

Applications of nuclear scintigraphy in the investigation of equine lameness

Part 2: The Thoroughbred racehorse

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In this two part article series, a number of lameness cases are discussed where nuclear scintigraphy has proved an invaluable diagnostic modality. Part 1 highlighted three examples pertaining to the sports horse. Part 2 documents three examples where scintigraphy has been used as part of a lameness work-up in the Thoroughbred (TB) racehorse. Often, it can be the only suitable diagnostic tool as:

1. The inappropriate use of local analgesia techniques can have the potential for catastrophic outcomes i.e. fractures.
2. Young Thoroughbreds can be dangerous to perform sequential diagnostic anaesthesia.
3. Multiple limb lameness is often present, confusing the results of diagnostic local anaesthesia tests.

Also, in the TB racehorse it is common to find a secondary pathology in a separate limb (e.g. lower grade stress fracture), which may require a different treatment to the original diagnosis.

CASE 1: AN ACUTE HINDLIMB LAMENESS

A two-year-old TB filly racehorse 'Ruby' presented one morning following exercise with an acute onset 3/5 left hindlimb lameness. A new gravel surface had recently been laid on an adjoining path to the one used by the horses to access the gallops, and the trainer was confident that the filly was suffering from only a bruised sole incurred by treading on an aberrant stone. The regular farrier examined the foot later that afternoon and found some evidence of haemorrhage and bruising within the sole. A period of 10 days' box rest and dry poultice dressings was recommended.

The filly's lameness improved considerably and ridden exercise resumed after the period of rest. During the first morning on return to trotting exercise, the filly had a repeated episode of severe left hindlimb lameness. The trainer immediately sought veterinary advice.

Physical examination performed by the attending vet concluded that the left pelvic musculature was painful on palpation. An ultrasound examination of

the area was unable to identify a fracture along the ilial wing or shaft. To definitively diagnose the cause, it was recommended that a nuclear scintigraphic examination of the horse be conducted.

Scintigrams obtained the following day revealed a marked increase in radiopharmaceutical uptake (IRU) in the distal portion of the left hind tibia (Figs. 1a and 1b). This confirmed that the lameness was attributable to a left tibial stress fracture. A radiographic examination of the tibia revealed an area of sclerosis on the endosteal surface of the distal shaft, although no discrete fracture line could be noted. The painful response noted with palpation of the pelvic musculature was thought to be an incidental finding. The trainer was advised to box

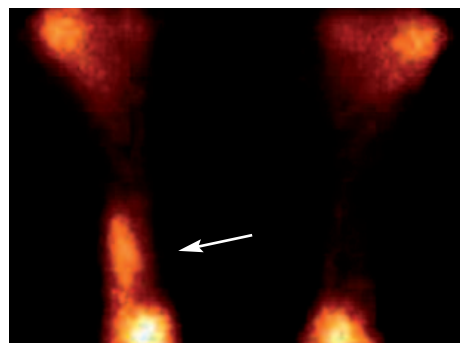


Fig. 1a: A caudal view of both tibia. The increase in radiopharmaceutical uptake in the left tibia is denoted by a white arrow.

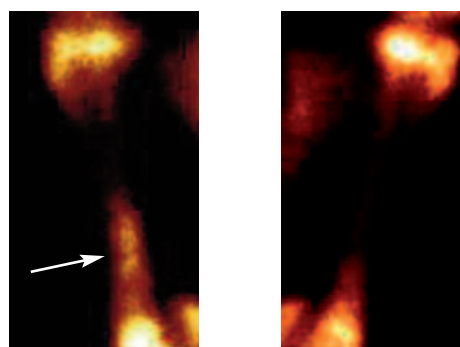


Fig. 1b: Lateral views of the left and right tibia; the white arrow indicates the increase in radiopharmaceutical uptake associated with the left tibia.

rest the horse for four weeks, followed by a further eight weeks' horse-walker exercise before returning to light ridden exercise.

CASE TWO: 'POOR MOVEMENT' FOLLOWED BY AN ACUTE HINDLIMB LAMENESS

A five-year-old National Hunt Thoroughbred racehorse 'Macken' was noted by the trainer to be 'moving poorly' in the hind quarters. The horse was treated conservatively with box rest and horse-walking exercise for three weeks before returning to normal exercise.

One week following a return to ridden work, the horse had reportedly 'lost its action' (become lame) whilst galloping. The horse was able to walk back to the stables and receive veterinary attention.

