

# Riots in Beirut: Description of the Impact of a New Type of Mass Casualty Event on the Emergency System in Lebanon

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## ABSTRACT

**Introduction:** In the summer of 2015, Beirut experienced a garbage crisis that led to rioting. Riot control measures resulted in multiple casualties. This study examines injury patterns of riot victims presenting to the emergency department of a tertiary care center in a developing country.

**Methods:** A retrospective study was conducted in the emergency department of the American University of Beirut Medical Center between August 22 and August 30, 2015. Patients seen in the emergency department with riot injuries were included. Patient characteristics, injuries, and resources utilized in the emergency department were analyzed.

**Results:** Ninety-five patients were identified. Most patients presented to the emergency department within a short time period. The mean age of the patients was  $28.0 \pm 8.7$  years. Most (90.5%) of the patients were males and 92.6% were protestors. Emergency medical services were utilized by 41.0% of patients. Laceration was the most common presenting complaint (28.5%), and blunt trauma was the most common type of injury (50.5%). The head/face/neck was the most common injured body region (55.8%). Most patients did not require blood tests or procedures (91.6% and 61.0%, respectively), and 91.2% of patients were treated in the emergency department and discharged. One patient required intensive care unit admission and another was dead on arrival.

**Conclusions:** Most patients had mild injuries on presentation. The emergency department experienced a high influx of patients. Complications and deaths can occur from seemingly nonlethal weapons used during riots and warrant effective prehospital and hospital disaster planning.

**Key Words:** riot, prehospital care, mass casualty, emergency medicine

Civil unrest results from unresolved disputes and can lead to organized mass gatherings and protests with resulting riots or violent public disturbances, destruction of property, and compromised safety of bystanders or participating individuals. Riots can challenge the emergency medical system because of the large number of casualties involved<sup>1,2</sup> and the lack of physician familiarity with the full extent of injuries caused by weapons used by security forces to incapacitate rioters.<sup>3</sup>

In the summer of 2015, Beirut, the capital city of Lebanon, experienced a garbage crisis resulting from failure to collect and dispose of the local rubbish; this eventually resulted in huge piles of garbage in the streets.<sup>4</sup> The government's failure to address this crisis triggered a series of demonstrations in Martyrs' Square in downtown Beirut, which led to civil unrest and a major riot at the end of August of the same year.<sup>4</sup> Riot control forces and military police used less-lethal weapons such as water cannons, tear gas, and rubber

bullets.<sup>4</sup> Approximately ten thousand rioters faced hundreds of policemen in riot gear, and violent eruptions<sup>4</sup> took place over 24 hours and resulting in dozens of casualties. The emergency department (ED) at the American University of Beirut Medical Center (AUBMC), the largest tertiary care center in Lebanon, was the main ED in the area to receive riot-related casualties because of geographic proximity to the events.

Existing literature that describes the impact of riots on the medical system is setting specific, in that the types of less-lethal weapons used to contain rioters determine the resulting types of injuries and, accordingly, the hospital resources that are utilized.<sup>1,2,5</sup> To date, riot-related mass casualty events have not been previously described in Beirut, Lebanon. This study describes the impact of a riot-type mass casualty event. Patient characteristics, injury patterns, ED management, and clinical outcomes of affected victims are examined.

**METHODS**

**Study Design and Sample**

A retrospective observational study was performed in which the charts of patients presenting to the emergency room at AUBMC between August 22 and August 30, 2015, when major riots were taking place, were reviewed. Charts of all patients arriving to the ED during this period were reviewed, and patients with riot-induced injuries were identified and included in our study. The study was approved by the institutional review board at AUBMC.

**Data Collection and Statistical Analysis**

A chart review of all patients included in the study was conducted. Investigators retrieved the following information from the patients' charts:

- patient demographics (age, sex, marital status, citizenship, role in riot)
- administrative elements (mode of arrival to ED, emergency severity index (ESI) score (1-5, with a score of 1 being the most urgent and 5 being least urgent), patient disposition from ED, and ED length of stay)
- clinical elements (chief complaint, type of injury, mechanism of injury, body region of injury, and medical interventions (laboratory test, imaging, procedures, medications))

Descriptive analysis was performed using SPSS 23 (Statistical Package for Social Sciences). Categorical variables were presented as frequencies and percentages, whereas continuous variables were summarized as means plus or minus standard deviations, medians, and interquartile ranges.

**RESULTS**

Out of 1302 charts reviewed, 95 patients presented to the ED at AUBMC with reported injuries as a consequence of the riots that took place in Beirut between August 22 and August 29, 2015. Of these patients, 90.5% were male, 94.7% were Lebanese, most (84.2%) were single, and the majority were protestors (92.6%). The mean age of the victims was 28.0 (± 8.7) years. Patient baseline characteristics are shown on [Table 1](#).

