New Trends in Terrorism-Related Injury Mechanisms: Is There a Difference in Injury Severity?

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Study objective: The latest wave of terrorism worldwide has seen significant use by terrorists of mundane, "low-technology" weapons, such as utility knives and civilian vehicles. How do the injuries they produce compare with that of more conventional terrorism mechanisms, such as use of firearms and explosives? We compare injury patterns of the most frequent terrorism-related injury mechanisms in an Israeli data set.

Methods: This was a retrospective study of 1,858 patients hospitalized because of terrorism events, which were recorded in the Israeli National Trauma Registry between January 1997 and December 2016. The events were divided into 4 groups based on weapon used: explosions, shootings, stabbings, and vehicular attacks. The groups were compared in terms of injuries sustained, use of hospital resources, and clinical outcomes.

Results: Explosion-related and vehicular terrorism resulted in a higher proportion of multiple injuries, whereas stabbings and shootings mostly led to isolated injuries. Victims of vehicular attacks had a high proportion of severe head injuries, whereas stabbing victims had a high volume of vascular injuries. All mechanisms involved significant damage to extremities; however, among stabbing victims injury was mainly to the upper extremities, whereas among vehicular attack victims it was mostly to the lower extremities. The overall injury severity of the compared groups was similar, leading to comparable levels of intensive care use and inhospital mortality. Certain similarities in victims' characteristics were observed between the shootings and stabbings and between explosions and vehicular attacks.

Conclusion: Despite differences between various terrorist attack mechanisms, the resulting injury severity and inhospital mortality are very similar, with stabbings and vehicular attacks causing injuries as serious as those caused by conventional weapons. [Ann Emerg Med. 2019;74:697-705.]

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INTRODUCTION

The number of terrorism-related injuries is increasing all over the world, with multiple terrorist attacks recorded both in acknowledged conflict zones and in traditionally more peaceful regions. These attacks vary in the choice of intended targets, their physical placement, timing, and, of course, in the chosen mechanism of the attack. In addition to the use of dedicated means of violence (firearms and explosives), recently there have been more mundane, "low-technology" objects, such as utility knives and civilian vehicles, used for malicious purposes.[1,2] Stabbings and vehicle-based terrorist attacks, executed by so-called lone wolves, are especially dangerous because they require very little logistic preparation and are therefore less preventable by security services.[2] These novel ways to inflict mass injuries by using available means, resulting in new patterns of injury and lethality, may require adaptation of existing clinical practices to provide the best possible treatment to victims.[1] Therefore, more knowledge is required in regard to the injuries that hospitals may encounter as a result of such a terrorist attack. Many comprehensive studies have been published in regard to the epidemiologic profiles of

†All members are listed in the Appendix.

Editor's Capsule Summary

What is already known on this topic

Terrorist attacks on civilian populations have typically been conducted with firearms and explosives, but more recently also with knives and civilian vehicles.

What question this study addressed

This study examined victims of such attacks in a large Israeli data set to determine whether injury patterns and severity were changing.

What this study adds to our knowledge

The proportion of severe and critical injuries and resource use was similar in all groups. Patterns of injury varied, however.

How this is relevant to clinical practice

Individuals planning mass casualty responses should consider how the injury patterns resulting from different assault mechanisms affect the surgical personnel required for an optimal response.

specific terrorism-related injury mechanisms; however, much less is known about how these mechanisms compare with one another.[3,4]

Injury mechanism is known to be a major defining factor of the clinical effects of the injury itself: its placement, its severity, the recommended treatment, and the expected outcome.[3,5,6] The most basic distinction in trauma surgery is between penetrating and blunt trauma mechanisms, although the variations within those groups may be significant. Sharp objects and bullets may both cause deep penetrating injuries, but in the latter case the surrounding tissues sustain additional damage because of the temporary cavitation created by the shock wave following the bullet's path[6,7]; blast trauma injury patterns can be very different from injuries caused by vehicle crashes and will frequently involve multiple organs, as well as different trauma types.[8,9]

In accordance with the difference between injury profiles, it is therefore logical to expect a certain hierarchy of injury severity to exist between the most frequent terrorism-related injury mechanisms, with some mechanisms consistently causing more severe injuries. The goal of this study was to assess this in a large national data set.

