Committee on Surgical Combat Casualty Care (CoSCCC)

Journal Watch

2nd Quarter

FY 2023

Journal Watch Key Terminology Searched:

Microcirculation
Shock
Human subject research
Haemorrhagic shock
Traumatic brain injury
Plasma
Transfusion
RBCs
Stability
Blast
Amputation
Traumatic Clinical outcomes
Injury
Coagulopathy
Fibrinogen concentrate
Viscoelastic haemostatic assays
Guidelines
Fractures
REBOA
Orthopaedic trauma
Wound ballistics
Cause of injury
Damage Control Resuscitation
Tension pneumothorax
Blast Injury
Combat casualty care
Surgical skills
Novel Coronavirus
Predictions
Limb Salvage
Trauma Management
Sublingual
IDF
Multiple trauma
Coagulopathy
Pre-hospital
Trauma
Resuscitation
Ultrasound
Facial trauma
Multiple
Clinical parameters
Pelvic fracture
Cryoprecipitate
Massive transfusion
Angiography
Internal fixation
X-ray
Antibiotic prophylaxis
Perioperative antibiotics
Faecal diversion
Head injuries
Battlefield Injury
Thoracotomy
Died of Wounds
medical treatment facility
Emergency surgery
COVID-19
Vital Signs
Temporary Shunts
Haemorrhage
Ethics committees
Institutional review board
Shock index
Diagnostic accuracy
Thrombelastography (TEG)
Imaging
Severe trauma
Afghanistan
War
Transfusion
Damage control Surgery
Battlefield Trauma
Fibrinogen
ABO
External fixation
Pelvic ring
Pre-peritoneal pelvic packing
Long bone fractures
Surgical site infection
Primary repair
Poly-trauma
Prolonged field care
Military Medicine
Killed in Action
Mortality
Infection prevention
Hypocalcemia
Global Surgery
LSCO

Trauma Surg Acute Care Open. 2023 Feb 27;8(1):e001049.doi: 10.1136/tsaco-2022-001049. eCollection 2023.

Power of mentorship for civilian and military acute care surgeons: identifying and leveraging opportunities for longitudinal professional development

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Abstract

Across disciplines, mentorship has been recognized as a key to success. Acute care surgeons, focused on the care of trauma surgery, emergency general surgery and surgical critical care, practice in a wide variety of settings and have unique mentorship needs across all phases of their career. Recognizing the need for robust mentorship and professional development, the American Association for the Surgery of Trauma (AAST) convened an expert panel entitled 'The Power of Mentorship' at the 81st annual meeting in September 2022 (Chicago, Illinois). This was a collaboration between the AAST Associate Member Council (consisting of surgical resident, fellow and junior faculty members), the AAST Military Liaison Committee, and the AAST Healthcare Economics Committee. Led by two moderators, the panel consisted of five real-life mentor-mentee pairs. They addressed the following realms of mentorship: clinical, research, executive leadership and career development, mentorship through professional societies, and mentorship for military-trained surgeons. Recommendations, as well as pearls and pitfalls, are summarized below.

Keywords: education, medical; general surgery; teaching.

JAMA Netw Open. 2023 Feb 1;6(2):e230484.doi:10.1001/jamanetworkopen.2023.0484.

Characterizing Moral Injury and Distress in US Military Surgeons Deployed to Far-Forward Combat Environments in Afghanistan and Iraq

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Abstract

Importance: Moral injury and distress (MID), which occurs when individuals have significant dissonance with their belief system and overwhelming feelings of being powerless to do what is believed to be right, has not been explored in the unique population of military surgeons deployed far forward in active combat settings. Deployed military surgeons provide care to both injured soldiers and civilians under command-driven medical rules of engagement (MROE) in variably resourced settings. This practice setting has no civilian corollary for comparison or current specific tool for measurement.

Objective: To characterize MID among military surgeons deployed during periods of high casualty volumes through a mixed-methods approach.

Design, setting, and participants: This qualitative study using convergent mixed methods was performed from May 2020 to October 2020. Participants included US military surgeons who had combat deployments to a far-forward role 2 treatment facility during predefined peak casualty periods in Iraq (2003-2008) and Afghanistan (2009-2012), as identified by purposeful snowball sampling. Data analysis was performed from October 2020 to May 2021.

Main outcomes and measures: Measure of Moral Distress for Healthcare Professionals (MMD-HP) survey and individual, semistructured interviews were conducted to thematic saturation.

