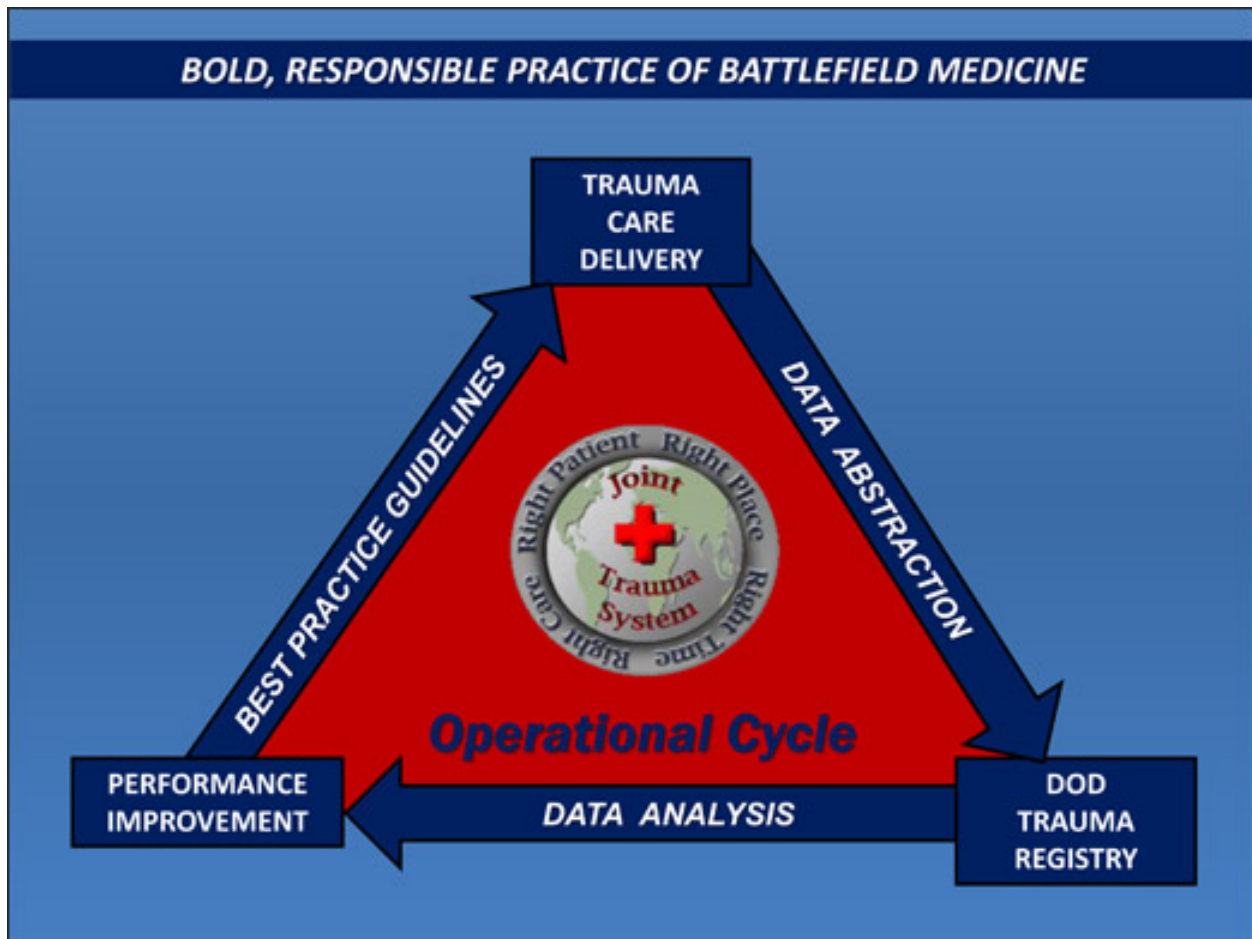


Committee on Surgical Combat Casualty Care
(CoSCCC)



Journal Watch

4th Quarter

2017

Journal Watch Key Terminology Searched:

