Ultrasonographic evaluation and surgical treatment of humeral osteitis and bicipital tenosynovitis in a horse

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A 7-year-old Missouri Fox Trotter mare was admitted to the veterinary teaching hospital for evaluation of lameness of 7 weeks' duration. The horse had been treated for a puncture wound in the right shoulder and was given antibiotics. The lameness increased when antibiotics were discontinued. Radiography of the shoulder had not revealed any visible lesions.

On physical examination, the horse would bear minimal weight on its right forelimb (grade IV/V lameness), and signs of pain were ellicited when the limb was manipulated. Muscular atrophy was apparent over the right shoulder and a 4-cm scar was evident dorsocaudal to the greater tubercle of the right humerus.

Examination of fluid from the scapulohumeral joint revealed a nonseptic inflammatory response, with a specific gravity of 1.026, 3.9 g of protein/dl, 400 nucleated cells/μl (65% neutrophils), and a good mucin clot. Bacteriologic culture of the joint fluid yielded no organisms.

During general anesthesia, radiography of the right shoulder revealed reorganization of trabecular bone and osteopenia of the dorsal cortex of the greater tubercle. The trabecular bone distal to the tubercles had a punched out appearance caused by demineralization. To better evaluate the intertubercular grooves for fractures or bone changes that might impinge on the biceps tendon, a craniproximal-craniodistal radiographic view was obtained. Osseous densities were seen in the periarticular areas with this radiograph.

Ultrasonography of the biceps tendons and bicipital bursa revealed multiple small hypoechoic areas associated with disruption of normal tendon architecture in the lateral portion of the right bicipital tendon (Fig 1). The tendon was large and there was a small amount of fluid in the region of the bicipital bursa (Fig. 2). The diagnosis was osteitis of the proximal portion of the right humerus and bicipital tenosynovitis.

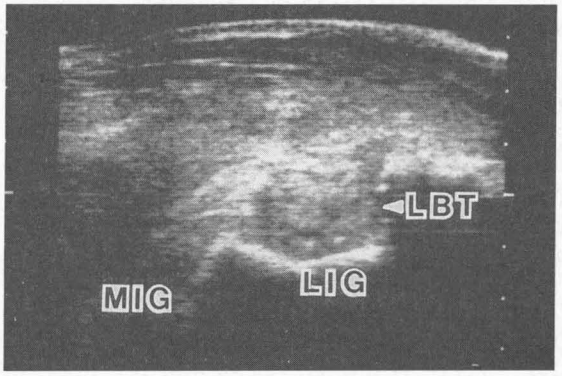

Figure 1—Ultrasonogram (transverse scan) of the right bicipital tendon. Notice multiple small hypoechoic areas in the lateral portion of the tendon. MIG = medial intertubercular groove; LIG = lateral intertubercular groove; LBT = lateral portion of the biceps tendon.

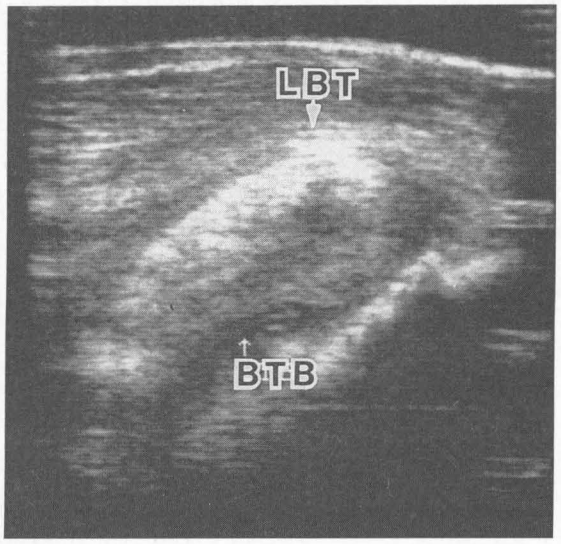

Figure 2—Ultrasonogram (transverse scan) of the right bicipital tendon. Notice fluid in the bicipital bursa. LBT = lateral portion of the biceps tendon; BTB = biceps tendon bursa.

The decision was made to surgically explore the right shoulder. The horse was anesthetized and positioned in left lateral recumbency. A 15-cm

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curvilinear skin incision was made over the cranial prominence of the greater tubercle. The brachiocephalic muscle was incised to expose the biceps brachii muscle and its tendon. The lateral portion of the tendon was disrupted, with vertical and horizontal tears. The damaged portion, 25 × 35 mm, was removed and submitted for histologic evaluation. The surface of the intertubercular groove was roughened and the underlying bone was soft. The affected bone of the intertubercular groove and the proximal aspect of the cranial prominence was removed by curettage. The area was then rasped to make a smooth surface for the biceps tendon. Bone wax was applied to this surface to reduce hemorrhage and thereby reduce the amount of constricting adhesions. After flushing the surgical area, a 3-layer closure of the tissues was performed, using No. 2 polydiaxone. The horse was treated throughout the perioperative period with procaine penicillin G and flunixin meglumine.

Histologic examination of the bone and tendon samples revealed bony resorption with fibrosis and small areas of osteomyelitis and granulation tissue. Infectious organisms were not observed. The samples of tendon were composed of dense tissue with margins of frayed fibers that contained linear collections of neutrophils and macrophages. Substantial necrosis was not associated with the samples.

After surgery, the horse received phenylbutazone (3g, PO, q 24 h) while in the hospital. The lameness improved daily and the horse was discharged on the eighth postoperative day. Five weeks later, the owner reported that the horse was doing better and appearing more comfortable, but still had a gait deficit. Nine weeks after surgery, the owner reported that the horse was running and had no apparent gait deficit. At 9 months, the horse was in full use.

Ultrasonography has been used extensively in evaluating causes of shoulder pain in human beings. It can be used to detect biceps tendon lesions including tendinitis, partial or complete rupture, displacement, and tendon sheath effusion, and to evaluate the biceps groove.[1,2] Sonography has been preferred over arthrography as an imaging method for evaluating biceps tendon lesions in human patients.[3] The ability to evaluate the bony configuration of the biceps tendon groove with sonography (83% of adequate examinations) was not different than with arthrography (86% of adequate examinations), but sonography gave a superior image of the tendon within the groove.[3] Ultrasonography also is noninvasive and less costly.

Ultrasonography of the equine biceps tendon has not been extensively evaluated.[4,5] We were able to evaluate the changes in the biceps tendon by using the contralateral shoulder as a control.

1. Ahovuo J, Paavolainen P, Bjorkenheim JM. Ultrasonography in lesions of the rotator cuff and biceps tendon. *Acta Radiologica* 1989;30(3):253–255.

2. Lind T, Reimann I, Larsen JK, et al. Sonography in soft-tissue trauma of the shoulder. *Acta Orthop Scand* 1989; 60(1):49–53.

3. Middleton WD, Reinus WR, Totty WG, et al. US of the biceps tendon apparatus. *Radiology* 1985;157:211–215.

4. Hauser ML. Ultrasonographic appearance and correlative anatomy of the soft tissues of the distal extremities in the horse. *Vet Clin North Am [Equine Pract]* 1986;2(1):127–144.

5. Genovese RL, Rantanen NW, Hauser ML, et al. Diagnostic ultrasonography of equine limbs. *Vet Clin North Am Equine Pract* 1986;2:145–226.