Scoop and Run and Stabilize Enroute

Jon Jui MD, MPH

The Literature Favors Scoop and Run

Aeromedical Literature

Aeromedical vs Ground Transport

Year	Author	Type of Study	Details	Number of patients	Conclusions
2007	Mitchell	Retrospective, Trauma Regisry Nova Scotia, Canada	1998-2002	823	Better outcomes in helicopter patients ISS > 12
2012	Galvango	Retrsopective Study, US	National Trauma databank 2007-2009	223,475	Improved survival in patients transported by Helicopter
2013	Hesselfeldt	Retrospective Study, Denmark	PS-HEMS service, Eastern Denmark 2009-2011	1788	Improved survival 30 days in helicopter patients
2018	Michaels	Retrospective study, US	National Trauma Databank 2014	469,407	Helicopter patients 57% less likely to die

Police VS EMS Transport

Police VS EMS Transport

Year	Author	Type of Study	Details	Number of Patients	Conclusions
2010	Band	Retrospective	Trauma Registry	2127	Unadjusted mortality higher in police transport
2014	Band	Retrospective	Trauma Registry	4122	Patients with severe injury (ISS > 15) with GSW and stab wounds more likely to survive if transported by police
2016	Wandlin g	Retrospective	National Trauma Databank 2010 to 2012	88,564	For TSE, patients with penetrating injury hve similar mortality for police and EMS transports
2021	Colnaric	Retrospective	National Trauma Databank 2015	2394	Factors associated with survival include comorbidity, durg use, cut or pierce, mechanism, fractures
2022	Arbid	Retrospective	National Trauma Databank 2015	733	Police transported patients had similar outcomes as EMS Tx
2022	Taghavi	Prospective observational	Multicentered 25 trauma centers	1618	Police transport of penetrating trauma patients in urban locations results in similar outcomes compared to ALS Tx

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J Trauma Acute Care Surg. 2016 July ; 81(1): 93–100. doi:10.1097/TA.0000000000000999.