MATERIALS AND METHODS

Study Design

We performed a retrospective cohort study of trauma patients who sustained a terrorism-related injury between January 1997 and December 2016. Patient data were obtained from the records of the Israeli National Trauma Registry, maintained by the Israel National Center for Trauma and Emergency Medicine Research in the Gertner Institute for Epidemiology and Health Policy Research.

Data Collection and Processing

The registry contains information concerning trauma patients hospitalized in 20 hospitals, including all 6 Level I trauma centers in Israel. It does not include patients who were declared dead at the scene or on arrival at the hospital or those discharged from the emergency department (ED). The data are collected at each hospital by dedicated trauma registrars, monitored by a trauma coordinator, and supervised by the trauma unit director. They are entered electronically and transmitted with no identifying details to the central database, managed by the Israel National Center for Trauma and Emergency Medicine Research at the Gertner Institute. After the data are received from a hospital and entered into the central database, logic and other tests are performed to ensure quality and completeness. Missing, unclear, or erroneous data are corrected and completed. When missing information is detected, a query is sent to the hospital to fill it in. For each patient in the registry, there are approximately 150 variables providing demographic data, detailed injury data (circumstances and mechanism), information on out-of-hospital treatment and treatment in the ED, hospital data, information on operations, diagnosis (according to the *International Classification of Diseases, Ninth Revision, Clinical Modification* [*ICD-9-CM*] and Abbreviated Injury Score), and destination on discharge.

All studies performed with the registry data are approved by the Institutional Ethical Committee of Sheba Medical Center.

Terrorism-related injuries were identified in the registry by *ICD* E-codes E979 and E990 to E999. Fifty-five cases were excluded for not having a recorded diagnosis. For the remaining patients, terrorism-related shootings, explosions, stabbings, and vehicular attacks were identified according to specific *ICD* E-codes and open-text description of injury. Logic tests were performed comparing *ICD* E-codes with Abbreviated Injury Score diagnoses and performed clinical procedures.

Case finding was conducted by the researchers at the Gertner Institute. After all the mentioned E-codes were

obtained, they were checked against open-text descriptions of the same cases. Because of the data management in the registry, all the remaining cases had an extremely low proportion of missing cases in a very small number of variables; therefore, percentages were calculated out of existing values.

Every attack was identified by date and mechanism and checked by its reported description in open sources, such as Internet news and government agencies' sites. It was decided a priori to analyze only the mentioned 4 mechanisms and disregard war-related injuries (including those of patients from wars abroad) and terrorism mechanisms endemic to Israel, such as ballistic arc projectiles (missiles and mortars), as well as clinically rare cases of stone throwing and Molotov cocktail use. After deliberation by 3 members of the research team, it was also decided to exclude the 26 patients injured in mixed events, in which no clear statement could be made in regard to the source of injury. The deliberation was based on the description of the event in the registry data and the open sources; because no distinction of specific injury mechanism could be made based on the available data, the team reached a consensus about the unsuitability of members of this group for the purpose of the study. Figure 1 presents the whole process of study sample selection.

