European Journal of Therapeutics

DOI: 10.5152/eurjther.2021.20020

Original Research

Traumatic Injuries From Sheep Sacrifice During the Eid Al-Adha Holiday: A Prospective Multicentered Study

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ABSTRACT

Objective: We sought to describe injuries related to the sacrificial slaughtering of animals during the Eid holiday.

Methods: We conducted a centered prospective observational cohort study during the Eid (August 21-24, 2018) at 5 emergency departments in Gaziantep, Turkey. Descriptive statistics of injuries collected included the injury location, involvement of dominant or non-dominant hand, cause of injury (instrument vs animal), type of instrument causing injury, surgical interventions performed, and professional occupations of patients.

Results: We included two hundred seventy-seven patients with injuries who fulfilled the criteria and excluded injuries not related to animal slaughter. Most injuries (91%) occurred in people who were not professional butchers (n=252) and simple laceration (not involving vessels or tendons) was the most common injury type (95.3%; n=265). Those who were injured and had no experience were mostly injured during the processing of the meat (butchering) and while helping others. Lacerations were most commonly observed in the upper extremity (83.4%; n=231), on the non-dominant side (67.5%; n=187), in the hand (78.7%, n=218), and specifically in the index finger (23.1%; n=64). A surgery was performed on 8 patients.

Conclusion: The first day of Eid is associated with an increase in mostly non-dominant upper extremity injuries among inexperienced people slaughtering animals. Further education and safety measures may reduce such injuries. Emergency departments serving larger Muslim communities may benefit from anticipating an uptick in these injuries.

Keywords: Sacrifice, Eid Al-Adha, injuries, emergency medicine, sheep

INTRODUCTION

The annual Eid holiday (Festival of Sacrifice) is one of the two main Islamic holidays celebrated by approximately 1.8 billion Muslims across the world. This is marked by animal sacrifice during the Eid Al-Adha holiday, which is one of the pillars of worship in Islamic belief, and can be performed by professional butchers or laypeople. The Festival of Sacrifice (Bayram or Eid) after the Hajj pilgrimage is celebrated duringfour days starting from the 10thday of the month "Zul-Hijjah" of the lunar Islamic calendar. Muslims sacrifice bovines or sheep during any of the four days of this celebration, generally on the first day of the Eid holiday (1). In the 2018 Eid, an estimated 3.6 million animals were prepared for sacrifice in Turkey (2). Injuries from sacrificing and processing of meat can range from mild skin lacerations to deadly accidents. Blunt trauma may be observed as a result of an animal attack. The person or another person sacrificing orprocessing the meat may be injured during the sacrifice (3-7). Recently, a number of precautions have been placed in Turkey to provide a safer, easier and healthier sacrifice. Throughout the holiday, municipalities facilitate venues for the sacrifice of animals. These well-equipped sacrifice centers provide professional butchers. However, injuries are observed despite these precautions. Although animal slaughter and meat processing are typically reserved for the butchers, many people prefer to perform the sacrifice themselves. Despite these precautions, serious injuries are incurred.

The purpose of this study was to quantify and describe the incidence, causes and types of injuries related to the sacrificial

How to cite: Oktay MM, Boğan M, Sabak M, Gümüşboğa H, Hakmeh W, Eren ŞH. Traumatic Injuries From Sheep Sacrifice During the Eid Al-Adha Holiday: A Prospective Multicentered Study. Eur J Ther 2021; 27(1): 8-13.

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Received: 19.03.2020 • **Accepted:** 28.07.2020

slaughtering of sheep during the Eid Al-Adha holiday from patients presenting to five emergency departments (ED) in the city of Gaziantep, as well as the medical and surgical interventions performed. Few retrospective studies have been performed on this topic,and this prospective, multicentered design is of great value. The aim of the study is to provide knowledge about the frequency and types of injuries observed in animals sacrificed during the Eid holiday to anticipate a need for certain consultant services (such as hand surgery) and to raise awareness of such injuries in hopes that it will lead to preventive safety measures to reduce such injuries in the future.

METHODS

Ethics committee approval was received for this study from the ethics committee of Hasan Kalyoncu University (Date: 06/06/2018; No:2018-05). This study was conducted during the 4 days of the Eid Al-Adha holiday (August 21-24, 2018) in the emergency departments of 5 hospitals in Gaziantep, Turkey. The patients presented with laceration or blunt trauma to the EDs (864). We included consenting patients who met the inclusion criteria.

