Proceedings of the 47th British Equine Veterinary Association Congress
BEVA

Sep. 10 – 13, 2008
Liverpool, United Kingdom

Next Congress:

BEVA CONGRESS
British Equine Veterinary Association
9-12th September - Birmingham, UK

Reprinted in IVIS with the permission of the British Equine Veterinary Association – BEVA
http://www.ivis.org/
How important is subchondral bone pathology in the mature equine athlete?

Sue Dyson
Centre for Equine Studies, Animal Health Trust, Lanwades Park, Kentford, Newmarket, Suffolk CB8 7UU, UK.

Stress-related bone injury and 'subchondral bone' pain in young Thoroughbred athletes, particularly in the fetlock and carpus, are well recognised (Davidson and Ross 2003). However, with the exception of subchondral bone cysts and osseous cyst-like lesions, subchondral bone pain has generally been overlooked, despite the relative early recognition of increased intra-osseous pressure in some horses with navicular bone pathology (Svalastoga 1983) and osteoarthritis of the distal hock joints (Kristoffersen 1981; Sonnichsen and Svalastoga 1985).

What do we actually mean by subchondral bone? The subchondral bone plate, the densely mineralised band of bone beneath the articular cartilage, has chondral and endosteal surfaces. The endosteal surface is the interface with trabecular bone. Pathological change rarely involve the subchondral bone alone; more commonly there is involvement of adjacent trabecular bone with or without the subchondral bone plate. The articular cartilage may or may not be intact. For the purposes of this discussion osseous reactions involving the endosteal surface and adjacent trabecular bone at ligament and tendon insertions are excluded.

Although some lesions can be identified radiographically, usually as radiolucent areas or regions of sclerosis, the clinical importance of subchondral bone pathology has increased in recognition with the advent of the clinical use of magnetic resonance (MR) imaging (Zubrod et al. 2004; Dyson and Murray 2006) and computed tomography (Bergman 2007). However there remain limitations in the interpretation of the nature of the pathological changes. Pathological studies have demonstrated that a region of increased signal intensity in fat suppressed MR images may represent bone oedema, fibrosis or necrosis (Zanetti et al. 2000). Correlation between MR images and nuclear scintigraphy may give additional information about osseous activity. Theoretically increased radiopharmaceutical uptake (IRU) reflects increased osteoblastic activity; however, intense IRU has been seen in some lesions in which bone necrosis predominated pathologically (Dyson, unpublished data).

There are usually no localising clinical signs suggestive of subchondral bone pathology. There is often no distension of the joint capsule, unless there is associated cartilage pathology and synovitis. Diagnosis is initially dependent on accurate localisation of pain. Frequently the response to perineural analgesia is better than the response to intra-articular analgesia. In some instances the response to intra-articular analgesia is very poor, whereas in others there is an excellent response despite the presence of intact articular cartilage. It is currently not clear why intra-articular analgesia is sometimes effective and sometimes not.

Diagnosis is ultimately dependent on diagnostic imaging. Although some subchondral bone cysts and osseous-cyst like lesions are identifiable radiographically, others may be masked by surrounding intact bone. Moreover, not all osseous cyst-like lesions are of clinical significance. Special radiographic views may permit identification of subchondral bone sclerosis, such as in the radial facet of the third carpal bone. Nuclear scintigraphy may reveal a focal region of IRU reflecting abnormal bone modelling the result of trauma or overload, but normal RU does not preclude the presence of pathological change in the subchondral bone. Lesions of the distal dorsal aspect of the middle phalanx identified using MRI usually have normal RU. Magnetic resonance imaging and computed tomography are much more sensitive indicators of subchondral bone pathology than radiography.
Currently there is poor knowledge and understanding of the pathological processes leading to subchondral bone pathology in mature sports horses. In some instances single episode acute trauma is the inciting factor, with ensuing bone necrosis. Subchondral bone trauma of the distal phalanx has been seen associated with collateral ligament injury of the distal interphalangeal joint, and presumably joint instability. However, in some horses the only recognisable pathological change is bone sclerosis, which presumably reflects the end response to repetitive overload. The borderline between adaptive bone response and pathological adaptation is poorly recognised. The mediation of pain is also poorly understood.

REFERENCES

NOTES