The highest influx of patients arriving to the ED occurred on August 23, 2015 (62 patients), with the peak arrival of patients occurring between 9:00 pm and 10:00 pm (24 patients). More than half (53.7%) of the ED admissions occurred between 8:00 pm and 11:00 pm on the second day of the riots at a rate of approximately 1 patient every 3.5 minutes. The most common mode of transport to the ED was non-EMS (51.6%). On arrival to the ED, the majority of patients had a medium to low triage acuity score (ESI score of 3 or 4). Laceration injury was the most common chief complaint (28.4%), and contusion / blunt trauma was the most common type of injury (50.5%). The most common reported mechanism of injury was by stones, rocks, and other projectile

**TABLE 1**

Patient Characteristics and Variables	
<b>Patient Characteristics</b>	
<b>Age, years (SD), (n=90)</b>	28.0 (8.7)
<b>Gender, No. (%), (n=95)</b>	
Male	86 (90.5)
Female	9 (9.5)
<b>Nationality, No. (%), (n=95)</b>	
Lebanese	90 (94.7)
Unknown	5 (5.3)
<b>Marital status, No. (%), (n=95)</b>	
Single	80 (84.2)
Married	15 (17.8)
<b>Role in riot, No. (%), (n=95)</b>	
Protestor	88 (92.6)
Policeman	5 (5.3)
Bystander	2 (2.1)
<b>Variable</b>	
<b>Mode of transport on arrival, No. (%)</b>	
EMS	39 (41.0)
Non-EMS	49 (51.6)
Unknown	7 (7.4)
<b>ESI score, No. (%)</b>	
1	1 (1.1)
2	8 (8.4)
3	57 (60.0)
4	26 (27.4)
5	3 (3.2)
<b>Chief complaint, No. (%)</b>	
Lacerations	27 (28.4)
Extremity pain	19 (20.0)
Shortness of breath	14 (14.7)
Head/face/neck pain	13 (13.7)
Visual disturbances / eye pain	6 (6.3)
Chest pain	5 (5.3)
Gunshot wound	3 (3.2)
Altered level of consciousness	2 (2.1)
Other <sup>a</sup>	6 (6.3)
<b>Type of injury, No. (%)</b>	
Blunt trauma / contusion	48 (50.5)
Laceration	37 (38.9)
Inhalation injury	17 (17.9)
Gunshot wound injury	4 (4.2)
Other <sup>b</sup>	2 (2.1)
<b>Mechanism of injury, No. (%)</b>	
Stones/rocks/projectile objects	28 (29.5)
Tear gas	16 (16.8)
Metallic/plastic batons	9 (9.9)
Rubber bullets	6 (6.3)
Physical assault	3 (3.2)
Other <sup>c</sup>	4 (4.2)
Unknown	24 (25.3)
<b>Region of injury, No. (%)</b>	
Head/face/neck	53 (55.8)
Extremities	34 (35.8)
Chest/abdomen/pelvis	13 (13.7)

Abbreviations: EMS, emergency medical services; ESI, triage acuity score.  
<sup>a</sup>Includes: (1) epistaxis, (2) testicular pain, (4) finger amputation, (5) poly-trauma, (6) back pain.  
<sup>b</sup>Includes: (1) posterior vitreous detachment and (2) finger amputation.  
<sup>c</sup>Includes injuries caused by: (1) water cannons, (2) barbed wire, (3) mechanical falls.

TABLE 2

## Patient Disposition and Emergency Department Medical Interventions

Categorical Variables	
<b>Laboratory tests in ED, No. (%)</b>	
No	88 (92.6)
Yes	7 (7.4)
<b>Imaging tests done, No. (%)</b>	
No	44 (46.3)
Yes	51 (53.7)
Radiography only	34 (66.7)
CT only	17 (33.3)
Radiography and CT	16 (37.3)
<b>Procedure done in ED, No. (%)</b>	
No	58 (61.1)
Yes	37 (38.9)
Laceration repair	30 (81.1)
FAST exam	13 (35.1)
Endotracheal intubation	1 (2.7)
<b>Medications administered in ED, No. (%)</b>	
No	31 (32.3)
Yes	64 (67.4)
Tetanus vaccine	35 (54.7)
Pain medication	25 (39.1)
Bronchodilators	14 (21.9)
Antibiotics	5 (7.8)
Others <sup>a</sup>	5 (7.8)
<b>ED disposition, No. (%)</b>	
Treated and discharged home	87 (91.6)
Left against medical advice	3 (3.2)
Admitted to unmonitored unit	3 (3.2)
Admitted to critical care unit	1 (1.1)
Dead	1 (1.1)
Continuous Variable	
<b>Length of ED stay, min, mean (SD)</b>	124.8 (199.1)

Abbreviations: CT, computed tomography; ED, emergency department; FAST, focused assessment with sonography for trauma.

<sup>a</sup>Includes (1) proton-pump inhibitors and (2) neuromuscular blockers.

objects (29.5%). The mechanism of injury was missing in 25.3% of cases. The head/face/neck was the most frequently injured body region (55.8%), followed by the extremities (35.8%). Characteristics of patient injuries are reported on Table 1.

