Transfusion et concentrés de complexes prothrombiniques en préhospitalier

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Hospices Civils de Lyon

RESHAPE
Research on Healthcare Performance

Réseau Urg'ARA

UNIVERSITÉ DE LYON

Liens avec l’industrie

- Octapharma

ORIGINAL ARTICLE

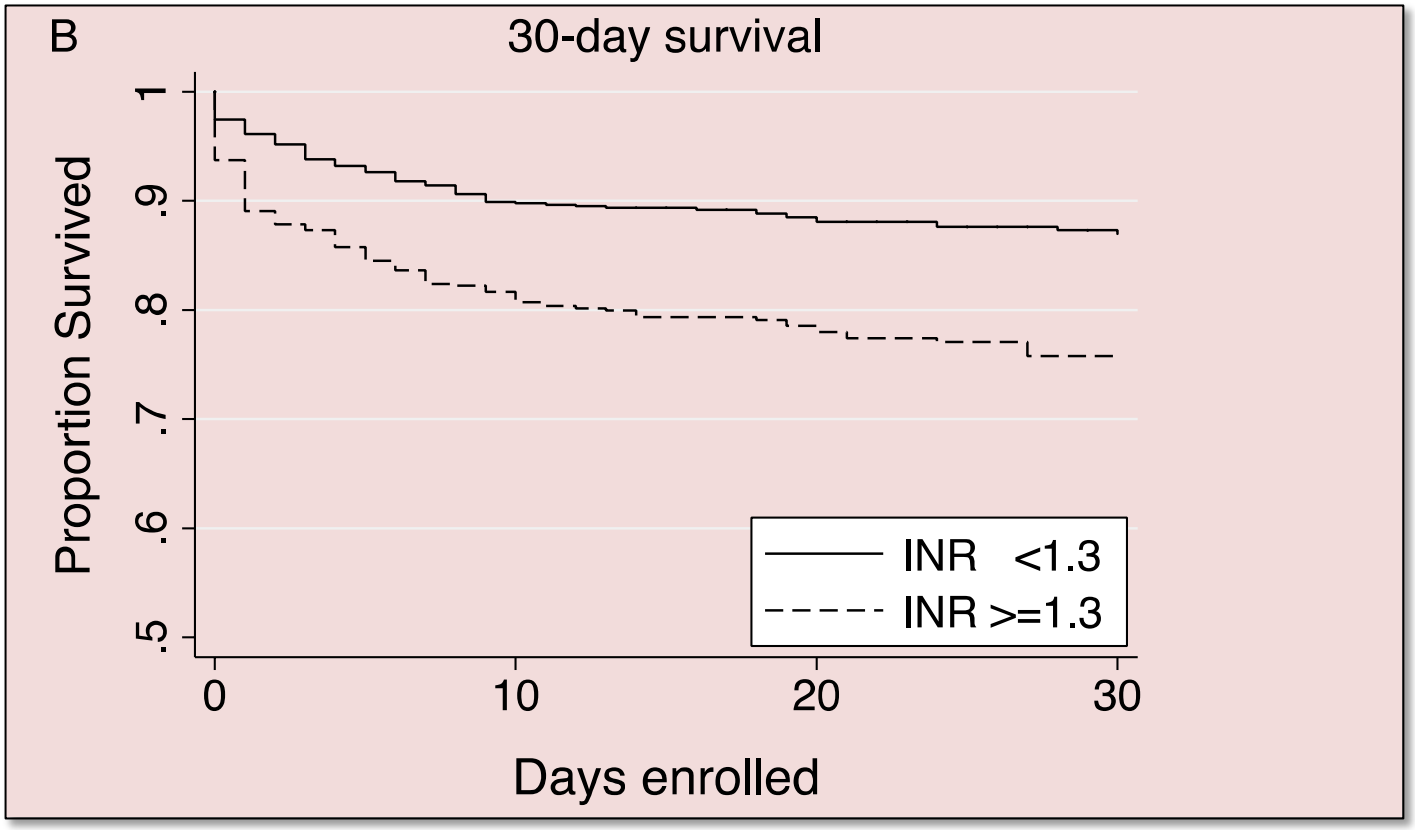
Evolving beyond the vicious triad: Differential mediation of traumatic coagulopathy by injury, shock, and resuscitation