Inclusion criteria in research: Patients

- With injury during the slaughtering and/or meat processing
- Who agree for a return visit to the ED for wound/injury recheck one month post-injury

Exclusion criteria in research:

- Injury not related to sacrifice processing
- Injury occurring outside specified days

Process:

Patients presenting to the ED with injury after slaughtering of animals or processing of meat were registered using previously prepared forms that included questions on:

- Demographics: age, gender, contact information
- The day and time during the Bayram in which the injury occurred
- Occupation: professional butcher or non-butcher
- Experience (individuals believed to be experienced other than professional butchers were those who had attended at least one animal slaughter)

Main Points:

- Most of the patients who present to the emergency department due to the injury during the Eid of sacrifice are non-butchers.
- There is a sudden spike in mostly hand surgery cases in emergency departments during the first day of Eid. Emergency departments should anticipate this increase and prepare on call coverage.
- The first finger of the upper extremities were most commonly injured and injuries observed had been during the first day of Eid.
- Education and safety precautions may help reduce the number of injuries

- Type of injury: penetrating or blunt trauma
- Type of laceration: simple (cutaneous, subcutaneous) or complicated (muscle, tendon, nerve, artery, bone injuries)
- Causes of injury: knife, meat chopper, meat grinder, axe, skewer, animal attack
- Role of person: *sacrificer* who uses the sharp object (knife, axe), *helper* who helps the sacrificer during the procedures, or *others* who observe the procedures during sacrificing or meat processing
- The stage at which the injury was incurred, either during sacrificing or meat processing (sacrificing: livestock slaughtering process; meat processing: processing of meat products after sacrificing)

All patients were called after one month for check-up and the following information was collected:

- Sequelae from injury
- Workforce loss post-injury (called-in sick)
- Reason for animal sacrifice(religious, economic or others)

Measurements:

- Descriptive statistics
- Comparison of types of injury, location of injury, types of laceration, severity of injury (simple/complicated), and sequelae between butcher and non-butcher patients.
- Comparison of types of injury, location of injury, types of laceration, severity of injury (simple/complicated), and sequelae between experienced and inexperienced patients.

We initially included 330 patients who had presented with injuries in the study. We subsequently excluded 53 patients who did not returnfor follow up and those who could not be reached by phone.The study was completed with 277 patients who fulfilled the inclusion criteria.

SPSS version 13 was used for the statistical analysis of the data. Descriptive statistics were used to summarize data with absolute and relative frequencies for categorical data, and means and standard deviations for continuous variables. The Pearson Chi-square test was used to investigate the relationship between the categorical variables.

RESULTS

We included 277 patients in the study. Among these, 227 (81.9%) were men and 50 (18.1%) were women. The mean age was 36.9 ±14.2 (SD) (range 3-76) years. The youngest injured person was a three-year-old boy injured while playing with a knife. Among the injured persons, only 9% were professional butchers (n=25) and 57% (n=158) were experienced. Among the patient, 190 (68.6%) did primary school,and 230 (83%) were evaluated during the first day of Eid and most of them (n=140, 50.5%) were seen between 06:00 and 12:00. The most common injuries were simple lacerations (92.1%; n=255), mostly with knives (n=227; 81.7%). Injuries occurred mostly during the processing of meat (n=144, 52%) and while helping (n=193, 69.3%). Among the patients surveyed, 82.7% (n=229) felt obligated to personally perform the sacrifice due to their religious beliefs (Table1).

Concerning the types of laceration, simple lacerations were detected in 255 (92.1%) cases. These injuries most frequently involved the non-dominant side (n=187, 67.5%), hand (n=218, 78.7%), and index finger (n=64, 23.1%) (Table 2). Five patients with complicated laceration had isolated tendon lacerations, two had an isolated arterial injury, one had an isolated nerve injury, one had tendon and nerve injury and one had injuries to a tendon, nerve and artery.

Among the 12 patients who presented with blunt trauma, one had a nasal fracture, two had intraocular bleeding, one had soft tissue injury of the upper lip, three had soft tissue injury of the hand, two had a distal fibula fracture, one had a distal tibia and fibula fracture, one had a 5th metatarsal fracture and one patient had a soft tissue injury of the foot.

