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CASE REPORT

Osteochondroma on the cranial aspect of the distal radial metaphysis causing tenosynovitis of the extensor carpi radialis tendon sheath in a horse

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Case report A 3-year-old Thoroughbred gelding was presented with a grade 3/5 lameness of the right forelimb and effusion of the extensor carpi radialis tendon sheath (ECRTS). Radiographic and ultrasonographic examinations revealed an osteochondroma on the cranial aspect of the distal radius projecting into the fibrous lining of the ECRTS. An open surgical approach was used to remove the osteochondroma and some of the proliferative synovial tissue.

Conclusion Six months after surgery the clinical signs had resolved and the horse raced successfully.

Keywords extensor carpi radialis tendon sheath; horses; osteochondroma; tenosynovitis

Abbreviation ECRTS, extensor carpi radialis tendon sheath

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An osteochondroma is a benign, variably sized, solitary bony exostosis covered by a cartilaginous cap.[1] It is among the most common benign osseous lesions of humans[1,2] and also occurs commonly in dogs.[3] Osteochondroma was long considered to be aberrant physeal tissue growing perpendicular to its physeal origin,[2] but recent studies have shown that it has a clonal origin and is now considered to be a true neoplasm.[4]

Solitary osteochondromas have been reported in a number of sites in the horse, with the most common being the caudal aspect of the distal radial metaphysis.[5] Other sites reported include the caudodistal aspect of the tibia[6] and the nasal bone.[7,8]

To our knowledge this is the first report of an osteochondroma on the cranial aspect of the distal radial metaphysis in a horse, causing tenosynovitis of the extensor carpi radialis tendon sheath (ECRTS).

Case report

A 3-year-old Thoroughbred gelding was presented to Fethard Equine Hospital to investigate chronic lameness in the right forelimb. The horse had been lame for 5 months and a fluid effusion had also been present in the ECRTS for the same time period. Previous medical management, consisting of bandaging, hydrotherapy and intrathecal administration of a corticosteroid, did not resolve the lameness or reduce the effusion in the ECRTS.

The horse was grade 3/5 lame (AAEP scoring system)[9] on the right forelimb when trotted in a straight line and the lameness was exacerbated by flexion of the right carpus. The range of motion of the right carpus was reduced to 10% of normal.

A firm mass could be palpated on the cranial aspect of the distal radius. Radiographic examination of the right carpal region revealed a well-defined, broad-based, mushroom-shaped, mineralized mass on the craniodistal aspect of the distal radial metaphysis, approximately 5 cm proximal to the distal radial physeal scar. The mass projected 3 cm cranially (Figure 1). No abnormalities were observed on radiographic examination of the left carpal region.

An ultrasound examination of the distal aspect of the right antebrachium revealed that the mass was projecting into the fibrous lining of the ECRTS, but did not appear to penetrate into the lumen of the ECRTS. The ECRTS contained a large amount of anechoic fluid and thickened synovial tissue. A sample of the synovial fluid was taken and sent for cytological evaluation, which revealed that the synovial fluid had a total nucleated cell count of 320 × 10^6/L and a total protein of 2 g/dL, suggesting that the effusion was inflammatory in nature.

A 10-mL instillation of Mepivacaine hydrochloride local anesthetic solution (Intra-Epicaine®, 2.0% w/v Solution for Injection, Dechra Limited, Stoke on Trent, UK) into the tendon sheath improved the lameness to a grade 1/5 on the AAEP scoring system. Radiographs of the craniodistal aspect of the right antebrachium were taken after instilling 6 mL of radio-opaque contrast material (Iohexol, 350 mg I/mL; Omnipaque®, GE Healthcare Ireland Co., Cork, Ireland) in 20 mL of isotonic saline solution into the ECRTS. The contrast radiographs confirmed that the ECRTS did not communicate with other synovial structures and that the mass did not penetrate the lumen of the ECRTS.

Based on the history, clinical signs and the characteristic shape and position of the osseous projection, a tentative diagnosis of osteochondroma was made. In order to treat the lameness and the effusion of the ECRTS, surgical removal of the mass and excision of effected synovial tissue was undertaken.