Matthew E. Kutcher, MD, Benjamin M. Howard, MD, MPH, Jason L. Sperry, MD, MPH, Alan E. Hubbard, PhD, Anna L. Decker, PhD, Joseph Cuschieri, MD, Joseph P. Minei, MD, Ernest E. Moore, MD, Bernard H. Brownstein, PhD, Ronald V. Maier, MD, *and* Mitchell Jay Cohen, MD

J Trauma Acute Care Surg. 2015

30% des traumatisés

EVITER/LIMITER la coagulopathie



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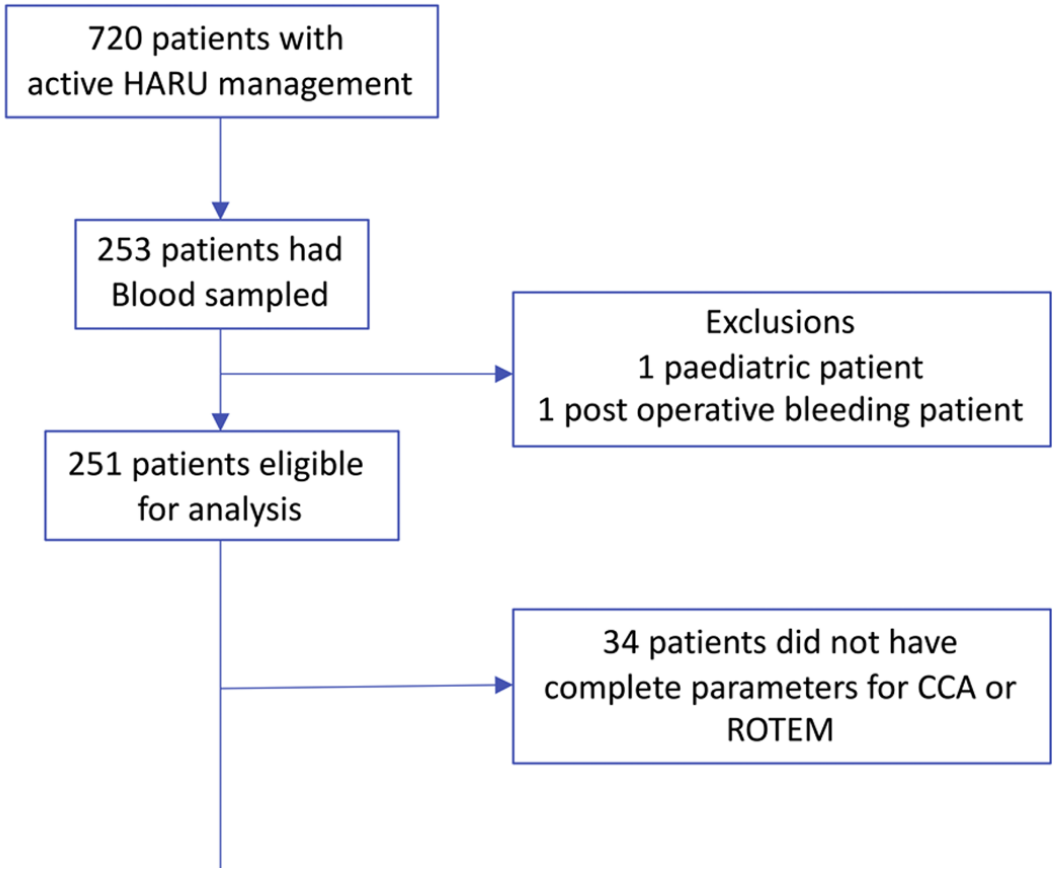
The nature and timing of coagulation dysfunction in a cohort of trauma patients in the Australian pre-hospital setting

Daniel Bodnar [a,b,c,d,e,*], Emma Bosley [a,f], Steven Raven [a], Sue Williams [g], Glenn Ryan [e,h], Martin Wullschleger [b,i], Alfred K. Lam [b,e,j]

