

Blunt Bovine and Equine Trauma

HENRY M. BUSCH, JR., M.D., THOMAS H. COGBILL, M.D., JEFFREY LANDERCASPER, M.D., AND BETTY O. LANDERCASPER, D.V.M.*

During the past 6 years 134 patients were admitted as the result of bovine (cow) and equine (horse) trauma. The mechanism of injury was fall from horse in 45 patients, animal assault in 42, animal kick in 39, and animal-drawn vehicle accident in eight. Injury Severity Score (ISS) ranged from 1 to 41 and was greater than or equal to 25 in 11 patients. One hundred seventeen operative procedures were performed by ten groups of surgical subspecialists. Mortality was nil. Ideal management of these injuries includes treatment in a regional trauma center and an educational program of preventive measures.

The invention of the gasoline engine virtually eliminated cows and horses as a means of power and transportation. However, in the rural United States, the cow (bovine) and horse (equine) remain vital to agriculture. Handling these large animals is not without risk and serious injuries may result. We found no reports addressing the topic of bovine and equine trauma. We therefore reviewed the incidence and magnitude of these injuries in a rural setting and examined principles of management and prevention.

MATERIALS AND METHODS

During the 6-year period ending December 1983, 134 patients were admitted to La Crosse (WI) Lutheran Hospital with injuries related to horses and cows. La Crosse Lutheran Hospital is a Level II trauma center affiliated with the Gundersen Clinic, a multispecialty clinic with 190 member physicians. The hospital is situated in rural western Wisconsin and serves as a referral center for parts of Wisconsin, Iowa, and Minnesota. Seriously injured patients are often stabilized at small community hospitals before transfer to La Crosse.

Hospital charts for the 134 patients were reviewed and Injury Severity Score (ISS) was calculated for each according to the method of Baker et al. (1, 2). Individuals ranged in age from 23 months to 72 years (average, 29.5). There were 87 males (65%) and 47 females.

ILLUSTRATIVE CASE REPORTS

Case 1. A 57-year-old male was pinned by a 2,000-pound dairy bull and repeatedly knocked to the ground forcefully at least seven times before he was able to crawl from the pen. He arrived in the Emergency Department with systolic blood pressure of 90 mm Hg and absent breath sounds on the left. Fluids were administered and a left thoracostomy tube placed. Admission hematocrit was 32%. Examination revealed the following injuries: bilateral flail chest, 13 rib fractures, bilateral hemothoraces, renal contusion, two forearm fractures, left

shoulder dislocation, bilateral scapula fractures, and dental alveolar fractures (ISS-41). The patient was treated by endotracheal intubation and mechanical ventilation for 15 days and bilateral tube thoracostomies. Open reduction/internal fixation of the wrist and dental fractures were performed. His hospital course was complicated by *Klebsiella pneumoniae* and at 16-month followup he remained severely dyspneic, unable to perform his usual farm work.

Case 2. A 14-year-old male was kicked by a horse, in the epigastrium and right lower chest. Chest radiograph revealed a right ninth rib fracture. Diagnostic peritoneal lavage was negative, but Gastrografin[®] swallow demonstrated a duodenal laceration (ISS-29). The patient was treated by laparotomy and Roux-en-Y duodenojejunostomy. He was discharged on the twelfth postoperative day.

Case 3. A 16-year-old male struck a horizontal bar while riding a horse at high speed. Basilar skull fracture, bilateral comminuted frontal sinus fractures, right orbit blowout, nasal fractures, and a dural tear with subdural bleeding were apparent (ISS-25). Exploration of the frontal sinuses, bifrontal craniotomy, dural repair, and periosteal graft placement were performed by neurosurgical and otolaryngologic services. The patient was discharged after 3 days in the ICU and 8 days' total hospitalization. Delayed repair of the orbital blowout fractures was performed 1 month after discharge.

RESULTS

The mechanism of injury was fall from horse in 45 patients (33%), kicked by cow in 28 (21%), bovine assault in 25 (19%), equine assault in 17 (13%), kicked by horse in 11 (8%), and animal-drawn vehicle accident in eight (6%) (Table I). As expected, the occupation of injured patients most often involved farming (Table II).