On examination the horse was sweating with a raised heart rate (120 bpm). The muscles of the pelvis, and epaxial muscles of the lumbar spine were taut and painful to palpate. The horse was reluctant to move forward, moderately lame at the walk on the left hind and noted to shift weight between the left and right hind limbs alternatively. An ultrasonographic examination of the pelvis was unremarkable at this time. The horse was stall tied and treated with phenylbutazone. A blood sample revealed mildly raised creatine kinase (260 iu/l; ref. range <250 iu/l) and aspartate transaminase (428 iu/l; ref. range <400 iu/l) but did not indicate an episode of rhabdomyolysis. A provisional diagnosis of a non-displaced pelvic fracture was made in view of the negative ultrasonographic, radiographic and biochemical changes, but a nuclear scintigraphic examination was advised to confirm the suspicion.

A scintigraphic examination performed one week later revealed a marked IRU in the left ilial wing (Fig. 2), confirming the provisional diagnosis. There was also some uptake in both carpi and standard radiographs performed 48 hours later revealed moderate sclerosis of the third carpal bone but no other abnormalities.

After three weeks, an ultrasound examination of the pelvis revealed an obvious accumulation of new

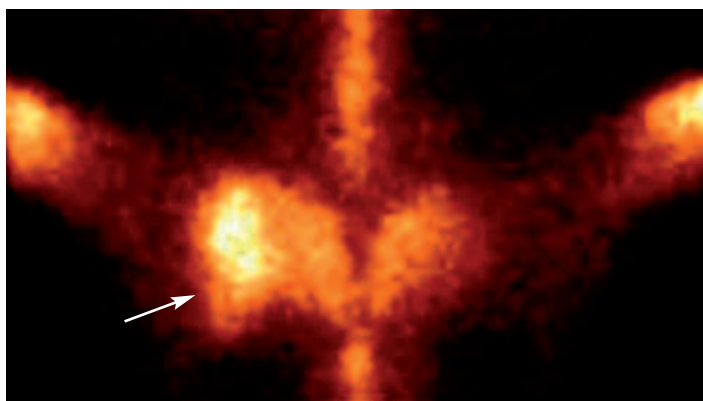


Fig. 2: A dorsal view of the pelvis; the arrow denotes the increased radiopharmaceutical uptake on the left wing of the ilium. Need to add arrow.

bone transversely across the left ilial wing, with disruption over the cortical surface cranially (Fig. 3). The horse was cross-tied and box rested for six weeks, before commencing a rehabilitation programme of walking exercise.

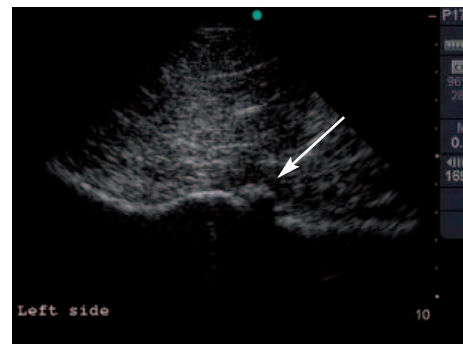


Fig. 3: A longitudinal view of the ilial wing showing a step defect and callus formation over the left wing of the ilium (arrow). The tuber sacrale is to the left of the picture, the tuber coxae is to the right.

CASE THREE: AN ACUTE FORELIMB LAMENESS

A three-year old flat racehorse 'O'Gara' was noted to be moderately lame left fore when walked out for morning exercise. An examination of the horse was carried out by a veterinarian the following day and found the horse to be 2/5 lame left fore at the trot on a hard surface. On palpation, the horse was noted to have mild effusion of the left fore fetlock and a positive response to flexion of this joint. Radiographic examination of the fetlock was carried out later that day and this revealed no significant abnormalities.

After one week of box rest, the horse resumed walking and trotting exercise, shortly after which it became severely lame. On admission to Donnington Grove Veterinary Surgery, the horse was 3/5 lame on the left fore limb at a walk. A clinical examination detected only mild effusion in the left fore fetlock. Nerve blocks were not deemed to be appropriate due to the risk of a catastrophic fracture. A further radiographic examination was carried out on the affected left fore distal limb, however no definitive diagnosis could be made (Fig. 4).



Fig. 4: A standard dorsopalmar radiograph of the affected fetlock prior to scintigraphic examination.

The following day a scintigraphic examination was performed revealing a moderate increase in uptake over the left fore fetlock – specifically over the distal aspect of the MC III (Figs. 5a and b).

