

Cow-related trauma: A 10-year review of injuries admitted to a single institution

Colin G. Murphy*, Ciara M. McGuire, Natasha O'Malley, Paul Harrington

Department of Orthopaedics, Our Lady of Lourdes Hospital Drogheda, Co. Louth, Ireland

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ABSTRACT

Introduction: Bovine-related injuries to farmers are common in rural communities. Many injuries are significant requiring hospital admission and surgery. We reviewed all cattle-related injuries admitted to a regional trauma centre over 10 years and detail the nature of the injuries.

Method: A retrospective review was undertaken, using hospital inpatient coding system (HIPE) to identify patients admitted following cow-related trauma for the last 10 years. From retrieved charts mechanism of injury was identified, demographics recorded and Injury Severity Score (ISS) and Trauma Injury Severity Score (TRISS) calculated based on the injuries sustained.

Results: 47 patients were identified, with a median age of 53 years. 4 injuries occurred in children, and 12 in patients over 65 years old. Three-quarters of those injured were male. Kicking was the most common mechanism of injury ($n = 21$), but charge/head-butt injuries and trampling injuries were associated with more serious injury scores. 72% of patients were admitted under Orthopaedics as their primary care team, 25% under General Surgeons, with one patient admitted medically. Mean ISS score was 6.9 (range 1–50). 41 operative interventions were performed on 30 patients during their admission. 6.3% of patients required admission to Intensive Care with a mean length of stay of 12.3 days (range 2–21 days). There was no mortality.

Conclusion: Cow-related trauma is a common among farming communities and is a potentially serious mechanism of injury that appears to be under-reported in a hospital context. Bovine-related head-butt and trampling injuries should be considered akin to high-velocity trauma.

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Introduction

Large animal-related injury is common among farming communities, with 24% of farmers in one survey reporting livestock related injuries,¹⁰ and 1.7% large-livestock farmers reporting animal-related injury in one year.¹³ Although the majority of farming injuries (80%) are treated by the general practitioner,⁷ livestock-related trauma is frequently seen in regional hospitals and may be associated with serious injuries. No study has examined the spectrum of injuries associated with cow-related trauma. A retrospective study was performed to determine the nature and severity of injuries for patients admitted to a single regional hospital over 10 years following cow-related trauma.

Methods

Our Lady of Lourdes Hospital, Drogheda is a regional trauma centre for the north eastern region of Ireland. It serves a catchment

area of 390,000, with an even urban and rural population divide.⁸ Statistics in this paper relate only to injuries caused directly by cattle, and exclude indirect injuries such as zoonoses and road accidents.

Using the Hospital Inpatient Coding system (HIPE), patients who were admitted to hospital following animal-related injury over a 10-year period were identified through ICD 9 (1997–2004) and ICD 10 (2004–2007) classification. Non-bovine injuries (horse, dog) were excluded through further coding sub-classification, and a further review of remaining charts was performed to exclude injuries relating to animals not included in ICD classification (cat, sheep, goat and pig). The specialty under whose service the patients were admitted was allocated according to the primary care team, even when the patient was attended by multiple teams.

Mechanism of injury was ascertained by the clinical notes from a combination of the referring doctor, the A&E doctor and the admitting team, and classified into broad groups accordingly (kick, body contact, charge/head-butt and trample). Although some injuries were sustained by crushing by the animal against a solid object, or falling after contact, these were classified by the nearest fit to one of the four groups of mechanisms. Situation of the injury was recorded only where it was clearly noted in the patient's chart. These fell into distinct categories: feeding, milking, tagging, herding, slaughter, and passing by. The term 'passing by' is used

* Corresponding author at: 144 Rock Rd, Booterstown, Co. Dublin, Ireland.
E-mail addresses: cmurphy@rcsi.ie (C.G. Murphy), ciaramcguire@rcsi.ie (C.M. McGuire), natashaomalley@gmail.com (N. O'Malley), Harringtonpjl@gmail.com (P. Harrington).

to describe the history given where no specific task or situation was being undertaken when the injury occurred.

Demographics were recorded, and occupation was listed using the term described by the patient on admission or by the admitting doctor's notes. A number of interactions occurred between cows and individuals whose occupation did not relate to farming or animals (mechanic, lawyer, student, unemployed). These were categorised as non-farming.

Injuries were grouped according to the major primary injury. An Abbreviated Injury Scale (AIS) and a Revised Trauma Score (RTS) was calculated for all patients. From these an Injury Severity Score (ISS) and a Trauma and Injury Severity Score (TRISS) were calculated.

Results

Forty-seven patients were admitted to a single hospital following cow-related trauma over a 10-year period. 35 of patients were male. The age breakdown is seen in Fig. 1, and the mean age was 49.3 years old. 72% of patients were admitted under Orthopaedics as their primary care team, 25% under General Surgeons, with one patient admitted medically.

