Retrospective Study of 25 Complete, Noncondylar, Third Metacarpal or Metatarsal Bone Fractures in Horses (1980–1996)

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Proper case selection, rigid stabilization, and efforts to prevent or treat infection will improve the success rate of metacarpal and metatarsal bone fractures in the horse. Metacarpal and metatarsal fractures in horses need not be associated with a poor prognosis. Authors' addresses: Depts. of Veterinary Clinical Sciences (McClure and Hawkins) and Veterinary Pathobiology (Glickman and Glickman), School of Veterinary Medicine, Purdue University, West Lafayette, IN 47906-1248 and Dept. of Large Animal Medicine and Surgery, Texas A&M University, College Station, TX 77843-4475 (Watkins). © 1998 AAEP.

1. Introduction

In data from 29 veterinary medical schools, a fractures of the third metacarpal and metatarsal bone (MC–MT) accounted for one third of all long bone fractures. These fractures are often high energy, comminuted fractures. Because there is minimal soft-tissue coverage and limited vascularity in the MC–MT, complications of MC–MT fracture repair are frequent.\(^1\) Even if the fractured limb can be repaired, contralateral limb problems, including laminitis and flexural and angular limb deformities, can develop.\(^2\) The purpose of this study was to review 25 repaired MC–MT fractures retrospectively and to evaluate the signalment and treatment in regard to outcome.

2. Materials and Methods

Medical records and radiographs of horses with complete MC–MT fractures were reviewed. Information obtained from each medical record included signalment and first aid, fracture type and configuration, treatment, complications, and success or failure to heal. Long-term follow-up was obtained for horses in which the fracture healed.

A database containing the information retrieved was established and the statistical analysis was performed by using the statistical analysis system (SAS).\(^b\) Categorical variables were compared by using the \(\chi^2\) test with Yates correction. Fisher's exact test was used to compare categorical variables when the expected count was \(< 5\) in one or more cells. The relationship of success or failure with the continuous variables was assessed by using the Wilcoxon rank sum test. A \(p\) value of \(\leq 0.05\) was considered to be statistically significant.

3. Results

The median age and weight were 5 months and 204 kg, respectively. Of the 25 horses, 11 (44%) were
females and 14 (56%) were intact males; 11 (44%) MC and 14 (56%) MT bones were involved. Seventeen (68%) horses had open fractures. Twenty (80%) fractures were diaphyseal, three (12%) were metaphyseal, one (4%) extended from the diaphysis to the metaphysis, and one (4%) was a Salter-Harris type II.

Internal fixation was used for 21 fractures, external coaptation was used for three, and one was treated with a transfixation cast. Sixteen of 21 (76%) fractures repaired with internal fixation and one of three (33%) fractures managed with external coaptation had complications. Incisional drainage was the most common complication (16/25; 64%). In 14/16 (88%) horses the drainage was caused by infection. Implant failure occurred in 7/21 (33%) of horses with internal fixation. One horse developed laminitis. Four foals developed flexural deformities, and two of these had angular deformities. Three horses developed diarrhea; one foal was euthanatized because of acute enterocolitis before it could be determined if healing would occur and was removed from further analysis.

Sixteen of 24 (67%) horses had complete fracture healing. The median time to radiographic union was 75 days. Eight of 24 (33%) horses were euthanatized a median of 64 days after surgery, all with incomplete healing. One foal sloughed a hoof wall 39 days after surgery and one horse had failure of the suspensory ligament 63 days after surgery.

Long-term follow-up was available for 16 horses; 11/16 (69%) of these had no complications. The time to athletic use of the animals was long (a median of 30 months) because many were young and not trained for use until 2–4 years of age. The three horses in use at the time of the fracture returned to work sooner (a median of 8 months).

For the 24 horses for which outcome was determined, age, sex, weight, and the bone affected were not associated with the outcome; however, treated horses were younger than the general hospital populations. Similarly, there was no association of outcome with fracture configuration, method of repair, and postoperative management. The relationship of infection to outcome approached statistical significance ($p = 0.079$). Open fractures were more likely than closed ones to become infected ($p = 0.009$). Infected fractures were more likely than noninfected fractures to have serosanguinous or purulent drainage ($p < 0.001$).

4. Discussion

The overall success rate of 67% was higher than expected and may be partially attributable to case selection. The horses in this study tended to be young and may have had a better prognosis than mature horses. Although there was no significant difference between age groups, the number of adult horses in the study was small.

5. Conclusions

In this study, the majority of MC–MT fractures were open at presentation. While this complicates fracture repair, many horses can be treated successfully. In this study, of the 12 fractures that were repaired with open reduction and internal fixation and that became infected, six healed successfully. Fractures can heal in the presence of infection as long as the fixation remains stable, but the majority of failures in this study were infected, nonunion fractures. To increase the success of MC–MT fracture repair, methods to increase the stability of the repair and to prevent and control infection have to be evaluated.

References and Footnotes


Veterinary medical database, Purdue University, West Lafayette, IN 47907.