IN FOCUS

Managing humeral intracondylar fissure

Though the aetiopathogenesis of the condition is debated and treatment can be challenging, it is important to diagnose HIF as soon as possible.

Humeral intracondylar fissure (HIF) is a condition that is most often seen in Spaniel breeds, particularly the English Springer Spaniel, although other breeds can also be affected. It is estimated to have a prevalence of 14 percent within English Springer Spaniels in the UK (Moores et al., 2012). HIF may cause thoracic limb lameness and pain on elbow manipulation, or it may be identified as an incidental finding. HIF can exist alongside other developmental elbow disease such as medial coronoid disease, OCD and radio-ulnar incongruence. Importantly, a dog with HIF is at risk of going on to develop intercondylar fracture, so there is benefit in the early recognition of the disease.

Aetiopathogenesis

The aetiopathogenesis of HIF is debated, but two main theories predominate. The first theory is that it is due to a failure of endochondral ossification (leading to the term incomplete ossification of the humeral condyle, IOHC) and the second is that it is caused by a stress fracture.

During canine growth, the distal aspect of the humeral condyle arises from two separate centres of ossification. The dividing cartilaginous plate ossifies by 8 to 12 weeks of age in a normal dog. If the cartilaginous plate were to fail to ossify, it could potentially lead to a fissure developing. In a humerus affected by HIF, the fissure develops at the site of the cartilaginous plate, providing strong evidence for a failure of endochondral ossification. One report of the histopathology of the intercondylar region of a single clinically affected patient supported this mechanism. However, other histological studies have provided conflicting evidence, as lesions have lacked the proliferative or hypertrophic cartilage that would be expected in a case of failure of endochondral ossification.

The second theory is that the fissure is a type of stress fracture. Computed tomography (CT) has revealed sclerotic bone being commonly found in the area immediately adjacent to the intracondylar fissure (Figure 1). This bone reaction, typical of a stress-type injury, is consistent with an adaptive biological response to repetitive loading, or a failure of bone repair in an unfavourable mechanical or biological environment. CT has also demonstrated the development of a fissure in a previously normal humeral condyle, as well as the progression of a partial to a complete fissure, suggesting that the lesion is one that develops with time rather than with skeletal development.

It may be that elbow incongruency, especially radio-ulnar incongruency, plays a role in the development of an HIF, either by placing uneven stress on the humeral condyle during development resulting in a failure of ossification, or during activity resulting in a stress fracture. There is limited evidence to support the role of incongruency.

As the aetiopathogenesis of this condition is uncertain, and with the possibility that more than one mechanism may contribute to the formation of such lesions, the term humeral intracondylar fissure has become more widely adopted.

The presentation of a Spaniel with thoracic limb lameness should always encourage a clinician to carefully image the distal humerus.