

JTACS APRIL TABLE OF CONTENTS

'BEST OF' APRIL ARTICLES

BEST OF BASIC SCIENCES ARTICLE

Female Platelets and Cryoprecipitate have Improved Hemostatic Potential

Females are hypercoagulable compared to males, which confers a survival advantage in trauma induced coagulopathy

Donor gender is not considered in current transfusion guidelines

Hypothesis: Platelet and cryoprecipitate transfusions from female donors have improved hemostatic potential

Hemostatic parameters of healthy donor plasma and cryoprecipitate were analyzed using comprehensive proteomics

Transfusions of male and female cryoprecipitate and platelets were compared in vitro

Female-donor platelets and cryoprecipitate improved clot dynamics more than male-donor

Female-donor cryoprecipitate has increased Factor V and Factor XIII

Conclusion: Sex-specific transfusion guidelines should be considered for hemostatic resuscitation

DeBot M et al. *Journal of Trauma and Acute Care Surgery*
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PLATELET AND CRYOPRECIPITATE TRANSFUSIONS FROM FEMALE DONORS IMPROVE COAGULOPATHY IN VITRO

[HTTPS://JOURNALS.LWW.COM/JTRAUMA/FULLTEXT/2023/04000/PLATELET_AND_CRYOPRECIPITATE_TRANSFUSIONS_FROM.1.ASPX?CONTEXT=FEATURE-DARTICLES&COLLECTIONID=5](https://journals.lww.com/jtrauma/fulltext/2023/04000/platelet_and_cryoprecipitate_transfusions_from.1.aspx?context=feature-darticles&collectionid=5)



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BEST OF SCC ARTICLE

Respiratory Physiotherapy and rehabilitation of patients with rib fractures: an international, multi-disciplinary e-Delphi study

An international multi-disciplinary delphi panel completed a three round modified e-Delphi survey

121 participants from 18 countries

Includes physiotherapists, researchers, physician assistants, trauma surgeons, intensivists and educators

Key recommendations for post injury management of patients with rib fractures across the recovery trajectory

18 clinical scenarios related to respiratory physiotherapy management and rehabilitation of patients with rib fractures

Battle C et al. *Journal of Trauma and Acute Care Surgery*
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EXPERT CONSENSUS GUIDANCE ON RESPIRATORY PHYSIOTHERAPY AND REHABILITATION OF PATIENTS WITH RIB FRACTURES: AN INTERNATIONAL, MULTI-DISCIPLINARY E-DELPHI STUDY

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Time to Critical Intervention: Pushing Advanced Resuscitation into the Prehospital Setting

Study Population: PAMPer + STAAMP trials Hemorrhagic Shock

Time to Early Resuscitative Intervention (TERI): EMS arrival to start of Plasma or pRBC or TXA In the field or within 90-minutes of trauma center arrival

Odds of mortality per minute delay in TERI:
24-hr mortality: 2.3% increase/min (aOR 1.023; 95%CI 1.005-1.042)
30-day mortality: 2.1% increase/min (aOR 1.021; 95%CI 1.005-1.038)

TERI associated with 30-day mortality, but total prehospital time was not (p=0.44)

TERI may be more important than total prehospital time

Time to resuscitative interventions critical, efforts to make available earlier in bleeding patients whether in the field or trauma center warranted

Deeb A-P et al. *Journal of Trauma and Acute Care Surgery*
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TIME TO EARLY RESUSCITATIVE INTERVENTION ASSOCIATION WITH MORTALITY IN TRAUMA PATIENTS AT RISK FOR HEMORRHAGE

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BEST OF TRAUMA ARTICLE

BEST OF EGS ARTICLE

Greater Patient Sharing between Hospitals is Associated with Better Outcomes for Transferred Emergency General Surgery Patients

Are repeated transfers of emergency general surgery patients associated with outcomes?

