Figure. Outcomes.

CONCLUSION: Blunt thoracic aortic injury repair timing was consistent with SVS recommendation, occurring within 24 hours in the majority of cases. A survival benefit associated with this strategy, however, was not demonstrated.

Just More Demand Ischemia: Elevated Troponin in Trauma Patients Can Safely Be Managed Without Cardiology Consultation

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INTRODUCTION: Cardiology is frequently consulted for trauma patients with elevated troponins, which often does not change patient management. The goal of this study was to identify which patients would benefit from co-management with cardiology after having a troponin elevation. We hypothesized that trauma patients with a positive cardiac screen would have better outcomes if co-managed with cardiology.

METHODS: A 7-year retrospective review of trauma admission with elevated troponin I levels (n = 971) was divided into 2 groups: those with a cardiology consult (CARDS, n = 252) and those without (NOCARDS, n = 719). Classic indication for cardiac catheterization was examined to gauge the utility of cardiology consultation. A regression analysis was performed to see if involving cardiology was protective against death (controlling for Injury Severity Score [ISS], age, and peak troponin).

RESULTS: Demographics and injury were similar between groups. Overall mortality was not statistically different in the CARDS and NOCARDS groups (18.2% vs 17.4%, p = 0.25). Hospital length of stay (LOS) was significantly shorter in the NOCARDS group (9 vs 7 days, p = 0.01). Regression showed that that consulting cardiology was not an independent predictor of death when controlling for age, Injury Severity Score, and peak troponin (odds ratio 1.078, 95% CI 0.719-1.611, p = 0.722).

CONCLUSION: These data did not identify a specific patient population that benefited from cardiology evaluation. Similar to existing protocols that allow for trauma patients with isolated L-spine fractures or mild traumatic brain injury to be managed safely without specialist consultation, we plan to design a similar protocol for trauma patients with elevated troponins to be managed safely without cardiology consultation.

Lives Saved and Public Empowerment 1 Year after Bleeding Control Training

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INTRODUCTION: Extremity hemorrhage is the most frequent cause of preventable traumatic death. Bystanders can prevent death by controlling hemorrhage before first responder arrival. The American College of Surgeons created the Bleeding Control Basic (BCON) course to train members of the public to stop the bleed. We report lives saved by BCON participants.

METHODS: Attendees of free BCON courses completed surveys before and after the course, as well as 6 and 12 months later. Surveys tracked post-course skill application and used Likert scale responses to measure confidence in skills and knowledge, willingness to treat, and belief in ability to save a life.

RESULTS: A total of 1,030 attendees enrolled, 682 with no earlier training. Of these, 374 and 371 responded at 6 and 12 months, respectively. In 12 months after the class, 31 participants (8.4%) applied BCON skills to live victims, with 29 (93.5%) reporting a successful outcome. Eight of the 31 (25.8%) were previously untrained. The hemorrhage was controlled successfully in the 16 cases involving tourniquet application or wound packing. For confidence in knowledge and skills, the mean response was between agree (4) and strongly agree (5) at each post-course stage. For willingness to treat, the mean significantly increased from pre (4.1) to post (4.6), 6-month (4.4), and 12-month (4.5). For life-saving ability, the mean significantly increased from neutral (3.3) to agree at each post-course point (4.2, 4.1, 4.1). (Table)

Table. Demographics of Participants Applying Bleeding Control Skills

Demographic, category	Frequency	Percentage
Age group		
13 − 17 y	4	12.9
18 − 30 y	15	48.4
31 − 45 y	6	19.4
46 − 65 y	6	19.4
Occupation		
First responder	14	45.2
Health care	10	32.3
Other	7	22.6
Previous training		
Yes	23	74.2
No	8	25.8

CONCLUSION: BCON effectively empowers people to stop bleeds and save lives. Participants demonstrated empowerment for 1 year. Previously untrained attendees have successfully rendered aid and saved lives.

Low-Volume Resuscitation with Polyethylene Glycol-20k for Post-traumatic Hemorrhagic Shock in a Hybrid Model of Controlled and Uncontrolled Hemorrhage

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INTRODUCTION: Polyethylene glycol-20k (PEG-20k)-based solution has been shown to dramatically improve microcirculatory perfusion in preclinical models of controlled hemorrhage and low volume resuscitation (LVR). We aimed to investigate the efficacy of PEG-20k in a hybrid model of controlled and uncontrolled hemorrhage.

