Importance of Advanced Imaging in Suspected Stress Fractures

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Case History

A 5-year-old Thoroughbred mare initially presented to the referral veterinarian with mild left forelimb lameness. She was positive to distal limb flexion and improved 50% to a IA (intra-articular) fetlock joint block. Radiographs were mostly unremarkable. Both front fetlock joints were medicated with intrarticular methylprednisolone. The horse was spelled for 2 months. The mare returned to training and was sound at low-level exercise but lameness recurred during high-intensity work. She was referred to Ballarat Veterinary Practice for further investigation and nuclear scintigraphy.

Initial Diagnostics

Lameness evaluation:

- Mild effusion LF fetlock joint
- Grade 2/5 lameness at a trot
- Positive distal limb flexion

Xrays showed no obvious evidence of a fracture within P1, however mild lucency can be detected in the mid sagittal region (Fig 1).

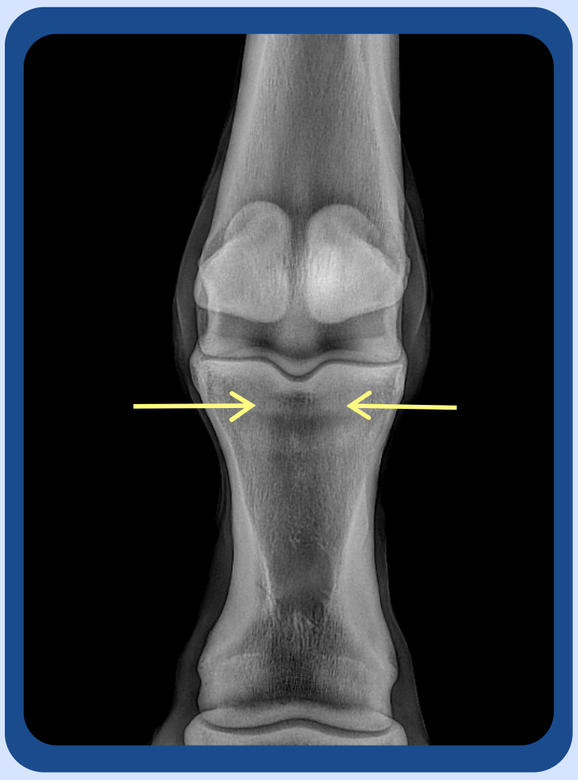

Figure 1: Initial radiographs showing mild lucency in the mid sagittal region.

Advanced imaging

A stress fracture was suspected in this case, so MRI was recommended over scintigraphy for superior anatomical localisation. It is the modality of choice for stress injuries and soft tissue injuries.

Standing MRI evaluation showed trabecular bone damage consistent with chronic incomplete sagittal P1 fracture (Fig 2 & 4).

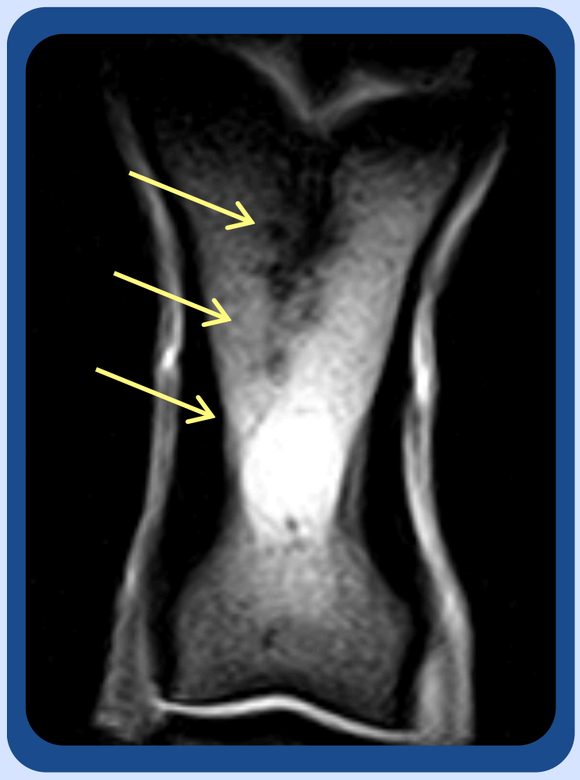

*Figure 2: T2*W GRE FRO FAST - L Trabecular bone damage consistent with a chronic incomplete sagittal plane stress fracture of P1.*