Not All Prehospital Time is Equal: Influence of Scene Time on Mortality

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Prolonged Scene Time

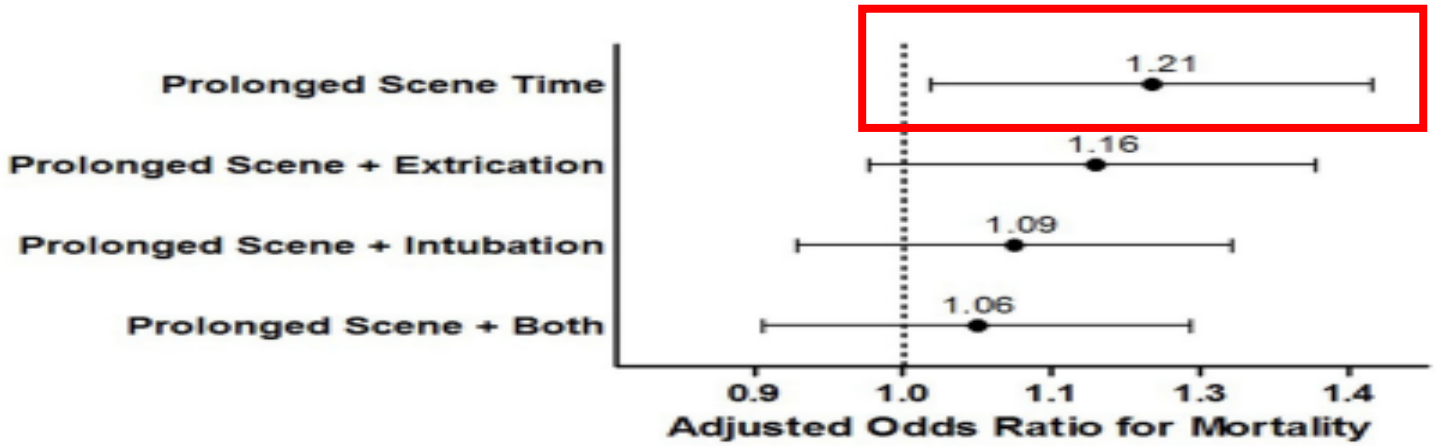

Figure 2.
Adjusted odds ratio of in-hospital mortality for prolonged scene time compared to no prolonged scene time under several risk-adjustment modeling scenarios for mediation testing. The top row represents the effect of prolonged scene time in the study population using the original risk-adjustment model without controlling for extrication or prehospital intubation. The second and third rows represent the association between prolonged scene time and mortality when controlling for extrication or prehospital intubation respectively in the study population. The bottom row represents association between prolonged scene time and mortality when controlling for both extrication and prehospital intubation in study population.

Results

- Increased response time does not increase patient mortality and increased scene time for extrication does not increase patient mortality

- Prolonged EMS treatment scene time was directly associated with increased patient mortality

Analysis of Scene Time vs Patient Outcomes

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Every minute counts: The impact of pre-hospital response time and scene time on mortality of penetrating trauma patients

Ahmed A.H. Nasser, Charlie Nederpelt, Majed El Hechi, April Mendoza, Noelle Saillant, Peter Fagenholz, George Velmahos, Haytham M.A. Kaafarani*

Division of Trauma, Emergency Surgery, and Surgical Critical Care, Department of Surgery, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

Results

Source: 43,467/1,403,470 patients from TQIP database 2010 to 2016.

- Every minute increase in Prehospital Response Time independently correlates with a 2% increase in mortality (OR 1.02, $p < 0.0001$)
- Every minute increase in Scene Time independently correlates with a 1% increase in mortality (OR 1.01, $p = 0.001$).

Conclusion

- In the penetrating injury trauma patient, Prehospital Response Time and Scene Time independently correlate with hospital mortality.

- This data suggests that a faster Prehospital Response Time and a "scoop and run" strategy may be more beneficial in this population

Research

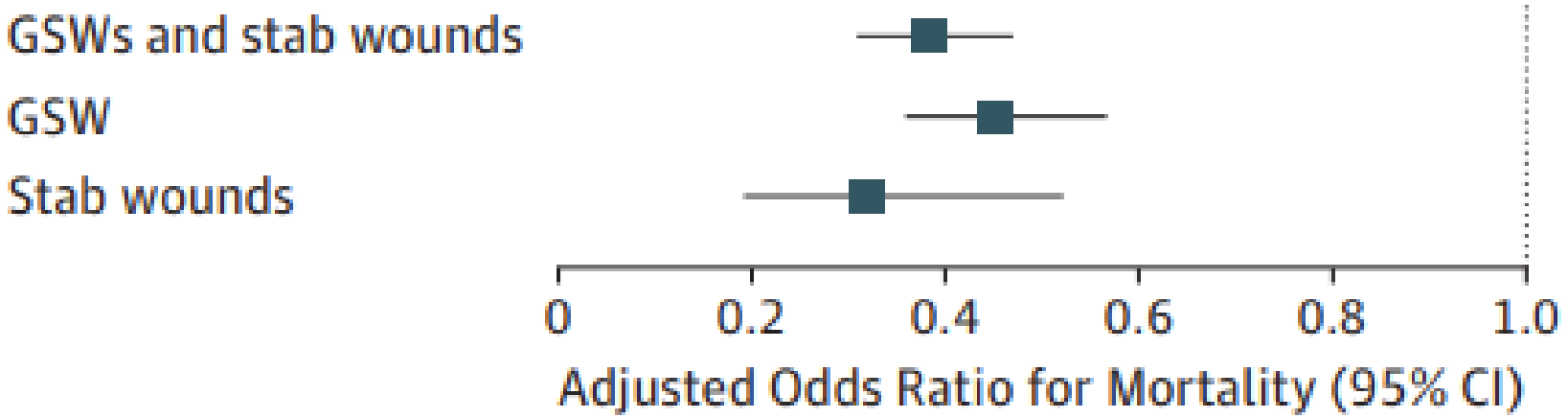
JAMA Surgery | Original Investigation

Association of Prehospital Mode of Transport With Mortality in Penetrating Trauma