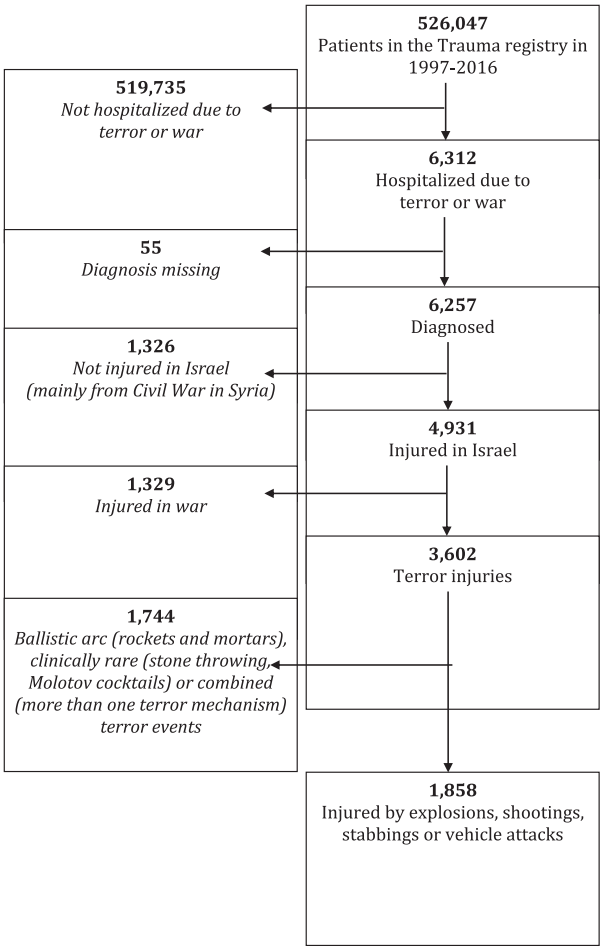

Figure 1. Study sample selection process.

Primary Data Analysis

Our goal was to compare the victims of 4 specific injury mechanisms in regard to their demographic characteristics, context of injury event, injury profiles, hospital resources use, and clinical outcome. For this task, the 4 mechanisms were compared for demographic and circumstantial parameters (including sex, age, and time and location of injury event) and clinical parameters, including Glasgow Coma Scale (GCS) score, lowest systolic blood pressure recorded in the ED, Abbreviated Injury Score, Injury Severity Score, injured body regions, overall number of injured body regions, surgery and ICU use in the hospital, length of stay in the hospital, and inhospital mortality.

To analyze the changes in the prevalence of various terrorism mechanisms during the study period, we divided the 20 years of the study into 4 meaningful phases: the Second Intifada[8] (October 2000 to December 2005), the Knife Intifada[1] (January 2015 to December 2016), and the 2 intermediate periods of January 1997 to September 2000 and January 2006 to December 2014.

Statistical analyses were performed with SAS (version 9.4; SAS Institute, Inc., Cary, NC). χ^2 Tests were used for group comparison. Odds ratios and 95% confidence intervals were calculated for factors related to mortality.

RESULTS

During the 20-year study period, 1,858 terrorism victims were hospitalized because of injury by 1 of the 4 terrorism mechanisms and were registered in the Israeli National Trauma Registry. Of those patients, 1,025 were hospitalized as a result of explosions, 571 as a result of shootings, 172 as a result of stabbings, and 90 as a result of vehicular terrorist attacks. Figure 2 shows the distribution of injuries from different terrorist attack scenarios throughout the study period. The relative frequency of terrorist explosions has declined steadily through the years as opposed to a significant increase in stabbings and vehicular attacks.

Comparison of basic demographic and circumstantial characteristics of injury mechanism groups uncovered significant variance of some groups from the others (Table 1). Shootings and stabbings included 80% male victims, whereas vehicular and explosive attacks included a higher proportion of female victims. Victims of vehicular