Microcirculation	Trauma Management	Haemorrhage
Shock	Sublingual	Ethics committees
Human subject research	IDF	Institutional review board
Haemorrhagic shock	Multiple trauma	Shock index
Traumatic brain injury	Coagulopathy	Diagnostic accuracy
Plasma	Pre-hospital	Thrombelastography (TEG)
Transfusion	Trauma	Imaging
RBCs	Resuscitation	Severe trauma
Stability	Ultrasound	Afghanistan
Blast	Facial trauma	War
Amputation	Multiple	Transfusion
Traumatic Clinical outcomes	Clinical parameters	Damage control
Injury	Pelvic fracture	Trauma
Coagulopathy	Cryoprecipitate	Fibrinogen
Fibrinogen concentrate	Massive transfusion	ABO
Viscoelastic haemostatic assays	Angiography	External fixation
Guidelines	Internal fixation	Pelvic ring
fractures	X-ray	Pre-peritoneal pelvic packing
REBOA	Antibiotic prophylaxis	Long bone fractures
Orthopaedic trauma	Perioperative antibiotics	Surgical site infection
Wound ballistics	Faecal diversion	Primary repair
Cause of injury	Head injuries	

The future of resuscitative endovascular balloon occlusion in combat operations.

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Abstract

Damage control resuscitation and early thoracotomy have been used to increase survival after severe injury in combat. There has been a renewed interest in resuscitative endovascular balloon occlusion of the aorta (REBOA) in both civilian and military medical practices. REBOA may result in visceral and limb ischaemia that could be harmful if use of REBOA is premature or prolonged. The purpose of this paper is to align our experience of combat injuries with the known capability of REBOA to suggest an implementation strategy for the use of REBOA in combat care. It may replace the resuscitative effect of thoracotomy; can provide haemostasis of non-compressible torso injuries such as the junctional and pelvic haemorrhage caused by improvised explosive devices. However, prehospital use of REBOA must be in the context of an overall surgical plan and should be restricted to deployment in the distal aorta. Although REBOA is technically easier than a thoracotomy, it requires operator training and skill to add to the beneficial effect of damage control resuscitation and surgery.

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High ratio plasma resuscitation does not improve survival in pediatric trauma patients.

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Abstract

BACKGROUND: Damage control resuscitation including balanced resuscitation with high ratios of plasma (PLAS) and platelets (PLT) to packed red blood cells (PRBC) improves survival in adult patients. We sought to evaluate the effect of a high ratio PLAS to PRBC resuscitation strategy in massively transfused pediatric patients with combat injuries.

METHODS: The Department of Defense Trauma Registry was queried from 2001 to 2013 for pediatric trauma patients (<18 years). Burns, drowning, isolated head trauma, and older teens were excluded. Those who received massive transfusion (≥ 40 mL/kg total blood products in 24 hours) and early deaths who received any blood products were then evaluated. Primary outcomes were mortality at 24 hours and in-hospital. Secondary outcomes included blood product utilization over 24 hours, ventilator-free days, intensive care unit-free days, and hospital length of stay.

RESULTS: The Department of Defense Trauma Registry yielded 4,980 combat-injured pediatric trauma patients, of whom 364 met inclusion criteria. Analysis of PLAS/PRBC ratios across the entire spectrum of possible ratios in these patients demonstrated no clear inflection point for mortality. Using a division between low (LO) and high (HI) ratios of PLAS/PRBC 1:2, there was no difference in all-cause mortality at 24 hours (LO, 9.2% vs. HI, 8.0%; $p = 0.75$) and hospital discharge (LO, 21.5% vs. HI, 17.1%; $p = 0.39$). HI ratio patients received less PRBC but more PLAS and PLT and more total blood products. Those in the HI ratio group also had longer hospital length of stay. Regression analysis demonstrated no associated mortality benefit with a HI ratio (hazards ratio, 2.04; 95% confidence interval, 0.48-8.73; $p = 0.34$).

CONCLUSION: In combat-injured children undergoing a massive transfusion, a high ratio of PLAS/PRBC was not associated with improved survival. Further prospective studies should be performed to determine the optimal resuscitation strategy in critically injured pediatric patients.

LEVEL OF EVIDENCE: Therapeutic study, level III. PMID: 28481839
DOI:[10.1097/TA.0000000000001549](#)

Relative device stability of anterior versus axillary needle decompression for tension pneumothorax during casualty movement: Preliminary analysis of a human cadaver model.

