Fractures of the Palmar Aspects of the Carpal Bones—A Debilitating Problem

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Fractures of the palmar aspects of the carpal bones, particularly the radial carpal bone, are difficult to appreciate on radiographs, are not innocuous, and frequently lead to degenerative arthritis. Surgical removal improves the outcome if intervention is soon after injury. Authors’ address: Department of Clinical Sciences, College of Veterinary Medicine, Cornell University, Ithaca, NY 14853. © 2000 AAEP.

Introduction
Fractures of the carpal bones have been extensively documented in racehorses and occur predominantly on the dorsal aspect of the carpus.1 Chip fractures are removed routinely usingarthroscopic access, and the outcome for most is fair to good for future performance.2 Comminuted or crushed carpal bones with subsequent severe lameness and instability of the carpus have also been documented.3 There are few reports of fractures of the palmar surfaces of the carpal bones, and access to these regions is generally regarded to be limited.1 One single case of fragment removal from the palmar aspect of the intermediate carpal bone is reported.4 However, no studies have been published to evaluate the etiology, clinical and radiographic presentation, and outcome of treatment of palmar fractures of the carpal bones.

Materials and Methods
Medical records of 10 horses that presented for forelimb lameness and had radiographic evidence of a fracture in the palmar aspect of the carpus were reviewed to gain information about signalment, clinical and radiographic findings, surgical approach for treatment, and outcome. Follow-up information was gathered from owners and referring veterinarians, and in several cases by re-examination of the horse at the referral institution.

Results
The age range of affected horses was 2–19 yr, with five male castrates, two females, two males, and one horse where sex was not recorded. Breeds included two Arabian horses, fourThoroughbreds, one Quarter Horse, one Warmblood, one mixed breed, and one horse of unknown breed. Six horses had undergone general anesthesia for surgery one day to 2.5 months prior to radiographic fracture diagnosis. However, lameness was usually noticed earlier (same day and up to 9 days post-operatively). One horse was found lame after turnout in the pasture, one horse had become lame after a fall during a race. Time until radiographic evaluation ranged from the day of injury to six weeks, while surgical treatment occurred within days of the diagnosis. Common clinical findings were swelling of the carpus, mild to moderate degrees of lameness, antebrachio-carpal joint effusion, and marked pain on flexion of the carpus. Radiography revealed osteochondral chip fractures of varying sizes on the palmar aspect of the radial carpal bone. In 4 cases concurrent fracture of the caudodistal radius, the ulnar carpal bone, or the intermediate carpal bone were recognized. The dorsomedial-palmarolateral oblique or latero-medial views demonstrated the fracture of the radial carpal bone best in most cases, although in some cases fragments were difficult to demonstrate.

Five horses were treated medically with rest, or rest in a cast and splinting. Of these horses, two were euthanized due to persistent lameness, two horses were sound enough to be used for breeding, and one animal was lame and retired to pasture. Surgical treatment (five cases) consisted of arthroscopic removal of intraarticular osteochondral fragments via a palmaro-medial approach (3 cases) or by palmaro-medial arthrotomy (2 cases). Horses were positioned in dorsal recumbency for both surgical approaches. A 3-cm arthrotomy was made over the palmaromedial joint pouch to allow dissection of the fracture fragments. Visualization of the entire palmar surface of the radial carpal bone was not possible. Arthroscopic techniques included initial examination and debridement of the antebrachio-carpal joint using a dorsolateral arthroscopic entry...
portal and dorsomedial instrument entry. A palmaromedial arthroscope entry was then established to allow examination of the palmar surfaces of the radial carpal bone and radius. Instrument triangulation was established through a second palmaromedial portal 2 cm medial to the arthroscope entrance. Fragments were removed with rongeurs and the cartilage and synovial tissue debrided with motorized shavers. Of the horses treated surgically one returned to function and is used as a riding horse, two horses were euthanized due to severe osteoarthritis, one horse was euthanized due to an unrelated fracture of a hind leg, and in one horse no follow-up is available.

**Discussion**

Results of this study suggest that recovery from general anesthesia is a major predisposing event, rather than age, sex, breed, or use of the horse. Therefore lameness after recovery, with associated

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**Fig. 1.** Radiographs showing fragment on palmar surface of the radial carpal bone (arrow) evident on lateral projection (A) and the dorsomedial-palmarolateral oblique (B) of another case.

**Fig. 2.** Surgical anatomy showing medial collateral ligament of the carpus (A), and the use of an arthroscope obturator to select site for skin incision. Adapted from Adams’ lameness in horses, Stashak, TS ed. Philadelphia: Lea and Febiger, 1987; 24.
carpal swelling, warrants timely radiographic assessment. Fractures of the palmar aspect of the carpus are uncommon but appear to be associated with acute trauma, predominantly during recovery from general anesthesia. Early recognition of clinical signs, thorough radiographic evaluation, and timely surgical treatment are important to reduce the likelihood of secondary osteoarthritis. The prognosis is poor to guarded both for medical and surgical treatment. Surgical removal of intraarticular osteochondral fragments via a palmar arthroscopic approach is the treatment of choice, although in some cases an arthrotomy may still be necessary. Too few horses have been treated surgically shortly after the injury to determine the real value of fragment removal, despite the intuitive value of arthroscopic debridement.

References