

A War Long Forgotten – Humanitarian Aid Mission for Victims of the Syrian Civil War

Avi Benov^{1,2*}, Itay Zoarets^{3*}, Elon Glassberg^{1,2,4}, Barak Cohen^{1,5}, Ran Ankory¹, Salman Zarka^{6,7}, Jacob Chen¹, Avi Yitzhak¹, David Dagan³ and Tarif Bader^{1,7}

¹Israel Defense Forces, Medical Corps, Tel Hasomer, Ramat Gan, Israel

²The Azrieli Faculty of Medicine, Bar-Ilan University, Safed, Israel

³Assuta Ashdod Medical Center, Ashdod, Israel

⁴The Uniformed Services University of the Health Sciences, Bethesda, USA

⁵Division of Anesthesia, Pain and Critical Care, Tel Aviv Medical Center, Affiliated with Tel Aviv University, Tel Aviv, Israel

⁶School of Public Health, University of Haifa, Haifa, Israel

⁷Department of Military Medicine, Hebrew University, Jerusalem, Israel

Abstract

Introduction: The Syrian civil war erupted in March 2011. The country's health care and social resources have suffered heavy damage and, in some areas, stopped to exist. Since March 2013 the Israeli Defense Forces-Medical Corps (IDF-MC) has operated a humanitarian operation to help the wounded reaching the Israeli border.

Methods: A Forward Surgical Team (FST) operated a role 2+ Medical Treatment Facility (MTF), near the Israeli-Syrian border. The MTF capabilities were those of a FST; life-saving interventions including Damage Control Resuscitation (DCR) and Damage Control Surgery (DCS) along with medical capabilities of an Intensive Care Unit (ICU), hospitalization, nursing, imaging, laboratory, pharmacy and logistics as were needed by the unique scenario. Treatment was given per the Israeli patient's rights law and the international law. Patients' medical data were recorded on a designated computerized system.

Results: Of 389 patients treated, 162 (41%) had traumatic injuries, 227 patients presented with acute medical illnesses or were admitted for trauma follow up. Average age was 23.6 years, and average length of stay was 2 days. Forty-one surgeries were performed, including 12 laparotomies. This operation posed several challenges: triage, safety, language and legal issues. The wide range of patients' age and variability of injuries also challenged the facility's treatment capabilities. The medical requirements of the wounded and relatively small staff mandated maximal flexibility and versatility.

Conclusion: This mission was characterized by several unique features, even when compared to previous IDF humanitarian operations. It proved to be feasible and efficacious in treating combat-type traumatic injuries in the field.

Keywords: Trauma; Humanitarian mission; Syria

Introduction

The Syrian civil war erupted in March 2011. The World Health Organization (WHO) estimates civilian victims to be over half a million Syrians and that over half of the population were forced to become refugees [1-3]. As a result the country's health care and social resources have deteriorated rapidly, most health care facilities are either damaged or destroyed, and most of the medical personnel have fled the country [4-6].

The Israeli humanitarian aid to Syrian refugees began on February 2013, when seven Syrian civilians arrived at the Syria-Israel border in order to seek medical help, even though Syria and Israel have been in a state of conflict since 1948. Israel Defense Forces (IDF) medical teams, posted with their units on a border protection mission, provided medical care to the wounded Syrian refugees and transferred them for further treatment to the "Rivka Ziv" Medical Center in Safed, Israel. Following this event, Israel has begun to provide medical assistance to wounded refugees arriving at the border. Over the past five years, IDF medical teams have treated thousands of trauma casualties, including hundreds of children as well as people suffering from various medical conditions [7,8]. The on-call medical teams in the IDF's Battalion Aid Station (BAS) include a physician, or alternatively a paramedic (EMT-P) who is authorized to provide Advanced Life Support (ALS), as well as three combat medics. These teams provide Point of Injury (POI) care and are trained in advance airway management, Life-Saving Interventions (LSIs), as well as administration of fluids and reconstituted Freeze-Dried Plasma (FDP) under remote damage control resuscitation principals [7-14]. The casualties were given initial treatment and were

evacuated to civilian hospitals in Israel. After the realization that a growing number of wounded is expected, a humanitarian operation was launched by the Israel Defense Forces Medical Corps (IDF-MC).