Farmers accounted for the majority of injuries (n = 36), but injuries to abattoir workers and vets totalled 8.6% and 6.3% respectively (Fig. 2). Kicking is the most common mechanism of injury, as seen in Fig. 3, but 13/47 injuries occurred through charging/head-butt, and 5/47 due to trampling. Trampling was associated with the highest mean ISS score (23), with kicking the lowest (ISS 3).

In almost half of admissions no details were recorded regarding the situation in which the injury occurred. Of the remaining half, feeding was the most common situation of injury, with herding, passing by and slaughter the next most common (Table 1).

The summary of the primary injury sustained in patients admitted to hospital is listed in Fig. 4. 41 operative interventions were performed on 30 patients. Fractures were the most common

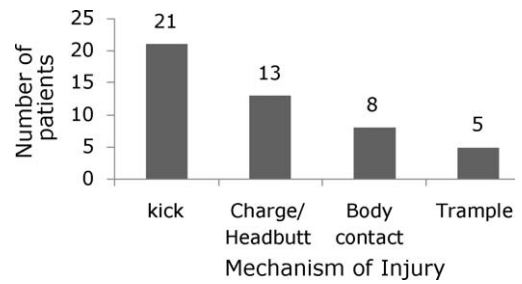


Fig. 3. Mechanism of injury.

Table 1
Situation of injury.

Situation of injury	
Milking	2
Tagging	2
Slaughter	4
Herding	5
Passing by	5
Feeding	6
Unknown	23
Total	47

injury presenting overall. Of the 11 long bone fractures, 4 were femoral and 7 tibial, including 5 tibial plateau fractures. Soft tissue injuries and lacerations were the second most common injury. Of these only 2 were related to cow-horns, both of which resulted in superficial lower limb lacerations.

ISS scores and TRISS scores can be seen in Figs. 5 and 6 respectively. Most ISS scores were less than 16 (96%). TRISS scores represent an estimate of the probability of survival (Ps), sometimes expressed as a percentage. Three patients had scores of less than 90%. All were admitted to the intensive care unit, and had surgical interventions for their injuries. The first patient (TRISS 0.88, ISS 10) was admitted with a head injury, a hip fracture and hypothermia after being trampled on by his herd of cattle in a field and found a number of hours later. The second patient (TRISS 0.74, ISS 38) was

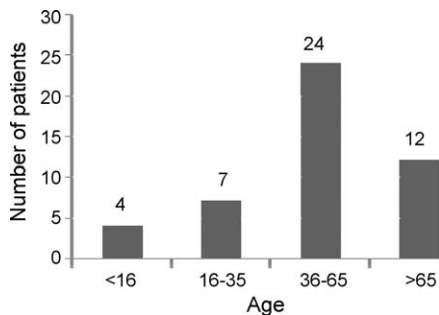


Fig. 1. Age of patients.

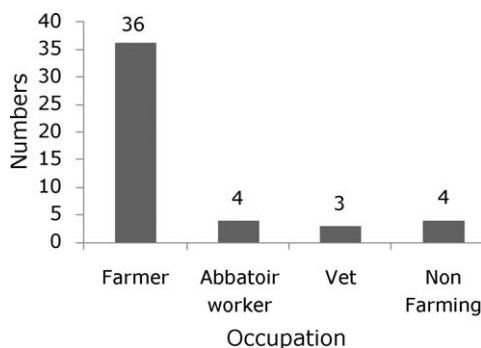


Fig. 2. Occupation of patients injured.

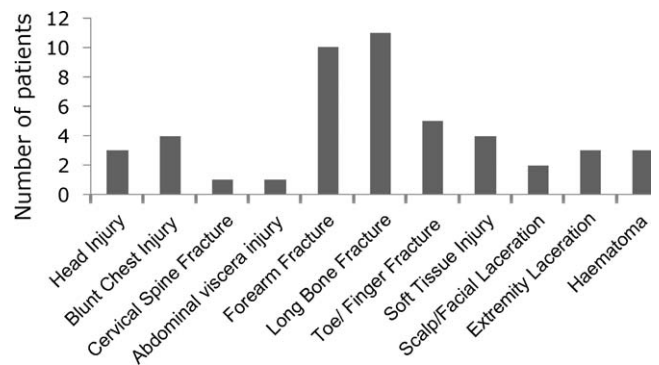


Fig. 4. Primary injury sustained.

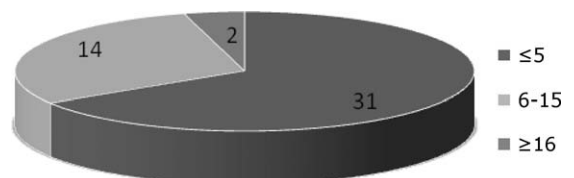


Fig. 5. Injury Severity Score.