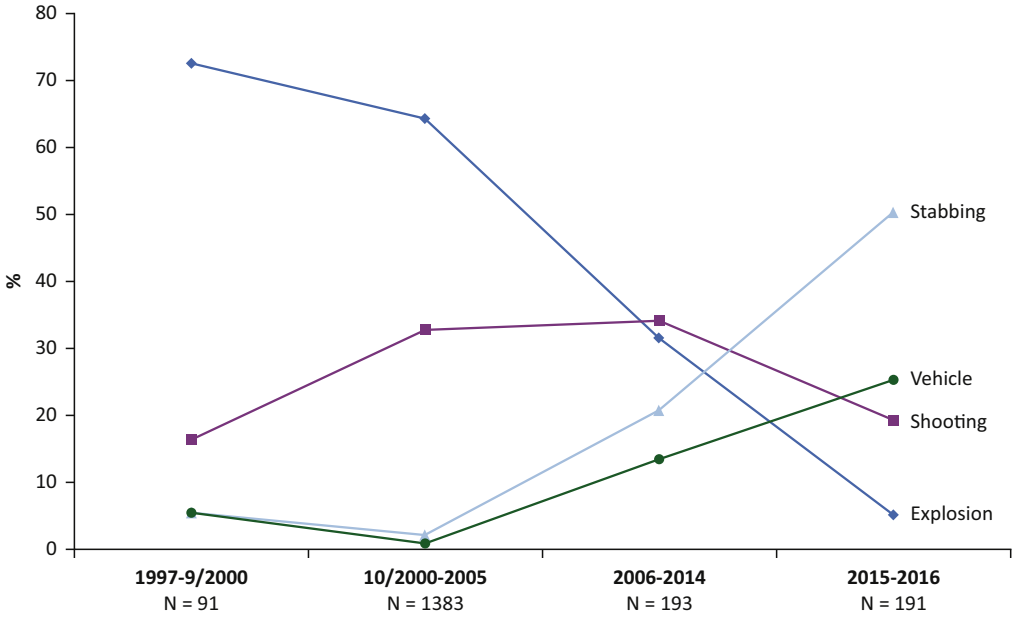

Figure 2. The prevalence of different types of terrorist attacks during the study period.*. *The periods 2000 to 2005 and 2015 to 2016 relate to the Second Intifada and the Knife Intifada, respectively; 1997 to 2000 is the period before the Second Intifada and 2006 to 2014 is the period between the intifadas.

attacks were different from other groups in their age composition, with 78% of patients aged 15 to 29 years compared with only 50% or less in the other 3 groups. Only a few children were admitted because of stabbing or ramming by a vehicle. Vehicular attacks also differed from other groups by taking place almost exclusively during weekdays. Shooting incidents differed from the other methods of attack in their time context: fewer patients were injured during the morning hours, but a higher proportion of patients were injured during nighttime attacks.

No significant differences were found between all types of terrorism-related injury mechanisms in the proportion of severe and critical injuries (Figure 3). Although the proportion of casualties with severe and critical injuries

Table 1. Demographic and circumstantial characteristics of terrorism-related injury mechanisms.

	Explosion, N=1,025, No. (%)	Shooting, N=571, No. (%)	Stabbing, N=172, No. (%)	Vehicle, N=90, No. (%)
Sex				
Men/boys	60 (614)	80 (457)	80 (138)	68 (61)
Women/girls	40 (411)	20 (114)	20 (34)	32 (29)
Age, y				
0–14	7 (71)	9 (51)	3 (5)	1 (1)
15–29	43 (437)	50 (282)	51 (88)	78 (70)
30–44	24 (242)	25 (138)	23 (40)	13 (12)
45–59	15 (153)	12 (70)	13 (22)	4 (4)
≥60	11 (116)	4 (21)	10 (17)	3 (3)
Day of week				
Weekday	78 (803)	80 (455)	75 (129)	88 (79)
Weekend*	22 (222)	20 (116)	25 (43)	12 (11)
Time of day				
7 AM–2:59 PM	41 (404)	24 (138)	45 (78)	42 (38)
3 PM–10:59 PM	42 (420)	51 (290)	44 (76)	47 (42)
11 PM–6:59 AM	17 (173)	25 (139)	10 (18)	11 (10)

*In Israel, the weekend is on Friday and Saturday.