A Trauma System–Level Assessment of Private Vehicle Transportation vs Ground Emergency Medical Services

Michael W. Wandling, MD, MS; Avery B. Nathens, MD, PhD; Michael B. Shapiro, MD; Elliott R. Haut, MD, PhD

Figure 2. Risk-Adjusted Odds Ratios for Mortality for Private Vehicle Transport When Compared With Ground Emergency Medical Services Transport



GSW indicates gunshot wound.

INDEPENDENT SUBMISSION

The impact of prehospital time intervals on mortality in moderately and severely injured patients

Job F. Waalwijk, MD, Rogier van der Sluijs, MD, PhD, Robin D. Lokerman, MD, Audrey A.A. Fiddelers, PhD, Falco Hietbrink, MD, PhD, Luke P.H. Leenen, MD, PhD, Martijn Poeze, MD, PhD, Mark van Heijl, MD, PhD, *and* **the Pre-hospital Trauma Triage Research Collaborative (PTTRC)**, *Utrecht, the Netherlands*

Conclusion

- A prolonged on-scene time is associated with mortality in moderately and severely injured patients, which suggests that a reduced on-scene time may be favorable for these patients.
- In addition, transport time was found not to be associated with mortality

Changing the Paradigm of EMS Treatment of Trauma Patients

Scoop and Run &
Resuscitate Enroute

What EMS interventions are needed

- **Control of hemorrhage**
  - **External**
  - **Torso**
    - Pelvic Splint
- **Airway**
- **Pneumothorax**
- **Circulation (as per protocol)**

What do the hospitals have that EMS does not

- Trauma Surgeons
- Critical care nurses
- Pharmacists
- Respiratory therapist

Hospital Logistics

- Blood
- Medications
- Imaging
- Advanced monitoring
  - Arterial lines
  - Central lines