Due to lack of an organized Syrian evacuation system and the ongoing fighting, not all wounded could get to the Israeli border soon after being injured. Most injuries occurred minutes to hours prior to arrival to the Israeli border but some were several days old, often complicated by the delay in treatment. Some casualties arrived after receiving basic, often improvised, initial medical care within Syria. Few crossed the border bearing written medical notes from Syrian health providers, while others arrived with only wound dressings or new surgical incisions and sutures indicating recent care.

The expected inflow of wounded from an area lacking medical resources combined with a relatively long duration of medical transfer

***Corresponding author:** Avi Benov, Israel Defense Forces, Medical Corps, Tel Hasomer, Ramat Gan, Israel, Tel: +5521999990714; E-mail: avi.benov@gmail.com

Itay Zoarets, Assuta Ashdod Medical Center, 7 Ha-Refua St, Ashdod, Israel, Tel: +972 3-517-2913; E-mail: itayzoarets@gmail.com

Received April 15, 2019; Accepted April 30, 2019; Published May 07, 2019

Citation: Benov A, Zoarets I, Glassberg E, Cohen B, Ankory R, et al. (2019) A War Long Forgotten—Humanitarian Aid Mission for Victims of the Syrian Civil War. *Emergency Med* 9: 394. doi:10.4172/2165-7548.1000394

Copyright: © 2019 Benov A, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

from the border to the Israeli hospitals exceeding 2 hours, led to the decision to deploy a Medical Treatment Facility (MTF) with surgical capabilities, commonly referred as Role 2+ medical facility, or a Forward Surgical Team (FST), next to the Israeli-Syrian border. The rationale was to promote advanced medical capabilities for those who would not survive the long evacuation time. The MTF comprised the second of three levels of treatment of the humanitarian operation. The first level was BASs treating the wounded immediately at the border. After triage and stabilization, casualties requiring higher level of care were evacuated either to the MTF next to point of care, or directly to Israeli tertiary civilian medical centers. The basic capabilities of the MTF were those of an IDF-MC FST, with the ability to provide life-saving interventions including Damage Control Resuscitation (DCR) and Damage Control Surgery (DCS) [15].

Since the MTF was deployed in an atypical war zone, medical capabilities of the ICU, hospitalization, nursing, imaging, laboratory, pharmacy and logistics needed to be enhanced, so additional medical personnel were recruited to the team (Table 1). Overall the MTF provided an Emergency Room (ER) including one intensive treatment bay for life saving procedures and 2 reception beds, an OR, a 4-bed ICU, a hospitalization unit divided into 3 separate rooms with a total of 12 beds, a laboratory and an imaging unit with portable plain X-ray and bedside ultrasound capabilities and a pharmacy.

The purpose of this analysis is to describe the unique Role 2+ IDF experience including the types of patients, injury mechanism, interventions performed and management strategies.

Methods

Data collection—the idf trauma registry

The Israel Defense Forces Trauma Registry (ITR) is a trauma registry operated by the Trauma and Combat Medicine Branch (TCMB) at the Surgeon General's Headquarters. The data sources obtained by the ITR included casualty cards filled by POI caregivers at the BAS. The cards collect data that depict the patient's vital signs and treatment given at POI, as well as demographics, mechanisms and anatomic distribution of the injuries. At the receiving civilian hospitals, complimentary casualty data from POI to

Medical Personnel	FST	Augmentation Team	Total
General Surgeons	2		2
Anesthesiologist	2		2
General Practice Physician		1	1
Orthopedic Surgeon		1	1
Intensive-Care Unit Nurse	2		2
Operating Room Nurse	1		1
General Nurse		2	2
Medical Device Technician	1		1
Radiology Technician		1	1
Laboratory Technician		1	1
Pharmacist		1	1
Medic	2	3	5
Command and logistic personnel	1*	4	4
Total	10	14	24

Note: FST: Forward Surgical Team.
* One of the surgeons is the commander of the team.