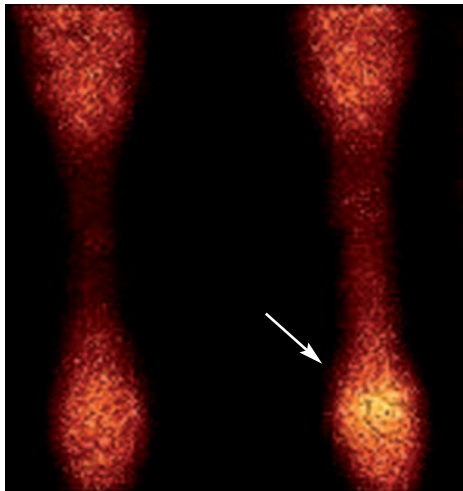


Fig. 5a: Dorsal view of the front cannons and fetlocks. IRU indicated by the arrow over the left fetlock region.

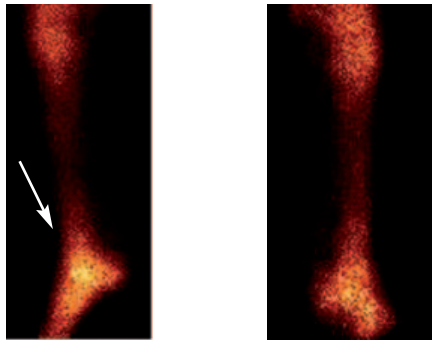


Fig. 5b: IRU in the left fore distal Mc III on a lateral view as denoted by the arrow. The right fetlock is also pictured for comparison.

A further radiographic examination was carried out 48 hours later. No significant radiographic abnormality was noted on a flexed dorsoproximal-dorsodistal skyline projection of the fetlock. However, a flexed dorso35°disto-palmarproximal oblique (D35Di-PaPrO) (Fig. 6) revealed a lucent line lateral to the sagittal ridge, suggestive of a fissure fracture.

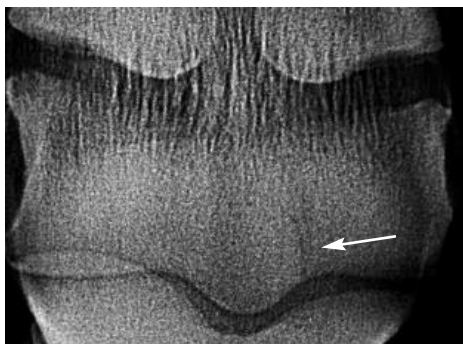


Fig. 6: Dorso35°disto-palmarproximal flexed oblique (D35Di-PaPrO) radiograph revealing a lucent line lateral to the sagittal ridge.

An MRI scan was carried out of the left fore fetlock on the standing sedated horse using a 0.27 Tesla permanent magnet. T1 Gradient Echo, T2 Fast Spin Echo, T2* Gradient Echo and STIR Fast Spin Echo and Gradient Echo sequences were compiled in the transverse, frontal and coronal planes of the left fore fetlock. There was a relatively marked increase in signal focused on the lateral aspect of the sagittal ridge of the left fore metacarpus, suggestive of a condylar fracture (Fig. 7a). Frontal sequences revealed moderate hypo-intense signal in both the lateral and medial palmar condyles typical of sclerosis, but this was not considered excessive for a racehorse. A diagnosis of a left fore, lateral condylar stress fracture was made and the trainer was advised to box rest the horse strictly for six to eight weeks followed by a reassessment. Repeat MRI scans carried out two months later revealed the stress fracture to be healed (Fig. 7b). The horse returned to training uneventfully over the following weeks.



Fig. 7a: A T1 GRE frontal MRI image of the left fore fetlock at the time of presentation. The arrow indicates a focal area of hyper-intense signal on the lateral aspect of the sagittal ridge, with less change in the surrounding subchondral bone than would be expected.



Fig. 7b: A similar T1 GRE frontal MRI image 10 weeks post injury – the stress fracture appears to have resolved.

This case is an example of where a definitive diagnosis, treatment protocol and prognosis could only be made after a combination of diagnostic imaging modalities. This also outlines the benefits of investigating all the findings of a scintigraphic examination.

SUMMARY

Nuclear scintigraphy forms an important tool in the investigation of lameness in both sports and racehorses. Stress fractures of the TB are likely to show immediately after recognition of lameness because of the increased osteoclastic and osteoblastic activity associated with bone modelling, whereas an acute traumatic fracture may be less obvious as it will take days before the gradually increasing bone activity is bound by technetium. On the other hand, detecting a subtle IRU in the sacroiliac joint of a dressage horse may be enough to direct the appropriate treatment towards it, assuming that it is clinically significant. This short article series is by no means a comprehensive outline of nuclear scintigraphy, but hopefully will give the reader some indication as to when it will be most useful to them during their next lameness investigation.