2016-2018 Wisconsin hospital census; n=3197 patients

Repeated transfers between hospitals confer a lower odds of in-hospital complication (0.85)

Fernandes-Taylor S et al. *Journal of Trauma and Acute Care Surgery*
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GREATER PATIENT SHARING BETWEEN HOSPITALS IS ASSOCIATED WITH BETTER OUTCOMES FOR TRANSFERRED EMERGENCY GENERAL SURGERY PATIENTS

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Early Surgical Stabilization of Rib Fractures for Flail Chest is Associated with Improved Patient Outcomes: An ACS-TQIP Review

3,345 patients with flail chest undergoing SSRF in TQIP 2017-2019, 418 matched

Early SSRF (<3 days) vs Late (>3 days) matched by Age, BMI, ISS, GCS, AIS zone 1 and 4, mFI-5

Early SSRF was associated with reduced ICU length of stay, hospital length of stay, and ventilator days

Shirroms A et al. *Journal of Trauma and Acute Care Surgery*. DOI: 10.1097/TA.0000000000003809
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EARLY SURGICAL STABILIZATION OF RIB FRACTURES FOR FLAIL CHEST IS ASSOCIATED WITH IMPROVED PATIENT OUTCOMES: AN ACS-TQIP REVIEW
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Outcomes of Surgical vs. Non-Surgical Treatment for Multiple Rib Fractures: A US Hospital Database Analysis

BACKGROUND

Surgical stabilization of rib fractures (SSRF) is effective for pain relief and overall outcomes in patients with multiple rib fractures (MRF)

Most clinical studies, however, have small sample size and limited follow-up time

Objective of our study: Evaluate post-surgical outcomes in patients with MRF with SSRF vs non-operative management (NOM)

METHODS

Data: Premier Healthcare Database

Population:
- Adult Patients with MRF
- 12 months follow-up data available

Exposure: SSRF vs NOM

Outcomes:
- Home or home health discharge
- 12 months readmission for lung-related complications

Analysis: Matched cohorts using fine stratification and weighting

RESULTS & CONCLUSION

Outcomes	SSRF	NOM	Odds Ratio
Home or Home Health Discharge	61.8%	58.2%	1.166 (1.073-1.267) p=0.0002
12-Months Lung-Related Readmissions	6.2%	7.6%	0.799 (0.657-0.971) p=0.0245

SSRF vs NOM, was associated with:
 • 16% greater odds of home discharge
 • 20% lower odds of lung-related readmissions

Shirrom AM et al. *Journal of Trauma and Acute Care Surgery*. DOI: 10.1097/TA.0000000000003828
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OUTCOMES OF SURGICAL VS NON-SURGICAL TREATMENT FOR MULTIPLE RIB FRACTURES: A US HOSPITAL MATCHED COHORT DATABASE ANALYSIS
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Is Perioperative COVID-19 Really Associated with Worse Surgical Outcomes? A Nationwide COVIDSurg Propensity-Matched Analysis

STUDY POPULATION

COVIDSurg N = 1,054
ACS NSQIP N = 96,882

PROPNESITY SCORE MATCHING

N = 843

Matching on Demographics Comorbidity Complexity Urgency

RESULTS

30-day mortality
Hospital length of stay
Thromboembolic events
Bleeding

Argandkov et al. *Journal of Trauma and Acute Care Surgery*. DOI: 10.1097/TA.0000000000003859
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IS PERIOPERATIVE COVID-19 REALLY ASSOCIATED WITH WORSE SURGICAL OUTCOMES? A NATIONWIDE COVIDSURG PROPENSITY-MATCHED ANALYSIS
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Enhancing Utility of Interfacility Triage Guidelines Using Machine Learning: Development of the Geriatric Interfacility Trauma Triage Score (GITTS)

Background

Injured older adults are under-triaged to tertiary trauma centers (TTCs)

In predominantly rural regions, a majority of trauma patients are initially transported to non-tertiary trauma centers (NTCs)