Most common injuries were orthopedic, neurologic, maxillofacial, thoracic, abdominal, and spinal (Table III). Thirty patients sustained multiple system trauma. Most frequent orthopedic injuries were tibia-fibula fractures, 13; forearm fractures, 12; and knee injuries, 12. Head injuries included 24 concussions and six skull fractures. Injury Severity Score (ISS) ranged from 1 to 41 (mean, 8.5). The ISS was greater than or equal to 25 in 11 patients (Table IV).

From the Department of Surgery, Gundersen Clinic/La Crosse Lutheran Hospital, La Crosse, Wisconsin.

* La Crescent Veterinary Service, La Crescent, Minnesota.

Address for reprints: Thomas H. Cogbill, M.D., Department of Surgery, Gundersen Clinic, 1836 South Avenue, La Crosse, WI 54601.

TABLE I
Mechanisms of injury in 134 patients

Fall from horse	45 (33%)
Kicked by cow	28 (21%)
Bovine assault	25 (19%)
Equine assault	17 (13%)
Kicked by horse	11 (8%)
Animal-drawn vehicle	8 (6%)
Total	134

TABLE II
Occupations of 134 patients

Farmer	54 (40%)
Farmer's wife	17 (13%)
Farmer's child	40 (30%)
Veterinarian	3 (2%)
Other	20 (15%)

TABLE III
Organ system injuries in 134 patients

Orthopedic	92
Cranio-cerebral	32
Maxillofacial	26
Thoracic	20
Abdominal	20
Spinal	7

TABLE IV
Injury Severity Scores (ISS) for 134 patients

0-9	115
10-24	8
≥25	11

TABLE V
Operative procedures

Orthopedic	83
Maxillofacial	20
Laparotomy	7
Peritoneal lavage	7
Neurosurgical	3
Thoracostomy	3
Other	4

One hundred seventeen operative procedures were performed (Table V). Orthopedic and maxillofacial procedures predominated. Seven patients underwent exploratory laparotomy and three splenic ruptures, three liver lacerations, one pancreatic injury, one duodenal laceration, and one severe mesenteric tear were repaired.

Nineteen patients were admitted to an intensive care unit and total hospital stay ranged from 1 to 115 days (average, 7 days). There were no deaths. Serious complications developed in 36 patients, including bony non-union in six, severe pulmonary morbidity in seven, and wound infection in four.

DISCUSSION

The incidence of blunt bovine and equine trauma is surprisingly high, accounting for 22 admissions annually

at our institution. Western Wisconsin is noted for a large number of active dairy farms and resultant large number of people in close contact with dairy cows and bulls. Dairy cows weigh in excess of 1,400 pounds and the bulls of several breeds may weigh over 3,000 pounds. The amount of force generated by these large animals easily explains the severity of injury observed in many of our patients. Also adding to the incidence of equine trauma is the presence of several Mennonite communities within our referral area.

The mechanism of injury was often predictive of the specific organs injured. Twenty-five of 30 patients (83%) kicked by cows sustained leg or facial trauma. These are the parts of the farmers' anatomy most often exposed to a cow's rear hoof as the milking process is initiated. Similarly, facial injuries in two of three veterinarians resulted from mastitis examinations. Forty-four of 62 patients (71%) falling from horses sustained head or arm trauma secondary to attempts at breaking the fall. Bovine and equine assaults were responsible for the most serious thoracoabdominal and multiple trauma. Six patients in this category had ISS of 25 or greater.

Life-threatening injuries may be associated with blunt bovine and equine trauma. Injury Severity Score was 10 or greater in 19 patients and 25 or greater in 11 individuals. During the period 1976-1980, farm animal-related trauma accounted for 25 deaths in Wisconsin (3). Mortality in our series was nil as the result of appropriate prehospital resuscitation and the delivery of quick, definitive care after admission. These patients are best managed in a regional trauma center with full multispecialty support facilities and personnel.

Only farmer education and preventive measures can reduce the incidence of blunt bovine and equine trauma. Protective headgear should be worn by persons, especially novices, riding horses. A second person should always be present when a sick animal is being examined to provide a diversion. A bull should never be approached without a protective device such as a heavy stick and a quick exit should be planned well in advance. Furthermore, if struck by a bull or cow the farmer should be advised not to attempt to stand as he will be repeatedly thrown to the ground, sustaining more injuries. The farmer should instead crawl to safety. Children must be instructed to respect these large animals and should avoid being underfoot. Finally, judicious use of anesthetics and tranquilizers is recommended when treating these animals. An educational program stressing these methods of prevention has recently been instituted at our trauma center.

REFERENCES

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