Table 1: Medical personnel in the military treatment facility.

rehabilitation is obtained and eventually uploaded to the ITR by TCMB personnel. Data collected at the MTF were gathered in computerized medical charts like those used worldwide and includes all data regarding vital signs, medication, follow-up charts and surgical procedures.

Methods and measurements

Data collection for this retrospective analysis was conducted under the approval of the IDF-MC Ethical Review Board, as a process review and improvement project (#1484). Medical records of casualties treated at the MTF between March 20, 2013 through December 31, 2013 were included for analysis. Data collection included demographic information, Mechanism of Injury (MOI), regional wound distribution, vital signs, and LSIs. MOI was grouped into 3 main categories: 1) Penetrating 2) Blunt and 3) Other (inhalation, burns etc.). Regional wound distribution was demarcated based on projected body surface area and grouped into main body regions: 1) Head, neck and eyes, 2) Trunk, subdivided to thorax and abdomen, and 3) Extremities, subdivided to upper and lower.

Ethical challenges

Treatment in the MTF was given per the Israeli patient's rights law, the international law and was accompanied by the IDF medical corps' legal adviser. All medical activity was conducted in light of the good medical practice principles. A translator was present in every admission, and every patient signed an informed consent for treatment written in Arabic in the facility. When an invasive procedure or surgery was required, another designated informed consent was signed. For minor patients as well as in cases of unconscious patients in need of medical treatment, emergency procedures were performed after 3 physicians documented their agreement regarding the necessity of the procedure, as obligated by the Israeli Patient's rights law. Minors were treated separately from adults whenever possible, and patients of different genders were also separated during treatment. In cases that the MTF couldn't provide treatment required, wounded were evacuated to hospitals in Israel.

Statistical analysis

Continuous data are presented as averages, medians and interquartile ranges (IQR; difference between the upper and lower quartiles); categorical data is presented as absolute numbers and percentiles. Chi-Square test was conducted when comparing categorical data using a Fisher exact test when appropriate. For normally distributed data, continuous variables were evaluated using a Student's t test or analysis of variance if more than two groups were evaluated. For skewed data, the Wilcoxon/Kruskal-Wallis test was used. All statistical tests were two-tailed using an alpha < 0.05 for significance.

Results

From March 1, 2013 to December 31, 2013 the MTF was active for 119 days with a total of 389 patients admitted for treatment. Of those patients 162 (41.6%) had acute injuries and received primary care, the remaining 227 (58.4%) patients presented with other medical conditions, acute medical illnesses or were admitted for trauma follow up. Average age was 23.6 years, 83 (21%) patients were under 18 years of age, of those 26 (6%) were under 10 years of age. Overall mean Length of Stay (LOS) was 2 days (SD-1.5). Average length of stay for operated patients was 4 days. 52 patients were admitted to the ICU with an average length of stay of 2 days in ICU.

Trauma patients

Of the three main MOI, penetrating injuries were the most

prevalent, accounting for 78% (n=127) of all injuries, while blunt mechanisms accounted for only 17% (n=27) of casualties (Table 2). Truncal injuries (thoracic, abdominal and pelvic joined) accounted for the most frequently injured region (36.5% n=89), while the single most frequently injured body region was lower extremities (26.2%), followed by upper extremities (21.7%) (Figure 1). Most casualties suffered injury to one body region (58%), while 11% sustained injury to three or more body parts, the average count of injuries was 1.5 per casualty.