Aim: Develop a high-yield transfer risk scoring model predicting mortality or serious injury (ISS>=16) at the receiving TTC based on information available at the initial NTC to enhance secondary triage of injured older adults

Methods

Machine-learning techniques including random forests, decision trees were additionally utilized to enhance variable selection for the prediction model

Results

The final model (AUC, 75%; 95% CI: 74-76%) included these top 4 predictors (& GITTS scores): airway intervention (11), traffic-related femur fracture (6), spinal cord injury (5), ED GCS <13 (5), and hemodynamic support (4)

Conclusion

Adjusted older patient with a traffic-related femur fracture, ED GCS <13, who required an airway intervention and airway support had a 25% increased probability of serious injury or mortality of 88%

Secondary triage of injured older adults to TTCs could be improved by use of a risk score in addition to clinician assessment.

Garwe T et al. *Journal of Trauma and Acute Care Surgery*. DOI: 10.1097/TA.0000000000003846
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ENHANCING UTILITY OF INTERFACILITY TRIAGE GUIDELINES USING MACHINE LEARNING: DEVELOPMENT OF THE GERIATRIC INTERFACILITY TRAUMA TRIAGE SCORE (GITTS)
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Prehospital Shock Index Predicts Outcomes After Prolonged Transport: A Multicenter Rural Study

Study Population

287 Scene | 502 Transfers

Scene: ISS 8 | Transfers: ISS 8.9

✓ Trauma Transfers or >60 minutes
 ✓ Blunt torso trauma
 ✓ TBI or missing data

EMS to Rural Tertiary Care Centers

(Shock Index = HR/SBP)

Initial EMS SI – Best Indicator:

Transfusions: scene & transferred (p < 0.05)
 ICU Days: scene & transferred (p < 0.05)
 Mortality: Scene (p < 0.1)

Bardes JM et al. *Journal of Trauma and Acute Care Surgery*. DOI: 10.1097/TA.0000000000003868
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PREHOSPITAL SHOCK INDEX PREDICTS OUTCOMES AFTER PROLONGED TRANSPORT: A MULTICENTER RURAL STUDY
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VARIATION IN HOSPICE USE AMONG TRAUMA CENTERS MAY IMPACT ANALYSIS OF GERIATRIC TRAUMA OUTCOMES

Hospice discharges may confound mortality reporting, as these may not be captured as geriatric trauma patient mortality.

Study Goals

Measure rates of hospice use, evaluate hospice discharge rates by trauma center level, and identify variables affecting hospice use in a geriatric trauma.

Study Sample: CMS-Inpatient Standard Analytical Files for 2017-19, age ≥65, with ≥1 injury ICD-10

Results

Level I Centers had lower rates than all other facilities for:
 • Hospice Discharge as a proportion of all dispositions
 • Hospice Utilization as a proportion of all mortality

Conclusions

Hospice discharge rates for geriatric trauma varied significantly by hospital type and Level I trauma centers had the lowest rates of Hospice use.

ISS>16 and Trauma Center level explained the largest proportion of variability in hospice use.

Fahmy SM et al. *Journal of Trauma and Acute Care Surgery*. DOI: 10.1097/TA.0000000000003883
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VARIATION IN HOSPICE USE AMONG TRAUMA CENTERS MAY IMPACT ANALYSIS OF GERIATRIC TRAUMA OUTCOMES: AN ANALYSIS OF 1,961,228 CMS HOSPITALIZATIONS FROM 2,317 FACILITIES
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International Survey of Institutional Surgical Stabilization of Rib Fractures Guidelines

30 institutional guidelines (3 countries)

3/28 recommendations (11%) integrated within >50% of guidelines

High variability
 "Thresholds" for indication (e.g. pain score, IS volume)
 Definitions (e.g. "displaced" fracture)
 Post-op follow-up (CXR, clinic visit)