Most of the patients who presented to the ED did not require any laboratory tests (92.6%) or procedures (61.0%). For patients who underwent a procedure in the ED, the most common procedure was laceration repair (81.1%), followed by a focused assessment with sonography for trauma (FAST) exam (35.1%). More than half of the patients underwent imaging tests, mainly radiography (66.7%). Medications were administered to 67.4% of the patients. The most frequently administered medication was tetanus vaccine (54.7%), followed by pain medication (39.1%). Most patients were treated in the ED and discharged home (91.6%). Only 1 patient required ICU admission, and 1 patient died in the ED from a penetrating head injury. The average ED length of stay

was 124.8 ± 199.1 minutes. Medical interventions and patient dispositions are displayed on Table 2.

## DISCUSSION

This retrospective study is the first to describe a riot-type mass casualty event in Beirut, Lebanon. Riots are setting-specific, and their impact is important to describe for better planning and mitigation. The mortality rate of 1.1% in this study is lower than rates reported in previous studies examining this topic. Previously reported mortality rates<sup>6</sup> from riots range from 2.0% to 6.1% on arrival to the ED. Other studies examining this topic do not report mortality rates.<sup>1,5</sup> This variation in mortality rates among patients with riot-related injuries may be a result of the numerous available forms of less-lethal weapons that can be used to incapacitate rioters and which may result in different types of injuries and subsequently different rates of deaths that are setting- and country-specific.

Temporary incapacitating agents used to control rioters often appear to have more than temporary effects: previous studies and case reports have documented pulmonary contusions and penetrating ocular injuries<sup>6</sup> from rubber bullets and ocular, cutaneous, and respiratory reactions and myocardial infarctions<sup>7</sup> from tear gas. These unfamiliar complications, as well as the lack of evidence-based management of patients with riot injuries,<sup>7</sup> could result in higher-than-expected mortality rates from seemingly nonlethal injuries, particularly in patients with chronic respiratory or cardiac diseases who are more likely to develop severe systemic sequelae from riot control agents.<sup>8</sup>

The most common mode of transport of patients arriving to the ED was non-EMS, however, EMS use in this study (41.0%) is higher than previously reported local EMS use. A study carried out at the ED of AUBMC showed that only 23.3% of the study population used EMS for all-cause presentations and that EMS use was associated with higher illness severity during routine daily operations.<sup>9</sup> During civil unrest and rioting, however, EMS are expected to increase their readiness by deploying additional ambulances and teams to the conflict zones. Additionally, EMS agencies in Lebanon are well adapted to quick transport and care of trauma-related cases because of the recurrent armed conflicts that occur in the region.<sup>10</sup>

Injury patterns and severity in this study mirror findings from other studies examining this topic. Riot victims are usually hemodynamically stable on presentation (medium to low triage severity score)<sup>1,2</sup> and are predominantly male.<sup>1,5,6</sup> Patients present mainly with abrasions and lacerations<sup>1</sup> affecting the head/neck and extremities, which are the most commonly injured body regions.<sup>1,2,5,6</sup> This study was also consistent with the existing medical literature regarding hospital resource utilization, diagnostic measures, and patient disposition.<sup>1,2,5</sup>

Casualties often arrive at emergency departments in large numbers over short periods of time.<sup>1</sup> This was demonstrated in our study, which showed that 53.7% of the ED admissions occurred over a 3-hour period at a rate of 1 patient arrival every 3.5 minutes. This resulted in the activation of our hospital disaster preparedness plan. This incident revealed that ED personnel need to be better prepared for high patient influx during rioting events. Disaster planning strategies could involve collaboration with EMS to allow for more balanced casualty distribution among the hospitals that are close to the riot scene. In Lebanon, the EMS system is composed of multiple volunteer agencies that lack prehospital standards and a lead agency. Effective communication between EMS personnel and ED staff is lacking.<sup>10</sup> This was made even more apparent when, during these riots, almost all patients were routed to our ED by EMS. Additionally, more advanced EMS systems often establish policies and protocols that allow them to treat and release patients on the field or transport them to appropriate EDs. Our EMS system has no such policies, which resulted in unnecessary ED admissions.

The limitations of this study are related to its retrospective nature. During mass casualty events, documentation in the ED records is often missing, and this might have led to underestimation of some injuries. No follow-up was obtained on patients, and as a result we could not comment on missing injuries or delayed complications of initial injuries. It is worth noting that, because of the fluctuating nature of the rioting crowd, estimating the crowd size was difficult. It is possible that larger rioting crowds may have resulted in different injury profiles. Although the study results mirror those of previous studies examining this topic in other countries, this study is innovative in reporting on the impact of riots out of a developing country that has not previously experienced such events.

### CONCLUSION

Patients' characteristics and patterns of injuries in riots in Lebanon were similar to those from other countries. Patients are usually young and present with low-severity injuries mostly related to lacerations. High patient influx over a short period of time was observed. Additionally, although nonlethal or less-lethal weapons are used during rioting, deaths do occur.

This highlights the need for effective prehospital and hospital mass casualty planning in Lebanon for improved response to such events.

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