Eight patients required surgery by otolaryngologists (n=1), orthopedics (n=1), and plastic surgery (2.2%, n=6). One of the two patients with amputation lost the distal phalanx of the first finger of the left hand due to chopping injury, and another lost the distal phalanx of the second finger of the right hand due to use of the mincer. Both patients underwent primary closure in the ED.

The patients were called for a recheck after one month; 222 (80.1%) patients recovered without any sequelae. We identified paresthesia in 17 patients (6.1%), pain in 15 (5.4%) patients, movement limitation in 13 (4.7%) patients, persistent swelling of injury site in 7 (2.5%) patients, amputation in 2 (0.7%) patients and wound side infection in one patient (Table 3).

Table 1. Descriptive Statistics

		Mean	Minimum	Maximum
Age		36.86±14.17	3	76
			Count (N)	Percent (%)
Gender	Male		227	81.9
	Female		50	18.1
Education Degree	None		2	0.7
	Primary school		190	68.6
	High school		60	21.7
	University		25	9
Occupation	Butcher		25	9
	Non–butcher		252	91
Experience	Yes		158	57.0
	No		119	43.0
Day of Bayram ED Visit Occurred	1st day		230	83
	2nd day		39	14.1
	3rd day		5	1.8
	4th day		3	1.1
Time of admission	600–1200		140	50.5
	1200–1800		105	37.9
	1800–2400		32	11.6
Type of injury	Laseration		265	95.7
	*Simple		255	92.1
	*Complicated		10	3.6
	Blunt trauma		12	4.3
Causes of Injury	Knife		227	81.9
	Meat chopper		33	11.9
	Mean grinder		1	0.4
	Axe, skewer, animal attack, etc		16	5.8
Sacrificing & Meat Processing	Sacrificing		133	48
	Meat Processing		144	52
Role of Injured Person	Sacrifier		82	29.6
	Helper		193	69.7
	Others		2	0.7
Reason for animal sacrifice	Religious		229	82.7
	Financial		45	16.2
	Other		3	1.1

Table 2. Anatomic Location of the Laceration

		Count (N)	Ratio (%)
Type of laceration	Simple	255	92.1
	Complicated	10	7.9
Side	Dominant Side	90	32.5
	Non–Dominant Side	187	67.5
Localization of injury	Upper Extremity	231	83.4
	·Hand	218	78.7
	Thumb	63	22.8
	Index finger	64	23.1
	Middle finger	25	9
	Ring finger	8	2.9
	Little finger	13	4.7
	Volar side	19	6.9
	Dorsal side	26	9.3
	·Forearm	10	3.6
	·Others	3	1.1
	Lower Extremity	38	13.7
	·Foot	16	5.8
	·Cruris	14	5
	·Others	8	2.9
	Non– Extremity	8	2.9

No significant differences were found between the experienced and inexperienced groups in terms of the type of injury, and the type of laceration and sequelae (p>0.05). Injuries among the experienced patients happened more often during the sacrifice, while inexperienced people were more likely to be injured during meat processing (p=0.001). While injury patterns among experienced patients were more often during the active use of a knife, the inexperienced were injured more often when they were helping (p=0.001) (Table 4).

In analyzing differences between butchers and non-butchers, there was no statistically significant relationship between the

Table 3. Comparison of Experiences

	Experience	Yes	No
Type of injury	Laceration	149	116
	Blunt trauma	9	3
	x2=1.651 P=0.199		
	Upper Extremity	124	107
	Lower Extremity	28	10
	Non-extremity	6	2
Localization of injury	x2= 6.414 P=0.040		
	Hand	115	103
	Food	9	7
	Forearm	7	3
	Cruris	13	1
	Others	14	5
	x2= 11.802 P=0.019		
Type of laceration (n=265)	Simple	142	113
	Complicated	7	3
	x2= 0.801 P=0.371		
Sacrificing & Meat Processing	Sacrificing	98	35
	Meat Processing	60	84
	x2=28.925 P=0.001		
Duty of Person	Active sacrifier	72	10
	Helper	86	107
	Others	0	2
	x2=46.596 P=0.001		
Sequel	None	129	93
	Limited motility	8	5
	Paresthesia	9	8
	Pain	7	8
	Bump/edema	3	4
	Infection	0	1
	Amputation	2	0
	x2=4.395 P=0.623		

