Severe lameness caused by a bone marrow lesion of the middle phalanx in a Standardbred racehorse: diagnosis using standing MRI

Molly Allen, Brian H. Anderson, Andrew R. Cust, Ian C. Fulton
Ballarat Veterinary Practice Equine Clinic, Miners Rest, 3352, Victoria

History
A 3 year-old Standardbred colt initially presented with severe left hind limb lameness at the walk (the horse was not trotted as the degree of lameness was such that a fracture was suspected) and generalised pastern swelling after a traumatic paddock incident. Radiographs and ultrasound were unremarkable. The horse was rested initially in a box for 3 weeks then a day yard for 5 weeks and appeared sound but lameness recurred after 3 days of jogging exercise.

At the second presentation the horse was again lame at the walk with marked swelling around the left hind pastern with digital sheath effusion. An ultrasound examination was inconclusive. Local anaesthesia of the tendon sheath yielded 90% improvement of the lameness at the walk. Digital radiographs of the left hind foot, pastern and fetlock were still unremarkable.

Magnetic Resonance Imaging
A standing MRI examination of the left hind pastern was performed on a 0.27 Tesla magnet at the Ballarat Veterinary Practice Equine Clinic. Imaging sequences and planes included T1W GRE and T2W GRE in sagittal, frontal and transverse planes and STIR FSE in sagittal and transverse planes. Images were submitted for specialist interpretation.

There was marked STIR and T2 hyperintensity and moderate T1 and T2* hypointensity in the plantar and proximal aspect of the middle phalanx indicating fluid accumulation in trabecular bone, or bone oedema pattern1-3 (Figs. 1-3).

There was also a well-defined round lesion in the mid to medial aspect of the distal scutum near its insertion onto P2 (Figs. 4 and 5) and an irregular pattern in the straight sesamoidian ligament.

Relevance
Bone marrow lesions (BMLs) are abnormal intraosseous areas of high bone turnover with increased expression of cytokines and angiogenic factors. BMLs that occur secondary to trauma are often associated with soft tissue injuries and tend to induce load-related pain3 as demonstrated in this case. Pain associated with these lesions is due to increased intraosseous pressure and irritation or disruption of sensory nerves in the bone marrow.4

Due to a combination of increased vascularization and capillary leakage these lesions possess a ‘bone oedema pattern’ on MRI characterised by high signal on T2-weighted and STIR imaging and an intermediate to low signal on T1-weighted and T2*-weighted imaging1,3,4 Although BMLs possess increased radiopharmaceutical uptake on nuclear scintigraphy, this finding is nonspecific and MRI is the only imaging modality available for definitively diagnosing BMLs, which are best viewed in fat-suppressed sequences.1,3,4

In a previous case report1 of middle phalangeal BMLs, horses presented with insidious onset lameness and no history of acute trauma. In contrast, the horse in the present case was considered ‘fracture’ lame after a traumatic incident. Furthermore in the previous study horses were rested with variable results and in horses that returned to soundness BMLs were retrospectively considered to be sports-related non-pathological findings.1 The present case describes as a cause of severe lameness a pathological BML sustained after trauma with associated soft tissue injuries. With concern about a possible fracture, standing MRI was the preferred technique as it avoids the risk of general anaesthesia required for high-field magnets. Using this technology diagnostic quality images were obtained, an appropriate treatment plan of tiludronate and rest established and the horse has recovered to the point of full training for 2 months without lameness.

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References

Hallmarq Veterinary Imaging Standing Equine MRI
T idden, Ceva Australia