The Painful Sacrifice: The Epidemiology of Hand Injuries During the Holy Festivals in the Sultanate of Oman—A 10-Year Case-Control Study

HAND
2017, Vol. 12(3) 242–245
© American Association for
Hand Surgery 2017
DOI: 10.1177/1558944716669350
hand.sagepub.com

Sultan Al-Shaqsi^{1,2}, Taimoor Al-Bulushi¹, Ayman Al-Salmi¹,
Ammar Al-Kashmiri¹, and Ali Al-Lawatti¹

Abstract

Background: The human hand is an important functional and sensory organ. Its complex anatomy reflects its important functional capabilities. Many Muslim countries observe the holy festivals with a traditional sacrifice of an animal in order to share the meat (basic commodity) with beloved ones. During such festivals hand injuries have been reported to increase. This study aimed to compare cases and controls of hand injuries treated at the national trauma center in the Sultanate of Oman during a 10-year time period. **Methods:** This is a case-control retrospective review for 10 years in the Sultanate of Oman. The cases were all hand injuries registered and assessed at Khoula Hospital in the Sultanate of Oman during the 3 days of both holy festivals from January 2004 to December 2013. Controls were hand injuries registered and assessed at Khoula Hospital in the Sultanate of Oman during nonfestival days. Data were extracted and collected from the Emergency Department database. A descriptive and comparative analysis was done. **Results:** There were 1091 cases reviewed in this study. Knife laceration was 2.4 more common during holy festivals than any other time. Extensor tendon injuries were 2.7 more common during holy festivals than nonfestival times. Thumb and index fingers constituted around 40% of the total injuries. Of all patients reviewed, 85% were treated and discharged home without admission. **Conclusion:** Holy festivals in the sultanate of Oman are risky times for hand injuries. Knife lacerations are more common during such times than any other times. Emergency and plastic services should be aware of the pattern of hand injuries during such times in order to prepare and plan services accordingly.

Keywords: Eid, Sultanate of Oman, hand, injury, epidemiology, tendons, finger, wrist, knife, laceration

Introduction

The human hand is a complex organ structurally fashioned to provide a high level of function. In many countries that follow the Islamic faith, Muslims observe and celebrate 2 great holy festivals annually.¹ The first is the great festival that follows the month of fasting, Ramadan. The second is the great festival that follows the holy pilgrimage season to Mecca.¹ Such festivals usually last for about 3 days. During the second great festival, an animal is sacrificed in commemoration of prophet Ibrahim's sacrifice of his son, prophet Ismail, to Allah.² As part of the celebration activities, sacrificing a sheep, cow, goat, calf, or camel and sharing the meat with friends, family, and neighbors is widely practiced in most Muslim countries.² Importantly such Islamic teachings enhance societal solidarity by encouraging sharing basic commodities (meat) with the poor and needy. Many previous studies have reported increased number of hand injuries during the holy festivals in many Muslim countries. This study attempts to compare the pattern and

epidemiology of hand injuries during holy sacrifice festivals to those of nonfestival days. The hypothesis tested in this study is that hand injuries are more common during such festivals than any other times. This study aims to highlight the pattern of such injuries during holy festivals as compared with other times, their management, and outcome in the Sultanate of Oman.

Methods

This is a case-control retrospective review for 10 years in the Sultanate of Oman. The cases were all hand injuries

¹Khoul Hospital, Muscat, Oman

²University of Toronto, Ontario, Canada

Corresponding Author:

Sultan Al-Shaqsi, Plastic and Reconstructive Department, Khoul Hospital, Mina Alfahil, Muscat, Postal code 612, PO Box 75, The Sultanate of Oman.

Email: drsultanalshaqsi@gmail.com

registered and assessed at the National Trauma Centre (Khoulia Hospital) in the Sultanate of Oman during the 3 days of both holy festivals from January 2004 to December 2013. Cases will only include traumatic hand injuries. Nontraumatic hand injuries such as hand infections and gangrene in diabetics were excluded. Controls were hand injuries registered and assessed at the National Trauma Centre (Khoulia Hospital) in the Sultanate of Oman during nonfestival days matched for the 3 days of the holy festival on that particular year (ie, Saturday was selected as a control day for festival falling on Saturday). Such days were checked so no national occasion occurred on those days. The pattern of injuries during such days was assumed to reflect baseline cases (ie, Saturday will be selected for an Eid day falling on Saturday).

Data were extracted and collected from the Emergency Department database. All cases were reviewed in retrospect by 2 qualified doctors before data entry was commenced. There are multiple variables extracted from each hand injury case which included demographics, socioeconomic status (if available), time and date of event, mode of transport, type of injury, location of injury, management, outcome, and length of stay.

Data were crosschecked and entered into a prepopulated Statistical Package for Social Sciences (SPSS) datasheet. The Statistical Package for Social Sciences (SPSS) software (SPSS Statistics 12.1, for Windows, New York) will be utilized in the data analysis. In order to assess the significance of differences in the variables between cases and controls, a series of chi-square tests and the Fisher exact tests were used where appropriate.