Where / When does stay and play makes sense

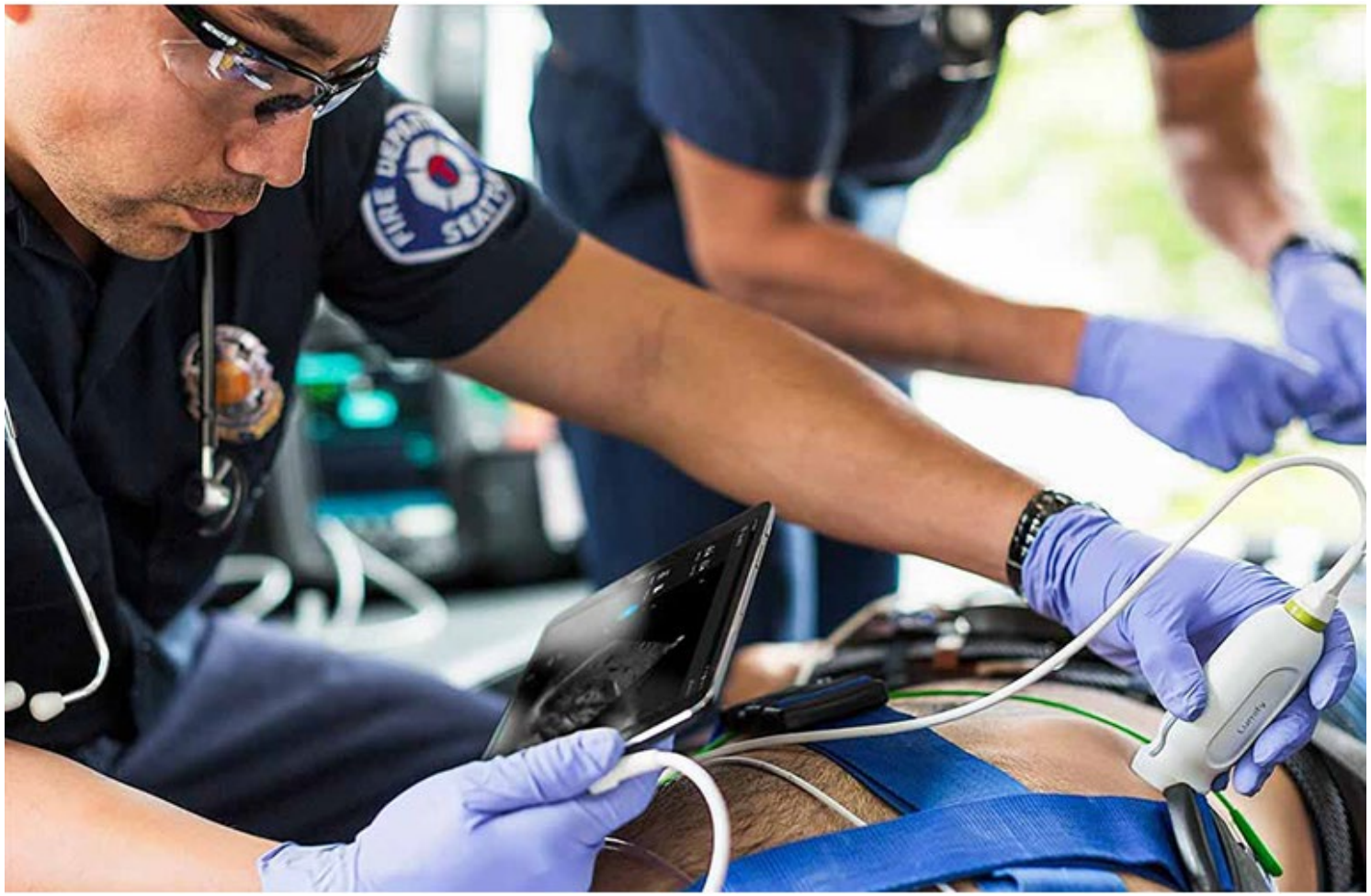
- **Mass Casualty Incident**
  - **2004 Madrid train boming**
  - **Boston Marathon**

EMS Technology Advances

EMS Technologic Advances

Airway Management

Ultrasound in the Field



MCEMS Trauma
Airway Management

MCEMS Intubation Patients NOT in cardiac arrest VL Success Trauma Patients

	Number	Percent
Success	77	89%
Unsuccessful	6	11%
Total	83	100

EMS Fluid Administration in Trauma Patients

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Crit Care Clin. 2017 January ; 33(1): 15–36. doi:10.1016/j.ccc.2016.08.007.

Optimal Fluid Therapy for Traumatic Hemorrhagic Shock

Ronald Chang, MD[1,2,3] and **John B. Holcomb, MD**[1,2]

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[2]Department of Surgery, University of Texas Health Science Center, Houston, TX

Can we use “permissive hypotension” with blunt trauma patients?

Brown J Trauma Acute Care Surg. 2013;74

Summary: Controlled Resuscitation

Date	Investigator	PH Fluid Outcomes	Comments
1985	Smith	No difference	
1990	Kaweski	No difference	
1994	Bickell	Worsened	Penetrating trauma
2002	Dutton	No difference	
2002	Dula	No difference	
2011	Morrison	No difference	Increased post operative bleeding complications
2013	Hampton	YES, but in head injury	NO change in BP noted
2013	Brown	YES, but in head injury	Fluid restriction in normotensive patients lead to better outcomes
2015	Schreiber	No difference	CR may offer survival benefit in blunt injury patients

Summary Conclusions

- For specified patient populations, controlled resuscitation is a viable concept and may improve outcomes.
  - Penetrating
  - ? Blunt
- Contraindications
  - Head injury
  - Severely hypotensive
  - Prolonged severe hypotension
  - ? Elderly

Whole Blood in Civilian EMS 2022

Mortality in Trauma: Timing of Critical Interventions

Transport Time and Preoperating Room Hemostatic Interventions Are Important: Improving Outcomes After Severe Truncal Injury