Regarding the estimated time from injury to admission, per reports from the conscious wounded or their escort, 14% (n=23) of patients received care within one hour of injury, 26% (n=42) received care between one and three hours, 12% (n=20) were treated within three to six hours and 40% (n=66) of patients had delayed care provided more than six hours from the time of injury. Estimated time from injury to treatment was unknown for 6% (n=11) of the patients. The average Injury Severity Score (ISS) for the trauma patients was 16.4 (SD 5.6).

Overall 261 surgical procedures were performed in the MTF, of them 12 laparotomies. Causes of surgical interventions and use of anaesthesia are reported in Table 3. Thirty-six patients received at least one blood product. Freeze Dried Plasma (FDP) was administrated to 15 patients (a total of 29 units) and O positive packed Red Blood Cell (RBC) units were administrated to 12 patients (a total of 27 units).

Mechanism of injury	N (%)
GSW	69 (42)
Shrapnel	58 (36)
IED (Blast)	13 (8)
MVA	8 (5)
Post-op complication	8 (5)
Fall	6 (4)
Total	162 (100)

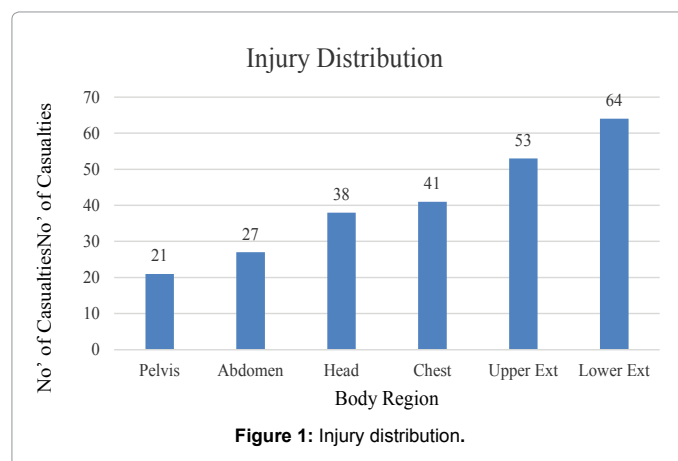
Table 2: Main mechanism of injury.

Nine patients received both FDP and RBC. No adverse reactions were documented.

Post-operative complications included pulmonary insufficiency (n=1), acute renal failure (n=1) and pulmonary re-expansion syndrome (n=1). Those patients were transferred to a civilian hospital for further treatment. One mortality case was documented in the MTF—a male who presented with multiple penetrating injuries to both chest and abdomen after he had undergone laparotomy in Syria few hours prior to his arrival. On admission, he was unconscious with profound hypovolemic shock and ongoing bleeding from his abdomen. During emergent laparotomy, large amounts of blood and intestinal content with multiple perforations to small and large intestines with multiple bleeding sites from the small bowel mesentery were encountered, and DCS was performed. The patient died few hours after the operation.

Medical patients

58.4% (n=227) of patients arriving to the MTF suffered from illnesses requiring medical treatment, most of them with orthopedic



	General Anesthesia	Sedation with Local Anesthesia	Local Anesthesia	None	Total
Laparotomy	11				11
Orthopedic External Fixations	8				8
Damage Control Laparotomy	1				1
Debridement	4	18	4		26
Orthopedic External Fixations Removal	8				8
Closed Reduction		14			14
Amputations	4				4
Removal of foreign bodies	2				2
Airway management	1				1
Thoracostomy Tube	1	7			8
Wound Dressing			9	130	139
Suture Wound		2	15		17
Apply Cast		6			6
Removal of foreign bodies in eye			2		2
Intubation	3				3
Treatment of Burns		10		2	10
Total	43	57	30	132	260

Table 3: Causes of surgical interventions and use of anesthesia.

