Editorial: “Focus on disaster and military surgery”

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The aim of the section for Disaster and Military Surgery is to promote both scientific knowledge and education of general and acute care surgeons in the treatment of injuries seen following disaster and wars. Nevertheless, we are aware that this distinction from other types of trauma is problematic and that war-like injuries are becoming more common within our civilian societies, whether affected by military conflicts or not. Michael Stein and Asher Hirshberg prophesized almost 20 years ago that “Terrorism is the war of the future for the human race. It takes many forms, but in essence the common denominator is the calculated use of violence or the threat of violence to attain political, religious, or ideologic goals... This battlefield is no longer remote” [1]. While these authors emphasized the growing use of bombs outside of the battlefield, we have seen increased use of other “weapons” as well including mass shooting attacks and more recently the use of trucks stampeding into crowds. Most of these were aimed at innocent civilians. Today, no country is immune from these forms of attacks. The distinction between disaster surgeons, military surgeons and civilian acute care surgeons has become blurry. We should all learn from one another if we wish to make an impact on survival.

Seven manuscripts, six original articles and one review were chosen for this focus on Military and Disaster Surgery. In the first manuscript, Stefanopoulos et al. present a comprehensive review on wound ballistics [2]. Information is

offered on the effect on different tissues such as skin, blood vessels, muscle, brain, lung and liver. The importance of this manuscript is detailed in the beginning. Penetrating trauma is becoming more common and so is the use of military rifles as a weapon of both terror and crime.

The next two manuscripts deal with the preparation and response to war situations. In the first of these, Qasameh et al. describe a Jordanian hospital response to the Syrian conflict across the border [3]. The King Abdullah University Hospital served as a referral center for other more forward hospitals located near the Syrian–Jordanian border. The treatment of 90 consecutive non-combatant Syrians with war injuries is described. Extremities and head and neck areas were those most commonly involved. Half of the patients were injured by explosion and half were injured by shooting. Infection was common in patients with limb injuries and neurologic impairment was common after cranial injuries. This should be expected due to the mechanism of trauma and time interval between injury and treatment. The authors describe the economical consequences of their efforts, a burden which is usually put up with by the treating hospital itself. Several other pertinent issues in the treatment of injured patients from across the border conflicts are missing from this manuscript and should be dealt with in future reports from similar scenarios. The first one is the issue of informed consent whether in unaccompanied children in need of operation or unaccompanied multiply injured patients in need of amputation. The second one concerns follow-up and rehabilitation of these patients. In the second of the two articles, Khorram-Manesh et al. describe a feasibility study in which a large-scale exercise was developed and deployed in Sweden to test military civilian cooperation following a mass casualty scenario (soldiers injured in combat transported to a civilian hospital by air) [4]. Several shortcomings were identified including different reporting

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systems between military and civilian health-care staff and incompatibility between civilian and military medical equipment. Different countries have different systems that may influence the military involvement in civilian disasters and civilian involvement in military conflicts. Some countries have military hospitals and military casualties will not be treated in the civilian sector. There are other countries, such as Sweden, where there are no military hospitals and civilian hospitals are responsible for the treatment of military casualties. The authors of this manuscript emphasize that the immediate response to major incidents includes non-medical measures that are equally important and may impact the survival of victims. Simulation exercises involving both the civilian and military sectors are needed to enhance cooperation.

The last four manuscripts deal with specific injuries that may be encountered following shooting or bombing. Ünlü et al. describe an experiment in which the success rate of midhigh application of the Combat Application Tourniquet CAT[®] was assessed in 145 servicemen [5]. A Doppler US device was then used to examine whether popliteal blood flow was impeded or not. Only 70% of the participants were successful in impeding popliteal blood flow. No differences were found between successful and failed application for BMI, mean arterial pressure, and leg circumference. The authors conclude that soldiers should be taught their optimal turn degrees to achieve hemorrhage control. Extremity injury is common in the battlefield and hemorrhage from extremities is a preventable cause of death. This understanding has led armies to promote the use of tourniquets at an early stage before medical encounter, and tourniquets are issued to combat soldiers. The authors of this manuscript emphasize the need for training to avoid the inadequate placement of the device as was revealed in this study.

İçer et al. assessed the clinical findings in patients with cranial gunshot wounds [6]. Specifically, they compare the clinical findings between 30 patients with and 26 patients without penetrating injuries. Suicidal injury, dilated and anisocoric pupils, hemodynamic instability, penetrating bullet rather than pellets, and lateral trajectory were associated with dural penetration and mortality. These were independent of CT findings. The need to define clinical parameters that may guide treatment is most important in mass casualty incidents in which several simultaneous patients are in need of workup with CT and surgery. This manuscript offers us some clues. However, more study needs to be done in this area.

