ORIGINAL ARTICLES

01. Hemorrhagic Shock.
Cannon JW. N Engl J Med. 2018 Jan 25;378(4):370-379.
PMID: 29365303 DOI: 10.1056/NEJMra1705649
PDF: READ PDF HERE
URL: https://www.ncbi.nlm.nih.gov/pubmed/?term=29365303

02. Assessment and Resuscitation in Trauma Management.
Gondek S, Schroeder ME, Sarani B. Surg Clin North Am. 2017 Oct;97(5):985-998. doi: 10.1016/j.suc.2017.06.001.
PDF: READ PDF HERE
URL: https://www.ncbi.nlm.nih.gov/pubmed/28958368
The golden hour of trauma represents a crucial period in the management of acute injury. In an efficient trauma resuscitation, the primary survey is viewed as more than simple ABCs with multiple processes running in parallel. Resuscitation efforts should be goal oriented with defined endpoints for airway management, access, and hemodynamic parameters. In tandem with resuscitation, early identification of life-threatening injuries is critical for determining the disposition of patients when they leave the trauma bay. Salvage strategies for profoundly hypotensive or pulseless patients include retrograde balloon occlusion of the aorta and resuscitative thoracotomy, with differing populations benefiting from each.

03. New understandings of post injury coagulation and resuscitation.
Cohen MJ, Christie SA. Int J Surg. 2016 Sep;33(Pt B):242-245. Epub 2016 May 19. PMID: 27212591. DOI: 10.1016/j.ijsu.2016.05.037
PDF: READ PDF HERE
URL: https://www.ncbi.nlm.nih.gov/pubmed/27212591
Coagulopathy following injury is common and it predicts poor outcomes and increased mortality. For many decades, coagulopathy in trauma was considered as an iatrogenic phenomenon, and clinical practice focused on a resuscitation strategy using large volume crystalloid and packed red blood cells. The discovery of Acute Traumatic Coagulopathy as a distinct pathophysiologic state coupled with a transition towards balanced product resuscitation has fundamentally changed the paradigm of trauma care and represents one of the most active areas of current research in the field of trauma. In this review, we examine the development and current understanding of the mechanisms, implicated mediators, and physiology of Acute Traumatic Coagulopathy, with an emphasis on the role of the activated Protein C pathway. We will also review the state of resuscitation practice including the evidence for balanced product administration and the previously under-appreciated importance of platelet count and function. Importantly, we highlight ongoing knowledge deficits in traumatic coagulopathy and resuscitation as directions for future investigation in order to facilitate further insight into these rapidly evolving fields.

04. Balanced Resuscitation in Trauma Management.
Cantle PM, Cotton BA. Surg Clin North Am. 2017 Oct;97(5):999-1014. doi: 10.1016/j.suc.2017.06.002. Epub 2017 Aug 17.
PDF: READ PDF HERE
URL: https://www.ncbi.nlm.nih.gov/pubmed/28958369
Over the past decade substantial knowledge has been gained in understanding both the coagulopathy of trauma and the complications associated with aggressive crystalloid-based resuscitation. Balanced resuscitation, which includes permissive hypotension, limiting crystalloid use, and the transfusion of

blood products in ratios similar to whole blood, has changed the previous standard of care. Prompt initiation of massive transfusion and the protocolled use of 1:1:1 product ratios have improved the morbidity and mortality of patients with trauma in hemorrhagic shock. Balanced resuscitation minimizes the impact of trauma-induced coagulopathy, limits blood product waste, and reduces the complications that occur with aggressive crystalloid resuscitation.

05. Novel concepts for damage control resuscitation in trauma.
Van PY, Holcomb JB, Schreiber MA. Curr Opin Crit Care. 2017 Dec;23(6):498-502. PMID: 28953559
DOI: 10.1097/MCC.0000000000000455
PDF: READ PDF HERE
URL: https://www.ncbi.nlm.nih.gov/pubmed/28953559
PURPOSE OF REVIEW:
Traumatic injuries are a major cause of mortality worldwide. Damage control resuscitation or balanced transfusion of plasma, platelets, and red blood cells for the management of exsanguinating hemorrhage after trauma has become the standard of care. We review the literature regarding the use of alternatives to achieve the desired 1 : 1:1 ratio as availability of plasma and platelets can be problematic in some environments.
RECENT FINDINGS:
Liquid and freeze dried plasma (FDP) are logistically easier to use and may be superior to fresh frozen plasma. Cold storage platelets (CSPs) have improved hemostatic properties and resistance to bacterial contamination. Low titer type O whole blood can be transfused safely in civilian patients.
SUMMARY:
In the face of hemorrhagic shock from traumatic injury, resuscitation should be initiated with 1 : 1 : 1 transfusion of plasma, platelets, and red blood cells with limited to no use of crystalloids. Availability of plasma and platelets is limited in some environments. In these situations, the use of low titer type O whole blood, thawed or liquid plasma, cold stored platelets or reconstituted FDP can be used as substitutes to achieve optimal transfusion ratios. The hemostatic properties of CSPs may be superior to room temperature platelets.

06. Thoracic Trauma.
Dennis BM, Bellister SA, Guillamondegui OD. Surg Clin North Am. 2017 Oct;97(5):1047-1064. doi: 10.1016/j.suc.2017.06.009.
PDF: READ PDF HERE
URL: https://www.ncbi.nlm.nih.gov/pubmed/28958357
Management of chest trauma is integral to patient outcomes owing to the vital structures held within the thoracic cavity. Understanding traumatic chest injuries and appropriate management plays a pivotal role in the overall well-being of both blunt and penetrating trauma patients. Whether the injury includes rib fractures, associated pulmonary injuries, or tracheobronchial tree injuries, every facet of management may impact the short- and long-term outcomes, including mortality. This article elucidates the workup and management of the thoracic cage, pulmonary and tracheobronchial injuries.

