Equine Meniscal Injuries: A Retrospective Study of 14 Horses

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Ultrasound provides a reliable, non-invasive diagnostic modality for the diagnosis of equine meniscal injuries. Meniscal injuries should be suspected in horses with severe hind limb lameness and prominent stifle effusion. Uniaxial degenerative changes seen radiographically should also be considered suspicious for meniscal injury. Authors’ addresses: Veterinary Medical Teaching Hospital (Flynn) and Department of Surgical and Radiological Sciences (Whitcomb), School of Veterinary Medicine, University of California, Davis, CA 95616. © 2002 AAEP. *Presenter

1. Introduction

Equine stifle injuries can be categorized as soft tissue or bony abnormalities. Lesions involving the soft tissues of the stifle joint have been diagnosed, but their incidence is unclear because of the difficulty in obtaining a definitive diagnosis with traditional methods. Radiography is the most commonly used technique for investigating disorders affecting the stifle; however, it is limited to bony abnormalities. Diagnostic arthroscopy has been used to diagnose cranial meniscal tears. However, arthroscopy requires specialized equipment and training, subjects the horse to the risks of general anesthesia, and provides access limited to the cranial structures of the stifle joint. Magnetic resonance imaging (MRI) has become available for use in the live horse; however, imaging of the stifle joint in vivo cannot yet be performed.

Ultrasound, in comparison, is a readily available technique that is routinely used to assess soft tissue structures and bony surfaces of equine limbs. Techniques for the ultrasonographic evaluation of the equine stifle joint have been described, as well as the normal ultrasonographic appearance of stifle soft tissue structures. The ultrasonographic appearance of meniscal injuries has been described in various texts and clinical reports. This report is the first retrospective study of equine meniscal injuries to include clinical, radiographic, and ultrasonographic findings.

2. Materials and Methods

Records were reviewed of all horses presenting to the Large Animal Ultrasound Service at the University of California, Davis, Veterinary Medical Teaching Hospital (UCD-VMTH) for ultrasonographic evaluation of the stifle joint between July 1999 and February 2002. All horses underwent a complete lameness evaluation. Stifle radiographs were taken of all horses. Lameness was localized to the stifle joint based on clinical and/or radiographic findings.

Ultrasound examinations were performed with either the Ausonics Impacta or GE Vingmed System 5b ultrasound machines. The machines were equipped with either a 7.5- or 10-MHz linear transducer and a 5.0- or 6.0-MHz curvilinear transducer. The cranial, lateral, and medial aspects of the stifle
joint were clipped with a No. 50 blade. The skin was washed with soap and water, and ultrasound coupling gel was applied. Horses were lightly sedated with detomidine HCl (0.004–0.008 mg/kg, IV). The scanning technique used was similar to that described in previous reports. The 7.5- or 10-MHz linear transducer was used to evaluate the middle, medial, and lateral patellar ligaments, medial and lateral collateral ligaments, and medial and lateral menisci, as well as the femoropatellar and medial and lateral femorotibial joint capsules. The 6.0-MHz curvilinear transducer was used to evaluate the cranial aspect of the stifle, with the limb held in the flexed position. This allowed visualization of the cranial horn of the menisci, cranial meniscal ligaments, and cranial cruciate ligament.

3. Results
One hundred and nine stifles were evaluated ultrasonographically in 77 horses. Fifteen meniscal injuries were diagnosed in 14 horses. The medial meniscus was affected in eight horses, and the lateral meniscus was affected in five horses. Both menisci were affected in one horse.

The mean age of affected horses was 9.4 yr (range, 7 mo to 20 yr). Quarter Horses were over-represented compared with the UCD-VMTH hospital population. Lameness was evaluated according to the AAEP grading scale (1–5). The degree of lameness at presentation ranged from grade 3–5/5, with a mean lameness grade of 4/5. Duration of lameness before presentation was 4 days to 10 mo. Upper limb flexion tests were positive in six cases. Three horses resisted upper limb flexion. Flexion tests were not performed on five horses because of the severity of lameness. All cases demonstrated palpable effusion of the stifle joint.

Ultrasonographic parameters used to evaluate the meniscus included shape, echogenicity, and position. The normal ultrasonographic appearance of the medial and lateral meniscus is shown in Figures 1 and 2, respectively. All affected menisci demonstrated a flattened and/or irregular shape. Fourteen menisci demonstrated a mottled echogenicity; 12 of these had anechoic defects. One meniscus was diffusely hypoechoic. Abaxial bulging or prolapse was seen in 13 menisci. Figures 3–5 show abnormal ultrasonographic findings. Effusion and synovitis of the associated femorotibial joint was seen in 12 horses. Femorapatellar effusion and synovitis was seen in nine horses. Other ultrasonographic findings included seven cases of medial collateral ligament desmitis. Six were mild-to-moderate, and one was severe. Seven horses demonstrated patellar ligament injuries. Six were mild-to-moderate and appeared chronic in nature. One horse had ruptured patellar ligaments associated with a comminuted patellar fracture. Eleven cases demonstrated ultrasonographic evidence of periarticular osteophyte formation.

