiotherapy, joint supplements and painkillers) or with removal of the anconeal process depending on the severity of the lameness.

4. Medial compartment disease: In this case procedures to try and change the weight-bearing axis of the elbow and antebrachium might be considered. Dynamic ulna osteotomy (UO), sliding humeral osteotomy (SHO), or proximal abducting ulna osteotomy (PAUL) are treatment options. More advanced cases may be candidates for a salvage procedure, elbow arthrodensis or total elbow replacement.

5. Osteoarthritis: In all cases a consequence of elbow dysplasia is the development of osteoarthritis, and therefore medium and long-term prognosis will depend on the degree of osteoarthritis developing and also the clinical consequences of this osteoarthritis. Weight management, aiming to keep the dog on the lower spectrum of normal, and exercise modification, allowing for regular exercise without overdoing it to optimise muscular strength, are the most powerful tools to positively influence the overall outcome of elbow dysplasia and should therefore form part of the management in all cases.

PROGNOSIS

Clinical improvement is seen in reported up to 85% of cases after the various treatment options. However, none of the treatments is curative, and prognosis in regards to further development of osteoarthritis is poor. All dogs with elbow dysplasia will profit from life-style adjustments and with this many can still have a good quality of life. A small group of patients, however, may not respond to any treatment and for those salvage procedures, like a total elbow replacement, may be considered.
COMPANION ANIMAL

ORTHOPEDICS

References:


modified from Michelsen, Vet J 2013