John B. Holcomb, MD, FACS

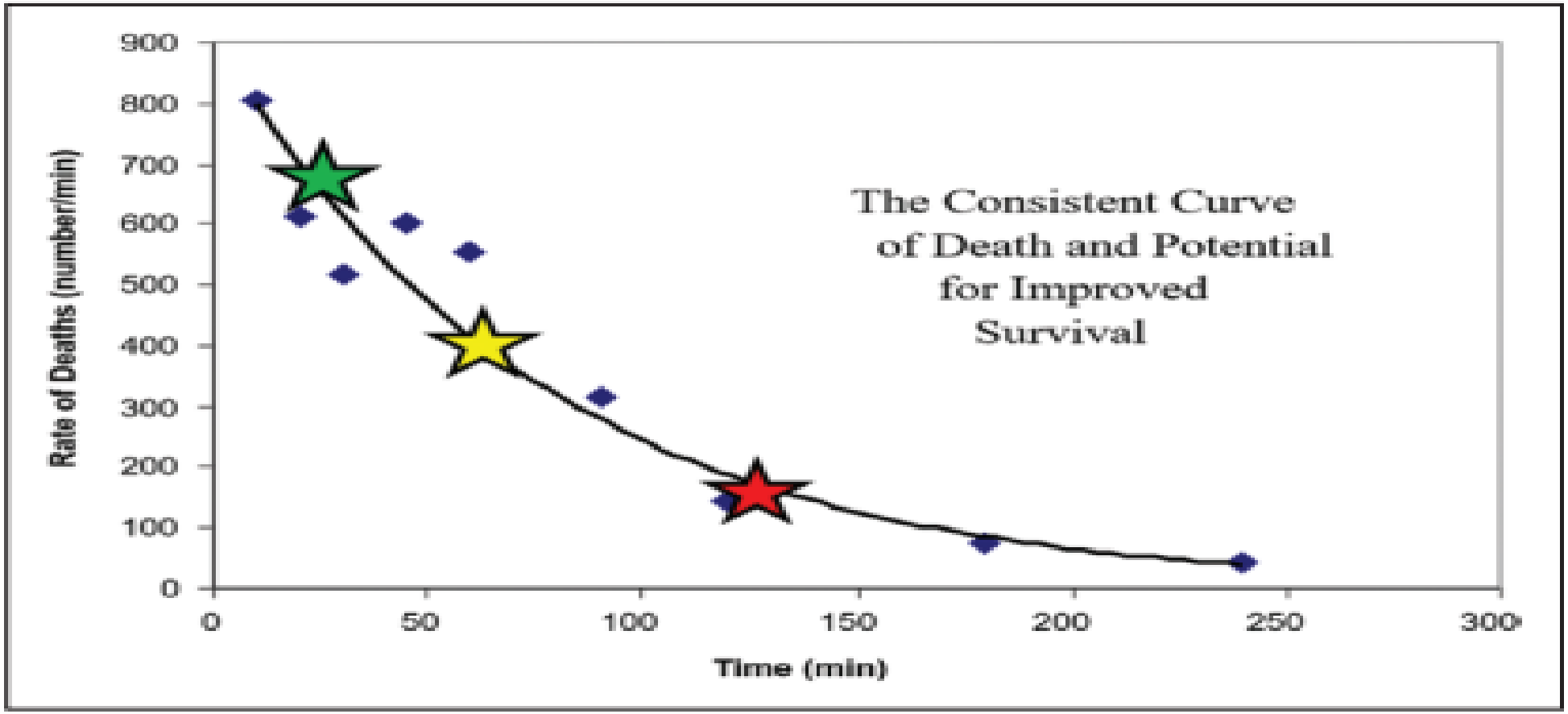


Figure 3. Death versus time: U.S. vehicle-related fatalities from 2003 to 2005. *n* = 55,537. Modified from Champion et al (23). ★ Prehospital intervention, ★ emergency department intervention, ★ operating room definitive hemostasis.

