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Penetrating abdominal injuries during the Syrian war: Patterns and factors affecting mortality rates

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ABSTRACT

Background: A large number of innocent Syrians were injured or killed during the years of war. This retrospective study investigates the differences in patterns of injury and factors affecting the mortality rate in 324 patients coming to Damascus Hospital with penetrating abdominal trauma, and illustrates the difficulties of diagnosis and decision making in crisis situations.

Methods: A retrospective study was registered from patient's records between October 2012 and June 2013 in Damascus Hospital. All victims were injured either by explosions or gunshots.

Results: A total of 325 patients: 183 by explosion; 56.3%, 141 by gunshot; 43.3%, and one patient by other means; 0.3% were reviewed. The study focused on the two large groups with a total of 324 patients. Males were predominant (82.1%; n=266) and the majority of patients were between 19 and 35 years old. Patients suffering from multi abdominal organ injury were more common in gunshot group (n=72, 51.1%) compared to the explosion group (n=83, 45.3%). 264 patients (81.5%) underwent surgical operations and only 22 (8.3%) had normal laparotomy. The inpatient mortality rate was (17.0%; n=55), and there was no difference in mortality rate between the two groups. More than the half of deaths (n=42; 76.4%) had a P.A.T.I score ≤ 25 where the death rate was 35.6% which is higher compared to 6.3% in those with a P.A.T.I < 25. In the ICU 33 patients died, of these (87.9%; n=29) died after immediate admission to the ICU which is higher compared with a later admission (12.1%; n=4). The need for massive blood transfusion affected the mortality rate.

Conclusion: Efforts must be directed toward training of medical staff to deal with crisis incidents. The need for massive blood transfusion and ICU admissions can affect mortality. P.A.T.I was found to be an effective predictor of mortality. Clinical experience in this field can produce better health care and faster judgments.

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Introduction

Since the war in Syria started in 2011, this conflict has produced a large number of victims due to terror-related activities. Five years of this war precipitated a large number of Syrians injured or killed especially between 2012 and 2013. Many places in Syria were bombed, shelled, or witnessed a ground battle involving guns. Damascus, the capital of Syria, was a target for many of those attacks. Such incidents resulted in a higher mortality rate than road

traffic accidents and other forms of trauma [1]. Historically, these types of attacks are the most common [2]. This study illustrates civilians came to Damascus Hospital who sustained penetrating abdominal trauma injuries and required immediate surgery and/or admission to the surgical ward for conservative management or Intensive Care Unit (ICU) for close observation. Frequently, the management decision was based mainly on clinical evaluation and if available further imaging techniques, such as ultrasonography, X-ray, and/or contrast Computed Tomography (CT) were used.

Before 2011, Damascus Hospital was one of the main health care providers in Damascus having efficient equipment and a large number of qualified physicians. Furthermore, Syria was fairly peaceful and inexperienced in dealing with large number of victims in one day. After the war began, the medical establishment field faced a challenge in providing care due to a shortage of

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medical supplies, drugs, equipment, and medical and nursing staff. It was a burden on all junior and senior residents to make the proper decision in urgent situations, even before referral to the consultant in charge, dependent on their own experience in this field, and the clinical evaluation, in addition to the Imaging techniques that were used, when available, in assessment of intra-abdominal injuries. Different types of aggressions, such as bombing, shootings, and shelling result in a wide variety of injuries that need special preparations and skills from hospitals and doctors to deal with each pattern [3]. This review focuses on penetrating abdominal trauma, describing abdominal organ injury patterns and care for victims treated at Damascus Hospital. As far as we know, this is the first article published from a Syrian Hospital about the war in Syria.

Methods

Damascus Hospital is one of the main hospitals located in the center of Damascus, with its 500 beds and 12 operating rooms (OR) receiving most of victims injured in the capital and its suburbs, in addition to complicated cases from all over the country. Data was retrospectively collected on 325 patients either injured or killed from terror-related attacks during the period from October 2012 to June 2013. The focus was on patients who sustained penetrating abdominal injuries from different patterns of attacks, explosions, and gunshots. Analysis included age, gender, injury type, ICU admissions, mortality rate, penetrating abdominal trauma index (P. A.T.I), and injured abdominal organs. Parameters were described and compared between gunshot patients and patients injured by explosions.