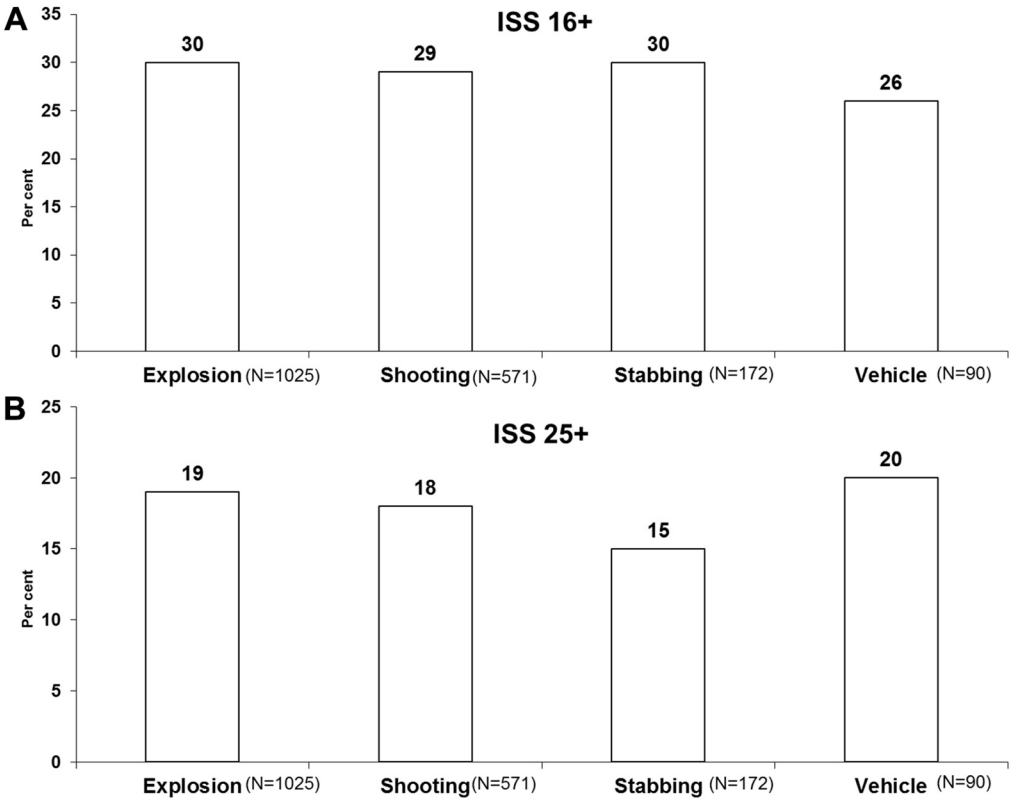

Figure 3. Proportion of patients with severe or critical injuries (ISS ≥16) and critical injuries (ISS ≥25) in different terrorism mechanisms out of the total number of patients.

(Injury Severity Score ≥16) in the vehicular attack group may seem smaller (Figure 3*A*), almost all of those injuries were critical (Injury Severity Score ≥25) compared with injuries from stabbing attacks, in which only half of the severe injuries were critical (Figure 3*B*). Other parameters of injury severity, such as GCS score and systolic blood pressure, were also found to be similar between the groups (Table 2).

Despite the lack of variance in overall injury severity, the injury profiles were very different between the 4 terrorism-related injury mechanisms (Table 2).

Victims of explosion- and vehicle-related terrorism had a much higher proportion of injuries to multiple body regions, whereas victims of stabbings and shootings had mostly isolated injuries. A similar pattern existed with head and face injuries; however, the proportion of severe head injuries (Abbreviated Injury Score ≥4) was significantly higher among victims of vehicular attack. Stabbing events caused significantly more neck and chest injuries (25% and 50%, respectively), but in terms of severe chest injuries, all groups were found to be relatively homogeneous. Similarly, the proportion of abdominal injuries was also highest among stabbing victims, but the percentage of severe abdominal injuries was similar to that of victims of terrorist shootings. All terrorism mechanisms involved significant damage to extremities, but among stabbing victims injury was mainly to the upper extremities, whereas among vehicular attack victims it was mostly to the lower extremities (76% of patients in the group). Spinal injuries were relatively rare but much more frequent after vehicular attacks. Stabbing attacks resulted in a significantly higher proportion of vascular injuries.

The consumption of hospital resources followed the trend of variance in injury profiles combined with similarity in injury severity (Table 3).

Victims of all types of terrorism events required similar volumes of ICU hospitalizations (27% to 30%). On the other hand, shooting victims required a significantly higher proportion of surgeries, although their proportion of operating room entries directly from the ED was similar to that of stabbing victims. Most surgeries were performed on the torso and musculoskeletal apparatus; however, vehicular attack victims were found to be different, with more head than torso surgeries. The proportion of musculoskeletal surgeries in this group was especially high (42%).

The length of hospital stay was lowest among stabbing victims (31% hospitalized for longer than 7 days) and highest among vehicular attack and explosive attack victims

Table 2. Injury profiles and overall injury severity of different terrorism mechanisms.