INDICATIONS
CONTRAINDICATIONS
OPERATIVE CONSIDERATIONS
POST-OP MANAGEMENT

Compared vs contemporary evidence
 (28 evidence-based SSRF recommendations from international expert panel)

SSRF: gap between evidence and clinical practice?
 Consensus effort needed to close knowledge gaps, disseminate & implement contemporary evidence

Choi I et al. *Journal of Trauma and Acute Care Surgery*. DOI: 10.1097/JA.0000000000003785
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CHALLENGES IN CLOSING THE GAP BETWEEN EVIDENCE AND PRACTICE: INTERNATIONAL SURVEY OF INSTITUTIONAL SURGICAL STABILIZATION OF RIB FRACTURES GUIDELINES
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Developing a National Trauma Research Action Plan (NTRAP): Results from the Trauma Systems Delphi Survey

METHODS
 Experts in military and civilian trauma systems and research identified gaps in knowledge, generated research questions and prioritized questions using a consensus-driven Delphi survey approach.

RESULTS
 Subject matter experts generated 570 research questions. 427 questions (75%) reached a consensus level of 60% agreement; 209 (49%) were High Priority, 213 (50%) Medium Priority, 5 (1%) Low Priority.

CONCLUSION
 Gaps in understanding related to healthcare infrastructure, technology products, education and training, operative intervention and resuscitation were identified. The panel determined that the prehospital phase of care needs focused research.

Haut ER, et al. *Journal of Trauma and Acute Care Surgery*. DOI: 10.1097/JA.0000000000003867
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DEVELOPING A NATIONAL TRAUMA RESEARCH ACTION PLAN (NTRAP): RESULTS FROM THE TRAUMA SYSTEMS AND INFORMATICS PANEL DELPHI SURVEY
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PROSPECTIVE SINGLE CENTER PARADIGM SHIFT OF SURGICAL STABILIZATION OF RIB FRACTURES WITH DECREASED LENGTH OF STAY AND OPERATIVE TIME WITH AN INTRATHORACIC APPROACH

Intrathoracic plating (ITP) vs. Extrathoracic plating (ETP)

ITP (07/2017-10/2019) vs. ITP (11/2019-09/2021)

≥3 HEAD AIS

Hospital Stay 10 vs 8 days p=0.04

Intensive care unit stay
Ventilator days

Tay-Lasso E et al. *Journal of Trauma and Acute Care Surgery*. DOI: 10.1097/JA.0000000000003811
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BEST OF EMERGENCY GENERAL SURGERY ARTICLE

Impact of Sternal Fixation on Patient Outcomes: A Case Matched Review

Background: Traumatic sternal fractures are rare but debilitating injuries that can cause severe pain requiring opioids, pulmonary compromise, and decreased upper extremity ROM. Sternal fixation has gained popularity in recent years. However, there is paucity of literature on its efficacy compared to nonoperative management.

Methods: Case matching 1:1 of sternal fixation to nonoperative management based on age and injury severity score. Out of 351 patients included in the study, a total of 59 patients that underwent sternal fixation were matched to 58 patients that underwent nonoperative management.

Results: Decreased opioid pain medications requirements within 24 hours of discharge. Improved respiratory function at discharge measured via incentive spirometry % predicted value. No significant difference in average pain score, hospital LOS, and ICU LOS.

Bauman ZM et al. *Journal of Trauma and Acute Care Surgery*. DOI: 10.1097/JA.0000000000003824
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A novel PAAs-based stasis dressing to treat lethal hemorrhage in a penetrating trauma swine model

PB (PAAs-based bag) group, n=6
 CELOX-A group, n=6
 standard gauze group, n=6

PB, CELOX-A initiated and sustained hemostasis for 60 min, whereas 0% of the standard gauze achieved initial hemostasis.

Maximum number of manual compressions were applied in standard gauze (6/6, 100%), followed by CELOX-A (5/6, 80%), while no manual pressure was required in the case of PB (0/6, 0%).

