Large Animal-Related Injuries in a Rural Population in Northeastern Turkey

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Received: 16 September 2011 / Accepted: 29 March 2012 / Published online: 14 April 2012
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Abstract Animal-related injury is a serious health problem for people living in rural areas. This type of injury could be of great consequence and life-threatening. There are insufficient data regarding this issue. The purpose of this study was to evaluate the causes and treatment outcomes of large animal injuries. We reviewed the medical records of 157 patients with large animal-related injuries in a State Hospital in Northeastern Turkey, between September 2004 and April 2007. Demographic and etiological characteristics of patients and injury and outcome data were analyzed. A total of 157 patients were included in the study. One hundred and

thirty-two (84.1 %) of them were male and 25 (15.9 %) female. The mean age of patients was 29.1 years (range 3–83 years). One hundred and twelve patients (71.3 %) had horse-related injuries and 45 patients (28.7 %) had bovine-related injuries ($P=0.096$). Twenty-one (13.4 %) patients were referred to a tertiary center due to their need for intensive care, whereas 1 (0.6 %) patient died. Large animal-related injuries constitute an important health problem for people living in rural areas. This type of injury could be serious and mortality could be observed.

Keywords Large animal injuries · Public health · Rural areas

Presented as orally at the 6th. Congress of National Trauma and Emergency Surgery (September 4–8, 2007, Antalya, Turkey).

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Introduction

Large animal-related injuries (LARI) are common and are an important health problem for people living in rural areas. Patients with large animal trauma present with blunt and penetrating high-energy transfer injuries to multiple body regions. Serious injuries of the body are usually caused by attacks of large animals such as horses and cows [1]. Animal husbandry is the basic economic sector in Kars city. Kars State Hospital is a level II health center serving in Northeast Anatolia. Kars city with its approximately 325,864 inhabitants has 303,970 large animals according to the village inventory in 1999. Kars city and surrounding areas have been pivotal areas for animal husbandry in Turkey with its pasturage. Animal raising in this area is an economic activity that is usually carried out in order to meet the family needs [2]. In the villages, almost all the families have cows and donkeys or horses for their individual agricultural requirements. Donkeys and horses are used for transporting goods and people and for agricultural activities. Furthermore, horse-javelin is a loved traditional game,

Table 1 Demographic findings, causes, and type of injury and treatment modality

		Number of patient	Percentage (%)	<i>P</i> value
The average age		29.1 (3–83)		
Gender	Female	25	15.9	$p<0.001$
	Male	132	84.1	
Cause of injury	Horse	112	71.3	$p=0.096$
	Cow	45	28.7	
Type of injury	Fall	65	41.4	
	Kicking	92	58.6	
Treatment	Outpatients	123	78.4	
	Hospitalized	34	21.6	
The number of organs injuries	single	125	79.6	
	Two $\geq$	32	20.4	

whereas horseback riding is not a widespread recreational activity in this region. As a result of these human–animal interactions, trauma inevitably occurs during routine animal care or milking and in the course of regular activities such as roundups [1].

The aim of this study was to analyze a series of 157 patients who were treated for LARI over the last 3 years.

Patients and Methods

We reviewed the medical records of 157 patients with LARI in Kars State Hospital between September 2004 and April 2007. Large animals were defined as horse and cattle. Demographic and etiological characteristics of patients and injury and outcome data were analyzed retrospectively. Chi-Square test by SPSS 15.0 for Windows software was used for analysis. A P value <0.05 was considered statistically significant.

Results

A total of 157 patients were included in the study. A hundred and thirty-two (84.1 %) of them were male and 25 (15.9 %) female ($P<0.001$). The mean age of patients was 29.1 years (range 3–83 years). One hundred and twelve

(71.3 %) patients had horse-related injuries and 45 (28.7 %) patients had bovine-related injuries ($P=0.096$). The patients with horse injuries had either fallen ($n=42$) or were kicked ($n=70$). The patients with bovine injuries were either butted ($n=23$) or were kicked ($n=22$). Thirty-two (20.4 %) patients had multiple organs injuries (Table 1). The locations of injuries were as follows: 69 (43.9 %) maxillofacial, 31 (19.8 %) extremities, 28 (17.8 %) cranial, 16 (10.2 %) thorax, and 13 (8.3 %) abdominal. Locations of Injuries are shown in Table 2. Thirty-four (21.6 %) patients were hospitalized and 16 (10.2 %) patients were operated by different surgical units. Physical signs of an acute abdomen (sensitivity, tenderness, muscular defense, rigidity) were observed in 8 (5.1 %) patients. Computed tomography (CT) was performed in 10 patients on the basis of the surgeon's judgment. Diagnostic peritoneal lavage was performed in 5 patients and, it was positive in 2 of them (Table 3).