Stifle radiographs taken of all horses revealed secondary degenerative joint disease (DJD) in 11 of 14 horses. Ten of 11 horses demonstrated uniaxial DJD, which was associated with the side of meniscal injury. One horse with biaxial meniscal injury demonstrated biaxial degenerative changes. Degenerative joint disease was not present in three...
horses that had clinical signs of less than 2-wk duration.

4. Outcome
Necropsy was performed in three horses and confirmed meniscal injury. Two horses underwent diagnostic arthroscopy, and meniscal injury was confirmed. Four horses have been followed for 2–21 mo at the UCD-VMTH. One case was sound at 15 mo after diagnosis. Two horses have improved 1–2 lameness grades, and one horse worsened 1 lameness grade. Ultrasonographic re-evaluation of these horses revealed an unchanged appearance of the injured menisci.

Fig. 2. Normal ultrasonographic appearance of the lateral meniscus. This sagittal image was obtained between the peroneus tertius tendon and the lateral collateral ligament. The normal lateral meniscus also demonstrates a homogeneous echogenicity and a triangular shape.

Fig. 3. Abnormal medial meniscus. These sagittal images were obtained from a 6-yr-old Standardbred racehorse with grade 5/5 right hind lameness. The left image demonstrates a large central hypoechoic defect (arrow). The right image demonstrates a large central anechoic defect (arrowhead). Both images depict an irregular shape with bulging of the meniscus.
re-evaluation demonstrated stable-to-mild progression of degenerative joint disease. Of the remaining five cases, one case was recently diagnosed and has not returned for recheck. Two horses have been followed through telephone communication. One horse has remained lame and was retired to pasture, and one horse returned to use as a cutting horse. Two horses were lost to follow-up.
5. Discussion

The results of this study demonstrate the value of ultrasound in the diagnosis of meniscal injuries in horses. In those cases in which a definitive diagnostic procedure was performed, e.g., necropsy or arthroscopy, meniscal injury was confirmed in five of five cases. The incidence of meniscal injury in 14 of 109 stifles evaluated ultrasonographically is similar to previous work reported by Denoix et al.13 Our incidence is also similar to that reported by Walmsley based on arthroscopic diagnosis of meniscal injuries.15

Ultrasonographic evaluation of the stifle joint can be performed with basic ultrasound equipment available to the equine practitioner. Sagittal images of the medial meniscus are relatively easy to obtain with standard tendon or rectal linear transducers by placing the transducer between the medial patellar ligament and medial collateral ligament. Sagittal images of the lateral meniscus are obtained in a similar fashion; however, a curvilinear or sector transducer may provide greater access because of the increased overlying muscle mass of the lateral aspect of the stifle joint. The ultrasonographic parameters of shape, echogenicity, and position used in this study to characterize meniscal injury are similar to those used in previous work and are felt to be reliable indicators of meniscal injury.9–12

Ultrasonographic findings can be used to determine treatment plans and prognosis. In our study, only one horse has been able to return to his preinjury exercise level. Five of 14 horses have remained lame. The one horse determined to be sound at UCD-VMTH recheck 15-mo postinjury has not returned to his preinjury exercise level and has been retired to pasture. Three horses were euthanized because of severity of lameness at presentation (grade 5/5) and poor prognosis based on ultrasonographic and radiographic findings. Antemortem diagnosis of meniscal injury played an important role for prognostication in these cases and assisted their owners and treating clinicians in making an informed decision.

Our study revealed the consistent radiographic finding of uniaxial degenerative joint disease in 11 of 14 horses. The uniaxial degenerative changes were associated with the side of meniscal injury in all horses. The three horses without radiographic evidence of degenerative joint disease presented to the UCD-VMTH 4–14 days after injury. Sufficient time had not elapsed for degenerative changes to occur in these horses secondary to the instability created by the meniscal injury. Two of these horses were euthanized shortly after presentation, and therefore radiographic re-evaluation did not take place. The third horse developed mild degenerative joint disease on repeat radiographs taken 3 mo after diagnosis. Based on these findings, the presence of uniaxial degenerative joint disease of the stifle joint should be considered suspicious for meniscal injury. However, the absence of radiographic changes should not rule out meniscal injury in those horses presenting in the acute phase of injury.

Where stifle arthroscopy is available, ultrasound should be used in combination with, or as a screening process before, arthroscopy. In all cases in this study, the extent of injury would have been underestimated with arthroscopy alone. Ultrasound allows visualization of a greater percentage of the meniscus than arthroscopy. Only the cranial horn of the meniscus is visible arthroscopically. Ultrasound allows visualization of the cranial horn of the meniscus as well as the meniscal body to the level of collateral ligaments.

The use of ultrasound does have some limitations. It is possible that minor meniscal injuries may not be appreciated. In addition, injuries to the caudal portion of the meniscus may be underrepresented. Ultrasonographic imaging of the caudal aspect of the meniscus has been described.8 This technique is not used at the UCD-VMTH because of the difficulty in obtaining diagnostic images as a result of significant overlying muscle mass in the caudal stifle region.

In summary, meniscal injuries should be suspected in horses with severe, acute, or chronic onset hind limb lameness and prominent stifle effusion. Uniaxial degenerative changes seen radiographically should also be considered suspicious for meniscal injury. Ultrasonographic evaluation of the stifle joint should be performed in such cases to rule out meniscal or other soft tissue injury.

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References and Footnotes


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