METHODS: Adult male rats were hemorrhaged by tail cut and splenic parenchymal transection resembling concurrent traumatic amputation and noncompressible torso hemorrhage. When lactate reached 8 mmol/L, the tail was clamped and a bolus of PEG-20k, Lactated Ringer's (LR) or Hextend was administered. Animals were euthanized if they survived 240 minutes after resuscitation. Study outcomes included survival time, blood pressure, lactate, and percentage blood loss.

RESULTS: Baseline measures, hemorrhage time, and lactate levels at the end of shock were similar between groups. All animals in the PEG-20k group survived 240 minutes post-resuscitation; mean survival time was 48.8 ± 42.9 minutes with Hextend and 26.3 ± 20.1 minutes with LR ($p = 0.024$). PEG-20k rapidly restored blood pressure to baseline levels with near normalization of lactate by 4 hours post-LVR (Figure). Percent total blood loss was 51 ± 6, 49 ± 6 and 49 ± 5 in the PEG-20k, Hextend, and LR groups, respectively ($p > 0.05$) without significant differences in intra-abdominal blood loss between groups (Figure).
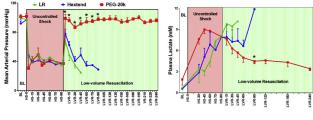

Figure.

CONCLUSION: In this novel rat model of combined controlled and uncontrolled hemorrhagic shock and tissue injury, LVR with PEG-20k was highly effective in restoring blood pressure and tissue perfusion without an additional risk of uncontrolled rebleeding. PEG-20k provides a promising tool that could reduce mortality of severe hemorrhagic shock, especially in austere environments with prolonged transport time.

Massive Blood Transfusion after Geriatric Trauma: Effect of Blood Ratio on Mortality

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INTRODUCTION: Massive blood transfusion (MBT) after geriatric trauma poses unique challenges. Despite extensive evidence on optimal resuscitative strategy in nongeriatric patients, there is limited research in the geriatric population. We used a national trauma registry and evaluated the effect of transfusion ratio and other clinical factors on mortality.

METHODS: We performed a multicenter, retrospective, cohort analysis of trauma patients from 2014 to 2017 using the American College of Surgeons Trauma Quality Improvement Program (TQIP) database. We included all patients ≥ 60 years of age who were transfused ≥ 10 units of packed red blood cells (pRBCs) and ≥ 1 unit fresh frozen plasma (FFP) within 24 hours, or ≥ 5 units of pRBCs and ≥ 1 unit FFP within 4 hours of emergency department admission. We calculated FFP:pRBC ratios and stratified our population into 5 cohorts (1:1, 1:2, to 1:>5). Our primary outcome was 24-hour mortality. We constructed multivariate regression models and adjusted for confounders including demographics, vitals, Injury Severity Score (ISS), and Glasgow Coma Scale (GCS), etc, to estimate the independent effect of blood ratios on mortality.

RESULTS: A total of 33,266 patients underwent MBT; 3,465(10.4%) patients met our inclusion criteria. Mean age was 70.1 ± 8.1 years, 68.6% (n = 2,376) were men. On average, patients received 14.5 ± 11.4 units of RBC and 8.1 ± 7.9 units of plasma. Overall 24-hour mortality was 27.6% (n = 956) and FFP:RBC cohort-specific mortality increased incrementally (1:1, mortality = 24%; 1:2, mortality = 28.1%; 1:3, mortality = 27.6%; 1:4, mortality = 29.8%; 1:>5, mortality = 34.0%). On multivariable analysis, 1:1 FFP:pRBC ratio was independently associated with lowest mortality (odds ratio = 0.6, 95% CI 0.4-0.8, p = 0.002) while increased age, increased Glasgow Coma Scale/Injury Severity Score, and presence of comorbidity independently increased risk of 24-hour mortality.

CONCLUSION: 1:1 FFP:pRBC ratio was associated with lowest mortality after MBT after geriatric trauma.