Stranch et al. present a hypothesis-driven study in which the results of treatment of 76 patients with penetrating cardiac injury by acute care surgeons was assessed [7]. The authors show that 61% of the patients with cardiac injury survived, which is comparable to what is known in the medical literature. Though the study was carried out in

a Level One trauma center with an available cardiothoracic service, acute care surgeons operated all of the patients in need of operation. Furthermore, none of the patients required cardiopulmonary bypass. The authors dispute the 24-h availability of cardiothoracic surgery capabilities and cardiopulmonary bypass as a prerequisite for being considered a Level One trauma center. We agree that acute care surgeons should be trained in workup and surgical treatment of possible penetrating cardiac injury. Nevertheless, one should remember that the authors' conclusion that acute care surgeons are the most appropriate surgeons to care for these injuries is based upon one medical center's experience compared with historical reports in the literature, rather than on a head-to-head comparison between patients treated by cardiothoracic surgeons and acute care surgeons.

The last manuscript deals with the impact of the tympanic membrane perforation (TMP) upon severity of injury in a cohort of patients injured following an explosion [8]. The main assumption is that since both TMP and injury severity are related to the amount of energy exposure, there should be some relationship between the presence of TMP to injury severity. Several other studies discussed within the manuscript, however, have contested this. The main finding of this retrospective study done in one medical center (Level Two) is that most of the patients presenting with TMP following an explosion are indeed mildly injured. Nevertheless, TMP is related to injury severity, need for operation, need for ICU, and need for secondary transport to a Level One trauma center. This study is one of few other published studies that stemmed from two conferences that were held in 2008 and 2009 in Israel and Madrid, Spain. In these conferences, physicians working in civilian institutions with experience in treatment of major incidents following terrorist bombings discussed specific patients with adverse outcomes in a format similar to morbidity and mortality sessions. The most important product of these conferences was a list of over 70 clinical questions that need to be clarified to advance the treatment following this type of mechanism of injury. Though most of the patients with TMP are mildly injured and may be discharged from the emergency department without hospitalization, it is clear that there is a place for more caution in patients with TMP even if these present without clear signs of other injuries on admission.

Compliance with ethical standards

Ethical approval The authors comply with the ethical guidelines for authorship and publishing in the European Journal of Trauma and Emergency Surgery.

Compliance with research involving human participants and/or animals The first author (IA) is also the author of one of the

manuscripts discussed within this editorial. This was a retrospective research involving human participants, done according to GCP guidelines, following approval of the local IRB (Helsinki Committee).

Informed consent No informed consent was needed for this editorial.

Conflict of interest Itamar Ashkenazi and Mike Bemelman declare no conflict of interest in relation to this work.

References

1. Stein M, Hirshberg A. Medical consequences of terrorism. The conventional weapon threat. *Surg Clin N Am*. 1999;79(6):1537–52.
2. Stefanopoulos PK, Piniadis DE, Hadjigeorgiou GF, Filippakis KN. Wound ballistics 101: the mechanism of soft tissue wounding by bullets. *Eur J Trauma Emerg Surg*. 2015. doi:[10.1007/s00068-015-0581-1](https://doi.org/10.1007/s00068-015-0581-1).
3. Qasimeh GR, Shotar AM, Alkhail SJA, Qasimeh MG. The pattern of the Syrian refugee's injuries managed in King Abdullah University Hospital (Jordan). *Eur J Trauma Emerg Surg*. 2017. doi:[10.1007/s00068-017-0761-2](https://doi.org/10.1007/s00068-017-0761-2).
4. Khorram-Manesh A, Hönroth H, Rotter P, Wilhelmsson M, Aremyr J, Berner A, Nero Andersson A, Carlström E. Non-medical aspects of civilian-military collaboration in management of major incidents. *Eur J Trauma Emerg Surg*. 2017. doi:[10.1007/s00068-017-0778-6](https://doi.org/10.1007/s00068-017-0778-6).
5. Ünlü A, Petrone P, Guvenc I, Kaymak S, Arslan G, Kaya E, Yilmaz S, Cetinkaya RA, Ege T, Ozer MT, Kilic S. Combat application tourniquet (CAT) eradicates popliteal pulses effectively by correcting the windlass turn degrees: a trial on 145 participants. *Eur J Trauma Emerg Surg*. 2015. doi:[10.1007/s00068-015-0582-0](https://doi.org/10.1007/s00068-015-0582-0).
6. İçer M, Zengin Y, Dursun R, Durgun HM, Göya C, Yıldız İ, Güloğlu C. Factors affecting dural penetration and prognosis in patients admitted to emergency department with cranial gunshot wound. *Eur J Trauma Emerg Surg*. 2015. doi:[10.1007/s00068-015-0564-2](https://doi.org/10.1007/s00068-015-0564-2).
7. Stranch EW, Zarzaur BL, Savage SA. Thinking outside the box: re-evaluating the approach to penetrating cardiac injuries. *Eur J Trauma Emerg Surg*. 2016. doi:[10.1007/s00068-016-0680-7](https://doi.org/10.1007/s00068-016-0680-7).
8. Ashkenazi I, Olsha O, Turegano-Fuertes F, Alfici R. Tympanic membrane perforation impact on severity of injury and resource use in victims of explosion. *Eur J Trauma Emerg Surg*. 2015. doi:[10.1007/s00068-015-0609-6](https://doi.org/10.1007/s00068-015-0609-6).