When the hospital was expected to receive a large number of victims, an emergency team consisting of junior and senior residents, in addition to the consultant on call, were ready and prepared at the emergency department (ED) to provide medical care. All elective surgeries were postponed and the 12 ORs were ready. Patients discharged from wards to make room for incoming victims.

All victims were assessed by senior residents and divided into critical patients who need immediate surgery based on clinical evaluation, and those who underwent a further imaging such as Focused Assessment Sonography for Trauma (FAST) and/or CT. Clinical findings such as abdominal tenderness with rigidity and evisceration of abdominal contents from the wound as well as general status of the patient such as hypotension and shock were considered indications for exploratory laparotomy. Two intravenous lines along with blood withdrawal for cross and match were established before the patient went to OR.

Results

Population study

325 victims came to Damascus Hospital suffering from intra-abdominal injuries. 183 injuries were due to explosions (56.5%) and 141 (43.3%) were gunshot wounds. Only one patient was injured by stabbing, and was excluded from the study. This paper will focus on the two large groups, gunshot patients and patients injured due to explosion, a total of 324 patients.

Males were predominant (n = 266; 82.1%; 95% CI 77.5%–86.1%). Both males and females were affected more by explosions (139, 44 respectively as listed in Table 1). Males suffering from gunshots were higher than females (90.1%, n = 127). Almost half of patients were between 19 and 35 years old (n = 143, 44.1%) and this age group contained (n = 68; 37.2%) of injuries caused by explosion and 53.2% due to gunshot (n = 75). The number of children who

Table 1
Age and Gender Distribution by Injury Mechanism.

	Total		Explosion		Gunshot	
	N	%	N	%	N	%
Total	324	100	183	56.5	141	43.5
Gender						
Male	266	82.1	139	76.0	127	90.1
Female	58	17.9	44	24.0	14	9.9
Age groups						
0–18	59	18.2	45	24.6	14	9.9
19–35	143	44.1	68	37.2	75	53.2
+35	122	37.7	70	38.3	52	36.9

sustained abdominal injuries was (n = 59, 18.2%) as many schools were exposed to attacks during the war (Table 1).

Injury study

Of all patients exposed to explosions, (26.8%; n = 49) had no internal injury, which is a little higher than gunshot patients without internal injury (24.1%; n = 34). On the other hand, patients suffering from multi-abdominal organs injury were more in gunshot group (n = 72, 51.1%) compared to the explosion group (n = 83, 45.3%). Abdominal organs exposed to injury were registered and compared between the two groups. The small intestine was the most injured organ among the explosion group 34.0%, while the large intestine was the most frequent organ to be damaged in gunshot patients, 37.0%. Overall, other than duodenum, spleen, extra hepatic biliary tree, small intestine, and stomach, which were more damaged in explosion victims, all other abdominal organs were damaged more in gunshot victims.

Surgical operations

264 patients (81.5%) underwent surgical operation due to several types of injury and the decision of surgery was made based mainly on clinical evaluation. The rates of surgery were similar in the two groups, (n = 145; 79.2%) of the explosion patients and (n = 119; 84.4%) of the gunshot patients. A low number of patients (n = 22; 8.3%; 95% CI 5.3%–12.3%) had negative laparotomies (Table 2). Of all patients who went to surgery; (n = 118; 44.7%) had P.A.T.I \geq 25, (35.6%; n = 42) died due to their injuries; on the other hand, 146 patients (55.3%) had P.A.T.I < 25 and only (8.9%; n = 13) died.

Inpatient mortality

The inpatient mortality rate was 17.0% (55 patients). There was no difference in mortality rate between the two groups (Table 3). In general, most deaths occurred within one day across both groups (n = 40 72.7%; 95% CI 59.0%–83.9%). Only few patients died after 8 days (6 patients) (Table 3).

Table 2
Number of Patients Who Had either Surgery or Observation and no. of Negative Laparotomies by Injury Mechanism.

	Total		Explosions		Gunshots	
	N	%	N	%	N	%
Total No. of patients	324	100	183	56.5	141	43.5
Patients had Laparotomy	264	81.5	145	79.2	119	84.4
Negative Laparotomy	22	8.3	11	7.6	12	10.1
Observations	60	18.5	38	20.8	22	15.6

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