Table 4. Comparison of Butchers and Non-Butchers

	Occupation	Butcher	Non-butcher
Localization of injury	Upper Extremity	19	212
	Lower Extremity	5	33
	Non-extremity	1	7
	x^2= 1.088 p=0.580		
Location	Hand	17	201
	Food	2	14
	Forearm	2	8
	Kruris	2	12
	Others	2	17
	x^2= 2.626 p=0.622		
Type of Injury	Laceration	24	241
	Blunt	1	11
	x^2= 0.007 p=0.932		
Type of laceration (n=265)	Simple	24	231
	Complicated	0	10
	x2=1.035 p=0.309		
Sequelae	None	25	197
	Limited motility	0	13
	Paresthesia	0	17
	Pain	0	15
	Bump/edema	0	7
	Infection	0	1
	Amputation	0	2
	x2=6,808 p=0,339		

Table 5. Injury Sequelae

Sequel	Count (N)	Ratio (%)
None	222	80.1
Limited motility	13	4.7
Paresthesia	17	6.1
Pain	15	5.4
Contusion/edema	7	2.5
Infection	1	0.4
Amputation	2	0.7

anatomic location of the injuries, the nature of the lacerations (simple or complicated), and injury sequelae (p>0.05) (Table5).

DISCUSSION

The Eid sacrifice is a ritual involving family members of all ages. The young injured patients were reported in the study by Avşaroğluları (4) and Ersen (8). In the literature, there are studies reporting mean ages of 32±14, 35±15 and 39 years (4, 6, 9). These reports are similar to our report and generally comprise adult age groups. In line with previous studies, the gender distribution of the cases demonstrated that injured patients were mostly men (3, 4, 6, 7) demonstrating a predominately male population with rates of 85%, 86%, 85.5%, and 84.2%. The male preponderance was 7:1 in the study by Rahman et al. (10). We believe that this was due to the traditional role of adult males in the sacrifice procedure and the role of female members of the family in the meat processing procedure in Muslim traditions.

In our study, we found that only 9% of the injured people were professional butchers (n=25). Other studies in the literature show rates around 3.7%, 3.3%, and 8% (3, 7, 10). This suggests that injuries might be minimized by relegating the animal slaughter to professionals.

In our study, only 4.3% of all cases had blunt traumas (n=12), compared with 16.1% in the study by Baştürk et al. (2). Similar to our results, other studies (3-7) show that most injuries observed had been during the first day of Eid, especially in the morning.We believe this was due to the fact that the sacrifice is most frequently performed early on the first day of Eid. Similar to the study by Avşaroğulları (4), we found that most injuries were observed among the non-experienced family members who had assisted in the animal slaughter. Experienced individuals in sacrifice were more likely to be injured during the animal slaughter (p=0.01). Those inexperienced in sacrifice were mostly injured while assisting others in butchering/processing of the meats (p=0.001). In the study by Bildik et al. (7), 96% of the injured patients had almost no prior experience slaughtering or butchering animals. Avşaroğlu suggested that this likely stems from the prevalent belief that the sacrifice should be performed by a family member (4). We found that 82.7% of the injured people were not professional butchers but did share this belief.

Similar to the outcomes observed in our study, other studies have reported that most injuries were simple lacerations. Simple lacerations comprised 89.2% of injuries in the study by Bildik (7), 78.6% in the study by Baştürk (3), 60.6% in the study by Dizen (6), and more than 50% in the study by Sarıfakioğlu (5). In all these studies, injuries were mostly observed in the upper extremity and the hands (3-7). These outcomes are consistent with thos of our study. In the study by Avşaroğulları, 91% of patients actively used their right hands, but the injuries were observed at equal rates in each hand (4). In the study by Rahman, right hand dominant injuries were observed at a rate of 73.5% (10). In studies comparing both hands, injuries were more common in the left hand (5,6). In our study, 67.5% of the injuries were observed in the non-dominant hand and the most common hand injuries were those in the index fingerfollowed by those on the thumb. In the study by Sicca, the dorsal face of the first finger of the non-dominant hand was most commonly injured (9). In the study of Ersen et al. (8), the most commonly injured finger was the second (33%), followed by the first. In our study, the injuries were most commonly observed in the hand, the index finger and the thumb of both experienced and non-experienced individuals (p=0.019). This is due to the fact that the hands and fingers are exposed to the lacerating tool during active cutting and supportive help.