	Explosion, N=1,025, No. (%)	Shooting, N=571, No. (%)	Stabbing, N=172, No. (%)	Vehicle, N=90, No. (%)
No. of injured body regions				
1–2	66 (674)	88 (501)	81 (140)	74 (67)
≥3	34 (351)	12 (70)	19 (32)	26 (23)
Affected body regions*				
Head	29 (295)	17 (95)	17 (30)	29 (26)
Head AIS ≥4	10 (104)	7 (40)	3 (5)	15 (14)
Neck	11 (116)	7 (39)	25 (43)	7 (6)
Face	42 (428)	13 (74)	11 (19)	36 (32)
Chest	28 (282)	27 (152)	50 (86)	20 (18)
Chest AIS ≥4	8 (85)	7 (39)	11 (19)	6 (5)
Abdomen	24 (241)	26 (147)	36 (61)	19 (17)
Abdomen AIS ≥4	5 (49)	8 (46)	8 (13)	3 (3)
Upper extremities	32 (332)	34 (192)	33 (57)	23 (21)
Lower extremities	40 (408)	42 (238)	12 (20)	76 (68)
Spine (entire)	4 (45)	5 (30)	3 (6)	13 (12)
Vascular injuries	8 (83)	10 (56)	15 (26)	7 (6)
ISS				
1–14	70 (717)	71 (405)	70 (120)	74 (67)
16–75	30 (308)	29 (166)	30 (52)	26 (23)
GCS score				
3–8	13 (130)	14 (78)	11 (19)	14 (13)
9–15	87 (860)	86 (479)	89 (151)	86 (77)
Systolic blood pressure, mm Hg				
<90	12 (123)	12 (67)	15 (25)	13 (12)
≥90	88 (902)	88 (504)	85 (147)	87 (78)

AIS, Abbreviated Injury Score; *ISS*, Injury Severity Score.
*Affected individuals may be injured in more than one region.

(47% and 45%, respectively, staying longer than 7 days). Inhospital mortality was almost identical in all groups (6% to 8%). Factors most associated with mortality of terrorism victims on the sample level were found to be a higher number of injured body regions, vascular injuries, severe head injuries, and being older than 74 years (Table 4).

LIMITATIONS

Restricting our analysis to only hospitalized patients was a limitation to this study because our data did not include an indication of on-scene mortality or the total volume of wounded individuals. However, in terms of the relevance of our study for hospital preparedness, the exclusive focus on the patients presenting to a hospital may be sufficient. An additional limitation of our study is related to underrepresentation of mild injuries in the database used for the study because the Israeli National Trauma Registry includes only patients who were hospitalized after admission. This means that even though a general appreciation of required hospital resources could be made in accordance with our study, the overall ED load could be significantly greater because of nonadmitted patients. However, because our goal was to appreciate the effect of injury severity on the most limited critical hospital resources, such as ICU beds and operating rooms, we do not consider this a critical limitation.

We also acknowledge that the patterns of terrorism-related injuries in other parts of the world may be different from what was found in our study of terrorist attacks in Israel.

DISCUSSION

Our goal in this study was to analyze the relationship between the injury patterns caused by different mechanisms of terrorist attacks and the severity of the inflicted injuries. We found that despite significant differences in injury patterns, the context of attacks, and the characteristics of the victims, the severity of injuries of victims hospitalized after all types of terrorist attacks was almost identical. This lack of variation extended to

Table 3. Hospitalization resources and outcomes in different terrorism mechanisms.

	Explosion, N=1,025, No. (%)	Shooting, N=571, No. (%)	Stabbing, N=172, No. (%)	Vehicle, N=90, No. (%)
ICU admission*	29 (291)	27 (153)	30 (51)	30 (27)
ED directly to ICU	11 (109)	8 (45)	9 (16)	13 (12)
Surgical intervention required	51 (526)	62 (352)	47 (80)	47 (42)
Operation within 24 h	43 (439)	53 (301)	44 (76)	33 (30)
ED directly to OR	29 (300)	38 (219)	39 (67)	20 (18)
Head†	6 (66)	4 (25)	2 (3)	8 (7)
Spine	1 (6)	0.4 (2)	1 (2)	0
Eye	6 (58)	3 (19)	2 (3)	0
ENT	2 (21)	2 (11)	2 (3)	2 (2)
Thorax	9 (94)	15 (84)	19 (33)	4 (4)
Abdomen	14 (146)	17 (98)	19 (32)	3 (3)
Musculoskeletal	22 (224)	24 (137)	13 (23)	42 (38)
Inhospital mortality	7 (73)	8 (44)	6 (10)	7 (6)
LOS ≥7 days	45 (460)	41 (233)	31 (53)	47 (42)

