How to Access the Digital Flexor Tendon Sheath Through a Palmar Axial Sesamoidean Approach

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A technique that permits reliable entry into the digital flexor tendon sheath, even in the absence of fluid distention, is described. The accuracy and efficacy of the palmar axial sesamoidean approach are compared with those of the more conventional palmaroproximal or plantaroproximal approach.

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1. Introduction

Access to the equine digital flexor tendon sheath is frequently necessary for medication of the sheath in conditions such as traumatic or septic tenosynovitis or in assessing whether lacerations communicate with the tendon sheath. Distention of the sheath is often not present in acute lacerations or draining wounds, which makes access challenging. This new technique allows reliable entry into the digital flexor tendon sheath, even when fluid distention of the sheath is absent. The purpose of this study was to define a new technique and assess the accuracy and effectiveness of the palmar–plantar axial sesamoidean approach, compared with a more conventional approach, in gaining needle access to the equine digital flexor tendon sheath.

2. Methods

Six cadavers with no observable musculoskeletal limb abnormalities were harvested within 6 h of death. Tenocenteses by the palmaroproximal–plantaroproximal (PP) and palmar–plantar axial sesamoidean (PAS) approaches were compared by using paired forelimbs and hindlimbs in a complete block design. The limbs were subsequently transected at the proximal metacarpus–metatarsus for radiographic evaluation and gross anatomic dissection.

Following the aseptic preparation of the limbs, tenocenteses was performed by the PP approach on the lateral aspect of the assigned limb, 1 cm proximal to the proximal border of the palmar–plantar annular ligament and 1 cm palmar–plantar to the lateral branch of the suspensory ligament. The needle was directed medially in a 45° proximolateral to distomedial angle in the dorsal plane. Forelimbs and hindlimbs were injected with the limbs intact and with the joints maintained at defined angles. Following initial placement of a 20 gauge, 2.5-cm needle, a 12-ml syringe containing 8 ml of radioopaque solution was attached. Criteria for probable entry into the tendon sheath included lack of resistance to injection combined with distention of the tendon sheath. The total time required and the number of times the needle was repositioned were...
recorded. Dorsopalmar-plantar and lateromedial radiographic projections were obtained.

The PAS approach was used in the contralateral limb of each cadaver specimen. The metacarpophalangeal joint was flexed to a standardized angle, and the needle was placed at the midbody of the lateral proximal sesamoid bone, 3 mm axial to the palpable palmar-plantar border of the lateral proximal sesamoid bone. The needle was inserted through the palmar-plantar annular ligament in the transverse plane and directed 45° medially from a dorsal direction, angled toward the central intersesamoidean region, to a depth of 1.5–2.0 cm.

This study design was repeated in six cadavers. Radiographs were interpreted by a blinded observer to confirm access to the tendon sheath and to evaluate the amount of contrast material deposited subcutaneously. Each limb was examined grossly for evidence of needle penetration or injury to surrounding soft-tissue structures.

Comparisons were made between the two approaches and between forelimbs and hindlimbs in the number of successful tendon sheath injections, the number of attempts to access the tendon sheath, the time required to complete the injection, and the number of limbs with a subcutaneous deposition of contrast material. The effect of approach on categorical variables was evaluated with a two-tailed Fisher's exact test within the forelimb and within the hindlimb, and on continuous variables with a repeated measures analysis of variance with limb (front and hind) and approach (PP and PAS) as fixed factors.

3. Results

Access to the tendon sheath was achieved in 12 of 12 limbs (100%) by using the PAS approach, and in 11 of 12 limbs (91.7%) by using the PP approach. The average time required for tenocentesis was 43.2 s for the PAS approach, and 82.8 s for the PP approach. Average and median values for the number of attempts to access the tendon sheath were 3.8 and 2, respectively, for the PAS approach and 9 and 4, respectively, for the PP approach. Gross evidence of injury to the superficial and deep digital flexor tendons or intersesamoidean ligament was not evident in any specimens. A radiographic evaluation revealed the subcutaneous deposition of contrast material in none of 12 limbs with the PAS approach, and in two of 12 with the PP approach.

4. Discussion

Tenocentesis of the digital flexor tendon sheath can be technically challenging because of synovial proliferation and hypervascularity in chronic digital flexor tenosynovitis, and because of a lack of tendon sheath distention in acute or draining lacerations. This study has demonstrated a reliable technique for access to the nondistended digital flexor tendon sheath. The average time and number of attempts required to gain entrance to the tendon sheath were lower for the PAS approach, and the lack of synovial villi at the site of tenocentesis may be beneficial in minimizing associated hemorrhage. No gross evidence of tendon or ligament damage was observed with either technique.

5. Conclusions

The authors have utilized the PAS approach in 15 clinical cases of septic tenosynovitis, acute lacerations involving the tendon sheath, and in chronic traumatic digital flexor tenosynovitis, without complications. The palmar-plantar axial sesamoidean approach offers an alternative, accessible site for tenocentesis of the equine digital flexor tendon sheath.