This study was reviewed and approved by the National Trauma Centre's ethics committee. All collected data were anonymized and untraceable. All data will only be used for research purposes and ethical standards of scientific research were strictly adhered to.

Results

There were 1091 hand injuries assessed at the National Trauma Centre in Oman during the study period of which 442 cases recorded during Ramadan Eids, 353 during Haji Eids, and 296 control cases. The Ramadan Eid in 2004 recorded the highest cases among all years reviewed. Table 1 shows the annual cases recorded during sacrifice festivals in Oman between 2004 and 2013.

Table 2 shows the results of the study comparing the 2 Eids with control cases. The average age of patients sustaining hand injuries in Oman during the study period was 25.7 years. There is no difference in mean age between the cases and controls. Males were disproportionately overrepresented in both cases and controls and constitute around two-thirds of the study population. In terms of the mechanism of hand injury, knife laceration was 2.4 more common during Eid times than during control times. This observation was statistically

Table 1. Demographics of Reviewed Cases.

Year	Cases reviewed			Total
	Ramadan Eid	Haji Eid	Control	
2004	93	41	39	173
2005	53	35	28	116
2006	37	15	25	77
2008	30	37	31	98
2009	42	36	24	102
2010	34	24	35	93
2011	35	38	34	107
2012	37	36	24	97
2013	49	78	27	154
Total	442	353	296	1091

significant with a *P* value of .001. Tendons were injured in 143 cases during Eid festivals compared with only 8 cases during controls. Extensor tendons were 2.7 more likely to be injured during Eid times than during other times. This study found no difference in injury likelihood between right and left hand. The chance of injuring either hand is about 50%. Thumb and index fingers constituted about 40% of all cases reviewed in cases and controls alike. Therefore, these were the main fingers injured. The majority of patients reviewed (about 85%) were treated in the emergency department and discharged, while 15% of patients were admitted for further surgical intervention. Of those who were admitted, the average hospital stay was significantly longer for patients during Eid time compared with those during other times (2.5 days vs 1.5 days).

Discussion

Injuries can have devastating effects and can turn a happy festive atmosphere to a painful one. The aim of this study is to highlight the burden of injuries during the Islamic festive times. The study showed that at baseline, hand injuries are mostly of the crush type, while during the religious festival days the mechanism is predominantly knife-related. The increase in knife injuries is likely related to the sacrificial practices taking place during the festivals, and this increased prevalence in turn reflects how common this practice is. This study only examined the injuries presenting to 1 hospital, and it is likely that there are many other injuries presenting to other hospitals as well as a significant number not presenting to medical attention. The injuries were predominantly in males and this is expected, as it is men who mostly carry out the sacrificial practice.

The most common injury was lacerations, and these commonly involved the thumb and index fingers with lesser involvement of the other fingers. The involvement of these 2 digits can be explained by the mechanism of slaughtering itself. The commonly injured hand would be the one not

Table 2. Hand Injuries During Eids Versus Control Cases.

Variable	Ramadan Eid	Haji Eid	Control	RR (case vs control)	P value
Age, mean (SD)	26.1 (3.2)	25.9 (2.8)	25.6 (2.7)		.32
Gender, male, No. (%)	313 (71.6%)	286 (81.5%)	227 (76.7%)		.54
Mechanism of injury, No. (%)					
Knife	252 (57.0%)	224 (63.5%)	552 (50.6)	2.4	.001
Crush	142 (32.1%)	101 (28.6%)	176 (59.5%)	0.8	.12
Burn	14 (3.2%)	3 (0.8%)	3 (1.0%)	1.0	.5
Motor vehicle crash	3 (0.7%)	2 (0.6%)	4 (1.4%)	0.9	.9
Other penetrating injury	31 (7.0%)	23 (6.5%)	37 (12.5%)	0.8	.8
Diagnosis, No. (%)					
Laceration	311 (70.4%)	285 (80.7%)	165 (55.7)	1.7	.03
Fracture	114 (22.9%)	65 (16.1%)	109 (34.1%)	0.7	.07
Dislocation	0	3 (0.8%)	3 (1.0%)	0.8	.9
Tendon injury, No. (%)					
Extensor	25 (59.5%)	31 (68.9%)	2 (33.3%)	2.7	.001
Flexor	42 (40.5%)	45 (31.1%)	6 (66.7%)	0.7	.9
Right	218 (49.3%)	153 (43.3%)	151 (51.0)	0.9	1.0
Left	224 (50.7%)	200 (56.7%)	145 (49.0)	0.8	.7
Thumb	73 (16.5%)	81 (22.9%)	63 (21.3%)	1.0	.8
Index	117 (26.5%)	86 (24.4%)	49 (16.6%)	1.8	.05
Middle	60 (13.6%)	47 (13.3%)	34 (11.5%)	1.1	.6
Ring	53 (12.0%)	34 (9.6%)	39 (13.2%)	1.0	.9
Little	46 (10.4%)	51 (14.4%)	58 (19.6%)	0.8	.6
Multiple	60 (13.6%)	43 (12.2%)	41 (13.9%)	1.0	.9
Other parts of hand	33 (7.5%)	11 (3.1%)	12 (4.1%)	1.6	.09
Management, No. (%)					
Suturing and wound care	365 (82.8%)	302 (85.6%)	253 (85.5%)	1.0	.1
Admission	76 (17.2%)	51 (14.4%)	43 (14.5%)	1.1	.8