OR, Operating room; *ENT*, ear, nose, throat; *LOS*, length of stay.
*Including directly from the ED.
†Head surgeries are related to skull, brain, and cerebral meninges.

similar levels of ICU consumption and inhospital mortality. A previous study comparing 2 "conventional" attack types (explosions and shootings) found a similar pattern[3]; however, our study has shown that the emergent low-technology attacks, such as stabbings and ramming by vehicles, are parts of the same pattern. Previous studies have found conventional terrorism-related injuries to be more severe than all other traumatic injuries,[8,10] and the similarly high injury severity of low-technology attacks expands this maxim to most terrorism-related injuries in general. Of course, in every type of attack the generally similar injury severity is derived from very different profiles of injury.

Based on the comparison of all mechanisms, a certain pattern emerges: the 2 penetrating injury mechanisms (ie, shooting and stabbing) appear to have many similarities, whereas to some extent this is also true in regard to explosions and vehicular attacks. Thus, both shootings and stabbings target a predominantly male population, cause many injuries to the torso, and consequently require more thoracic and abdominal surgery. On the other hand, both explosions and vehicular attacks are more demographically heterogeneous and cause multiple injuries in a single victim, with a large proportion of them being injuries to the head and face. The nature of the injuries would still be very different because of the significant variation in how energy is applied to the human body; however, the epidemiologic patterns are consistent enough to demand explanation. Because terrorist attacks are not random but are perpetrated intentionally with a goal of causing maximum damage,[10] the intent of the attackers should be taken into account. Although hitting a potential victim with a bullet or a bladed weapon demands intentional targeting of a specific person and vulnerable body area, explosions and vehicular attacks usually target large groups of people regardless of their

Table 4. Factors associated with mortality of terrorism victims (proportion out of each factor category; N=1,858).

	Mortality, No. (%)	OR (95% CI)
No. of injured body regions		
1–2	5 (75)	
≥3	12 (58)	2.4 (1.7–3.5)
Vascular injuries		
Yes	28 (48)	7.4 (4.9–10.9)
No	5 (85)	
TBI (head AIS ≥4)		
Yes	34 (55)	10.6 (7.1–15.7)
No	5 (78)	
Age, y		
0–14	1 (1)	
15–29	6 (54)	
30–44	7 (31)	
45–59	9 (23)	
60–74	9 (11)	
≥75	28 (11)	5.5 (2.6–11.1)

OR, Odds ratio; *CI*, confidence interval; *TBI*, traumatic brain injury.

identity, and injuries are therefore more random.[11] It may be therefore suggested that in addition to the basic distinction between types of attacks, terrorist shootings and stabbings should also be considered targeted attacks. Conversely, explosions and vehicular attacks cause injuries to multiple body areas and can be considered random attacks (Table 5). The mere distinction between blunt and penetrating mechanisms is insufficient because terrorist-perpetrated explosions entail a significant proportion of penetrating injuries.[4]

The malicious intent of the attackers also may explain the similarities in injury severity and inhospital mortality. The attackers' goal is to inflict maximum damage with means available to them for the attack, which motivates them to optimize the usage of their chosen weapons.[12] Thus, addition of penetrating components to explosive devices amplifies their range and the volume of injuries they cause; and, as was found in our study, specific targeting of upper chest and neck areas in stabbing attacks increases the likelihood of injuring a major blood vessel. Place and time of the attack may also be chosen specifically according to their ability to facilitate the effect of chosen mode of attack.[13] The resulting injuries from different types of attack thus may tend to be of similar severity potentially because of the uniformity of intent of the attackers.