Medical Reason of Admission		N (%)
Follow up	Follow up	70 (30.8)
Orthopedic	Orthopedic	53 (23.3)
Internal Medicine	Internal Medicine	
	Cardiac	10 (4.4)
	Hypertension	7 (3.1)
	Diabetes Mellites	7 (3.1)
	Respiratory	7 (3.1)
Ophthalmology		24 (10.6)
Neurology		20 (8.8)
General Surgery		7 (3.1)
Urology		7 (3.1)
Oncology		7 (3.1)
Genetic		4 (1.8)
Dermatology		4 (1.8)
Total		227 (100)

Table 4: Medical reason of admission.

problems (23.3%, n=53), and 13.7% (n=31) suffered from medical illnesses while 30.8% (n=70) arrived for follow up after being previously treated in the MTF or another hospital in Israel for previous trauma injury (Table 4).

Discussion

Not different from other militaries worldwide, the IDF-MC's primary mission is to support IDF's operations and Israeli military personnel during combat. Yet as medical personnel we are obligated to aid all those in need, friends or enemies, and the IDF-MC holds a long history of providing humanitarian aid to other populations in need [16-22].

This report documents the unique augmented role 2+ experience of the IDF-MC in caring for civilian injuries along an otherwise hostile international border. Patients in this report ranged from young children to the elderly with combat-like injuries as well as medical illnesses. This study demonstrates the flexibility and effectiveness of the IDF-MC MTF facility providing life-saving interventions. While abundant data exist on medical care provided to trauma patients in hospitals, Role 2 data provides an opportunity to assess the effects of medical care provided at proximity to point of injury, early in the course of the pathophysiology of injury. As majority of trauma related mortality occurs before arrival to a medical treatment facility [23], pre-hospital care holds a significant potential in terms of effect on mortality.

The mortality rate in this experience should not be compared to other results in published reports as this is characterized by an obvious selection bias [24]. Patients suffering mild injuries likely received care in Syria and did not arrive to the Israeli-Syrian border, whereas patients suffering the most severe or lethal injuries died before reaching the border. Accordingly, the calculated case fatality rate can be used to identify and assess changes in local medical care but cannot be extrapolated to other combat casualty care scenarios.

Working in the MTF posed several challenges: First, the decision of whether treatment should be given in the MTF or in a civilian trauma center. Second, the fact that these patients arrived from an enemy country raised operational and security concerns. This was

further complicated by the location of the MTF adjacent to the Syrian border, exposing it to ongoing fighting across the border, in times even putting the medical staff under fire while treating Syrian casualties. Language was another barrier complicating medical treatment. Legal as well as ethical issues such as treating citizens of another country, treating minors unescorted by their legal guardians, treating patients from different genders in a small and crowded facility, all needed to be addressed as well.

Treatment algorithm evolved over time as experience gained and conclusions deduced. This evolution also influenced the triage in role I by the BAS, by directing which types of injuries should be evacuated to the MTF versus those who should be evacuated directly to the civilian centers. The rather small-scale facility and staff receiving multiple patients at times, led to a policy of transferring those patients for whom the estimated hospitalization time would be prolonged, to civilian hospitals. That policy, combined with the strong will of most patients to return to their homeland and families as soon as possible led to relatively short LOS.

Regarding specific injuries such as head trauma or complex vascular injuries, the field-hospital's capabilities were restricted to stabilization with damage control resuscitation followed by early evacuation to civilian hospitals. In cases of abdominal trauma, laparotomies for DCS were initially performed in the field-hospital. Interventions were later extended to include definitive surgery when deemed appropriate. Orthopedic injuries were treated under standard of care similar to those of civilian hospital-wound treatment, debridement, casting, external fixations and amputations were all performed.

Unlike the routine medical issues facing military medical personnel operating in a war zone, the unique situation mandated the ability to treat patients of extreme age groups suffering various, not necessarily life-threatening medical problems (such as eyesight, hearing or rehabilitation issues). A group of medical specialists was arranged to support this effort, either through video-conference consultation or by arrival to the site.