Note. RR = relative risk.

holding the knife but rather the one opposite which acts to stabilize the animal's neck with a C-grip formed by the thumb and index fingers around the neck. The laceration would take place when the animal suddenly jerks or the knife accidentally slips resulting in cutting over the stabilizing fingers. Furthermore, when the lacerations involved tendons, these tended to affect the extensor tendons more commonly than the flexors. Again this is likely related to the position of the hand during the act where the palm of the hand would be relatively protected as it is padding the animal's neck and the dorsum of the hand being the one exposed. This type of injury can be partly avoided by stunning the animal prior to slaughtering it, which is practiced in other parts of the world; however, the Islamic religion prohibits such practice as it mandates that the animal be fully conscious during the act (International Islamic Fiqh Academy, Jeddah, 2009). In the control, lacerations were still the most common injury; however, the flexor tendons were much more commonly involved. This likely reflects the prevalence of a very specific mechanism of injury during the festival times and variable mechanisms during the other days of the year. This would also explain the more frequent involvement of digits other than the thumb and index outside the festival days.

Over the 10 years period of the study, there was no trend toward a decline in the number of injuries, although it was expected to see that with the increasing availability of professional slaughterers in slaughter houses. However, this trend may eventually be seen in the coming years with the recent increase of reported cases of Crimean-Congo Hemorrhagic Fever (CCHF) around the festival times, mostly being linked to animal sacrifices taking place at homes, and the government's efforts to encourage and facilitate the use of slaughter houses around these times.

There was no difference in the incidence of admission between the control group and the festival days group; however, the latter group had a longer length of stay on average. This does not necessarily reflect worse injuries but rather could be due to the fact that these injuries occur during a holiday season when the medical services slow down.

There have been few studies from other Muslim countries such as Saudi Arabia and Turkey that highlighted similar outbreak of injuries particularly of hand injuries during the sacrifice festivals.^{2,3,5,6} For example, Rahman and others reported 298 injuries during 4 years in 1 hospital in Saudi Arabia.⁵ Ninety-two percent were nonprofessional slaughterers with 75% of injuries inflicting the hands.^{2,5}

Similarly, a case review from Turkey reported 122 injuries during 2 years.⁴ Eighty-seven percent of injuries were lacerations to the hand with a knife.^{3,4}

Our study has few limitations. One is that it is retrospective in nature and the information is limited to whatever is available in the patient's chart. Important missing information includes the patient's occupation, which is very often not recorded. We were unable to determine if any of the injured patients were actually professional butchers who are also prone to such injuries by virtue of their profession. Also, the data were obtained from only 1 hospital in the country and does not reveal the entire burden of injury in the country. Another limitation is that the event history is not always recorded and attributing all the injuries seen during the festival season specifically to the slaughtering act is mostly presumptive.

Despite the limitations, our study is pioneering in describing the "unique" pattern of injuries during sacrifice season in the Sultanate of Oman. It highlights the "outbreaks" of injuries during the Holy sacrifice seasons. Policy makers need to gear health care resources during such times to meet the actual injury burden. Furthermore, preventive efforts need to be set in place to reduce the incidence of such injuries. This can be achieved through educational campaigns as well as increasing the availability of professional butchers during these seasons.

Acknowledgments

We would like to acknowledge the effort and help of all residents and doctors who participated and helped in this project.

Ethical Approval

This study was approved by our institutional review board.

Statement of Human and Animal Rights

This article does not contain any studies with human or animal subjects.

Statement of Informed Consent

No individual consent was obtained as no individuals were involved in this case review research.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

1. Ahmed QA, Arabi YM, Memish ZA. Health risks at the Hajj. *The Lancet*. 2006;367(9515):1008-1015.
2. Al-Ghamdi SM, Akbar HO, Qari YA, Fathaldin OA, Al-Rashed RS. Pattern of admission to hospitals during Muslim pilgrimage (Hajj). *Saudi Med J*. 2003;24(10):1073-1076.
3. Avşaroğullari L, İkizceli İ, Sözüer E, Yürümez Y. Hand injuries during a Muslim sacrifice festival. *Am J Emerg Med*. 2004;22(6):508-509.
4. Dizen H, Koç M, Ocak S, Tez M. The Sacrifice Festival: who is the victim? *Ann Emerg Med*. 2009;53(4):547-548.
5. Rahman M, Al-Zahrani S, Al-Qattan M. "Outbreak" of hand injuries during Hajj festivities in Saudi Arabia. *Ann Plast Surg*. 1999;43(2):154-155.
6. Sarifakioglu N, Levent A, Terzioglu A, Aslan G. Do we sacrifice ourselves? *Plast Reconstr Surg*. 2003;111(5):1762-1763.