Equine-related injury: a retrospective analysis of outcomes over a 10-year period

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Abstract
BACKGROUND: Morbidity and financial loss caused by equine-related injuries may be significant. The purposes of this study were to determine the patterns of equine-related injury and the impact on outcomes.

METHODS: A 10-year retrospective review of equine-related injuries was performed. Age, gender, mechanism, injury severity score, Glasgow Coma Score, length of stay, surgical interventions, and mortality were assessed.

RESULTS: Of 80 emergency department evaluations, 76 patients were admitted and form the basis of this study. The most frequent mechanism of injury was fall (68%), followed by crush injuries (15%), kicks (8%), and trampling (5%). Musculoskeletal injuries were most common (64%). Thirty-eight (50%) patients required surgical intervention. Thirty-seven (52%) patients were discharged home; 34% required outpatient physical therapy, and 14% required inpatient rehabilitation. The mortality rate was 7%.

CONCLUSIONS: Equine-related injuries resulted in significant morbidity; most victims required outpatient or inpatient rehabilitation. The use of preventive strategies may minimize mortality and reduce the financial impact of postinjury morbidity.

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those jockeys evaluated and treated by medical personnel at the track [4].

Ohio is home to 8 thoroughbred race tracks throughout the state and the greater Cincinnati area is home to 6 professional racing tracks within a 100-mile radius. Although these tracks predominantly reside within Kentucky, the University of Cincinnati is the primary level I trauma center for this catchment area. Moreover, enthusiasm for horse-related activities extends outside the professional arena of thoroughbred racing. Therefore, the purposes of this study were to determine the patterns of the equine-related injuries and their impact on patient outcomes.

Methods

The study design was reviewed and approved by the University of Cincinnati Institutional Review Board. Patients with equine-related injuries were identified by the University Hospital Regional Trauma Center Trauma Registry Data Base. A retrospective review of the medical records of these patients from July 1993 to July 2004 was performed. Demographic data collected and analyzed included age, gender, injury severity score (ISS), Glasgow Coma Score, hospital length of stay, surgical interventions, mortality, and the need for rehabilitation after discharge from the hospital. Data are expressed as mean ± standard error of the mean.

Results

During the 10-year study period, 80 adult patients with equine-related injuries were evaluated by the trauma service at the University of Cincinnati trauma center. Four patients (5%) were discharged home directly from the emergency department. The remaining 76 patients were admitted to the hospital and form the basis of this study. Their demographics are displayed in Table 1. There were an equal number of male and female patients, and the mean age at presentation was 42 ± 1 years (range, 15–81 y). The most common mechanism of injury was a fall from the horse, accounting for more than two thirds (68%) of all injuries sustained (Fig. 1).

Injury patterns were characterized by trauma to the head and face most frequently (38%) followed by thoracic injuries (26%), spinal column or cord injuries (22%), and pelvis and extremity injuries (21% each). When all injuries to the musculoskeletal system were combined, they accounted for 64% of all injuries sustained; far surpassing the frequency of head trauma (Fig. 2). Of the 76 patients admitted for management of their injuries, 38 patients (50%) required surgical intervention. Orthopedic procedures were performed most frequently (19%); however, other surgical services included neurosurgery (6%), general surgery (5%), and urology/vascular procedures (8%). There was no significant difference in ISS in patients requiring surgical intervention compared with patients who did not require surgery (15.5 ± 2 vs 12.3 ± 1; P = .14).

The mortality rate in the study group was 7% (5 patients); the mean ISS of 35 ± 8 in nonsurvivors reflects the severity of associated injuries. Four patients died from severe head trauma and 1 patient died from blunt abdominal trauma with injuries to the liver and spleen. Of the 71 surviving patients, 37 (52%) were discharged home without the need for further intervention; however, 24 (34%) patients required outpatient physical therapy. The remaining 10 (14%) patients were transferred to an inpatient rehabilitation center. Their injuries included closed head injury (3 patients), musculoskeletal trauma (3 patients), spinal cord injury (3 patients), and multisystem trauma (1 patient).

![Figure 1](image1.png) Mechanism of injury in victims of equine-related trauma. Falls were the most common mechanism of injury followed by being crushed, kicked, or trampled.

![Figure 2](image2.png) Distribution of injuries sustained in equine-related events. Injuries to the musculoskeletal system were most frequent. Other vulnerable body areas included the head/face and the thoracic region. Musculoskel = musculoskeletal; GU = genitourlogic.
The results from this 10-year retrospective review indicate that although mortality from equine-related injury is low, more than half of the injured patients required rehabilitation after discharge from the acute-care facility. Moreover, except for gender predilection, mortality and injury patterns were similar to nationally reported data over the same time period [5]. Importantly, the 3 body regions identified to be most at risk for injury after equine-related activities were the musculoskeletal system, the head/face, and the thoracic region.

Various reports over the past 20 years have detailed injury patterns associated with equestrian activities. Vulnerable body regions include the head, hand/wrist, foot/ankle, and spinal cord/column and preventive strategies have incorporated protective gear to minimize injury to these areas [6]. Interestingly, the use of riding helmets was associated with a 5-fold reduction in head injuries [7]. Other studies similarly have shown a reduction in the number and severity of head injuries in helmeted riders whereas the incidence and severity of injury to the unprotected upper extremities, particularly in female riders, has increased [8]. The injury patterns identified in the present study are consistent with past reports and taken together suggest that the use of protective gear targeting vulnerable body regions may minimize the severity and frequency of injury in equestrian events.

Mayberry et al [9] stratified 679 horse riders by skill level as defined by subjective total hours of experience. Their analysis showed that 1 in 5 riders would have sustained a serious injury, defined as an injury requiring hospitalization, surgery, or resulting in disability. When riders were stratified according to skill level, the risk of injury for novice riders (ie, riders with <100 hours of experience) was increased 3-, 5-, and 8-fold compared with intermediate, advanced, and professional riders, respectively. This study suggests that maximal risk reduction may be achieved through the use of preventive strategies by novice equestrians.

Limitations of the present study included the retrospective design and the small sample size. The retrospective design did not allow for stratification according to skill level or experience with horses, nor were we able to identify whether protective gear was used. Our characterization of injury patterns may promote further investigation into the use of preventive strategies specifically directed at body regions most frequently and/or seriously injured during equine-related activities.

Summary

Equine-related trauma is associated with high morbidity secondary to the prevalence of musculoskeletal fractures and closed head injuries. As a direct result of the injuries sustained, patients presenting with equine-related trauma are likely to require rehabilitation after discharge from the acute-care facility. Further investigation is necessary to identify high-risk individuals and implement preventative strategies that may minimize annual health care expenditures incurred from hospitalization and rehabilitation. Until additional research is available, the use of helmets and protective extremity padding should be considered by novice riders.

References