Curve of Death

Timing and Location of Interventions vs Survival

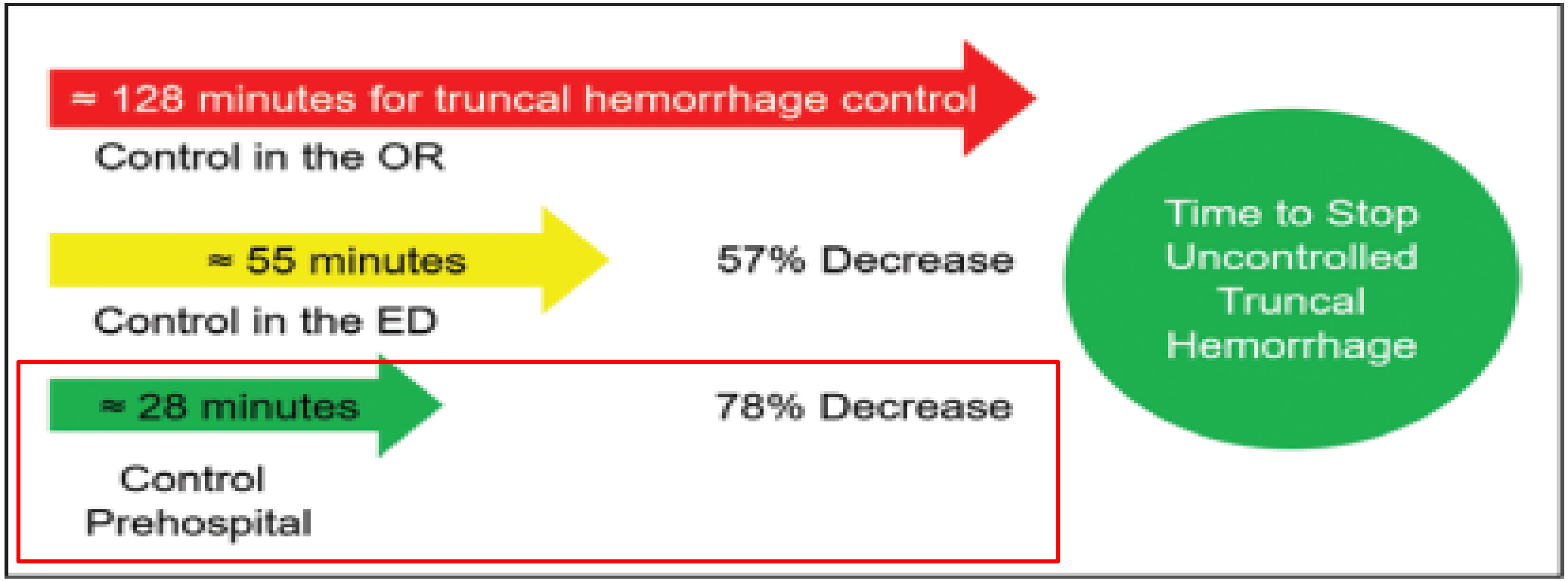


Figure 4. Timeline of truncal hemorrhage control. ED = emergency department, OR = operating room.

Published in final edited form as:

Lancet. 2018 July 28; 392(10144): 283–291. doi:10.1016/S0140-6736(18)31553-8.

COMBAT

Plasma-first resuscitation to treat haemorrhagic shock during emergency ground transportation in an urban area: a randomised trial

Original Investigation

FREE

February 3, 2015

Transfusion of Plasma, Platelets, and Red Blood Cells in a 1:1:1 vs a 1:1:2 Ratio and Mortality in Patients With Severe Trauma

The PROPPR Randomized Clinical Trial

John B. Holcomb, MD[1]; Barbara C. Tilley, PhD[2]; Sarah Baraniuk, PhD[2]; et al

» Author Affiliations | Article Information

JAMA. 2015;313(5):471-482. doi:10.1001/jama.2015.12

PROPPR

TIMING

MATTERS

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JULY 26, 2018 VOL. 379 NO. 4