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Abstract

BACKGROUND: Tension pneumothorax (tPTX) remains a significant cause of potentially preventable death in military and civilian settings. The current prehospital standard of care for tPTX is immediate decompression with a 14-gauge 8-cm angiocatheter; however, failure rates may be as high as 17% to 60%. Alternative devices, such as 10-gauge angiocatheter, modified Veress needle, and laparoscopic trocar, have shown to be potentially more effective in animal models; however, little is known about the relative insertional safety or mechanical stability during casualty movement.

METHODS: Seven soft-embalmed cadavers were intubated and mechanically ventilated. Chest wall thickness was measured at the second intercostal space at the midclavicular line (2MCL) and the fifth intercostal space along the anterior axillary line (5AAL). CO₂ insufflation created a PTX, and needle decompression was then performed with a randomized device. Insertional depth was measured between hub and skin before and after simulated casualty transport. Thoracoscopy was used to evaluate for intrapleural placement and/or injury during insertion and after movement. Cadaver demographics, device displacement, device dislodgment, and injuries were recorded. Three decompressions were performed at each site (2MCL/5AAL), totaling 12 events per cadaver.

RESULTS: Eighty-four decompressions were performed. Average cadaver age was 59 years, and body mass index was 24 kg/m. The CWT varied between cadavers because of subcutaneous emphysema, but the average was 39 mm at the 2MCL and 31 mm at the 5AAL. Following movement, the 2MCL site was more likely to become dislodged than the 5AAL (67% vs. 17%, $p = 0.001$). Median displacement also differed between 2MCL and 5AAL (23 vs. 2 mm, $p = 0.001$). No significant differences were noted in dislodgement or displacement between devices. Five minor lung injuries were noted at the 5AAL position.

CONCLUSION: Preliminary results from this human cadaver study suggest the 5AAL position is a more stable and reliable location for thoracic decompression of tPTX during combat casualty transport.

LEVEL OF EVIDENCE: Therapeutic study, level III.

PMID: 28383466 DOI: [10.1097/TA.0000000000001488](#)

Bigger is better: comparison of alternative devices for tension hemopneumothorax and pulseless electrical activity in a yorkshire swine model.

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Abstract

BACKGROUND: Tension pneumothorax is a cause of potentially preventable death in pre-hospital and battlefield settings and 14g angiocatheter (14G AC) decompression remains the current treatment standard, despite its high incidence of failure. Traumatic pneumothorax is often associated with hemothorax, but 14G AC has no proven efficacy for associated hemothorax. We sought to compare the 14G AC to three alternative devices for treatment of tension hemopneumothorax (t-H/PTX) in a positive pressure ventilation swine model.

METHODS: Our tension model was modified to incorporate a persistent air leak and pleural blood. Tension physiology was achieved with escalating CO₂ insufflation via transdiaphragmatic trocar and 10% estimated blood volume was instilled into each chest. Intervention was randomized between 14G AC, 10gauge angiocatheter (10G AC), modified Veress needle (mVN), and 3mm laparoscopic trocar (LT). After recovery, serial tension-induced pulseless electrical activity (PEA) events were induced and decompressed. Success of rescue, time to rescue, and physiologic data were recorded.

RESULTS: 195 t-H/PTX and 88 PEA events were conducted in 25 swine. LT and 10G AC were more successful and had faster median time to rescue for t-H/PTX, compared to 14G AC, while mVN performed comparably. Following PEA, 14G AC and mVN only succeeded at rescue 50% and 57% of the time, while 10G AC and LT had 100% success at return of spontaneous circulation. Time to successful return of circulation following PEA did not differ between devices; however, there was a noticeable difference in the rate of meaningful hemodynamic recovery following PEA favoring LT and 10G AC. There were no significant injuries noted.

CONCLUSION: While mVN performed comparably to 14G AC, both have unacceptable failure rates. 10G AC and LT performed superiorly in both t-H/PTX and PEA. We believe there is now ample evidence supporting replacement of the 14G AC with 10G AC in current treatment recommendations.

LEVEL OF EVIDENCE: II STUDY TYPE: Therapeutic. PMID: 28885469

DOI:[10.1097/TA.0000000000001684](https://doi.org/10.1097/TA.0000000000001684)

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