07. Surgical Management of Solid Organ Injuries.
Johnsen NV, Betzold RD, Guillamondegui OD, Dennis BM, Stassen NA, Bhullar I, Ibrahim JA.
Surg Clin North Am. 2017 Oct;97(5):1077-1105. doi: 10.1016/j.suc.2017.06.013.
PDF: READ PDF HERE
URL: https://www.ncbi.nlm.nih.gov/pubmed/28958359
Surgery used to be the treatment of choice in patients with solid organ injuries. This has changed over the past 2 decades secondary to advances in noninvasive diagnostic techniques, increased availability of

less invasive procedures, and a better understanding of the natural history of solid organ injuries. Now, nonoperative management (NOM) has become the initial management strategy used for most solid organ injuries. Even though NOM has become the standard of care in patients with solid organ injuries in most trauma centers, surgeons should not hesitate to operate on a patient to control life-threatening hemorrhage.

08. Surgical Management of Abdominal Trauma: Hollow Viscus Injury.
Coleman JJ, Zarzaur BL. Surg Clin North Am. 2017 Oct;97(5):1107-1117. doi: 10.1016/j.suc.2017.06.004.
PDF: READ PDF HERE
URL: https://www.ncbi.nlm.nih.gov/pubmed/28958360
Hollow viscus injury is common with penetrating trauma to the torso and infrequent with a blunt traumatic mechanism of injury. The diagnosis in hemodynamically unstable patients is often made in the operating room. In hemodynamically stable patients, the diagnosis can be difficult due to additional injuries. Although computed tomography remains the diagnostic tool of choice in hemodynamically stable patients, it has lower reported sensitivity and specificity with hollow viscus injury. However, even short delays in diagnosis increase morbidity and mortality significantly. Operative management of stomach, duodenal, small bowel, and colon injuries is reviewed.

09. Surgical Management of Vascular Trauma.
Teixeira PGR, DuBose J. Surg Clin North Am. 2017 Oct;97(5):1133-1155. doi: 10.1016/j.suc.2017.05.001. Epub 2017 Aug 17.
PDF: READ PDF HERE
URL: https://www.ncbi.nlm.nih.gov/pubmed/28958362
Vascular injuries remain among the most challenging entities encountered in trauma care. Improvements in diagnostic capabilities, resuscitation approaches, vascular techniques, and prosthetic device options have afforded considerable advancement in the care of these patients. This evolution in care capabilities continues. Despite advances, uncontrolled hemorrhage due to major vascular injury remains one of the most common causes of death after trauma. Successful management of vascular injury requires the timely diagnosis and control of bleeding sources; to facilitate this task, trauma providers must appreciate the capabilities and limitations of diagnostic imaging modalities. Trauma providers must understand when and how to effectively apply these strategies.

10. The Role of High-Fidelity Team-Based Simulation in Acute Care Settings: A Systematic Review.
Armenia S, Thangamathesvaran L, Caine AD, King N, Kunac A, Merchant AM. Surg J (N Y). 2018 Aug 13;4(3):e136-e151. doi: 10.1055/s-0038-1667315. eCollection 2018 Jul.
PDF: READ PDF HERE
URL: https://www.ncbi.nlm.nih.gov/pubmed/30109273
Introduction
High-fidelity team-based simulation has been identified as an effective way of teaching and evaluating both technical and nontechnical skills. Several studies have described the benefits of this modality in a variety of acute care settings, but a lack of standardized methodologies has resulted in heterogeneous findings. Few studies have characterized high fidelity simulation across a broad range of acutecare settings and integrated the latest evidence on its educational and patient impact.
Methods
The MEDLINE, EMBASE, Cochrane Library, and PsycINFO databases were searched for empirical studies from the last 10 years, investigating high fidelity team-based simulation in surgical, trauma, and critical care training curricula.
Results

Seventeen studies were included. Interventions and evaluations were comprehensively characterized for each study and were discussed in the context of four overarching acute care settings: the emergency department/trauma bay, the operating room, the intensive care unit, and inpatient ad hoc resuscitation teams.

Conclusions

The use of high-fidelity team-based simulation has expanded in acute care and is feasible and effective in a wide variety of specialized acute settings, including the emergency department/trauma bay, the operating room, the intensive care unit, and inpatient ad hoc resuscitation teams. Training programs have evolved to emphasize team-based, multidisciplinary education models and are often conducted in situ to maximize authenticity. In situ simulations have also provided the opportunity for system-level improvement and discussions of complex topics such as social hierarchy. There is limited evidence supporting the impact of simulation on patient outcomes, sustainability of simulation efforts, or cost-effectiveness of training programs. These areas warrant further research now that the scope of utilization across acute care settings has been characterized.

GUIDELINES/ALGORITHMS

11. EAST Practice Management Guidelines:
https://www.east.org/education/practice-management-guidelines

12. Western Trauma Association Algorithms:
http://www.westerntrauma.org/algorithms/algorithms.html

MILITARY PRIORITIES

The Top 10 R&D priorities for battlefield surgical care
Martin, M. et al. 2019 Journal of Trauma and Acute Care Surgery
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