PAMPer

Prehospital Plasma during Air Medical Transport in Trauma Patients at Risk for Hemorrhagic Shock

J.L. Sperry, F.X. Guyette, J.B. Brown, M.H. Yazer, D.J. Triulzi, B.J. Early-Young, P.W. Adams, B.J. Daley, R.S. Miller, B.G. Harbrecht, J.A. Claridge, H.A. Phelan, W.R. Witham, A.T. Putnam, T.M. Duane, L.H. Alarcon, C.W. Callaway, B.S. Zuckerbraun, M.D. Neal, M.R. Rosengart, R.M. Forsythe, T.R. Billiar, D.M. Yealy, A.B. Peitzman, and M.S. Zenati, for the PAMPer Study Group*

Resuscitation with blood products in patients with trauma-related haemorrhagic shock receiving prehospital care (RePHILL): a multicentre, open-label, randomised, controlled, phase 3 trial

RePHILL

*Nicholas Crombie, Heidi A Doughty, Jonathan R B Bishop, Amisha Desai, Emily F Dixon, James M Hancox, Mike J Herbert, Caroline Leech, Simon J Lewis, Mark R Nash, David N Naumann, Gemma Slinn, Hazel Smith, Iain M Smith, Rebekah K Wale, Alastair Wilson, Natalie Ives, Gavin D Perkins, on behalf of the RePHILL collaborative group**

Summary

Background Time to treatment matters in traumatic haemorrhage but the optimal prehospital use of blood in major trauma remains uncertain. We investigated whether use of packed red blood cells (PRBC) and lyophilised plasma (LyoPlas) was superior to use of 0·9% sodium chloride for improving tissue perfusion and reducing mortality in trauma-related haemorrhagic shock.

Lancet Haematol 2022

Published Online March 7, 2022

https://doi.org/10.1016/S2352-3026(22)00040-0

Whole Blood in the Field

SAFD Paramedic Matt Bowers removes whole blood from a cooler that can keep it cold for up to 50 hours. Credit: Roseanna Garza / San Antonio Report