Working in a small staff mandated several roles for each caregiver. The medical manager had to have maximal flexibility in activating and re-assigning the staff. That way, the senior general surgeon was at times the triage manager, ER physician, an OR surgeon and sometimes assistant surgeon during orthopedic surgeries. In a similar way, in several cases the orthopedic surgeon acted as a non-scrubbed nurse or as a temporary ICU physician. All medical personnel were trained to perform basic laboratory analysis and to take chest and limb X-rays. This flexibility enabled the staff to focus efforts where needed or, on the other hand, to distribute the effort or minimize the burden to maintain continuity of care. The small multi-disciplinary staff working around-the-clock actually turned into an advantage regarding case-management by minimizing communication errors. For example, the surgeon, the anesthesiologist and in some instances, even the nursing staff treating a patient in the ER, were the same physicians who's in-charge of the continued care in the OR and later in the ICU. Furthermore, the collaboration between the staff members, combined with the close proximity of all facilities allowed for a comprehensive treatment of the most severely injured with all existing capabilities in either the intensive-care bay of the ER or inside the OR, when direct admission into the OR was decided upon. This is only rarely possible in a civilian hospital. The concept demanded a core of staff members (surgeon, anesthesiologist and a nurse) to be constantly available and

involved in the management of all patients, as well as to perform a diversity of functions.

At discharge, patients were instructed on how to continue the medical care and were equipped with medical supplies for the next several weeks, including medications, wheelchairs and crutches, dressings etc. Patients received discharge letters in Arabic detailing the injury, medical and surgical treatment and further recommendations.

Questions regarding the efficiency of the MTF in decreasing mortality and improving patients' outcome arose during the humanitarian operation. On the first weeks of operation, most patients were treated more than 24 hours after their initial injury. In those cases, it was obvious that a natural selection had already taken place and those who survived until arrival to the border was strong enough to be evacuated to civilian hospitals. As the humanitarian operation continued, the inflow of patients increased and the time from injury to admission was shortened. Under those circumstances, severe acute combat-injuries were encountered. These patients often presented with shock, acute respiratory failure or even multi-organ failure, all necessitating prompt and aggressive medical attention or urgent surgical interventions. Those patients probably benefited from the early intervention.

Limitation

This report has limitations as a descriptive case series and is not designed to test the effectiveness of the strategies described. Despite these and other limitations, this experience provides insight into implementation of IDF-MC practice in unique prehospital conditions. In this context, this report provides a foundation for additional study of role 2 interventions related to surgical capabilities, hemorrhage control and resuscitation, as well as commanding a medical facility with limited resources.

Conclusion

This report documents the unique experience of the IDF-MC in caring for civilian injuries along a hostile international border. To the best of our knowledge this is the first ever humanitarian mission aiding another country with which it is in a state of war. The MTF on the Israeli-Syrian border was characterized by several unique features, even when compared to previous IDF's humanitarian operations. It proved to be feasible and efficacious in treating combat-type traumatic injuries in the field. The dedication of the medical staff to providing aid under difficult, sometimes dangerous conditions, to those in need in a timely and humane manner helped saving lives and contribute to bringing hearts together.

Presentation

The work was presented at 2018 Military Health System Research Symposium (#18-2178), Kissimmee, FL, USA.

Funding

None

Disclaimer

None

Acknowledgements

None

Conflict of Interest

The authors have no conflicts of interest to disclose.