In our study, only 3.6% of all cases had complicated lacerations involving the tendons, nerves or arteries. In the study by Baştürk et al. (3), 1.8% of the cases had muscle, nerve, tendon or artery injuries. These rates were very high in the study conducted by Dizen et al. (6) in 2009 with rates of injury to tendons of 27%, arteries and nerves of 5.8%, and amputations of 6.6%. In another study, the rate of tendon laceration was 25%, whereas the rate of vessel and nerve injury was 4.2% (7). The complicated injury rates observed in our study were lower compared to those in the afore-mentioned studies. Between 2011 and 2014, the most common artery injured was the radial artery in 195 patients hospitalized in the plastic surgery clinics, whereas distal amputation was observed in 26 patients (8). In our study, one patient had arterial injury, which included the radial artery, and amputation was observed in the distal end of the upper extremity.

In the study by Baştürk et al., 79.6% of the patients were discharged from the EDs with primary repair and wound dressing (3). In other studies, the rates were 82.5% and 92.3% (7, 10). In another study, 52 of 98 patients were discharged from the EU with primary closure (5). In our study, 97.8% of patients were treated in the ED and discharged. Surgical intervention was only necessary in 8 patients (1 by an otolaryngologist, 1 by an orthopedic, and 6 by a plastic surgeon). The rates of patients requiring surgery for injuries including complete tendon lacerations, finger amputations, extremity fractures, or ocular trauma, and hand injuries, were 11.7% and 7.7%, respectively (7, 10). In our study, we performed a control visit in order to determine the rate of sequelae, and the most common sequela was paresthesia. We believe that this was due to the partial damage of the superficial nerves observed in the distal part of the extremities.

A portion of the injuries observed during the sacrifice may be preventable. Non-butchers incurred 91% of injuries in this study, even though a butcher could sacrifice 40-50 animals in a day while a non-butcher could sacrifice 1-2 animals. Precautions should be taken in the EDs, especially on the first day of the Bayram holiday, in anticipation of an increased number of patients with laceration injuries involving the upper extremities and sometimes blunt trauma in localities where sheep sacrifice is prevalent. The number of professional sites for sacrifice should be increased, especially by the local managements, in order to provide proper service to the public.

CONCLUSION

The first day of the Bayram (Eid Al-Adha) holiday is associated with an increase in non-dominant upper extremity injuries among most inexperienced people slaughtering sheep. The rit-

ual slaughter of animals, usually sheep, is a central part of the Bayram (Eid Al-Adha) religious holiday for Muslims. This slaughter is sometimes performed by novices instead of professional butchers. Compared to the following 3 days of the holiday, we found an increase in the rates of injury during the first day of Bayram, particularly in the morning hours when the animal sacrifice is often performed. Injury patterns noted during the first day of the Bayram holiday usually consisted of simple lacerations often involving the upper extremity, specifically the non-dominant hand and the first finger. While government measures have been taken to reduce the chance of injury from the animal slaughter, further education and safety precautions may help reduce the number of injuries. EDs serving communities with larger Muslim populations where nonprofessionals engage in sheep slaughtering may benefit from anticipating an uptick in such injuries.

Limitations of Our Study

Although the EDs where our study was conducted likely captured many of the injuries experienced in Gaziantep, Turkey, the results may not be generalizable to the rest of Turkey or the world. Patients may have been injured but not received care in the ED, potentially leading to an underestimation of the actual rate of injury. Sixteen percent of patients were lost to follow up and therefore excluded. Although 19% of people 25-64 years old in Turkey attained at least an upper secondary education level, 68% of patients in this study had a primary school education level, which likely reflects a disproportionate amount of rural people being included in this study (11).

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Hasan Kalyoncu University (Date: 06/06/2018; No:2018-05).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - M.M.O.; Design - M.S., M.B.; Supervision - W.H., Ş.H.E.; Resources - W.H., H.G.; Materials - M.S., M.B., H.G.; Data Collection and/or Processing - M.S., M.M.O.; Analysis and/or Interpretation - W.H., Ş.H.E., M.M.O.; Literature Search - M.M.O., Ş.H.E., M.S., H.G.; Writing Manuscript - M.M.O., W.H., M.B.; Critical Review - M.M.O., W.H., Ş.H.E.; Other - M.S., H.G.

Acknowledgements: We thank the anonymous referees for their useful suggestions. We also thank Prof. Dr. Behçet AL for his support.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

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