STRAC
Regional Trauma and EMS System

REGIONAL TRAUMA & EMERGENCY HEALTHCARE SYSTEM

STRAC
Southwest Texas Regional Advisory Council

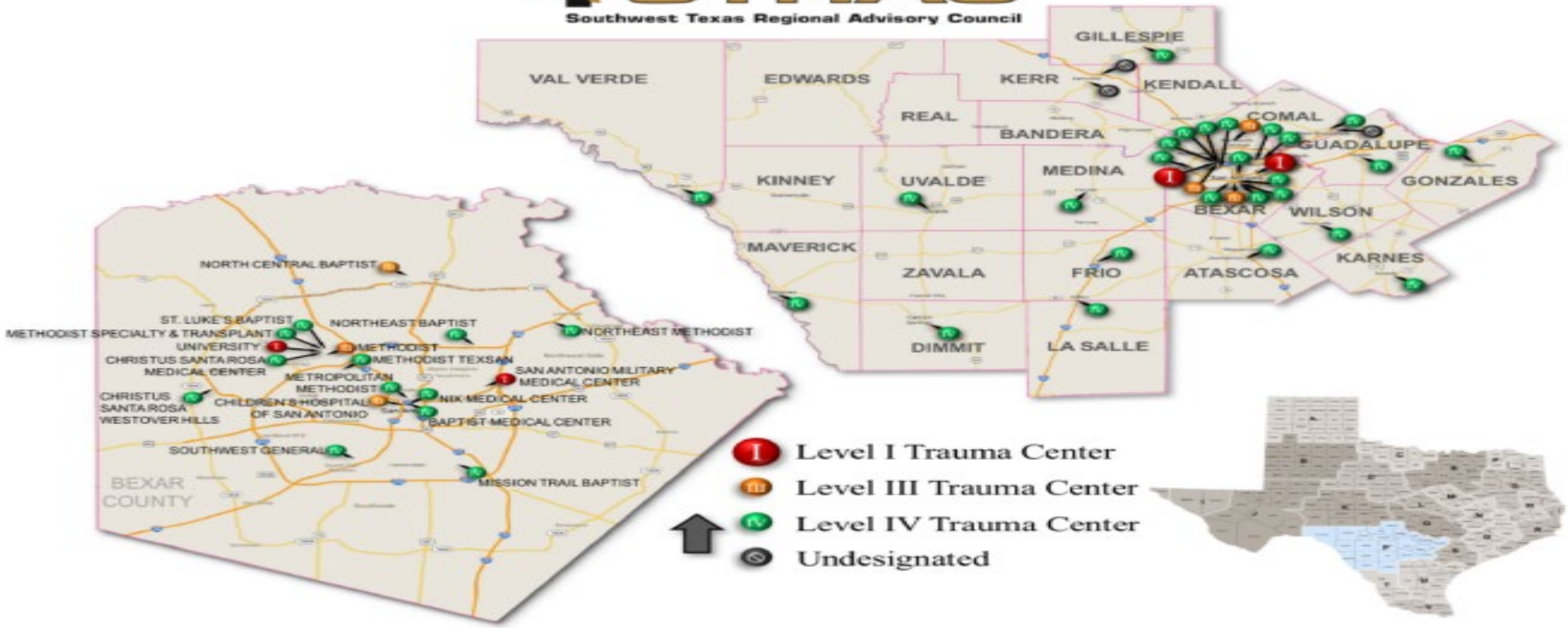


FIGURE 1 South Texas regional advisory council: Regional trauma system map. Adapted from https://www.strac.org/trauma

Scoop and Run vs Stay and Play Discussion

Disclaimer

- Urban vs Rural

- Trauma System Components
  - Ground vs Air
  - Providers
  - Weather
  - Trauma Hospitals

Logic and Common Sense

If it were you, where would you prefer to be resuscitated?

Resources Needed for Effective Resuscitation in Severely Injured Trauma Patients

Scoop and Run vs Stay and Play Advantages

SCOOP AND RUN

- Scalability
- Weather
- Multiple Patients
- Medical Logistics
- Penetrating vs Blunt Trauma
- Imaging, Blood Bank
- Cost
- Integrated teams
  - Anesthesia, surgical subspecialities
  - OR
  - Lab / Blood bank
  - Imaging
  - IR

TRAUMA SURGEON AT SCENE

- Time to “definitive care”
- Enhanced care at scene
- Quicker access to intervention(s)

Air vs Ground

Aeromedical Transport Nuances at Scene

- Activation vs Landing
- Preparing the landing zone
- Loading the patient and handoff
- Landing the helicopter at the hospital

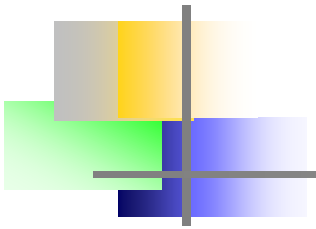

Landing Zone Safety
100 X 100 FEET
WIND DIRECTION
LEVEL GROUND


G-EHMS


G-LNDN
London Freemasons

Trauma
U.S. vs Rest of World

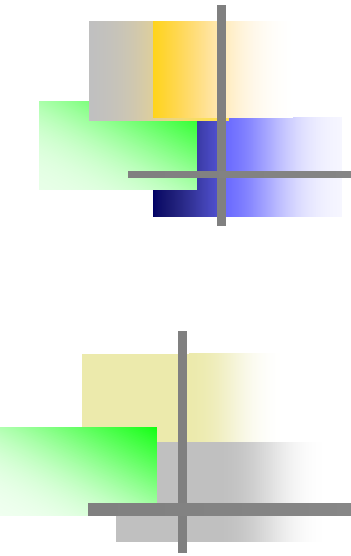
London Air Ambulance



Summary

ONE SIZE DOESN'T FIT ALL

Different Solutions for Different Events



The END