Nevertheless, some important differences between the compared mechanisms emphasize the critical aspects of preparedness for each type of event. First of all, although all terrorism mechanisms involved significant damage to extremities, vehicular attacks mostly targeted lower extremities, whereas stabbing mostly involved upper extremities. Both patterns are recognized in the literature, with "bumper fractures" of the tibial plateau identified as characteristic of crashes between a vehicle and a pedestrian[14] and so-called defensive injuries of hands and arms known to be a frequent result of stabbing attacks.[15] Vehicular attacks were also found to cause more spinal injuries and require more musculoskeletal and head surgeries than other mechanisms. Previous research of terrorist vehicular attacks has suggested that their very important feature is the sustained acceleration of the vehicle, compensating for the loss of energy transferred to the victims, compared with a routine case of a pedestrian hit by a car, in which the driver is usually trying to decelerate.[2] The lower incidence of injuries to lower extremities among stabbing victims may also be one of the contributing factors to their shorter length of stay in the hospital.[16]

Our study corroborated the previously known higher requirement of terrorism-related shooting victims for surgical procedures,[3] but we also found that terrorism-related stabbings resulted in transfer of a similar proportion of patients to surgery directly from the ED. The use of ICUs was similarly high among all study groups, emphasizing the universality of the challenge presented by terrorism to hospital resources. With most previous studies comparing the victims of different terrorism mechanisms with respective types of injury from other contexts (criminal stabbings,[1] road traffic crashes,[2] and war-related gunshot and explosion injuries[17]) showing terrorism-related injuries to be consistently more severe, and with this study showing this injury severity to present a similar strain on hospitals, it is clear that any type of terrorism event, including low-technology attacks, can pose a major challenge to hospital preparedness. Terrorism-related injuries that hospitals should

Table 5. Terrorism-related event profile by type of event.

	Conventional Terrorism		Low-Technology Terrorism	
		Targeted Attack		
What to Expect	**Random, Explosion**	**Shooting**	**Stabbing**	**Random, Vehicle**
Male victims, %	≈66	80	80	≈66
Dominant* injuries	Head Face Extremities	Torso Extremities	Torso Upper extremities	Head Face Extremities
Prominent† injuries/injury patterns	Multiple injuries	Isolated injuries	Neck Chest Vascular	Spine Lower extremities
Injury severity		**Similar (high)**		
Surgery required	Medium	High	Medium	Medium
Dominant* surgery	Musculoskeletal: abdomen	Musculoskeletal: thorax, abdomen	Thorax, abdomen	Musculoskeletal, head
ICU required		Similar (27%–30%)		
Inhospital mortality		Similar (6%–8%)		

*Dominant=most frequent.
†Prominent=most different from other categories.

be ready to encounter are therefore expected to be of higher severity than what they are used to and to require significant surge capacity, regardless of the terrorists' choice of weapons.

This universality of the challenge presented by terrorism-related injuries invites the need to emphasize in hospital staff training the explicit characteristics of injuries caused by specific types of terrorist attacks and their differences from routinely encountered injuries caused by certain trauma mechanisms.

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Author contributions: MR carried out the data analyses and composed the article. AG assisted with data analysis and critically reviewed the article. AR and MB conceptualized the clinical context of the study. AR, MB, and KP reviewed the final article. AG, AR, MB, and KP approved the final article. KP supervised all aspects of the study and revised the article. KP takes responsibility for the paper as a whole.

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APPENDIX

Israeli Trauma Group

The Israeli Trauma Group is a study group composed of trauma units of all hospitals belonging to the Israel Trauma Registry, tasked with producing the data for the registry. Members include Ricardo Alfici, MD, Hany Bahouth, MD, Alexander Becker, MD, Igor Jeroukhimov, MD, Milad Karawani, MD, Yoram Klein, MD, Guy Lin, MD, Ofer Merin, MD, Yuri Mnouskin, MD, Boris Kessel, MD, Gad Shaked, MD, Galit Sivak, MD, Dror Soffer, MD, Michael Stein, MD, and Michael Weiss, MD.