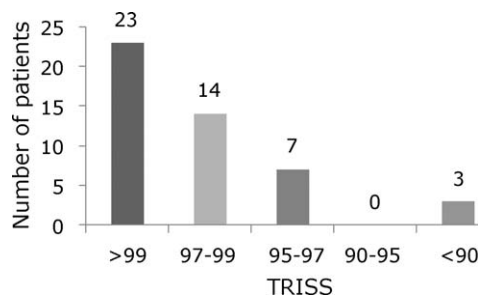


Fig. 6. Patient trauma and Injury Severity Score.

charged by a cow at feeding, head-butted in the chest and fell down a step. He sustained bilateral haemo-pneumothoraces and pulmonary contusions, with a cardiac contusion and a fractured femur. The third patient (TRISS 0.40, ISS 50) was trampled on while herding cattle into a feeding shed. He sustained a flail chest, bilateral pneumothoraces, large bowel perforation and multiple facial fractures. Mean length of stay in ICU was 12.3 days (range 2–21 days). There were no mortalities.

Eight patients had open fractures (2 tibia, 1 wrist, 1 metatarsal, 1 forearm, and 3 fingers). 2 patients developed an infection post-operatively. The first patient (Gustillo & Anderson 3B, midshaft fracture of tibia) had removal of intra-medullary nail 8 months following surgery for infected non-union. Full union was achieved 12 months later. The second patient had terminalisation of a traumatic distal phalanx amputation but developed a wound infection day 3 post-operatively despite being treated prophylactically with intravenous antibiotics on admission. He was treated with oral antibiotics, recovered well and was discharged from hospital day 2 post-operatively and from follow-up after 4 weeks.

Discussion

Bovine-related injuries represent a serious risk for rural communities. The prevalence of these injuries would appear to be under-reported. The reason for this may be three-fold: Firstly, rural general practitioners treat the majority of farming injuries, some which may not present to hospital. Secondly, there is to date no system either in A&E or Orthopaedic Trauma Clinic referrals for collating data regarding mechanism of injury. Finally, there is no specific coding system for strictly bovine-related injuries in either the ICD 9 or ICD 10 classification manuals if the patient is admitted to hospital. This is the chief limitation of HIPE data—only the injuries in which the doctors clearly document the causative animal are picked up for coding purposes, and then classified according to the nearest-fit category.

Contact with cows is not exclusive to farmers, but they would seem to be at highest risk, accounting for three quarters of the cases involved in this study. Among farmers, young age, hearing loss and doctor-diagnosed arthritis are associated with increased risk of large animal injury.¹³ Similarly tagging newborn calves and clipping cattle prior to slaughter has been associated with a significant risk of injury.¹⁰ In this study feeding and herding were the two most commonly cited situation in which the injury occurred, but the low rate of the documentation of the injury-situation highlights the limits of a retrospective study. Rural communities in Sweden have established registries to ascertain the precise context in which animal injuries occur.² Addition of a similar register would seem a worthwhile addition in this setting.

In cattle-related accidents, fatalities have been shown to be related to aggressive behaviour of the animal.¹² While no attempt was made to allocate blame in this study, the language used to describe the incident was interesting, contrasting the minimalist

objective recording of details of some doctors ('kicked by cow, unable to weight bear') with the more expansive accounts by others ('attacked by defensive mother cow while attempting to tag a calf, crushed against wall, then savagely stomped on'). It was felt that the anthropomorphism revealed more about the doctors than the behaviour of the cows.

Trauma scoring systems provide a method of examining quantitative and comparative analysis of injury severity. The ISS was one of the first trauma score systems,¹ and is based on the anatomical severity classification of injuries called the Abbreviated Injury System (AIS) and aims to combine them in a single value to correlate with outcome. It is by far the most frequently applied scoring system for description of injury severity worldwide, and the ISS cut-off of 16 represents the cut-off for an approximate predictive mortality of 10%.² The TRISS is the second most frequently used trauma score after the ISS.⁹ It combines the anatomical pattern of injury score (AIS) with the physiological response to trauma to provide a value between 0 and 1 which can be interpreted as an estimated probability of survival.³

Most animal injuries are caused by large animals, and horses and cows cause the most hospitalisations.^{4,6} The spectrum of large animal injuries is similar to road traffic accidents, and injuries caused by cattle must be considered as high-velocity trauma.¹¹ Although initially designed by the American Medical Association automotive safety group in 1971,⁵ the injury scales seem quite apt to measure interaction with large animals such as cows, by virtue the physics of the interaction and of the scoring, weighting of body region injuries with severity.

Conclusion

Bovine-related trauma is common among farming communities. These injuries are under-reported, and frequently cause significant injuries. A full history should be taken, in particular to the mechanism of trauma. Patients admitted to hospital after sustaining injuries from cattle, in particular those injured by head-butting or trampling, should be treated as high-velocity trauma.

Conflict of interest statement

There are no conflicts of interest with this paper.

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