Application time for PB (19.0 ± 4.6 s) was significantly less than CELOX-A (169.0 ± 73.5 s), and standard gauze (187.8 ± 17.3 s).

PBs can rapidly achieve durable hemostasis in the penetrating trauma hemorrhage swine model without any external compression. The packet form makes PB easy to deploy and remove from wounds. PB could be a promising hemostatic candidate for controlling penetrating hemorrhage.

Wang W et al. *Journal of Trauma and Acute Care Surgery*. DOI: 10.1097/JA.0000000000003865
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A NOVEL PAAS-BASED STASIS DRESSING TO TREAT LETHAL HEMORRHAGE IN A PENETRATING TRAUMA SWINE MODEL
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BEST OF SURGICAL CRITICAL CARE ARTICLE

Respiratory Physiotherapy and rehabilitation of patients with rib fractures: an international, multi-disciplinary e-Delphi study

An international multi-disciplinary delphi panel completed a three round modified e-Delphi survey

121 participants from 18 countries

Includes physiotherapists, researchers, physician assistants, trauma surgeons, intensivists and educators

Key recommendations for post injury management of patients with rib fractures across the recovery trajectory

18 clinical scenarios related to respiratory physiotherapy management and rehabilitation of patients with rib fractures

Battle C et al. *Journal of Trauma and Acute Care Surgery*. DOI: 10.1097/JA.0000000000003875
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EXPERT CONSENSUS GUIDANCE ON RESPIRATORY PHYSIOTHERAPY AND REHABILITATION OF PATIENTS WITH RIB FRACTURES: AN INTERNATIONAL, MULTI-DISCIPLINARY E-DELPHI STUDY.
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Variation in Tracheostomy Placement and Outcomes following Pediatric Trauma in Adult, Pediatric, and Combined Trauma Centers

Adults: Tracheostomy common and increasing
 Children: Tracheostomy rare and decreasing

National Trauma Data Bank: 33,602 children <18 years ventilated >24 hours at level I/II trauma centers

Tracheostomy rate: Pediatric 4.2%, Combined 7.8%, Adult 11.2%

Do tracheostomy practices differ for children treated at adult vs. pediatric trauma centers?

Propensity matching

Length of stay
 Discharge to care facilities


Killien EY et al. *Journal of Trauma and Acute Care Surgery*. November 2022 [DOI: 10.1097/JA.0000000000003848]
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VARIATION IN TRACHEOSTOMY PLACEMENT AND OUTCOMES FOLLOWING PEDIATRIC TRAUMA AMONG ADULT, PEDIATRIC, AND COMBINED TRAUMA CENTERS
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Long-term health related quality of life (HRQOL) and independence among older survivors of serious injury

Mixed methods prospective cohort study



126 trauma ICU survivors ≥ 65 years; Geri-T implemented for 65 patients

1-year after injury

Mean EQ-5D-5L Index score (HRQOL) 0.78, comparable to age-adjusted national norms

Independence:
ADLs 76%
IADLs 63%

Return to functional baseline 35%

Ger-T not associated with long-term HRQOL or independence

Most survivors were independent, but reported ongoing activity limitations, pain, and cognitive dysfunction, with most not returning to functional baseline at 1-year

ICU: intensive care unit; Geri-T: trauma ICU geriatric care bundle

EQ-5D-5L: validated survey of HRQOL; ADL: activities of daily living; IADL: instrumental activities of daily living

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THE EFFECTIVENESS OF FOLEY CATHETER BALLOON TAMPONADE VERSUS EXPANDING SPONGES AND HEMOSTATIC GRANULES FOR CATASTROPHIC PENETRATING GROIN HEMORRHAGE WITH SMALL SKIN DEFECT

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CONTRIBUTIONS OF SURGICAL CRITICAL CARE PROGRAM DIRECTORS SOCIETY TO THE TRAINING OF SURGEONS

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