Results: The total cohort included 20 surgeons (mean [SD] age, 38.1 [5.2] years); 16 (80%) were male, and 16 (80%) had 0 or 1 prior deployment. Deployment locations were Afghanistan (11 surgeons [55%]), Iraq (9 surgeons [45%]), or both locations (3 surgeons [15%]). The mean (SD) MMD-HP score for the surgeons was 104.1 (39.3). The primary thematic domains for MID were distressing outcomes (DO) and MROE. The major subdomains of DO were guilt related to witnessing horrific injuries; treating pregnant women, children, and US soldiers; and second-guessing decisions. The major subdomains for MROE were forced transfer of civilian patients, limited capabilities and resources, inexperience in specialty surgical procedures, and communication with command. Postdeployment manifestations of MID were common and affected sleep, medical practice, and interpersonal relationships.

Conclusions and relevance: In this qualitative study, MID was ubiquitous in deployed military surgeons. Thematic observations about MID, specifically concerning the domains of DO and MROE, may represent targets for further study to develop an evaluation tool of MID in this population and inform possible programs for identification and mitigation of MID.

World J Emerg Surg. 2023 Jan 9;18(1):5.doi: 10.1186/s13017-022-00468-2.

Early management of isolated severe traumatic brain injury patients in a hospital without neurosurgical capabilities: a consensus and clinical recommendations of the World Society of Emergency Surgery (WSES)

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Abstract

Background: Severe traumatic brain-injured (TBI) patients should be primarily admitted to a hub trauma center (hospital with neurosurgical capabilities) to allow immediate delivery of appropriate care in a specialized environment. Sometimes, severe TBI patients are admitted to a spoke hospital (hospital without neurosurgical capabilities), and scarce data are available regarding the optimal management of severe isolated TBI patients who do not have immediate access to neurosurgical care.

Methods: A multidisciplinary consensus panel composed of 41 physicians selected for their established clinical and scientific expertise in the acute management of TBI patients with different specializations (anesthesia/intensive care, neurocritical care, acute care surgery, neurosurgery and neuroradiology) was established. The consensus was endorsed by the World Society of Emergency Surgery, and a modified Delphi approach was adopted.

Results: A total of 28 statements were proposed and discussed. Consensus was reached on 22 strong recommendations and 3 weak recommendations. In three cases, where consensus was not reached, no recommendation was provided.

Conclusions: This consensus provides practical recommendations to support clinician's decision making in the management of isolated severe TBI patients in centers without neurosurgical capabilities and during transfer to a hub center.

Keywords: Hub; Management; Spoke; Transfer; Traumatic brain injury.

BMC Surg. 2023 Jan 27;23(1):23.doi: 10.1186/s12893-023-01919-6.

Gunshot injury to the colon by expanding bullets in combat patients wounded in hybrid period of the Russian-Ukrainian war during 2014-2020

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Abstract

Background: A gunshot wound to the colon is a frequent injury in armed conflicts. An example of a high-energy modern weapon is hollow-point bullets, which is associated with increased tissue damage and lethal outcome. The aim of this study was to evaluate gunshot injuries to the colon in combat patients and to assess the difference in clinical features of patients with colon injuries by hollow-point versus shape-stable bullets.

Patients and methods: Analyses of clinical data were performed on 374 male soldiers from the Armed Forces of Ukraine with gunshot abdominal wounds with injury to the colon in East Ukraine between 2014 and 2020. Out of 374 injured, 112 (29.9%) patients were diagnosed with penetrating gunshot bullet wounds: 69/112 (61.6%) were injured by shape-stable bullets, and the hollow-point bullets injured 43/112 (38.4%) patients.

Results: More severe hemorrhagic shock stages were in patients injured by hollow-point bullets: shock stages III-IV was in 25 (58.1%) patients injured by the hollow-point bullets vs. 17 (24.6%) patients injured by shape-stable bullets ($p = 0.0004$). Left colon parts were more frequently injured as compared to the right colon side or transverse colon: 21 (48.8%) patients were injured by the hollow-point bullets ($p < 0.0001$), and 41 (59.4%) patients were injured by the shape-stable bullets ($p = 0.032$). A significant difference was identified for the frequent injury to the middle colon within the entire cohort ($p = 0.023$). Patients injured by the hollow-point bullets demonstrated a higher frequency of 3-5 areas of colon gunshot defects, which was detected in 18 (41.8%) patients injured by hollow-point bullets and none with shape-stable bullets injury ($p = 0.0001$). Colon Injury Scale (CIS) IV was detected in 7 (16.3%) patients injured by the hollow-point bullets as compared to 2 (2.9%) patients injured by shape-stable bullets ($p = 0.011$). Colostomy was performed in 14 (69%) patients injured by shape-stable bullets and in 12 (27.9%) patients injured by hollow-point bullets ($p > 0.05$). 15 (35%) patients died after injury by the hollow-point bullet, whereas 9 (13%) patients after damage by the shape-stable bullets ($p = 0.0089$).

Conclusions: All patients should be suspected to have an injury by bullet with expanding properties in case of penetrating abdominal injury (absent of outlet wound) and careful revision of the abdomen must be performed to identify possible multiorgan injury as well as multiple gunshot defects of the intestine.