Other patients who did not require surgery had either a suspicious abdominal physical examination, but normal abdominal ultrasonographic findings or minimal intra-abdominal free fluid shown by ultrasonography, but no clear evidence of acute abdomen at physical examination.

Postoperative complications occurred in 3 (18.8 %) patients. Among these patients, 1 developed wound infection and 2 had atelectasis. All the patients who developed complications were treated medically. Twenty-one (13.4 %) patients were referred to a tertiary center due to their need for intensive care. One patient was brought to the emergency department as pre-exitus and died (0.6 %). In this case, cerebral hemorrhage was detected at autopsy.

Discussion

Rasouli et al. [3] stated that in their study covering approximately three million patients admitted to the

Table 2 Distribution of injuries according to location

Trauma localization	Number of patient (n)	Percentage (%)
Maxillofacial	69	43.9
Extremity	31	19.8
Cranial	28	17.8
Thorax	16	10.2
Abdominal	13	8.3
Total	157	100

Table 3 Diagnostic and treatment modalities of the patients who underwent surgery

Surgical department	X-ray	USG	CT	DPL	Pathology	Operation
General surgery	negative	negative	Spleen inj	no	Grade IV spleen	S
	Left PX	negative	PX+spleen inj	no	Grade III spleen	S+TT
	negative	Free fluid	no	positive	Small ints.perf	PR
	negative	Free fluid	no	positive	Large ints.per	PR
Thorax surgery	RF+PX	negative	PX	no		TT
	RF+PX	negative	PX	no		TT
	PX	negative	PX	No		TT
	RF+HPX	negative	HPX	no		TT
Brain surgery	negative	negative	SH	no	SH	H
	negative	negative	SH	No	SH	H
	PX	negative	SH+PX	no	SH	H+TT
Orthopedics	tibia fracture	negative	no	no	Tibia fracture	EF
	tibia fracture	negative	no	no	Tibia fracture	EF
	Femur fracture	negative	no	no	Femur fracture	EF
	Ulnar fracture	negative	no	no	Ulnar fracture	EF
	Ulnar fracture	negative	no	no	Ulnar fracture	EF

SH subarachnoid hemorrhage, EF external fixation, H haemostasis, PR primary repair, TT thorax tube, S splenectomy, PX pneumothorax, HPX hemopneumothorax, RF rib fracture

emergency room, around 1 % of the cases had an animal-related injury and mortality in them was around 0.2 %. Injuries related to the animals generally affect young population and are seen more frequently in males [4, 5]. The fact that these populations work actively and are interested in sports which involves animals raises the possibility for injuries. The average age is given by Johns et al. [6] as 34, by Temes et al. [7] as 27, by Brett et al. [8] as 32, by Watts and Meisel [9] as 34, and by Kousuke et al. [10] as 37. Similar results were demonstrated in our study with a mean age of 29 years.

Also in other studies, injuries happen mostly in males [7, 11, 12]. In the study conducted by Yıldız et al. [13], 13 of 19 patients were male. Moini et al. [14] expressed that 62 % of cases were male in their study and also in another study including 78 patients with similar injuries, 78 % of the cases were male [9]. However, in the study by Shahan et al. [15], the majority of 2,424 patients were female. Similarly, in our study, a significant proportion of patients were male.

In a retrospective study by Zhang et al. [16], including 149 patients, most of the injuries were not severe. About 60 % of the animal attacks result in mild injuries and an ambulatory treatment is adequate [17]. In our study, most of the patients were hemodynamically stable and the animal-related injuries were mild and needed ambulatory treatment (65 %, $n=102$). The most commonly injured regions are the head and extremities [6].

Similar to our study, this type of head-neck and extremity injuries constituted 81 % of trauma victims.

Horses have been identified as a major cause of animal-related farm injuries [5]. Horse-related trauma often leads to serious injuries of internal organs, head, spine, and limbs [18]. In our study, 112 patients (71.3 %) suffered from horse-related injuries.

When an injury is caused by cattle, both blunt injuries and penetrating injuries could occur in various parts of the body due to high energy transfer. Large animal encounters can result in multiple injuries to various body parts. Norwood et al. [11] reported 14 % abdominal injuries caused by large animals. In our study, 8.3 % of patients with abdominal injuries were detected.

In conclusion, large animal injuries are potentially serious health problems for people living in rural areas. Such injuries are an important cause of morbidity and mortality due to high energy transfer. In order to decrease the incidence of animal-related injuries, intervention programs should be put in practice for rural population and adequate supervision should be performed on farmers. Studies on this issue are scarce and more studies are needed.

Acknowledgment The authors thank Dr. İlhan GUNAYDIN for his comments.

Conflict of interests statement We do not declare any conflict of interests' statement.

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