Surgical treatment

Beginning on the day prior to surgery the horse was given procaine penicillin 20,000 IU/kg IM (Depocillin®, Intervet Ireland Ltd,

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Figure 1. **A 30-degree dorsolateral palmeromedial oblique view of the right carpus showing the osteochondroma (arrow) approximately 5 cm proximal to the physeal remnant on the cranial aspect of the distal radius.**

Dublin, Ireland) twice daily, gentamicin sulfate 6.6 mg/kg IV (Gentagect 10%, Franklin Pharmaceuticals, Co., Meath, Ireland) once daily, 4.4 mg/kg phenylbutazone IV (Phenylarthrite, Vetoquinol Ireland Ltd, Dublin, Ireland) once daily and a single dose of tetanus antitoxin 1500 IU IM (Intervet Ireland Ltd).

Prior to induction of general anesthesia, the horse was sedated with 1.1 mg/kg xylazine IV (Chanazine 10%, Chanelle Pharmaceuticals Manufacturing Ltd, Co., Galway, Ireland) and 0.2 mg/kg butorphanol IV (Torbugesic, Pfizer animal Health, Co., Cork, Ireland). Anaesthesia was induced with 2.2 mg/kg ketamine hydrochloride IV (Narketan 10, Vetoquinol, Buckingham, UK) and 0.05 mg/kg diazepam IV (Diazemuls®, Actavis group PTC, Hafnarfjordur, Iceland) and maintained with isoflurane (Isovet®, The Chanelle Group, Galway, Ireland) delivered in oxygen via a circle system. The horse was positioned in dorsal recumbency on the operating table with the right forelimb secured to a crossbar, with both the carpal and the cubital joints flexed to approximately 20 degrees.

After preparing the limb for surgery, skin staples were placed as radiographic markers on the cranial aspect of the distal antebrachium at the level of the mass and distally at 5-cm intervals to the level of the carpometacarpal joint. The distal antebrachium was then radiographed to determine the position of the mass relative to the markers.

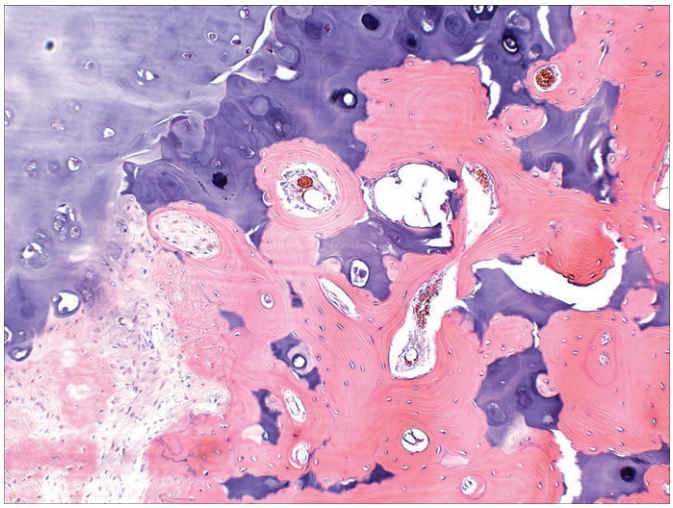

Figure 2. **Photomicrograph (×100) of a sample taken from the excised mass shows a pattern of endochondral ossification with hypercellular cartilage and a basophilic matrix. The section is stained with haematoxylin and eosin, showing bone in pink and cartilage in purple. The bone marrow is filled with adipose tissue and fibrosis, which is typical of osteochondroma.**

A longitudinal incision was made through the skin and subcutis directly over the ECRTS, beginning 5 cm proximal to the mass (as determined by the position of the staples) and extending distally for 15 cm to the level of the antebrachiocarpal joint. A combination of blunt and sharp dissection was used to divide the thickened subcutis and identify the fibrous tendon sheath. The osseous mass was identified on the medial aspect, projecting into the fibrous wall of the ECRTS. The mass had caused a fibrous inflammatory reaction in the wall of the sheath, but had not entered the lumen of the ECRTS. The mass was excised from the radius using an osteotome and hammer. The ECRTS was then entered cranially with a 15-cm sharp longitudinal incision. The hyperplastic synovial membrane of the proximal portion of the ECRTS was surgically excised. A sharp incision allowed a dissection plane to be established and the hyperplastic synovial membrane was stripped intact from the underlying fibrous layer. The synovial membrane was removed to the level of the distal radius. The portion of the synovial membrane extending over the carpus was preserved.