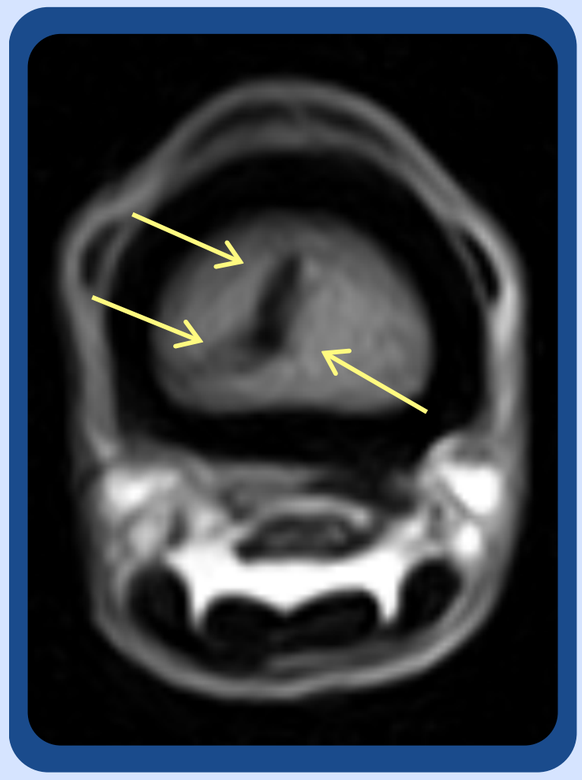

*Figure 4: T2*W GRE TRA FAST - L Transverse MRI view of stress fracture in P1, highlighting orientation of P1 fracture line.*

Surgery

- Surgical repair was performed under general anaesthesia. Three cortical screws were placed in lag fashion perpendicular to the fracture plane based off MRI findings.
- Radiographic monitoring confirmed appropriate screw placement (Fig 3).
- A fiberglass cast was applied for recovery and removed the following day.

Figure 3: Post-surgery radiographs confirming placement of lag screws.

Post-operative care

- 4 weeks of box rest with gradual hand walking and maintaining distal limb bandages.
- Follow-up radiographs at 4 weeks to determine moving to a yard
- Radiographs at 8 weeks prior to paddock turnout.
- Planned return to work at 4 months

Figure 5: 8 weeks post surgery repeat radiographs.

Discussion and Clinical Relevance

This case highlights the importance of advanced imaging in horses with subtle or poorly localised lameness when routine diagnostic investigations are inconclusive.

Initial radiographs were unremarkable, demonstrating the limitations of radiography in detecting early stress-related bone injury. Although CT is considered the gold standard for fracture imaging and surgical planning, only MRI and scintigraphy were available in this case. MRI was selected over scintigraphy because of its superior anatomical localisation and ability to detect internal bone pathology. It identified bone marrow oedema, trabecular injury, and early stress-related changes associated with an incomplete P1 fracture [2], while also defining fracture orientation to guide surgical planning and screw placement [4]. Although scintigraphy may have detected increased bone activity, it would not have accurately characterised the fracture lines.

Immediate cessation of strenuous exercise likely prevented progression to a catastrophic fracture. Surgical screw fixation was elected because the fracture lines extended to the medial cortex of P1, increasing the risk of propagation with conservative management.

MRI has long been regarded as the imaging modality of choice for diagnosing stress fractures in human medicine, and it has been shown to have the highest sensitivity and specificity for detecting lower limb injuries in equine patients [1]. Proximal phalanx fractures are recognised as the most common cause of catastrophic distal limb fractures in the UK [3], and early diagnosis and stabilisation is considered critical in racehorses.

Overall, this case demonstrates the value of MRI for the diagnosis, characterisation, and surgical planning of this type of stress fracture.

Case Outcome

At 8 weeks the mare was sound, radiographs (Fig 5) showed the absence of the previous lucency observed prior to surgery. There was some bone reaction seen either side of the screws. She will return to work in another 2 months time.

References

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