COMPARISON BETWEEN RADIOGRAPHY AND ULTRASONOGRAPHY FOR THE DETECTION OF BONE FRAGMENTS IN THE EQUINE TARSAL AND FETLOCK JOINTS

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Introduction

Bone fragments are frequently present in the equine fetlock and tarsal joints.\textsuperscript{1} These fragments can be developmental or traumatic in origin.\textsuperscript{1}

In the fetlock joint, fragments are commonly located at the dorsal (proximal sagittal ridge of the third metacarpal/metatarsal bone, proximal aspect of the proximal phalanx, synovial plica) or palmar/plantar (proximal aspect of the proximal phalanx, proximal sesamoid bones) aspect of the joint. In the tarsal joint, fragments can derive from the intermediate ridge of the distal tibia, the lateral and medial trochlear ridge of the talus and, the medial and lateral malleolus.

Radiography is still the most commonly used imaging modality for detection and localisation of fragments in both joints. However, the radiographic findings do not always fit with the arthroscopic results. It has been described that ultrasonography (US) can also be used for the determination of the exact location, the size and the anatomical relationships of fragments.\textsuperscript{2,3}

The aim of the present study was to compare radiography and US for the detection, quantification and localisation of bone fragments in the equine fetlock and tarsal joints.

Methods

The database of the Ghent University, Faculty of Veterinary Medicine, Department of Medical Imaging was reviewed for horses with bone fragments in the fetlock or tarsal joint that underwent a complete radiographic (4 standard projections) and US (systematic protocol) examination. Patient, clinical, radiographic, US and surgical data were retrieved. US was performed using convex (4-6MHz) and linear (7-9MHz) transducers (Logiq 200, GE Medical Systems) and the US number and location of fragments was recorded. These findings were compared with the radiographic findings and, with the arthroscopic findings, when available.

Results

Fifty-three horses were recorded in the study: 37 horses with fragmentation in the fetlock joint (46 joints) and 16 horses in the tarsal joint (16 joints). Mean age was 4.9 years (5 months to 20 years) and there were 13 geldings, 21 stallions and 19 mares. US was performed on the standing (n=27) or anaesthetized (n=26) horse. The most common clinical findings were joint effusion and lameness for both joints. Arthroscopic data were available in 40 horses (33 horses with fetlock joint fragments and 7 with tarsal fragments).

In the 46 fetlock joints, fragments were located at the dorsoproximal border of the proximal phalanx (n=18), the proximal sagittal ridge/synovial plica (n=18), palmar/plantar proximal border of the proximal phalanx (n=4), proximal sesamoid bones (n=4), medial condyle (n=1) and at the level of the collateral ligament (n=3). In 2 fetlock joints, fragments were present at 2 different locations.

In 21 MCP joints, the localisation and number of fragments was similar as determined with radiography and US. This was confirmed by arthroscopy in 18 of them. In 24 joints, 23 underwent arthroscopy, US was superior to radiography. In 20 of them, US allowed determining the location (lateral/medial; intra-articular/extra-articular) of the fragments contrary to radiography (n=14), US showed more fragments than radiography (n=3), or both (n=3). In the remaining 4 joints, the radiographic suspicion of fragmentation on the dorso-proximal aspect of the sagittal ridge was not confirmed with US and arthroscopy. In 1 joint, US revealed fewer fragments (3) compared to the radiography (4) and this did not correspond to the arthroscopic findings (5 fragments).

The tarsal fragments derived from the intermediate ridge of the distal tibia (n=8), lateral trochlear ridge of the talus (n=1), medial malleolus (n=5), lateral malleolus (n=1) and
calcaneus (n=2). In 1 joint, fragments were present both at the intermediate ridge of the tibia and the calcaneus.

In 8 joints (1 with arthroscopic confirmation) the localisation and number of fragments was similar on radiography and US. In 6 joints (3 with arthroscopic confirmation) US was considered superior to radiography as more fragments were seen with US compared to radiography (n=3) or because US showed the extra-articular location of a fragment (n=3). In 2 joints, radiography was considered superior to US because fewer fragments were seen with US than with radiography and arthroscopy.

**Conclusion**

US is a practical and reliable imaging modality that is superior to radiography for demonstration of the presence, quantification and exact location of fetlock joint fragments. For tarsal bone fragments, US is, at least, equivalent to radiography and even superior because of its ability to precisely localize some fragments (intra- versus extra-articular).

**References**