Adhesions were transected and visibly frayed tendon fibres were debrided. The fibrous layer of the tendon sheath was apposed using 3-metric polydioxanone (PDSII, Ethicon™, Livingston, UK) placed in a simple interrupted pattern. A simple continuous pattern using PDSII was used to close the subcutis and the skin was closed with 4-metric nylon (Monosof™, Covidian UK™, London, UK) using a near- and-far suture pattern. A Robert-Jones bandage that extended from the foot to the elbow was applied to the limb, prior to recovery from anaesthesia.

Treatment with antimicrobials and phenylbutazone was continued for 3 days after surgery. The horse was confined to a stall and cross-tied for 7 days to minimize flexion of the carpus. The bandage was changed every 4 days for 2 weeks, at which time the skin sutures were removed and the limb was left unbandaged.

Histological examination of the excised tissue confirmed the excised mass was an osteochondroma (Figure 2).

At 2 months after surgery, the horse was sound at a trot and the carpus could be flexed to approximately 80% of its normal range. The horse only resented flexion of the carpus past this point. At 6 months after surgery, the owner reported that the horse had not experienced recurrence of clinical signs caused by the osteochondroma and that the horse was in race training. The horse then raced successfully.

Discussion

This case report highlights that an osteochondroma can develop on the cranial aspect of the distal radius of the horse and should be considered as a differential diagnosis when investigating cases of tenosynovitis in the ECRTS.

A hard, palpable mass on the cranial aspect of the distal radius prompted a radiographic examination of the carpus and distal radius in this case. The radiographs revealed the mass to be an osseous growth with the typical radiographic appearance of an osteochondroma; that is, a solitary exostosis growing perpendicular to the bone of origin.[2] It has a broad base, a thin stalk and a mushroom-shaped cap.[1]

Another related condition, multiple hereditary exostosis, has a gross appearance similar to that of an osteochondroma but can be differentiated histologically from an osteochondroma by its lack of a cartilaginous cap.[3,10]

The lameness in this case improved significantly after intrathecal injection with local anaesthetic, which led us to conclude that the lameness was most likely the result of chronic tenosynovitis caused by irritation from the osteochondroma.

We decided that, in order to resolve the tenosynovitis in the ECRTS, it was necessary to surgically remove the mass regardless of its aetiopathogenesis.

Ultrasound examination and contrast radiography of the area revealed that the mass had not entered the lumen of the ECRTS and so an open surgical technique was used to both excise the mass from the distal radius and remove the hyperplastic synovial membrane from the ECRTS.

In 1997, Platt and Wright demonstrated that chronic tenosynovitis in carpal extensor tendon sheaths can be treated by radical removal of the hyperplastic synovial membrane from the underlying fibrous layer.[10] Removal of the hyperplastic membrane leads to formation of granulation tissue surrounding the tendon, which under the influence of stress and mesenchymal tissue transformation, forms a synovial structure.[11]

Osteochondromas can cause inflammation and distension of the carpal canal when they occur on the caudodistal aspect of the radius, the most common site in the horse.[11] An osteochondroma on the caudal aspect of the antebrachium is best removed tenoscopically through the carpal canal.[5,13–15] As diagnostic imaging confirmed that the mass did not penetrate the lumen of the ECRTS, an open approach was considered to be more appropriate in this case.

Previous studies report that horses with chronic inflammation of the ECRTS have a poor prognosis for return to athletic function following tenoscopic surgery.[10,16] In this case, excision of the proximal portion of the synovium of the ECRTS was included as part of the treatment because of the chronicity of the tenosynovitis.

Synovial resection was not performed on the distal portion of the ECRTS as it courses over the carpus, because that technique has resulted in severely restricted carpal flexion in one of the authors' experience (GMK).

Osteochondroma on the craniodistal aspect of the radius should be considered when investigating horses affected by inflammation of the ECRTS.

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