References

1. Joint statement on Syria (2016) Joint United Nations/ WHO.
2. Human TSOE, Rights (2018).
3. Black I (2016) Report on Syria conflict finds 11.5% of population killed or injured. *The Guardian*.
4. Stone-Brown K (2013) Syria: a healthcare system on the brink of collapse. *BMJ* 347: f7375.
5. WHO (2013) Donor update The Syrian Arab Republic.
6. WHO (2017) Syrian Arab Republic. Annual Report 2017.
7. Benov A, Glassberg E, Nadler R, Gendler S, Erlich T, et al. (2014) Role I trauma experience of the Israeli Defense Forces on the Syrian border. *J Trauma Acute Care Surg* 77: S71-76.
8. Bitterman Y, Benov A, Glassberg E, Satanovsky A, Bader T, et al. (2016) Role 1 Pediatric Trauma Care on the Israeli-Syrian Border-First Year of the Humanitarian Effort. *Mil Med* 181: 849-853.
9. Glassberg E, Badr T, Nadler R, Benov A, Zarka S, et al. (2015) When Humanitarianism Trumps Politics. *Isr Med Assoc J* 17: 339-340.
10. Nadler R, Gendler S, Benov A, Shina A, Baruch E, et al. (2015) Intravenous access in the prehospital settings: What can be learned from point-of-injury experience. *J Trauma Acute Care Surg* 79: 221-226.
11. Shina A, Lipsky AM, Nadler R, Levi M, Benov A, et al. (2015) Prehospital use of hemostatic dressings by the Israel Defense Forces Medical Corps: A case series of 122 patients. *J Trauma Acute Care Surg* 79: S204-209.
12. Benov Avi, Elon G, Baruch EN, Avi S, Gilad T, et al. (2016) Augmentation of point of injury care: Reducing battlefield mortality-The IDF experience. *Injury* 47: 993-1000.
13. Benov A, Salas MM, Nakar H, Antebi B, Tarif B, et al. (2017) Battlefield pain management: A view of 17 years in Israel Defense Forces. *J Trauma Acute Care Surg* 83: S150-S155.
14. Chen J, Benov A, Nadler R, Darlington DN, Cap AP, et al. (2017) Prehospital Blood Transfusion During Aeromedical Evacuation of Trauma Patients in Israel: The IDF CSAR Experience. *Mil Med* 182: 47-52.
15. Antebi B, Benov A, Mann-Salinas EA, Le TD, Cancio LC, et al. (2016) Analysis of injury patterns and roles of care in US and Israel militaries during recent conflicts: Two are better than one. *J Trauma Acute Care Surg*.
16. Beekley AC, Watts DM (2004) Combat trauma experience with the United States Army 102nd Forward Surgical Team in Afghanistan. *Am J Surg* 187: 652-654.
17. Bonnet S, Bertani A, Savoie PH, Mathieu L, Boddaert G, et al. (2015) Humanitarian Surgical Care Provided by a French Forward Surgical Team: Ten Years of Providing Medical Support to the Population of the Ivory Coast. *Mil Med* 180: 1075-1082.
18. Dunn AC, Royal New Zealand Army Medical Corps (2002) East Timor: the work of the New Zealand Forward Surgical Team from 1999 to 2000. *Mil Med* 167: 810-811.
19. Woll M, Brisson P (2013) Humanitarian care by a forward surgical team in Afghanistan. *Mil Med* 178: 385-388.
20. Kreiss Y, Merin O, Peleg K, Levy G, Vinker S, et al. (2010) Early disaster response in Haiti: the Israeli field hospital experience. *Ann Intern Med* 153: 45-48.
21. Merin O, Ash N, Levy G, Schwaber MJ, Kreiss Y (2010) The Israeli field hospital in Haiti—ethical dilemmas in early disaster response. *N Engl J Med* 362: e38.
22. Merin O, Kreiss Y, Lin G, Pras E, Dagan D (2014) Collaboration in response to disaster—Typhoon Yolanda and an integrative model. *N Engl J Med* 370: 1183-1184.
23. Eastridge BJ, Mabry RL, Seguin P, Cantrell J, Tops T, et al. (2012) Death on the battlefield (2001-2011): implications for the future of combat casualty care. *J Trauma Acute Care Surg* 73: S431-437.
24. Rasmussen TE, Gross KR, Baer DG (2013) Where do we go from here? Preface. US Military Health System Research Symposium, August 2013. *J Trauma Acute Care Surg* 75: S105-106.