Keywords: Colon injury; Expanding bullet; Gunshot; Hollow-point bullet; Shape-stable bullets; War in Ukraine.

Injury. 2023 Jan;54(1):124-130.doi: 10.1016/j.injury.2022.08.063. Epub 2022 Sep 7.

Extracorporeal Life Support for Severely Burned Patients with Concurrent Inhalation Injury and Acute Respiratory Distress Syndrome: Experience from a Military Medical Burn Center

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Abstract

Background: Both inhalation injury and acute respiratory distress syndrome (ARDS) are risk factors that predict mortality in severely burned patients. Extracorporeal life support (ECLS) is widely used to rescue these patients; however, its efficacy and safety in this critical population have not been well defined. We report our experience of using ECLS for the treatment of severely burned patients with concurrent inhalation injury and ARDS.

Methods: This was a retrospective analysis of 14 patients collected from a single medical burn center from 2012 to 2019. All patients suffered from major burns with inhalation injury and ARDS, and were treated with ECLS.

Results: The median total body surface area of deep dermal or full thickness burns was 94.5%, ranging 47.7-99.0 %. The median revised Baux score was 122.0, ranging 90.0-155.0. All patients developed ARDS with a median partial pressure of arterial oxygen to a fraction of inspired oxygen ratio of 61.5, ranging 49.0-99.0. Indications for ECLS included sustained hypoxemia and unstable hemodynamics. The median interval for initiating ECLS was 2.5 days, ranging 1.0-156.0 days. The median duration of ECLS was 2.9 days, ranging 0.3-16.7 days. The overall survival to discharge was 42.8%. Causes of death included sepsis and multiple organ failure. ECLS-related complications included cannulation bleeding, catheter-related infection, and hemolysis. The incidence of risk factors reported in literature were higher in non-survivors, including Baux>120, albumin < 3.0 g/dL, and lactate > 8 mmol/L.

Conclusions: For severely burned patients with concurrent inhalation injury and ARDS, ECLS could be a salvage treatment to improve sustained hypoxemia. However, the efficacy of hemodynamic support was limited. Identifying definite ECLS indications and rigorous patient selection would contribute to better clinical outcomes.

Keywords: Acute respiratory distress syndrome; Baux score; Extracorporeal life support; Extracorporeal membrane oxygenation; Inhalation injury; Major burn.

Crit Care. 2023 Mar 5;27(1):85.doi: 10.1186/s13054-023-04386-w.

Shock index as predictor of massive transfusion and mortality in patients with trauma: a systematic review and meta-analysis

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Abstract

Background: Management of bleeding trauma patients is still a difficult challenge. Massive transfusion (MT) requires resources to ensure the safety and timely delivery of blood products. Early prediction of MT need may be useful to shorten the time process of blood product preparation. The primary aim of this study was to assess the accuracy of shock index to predict the need for MT in adult patients with trauma. For the same population, we also assessed the accuracy of SI to predict mortality.

Methods: This systematic review and meta-analysis was performed in accordance with the PRISMA guidelines. We performed a systematic search on MEDLINE, Scopus, and Web of Science from inception to March 2022. Studies were included if they reported MT or mortality with SI recorded at arrival in the field or the emergency department. The risk of bias was assessed using the QUADAS-2.

Results: Thirty-five studies were included in the systematic review and meta-analysis, for a total of 670,728 patients. For MT the overall sensibility was 0.68 [0.57; 0.76], the overall specificity was 0.84 [0.79; 0.88] and the AUC was 0.85 [0.81; 0.88]. Positive and Negative Likelihood Ratio (LR+; LR-) were 4.24 [3.18-5.65] and 0.39 [0.29-0.52], respectively. For mortality the overall sensibility was 0.358 [0.238; 0.498] the overall specificity 0.742 [0.656; 0.813] and the AUC 0.553 (confidence region for sensitivity given specificity: [0.4014; 0.6759]; confidence region for specificity given sensitivity: [0.4799; 0.6332]). LR+ and LR- were 1.39 [1.36-1.42] and 0.87 [0.85-0.89], respectively.

Conclusions: Our study demonstrated that SI may have a limited role as the sole tool to predict the need for MT in adult trauma patients. SI is not accurate to predict mortality but may have a role to identify patients with a low risk of mortality.

Keywords: Hemorrhagic shock; Massive transfusion; Mortality; Shock index; Trauma.

Burns. 2023 Mar;49(2):275-303.doi: 10.1016/j.burns.2022.12.011. Epub 2022 Dec 26.

European Burns Association guidelines for the management of burn mass casualty incidents within a European response plan

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Abstract

Background: A European response plan to burn mass casualty incidents has been jointly developed by the European Commission and the European Burn Association. Upon request for assistance by an affected country, the plan outlines a mechanism for coordinated international assistance, aiming to alleviate the burden of care in the affected country and to offer adequate specialized care to all patients who can benefit from it. To that aim, Burn Assessment Teams are deployed to assess and triage patients. Their transportation priority recommendations are used to distribute outnumbering burn casualties to foreign burn centers. Following an appropriate medical evacuation, these casualties receive specialized care in those facilities.

Methods: The European Burns Association's disaster committee developed medical-organizational guidelines to support this European plan. The experts identified fields of interest, defined questions to be addressed, performed relevant literature searches, and added their expertise in burn disaster preparedness and response. Due to the lack of high-level evidence in the available literature, recommendations and specially designed implementation tools were provided from expert opinion. The European Burns Association officially endorsed the draft recommendations in 2019, and the final full text was approved by the EBA executive committee in 2022.

Recommendations: The resulting 46 recommendations address four fields. Field 1 underlines the need for national preparedness plans and the necessary core items within such plans, including coordination and integration with an international response. Field 2 describes Burn Assessment Teams' roles, composition, training requirements, and reporting goals. Field 3 addresses the goals of specialized in-hospital triage, appropriate severity criteria, and their effects on priorities and triage. Finally, field 4 covers medical evacuations, including their timing and organization, the composition of evacuation teams and their assets, preparation, and the principles of en route care.

Keywords: Burn assessment teams; Burns; Disaster planning; Mass casualty incidents; Patients transportation; Triage.

Scand J Trauma Resusc Emerg Med. 2023 Jan 7;31(1):2.doi: 10.1186/s13049-023-01066-0.

Oral transmucosal fentanyl citrate analgesia in prehospital trauma care: an observational cohort study

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Abstract

Background: Pain is one of the major prehospital symptoms in trauma patients and requires prompt management. Recent studies have reported insufficient analgesia after prehospital treatment in up to 43% of trauma patients, leaving significant room for improvement. Good evidence exists for prehospital use of oral transmucosal fentanyl citrate (OTFC) in the military setting. We hypothesized that the use of OTFC for trauma patients in remote and challenging environment is feasible, efficient, safe, and might be an alternative to nasal and intravenous applications.

Methods: This observational cohort study examined 177 patients who were treated with oral transmucosal fentanyl citrate by EMS providers in three ski and bike resorts in Switzerland. All EMS providers had previously been trained in administration of the drug and handling of potential adverse events.

Results: OTFC caused a statistically significant and clinically relevant decrease in the level of pain by a median of 3 (IQR 2 to 4) in NRS units ($P < 0.0001$). Multiple linear regression analysis showed a significant absolute reduction in pain, with no differences in all age groups and between genders. No major adverse events were observed.

Conclusions: Prehospital administration of OTFC is safe, easy, and efficient for extrication and transport across all age groups, gender, and types of injuries in alpine environments. Side effects were few and mild. This could provide a valuable alternative in trauma patients with severe pain, without the delay of inserting an intravenous line, especially in remote areas, where fast action and easy administration are important.

Keywords: Fentanyl; HEMS; OTFC; Prehospital analgesia; Trauma support.

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Immediate CT after hospital arrival and decreased in-hospital mortality in severely injured trauma patients

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Abstract

Background: Immediate whole-body CT (about 10 min after arrival) in an all-in-one resuscitation room equipped with CT has been found to be associated with shorter time to haemostasis and lower in-hospital mortality. The aim of this study was to elucidate the benefits of immediate whole-body CT after hospital arrival in patients with severe trauma with the hypothesis that immediate CT within 10 min is associated with lower in-hospital mortality.

Method: This retrospective cohort study of patients with an injury severity score of more than 15 who underwent whole-body CT was conducted using the Japanese Trauma Databank (2019-2020). An immediate CT was conducted within 10 min after arrival. In-hospital mortality, frequency of subsequent surgery, and time to surgery were compared with immediate and non-immediate CT. Inverse probability weighting was conducted to adjust for patient backgrounds, including mechanism and severity of injury, prehospital treatment, vital signs, and institutional characteristics.

Results: Among the 7832 patients included, 646 underwent immediate CT. Immediate CT was associated with lower in-hospital mortality (12.5 versus 15.7 per cent; adjusted OR 0.77 (95 per cent c.i. 0.69 to 0.84); $P < 0.001$) and fewer damage-control surgeries (OR 0.75 (95 per cent c.i. 0.65 to 0.87)). There was a 10 to 20 min difference in median time to craniotomy, laparotomy, and angiography. These benefits were observed regardless of haemodynamic instability on hospital arrival, while they were identified only in elderly patients with severe injury and altered consciousness.

Conclusion: Immediate CT within 10 min after arrival was associated with decreased in-hospital mortality in severely injured trauma patients.