2024



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The nature and timing of coagulation dysfunction in a cohort of trauma patients in the Australian pre-hospital setting

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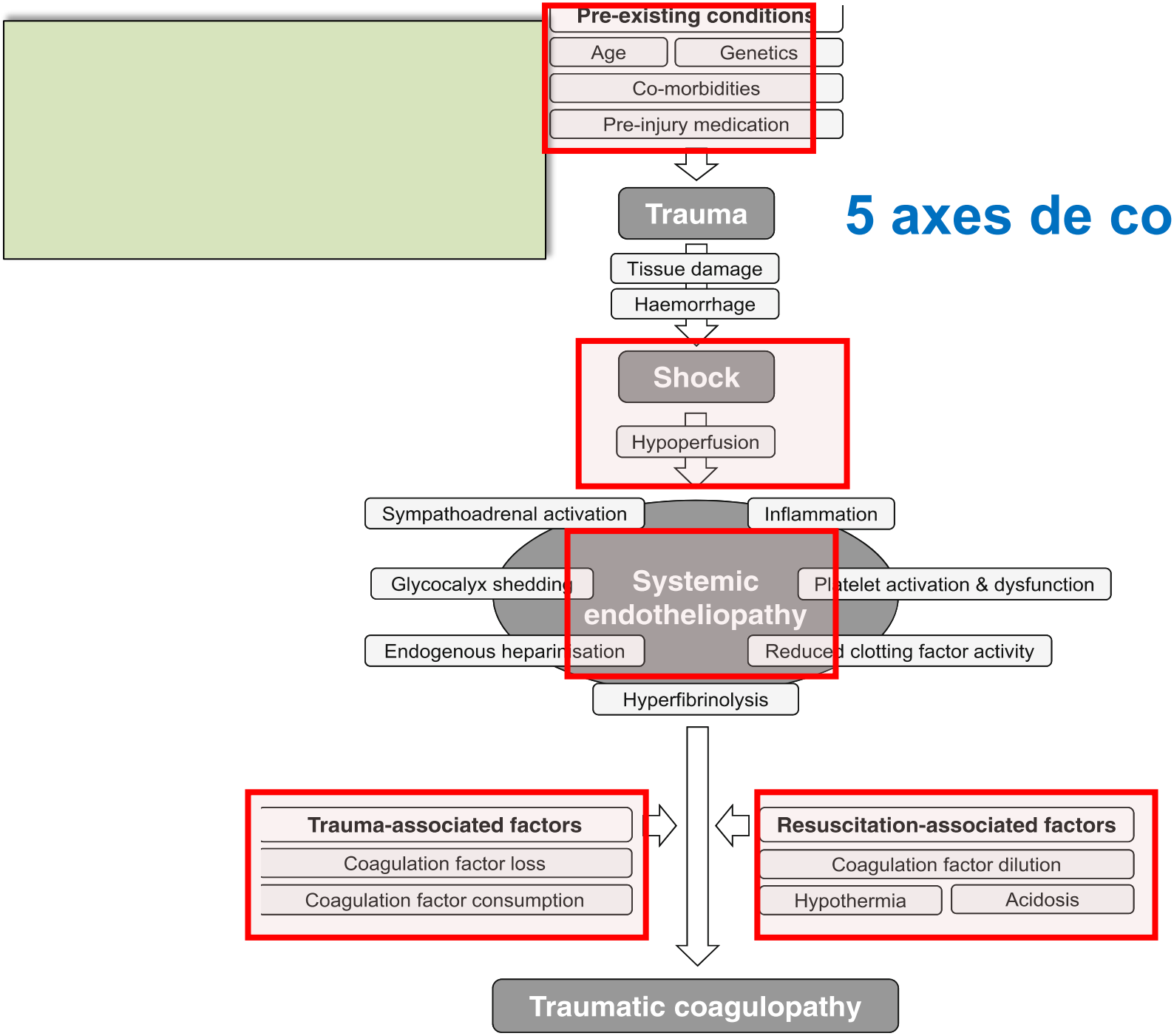
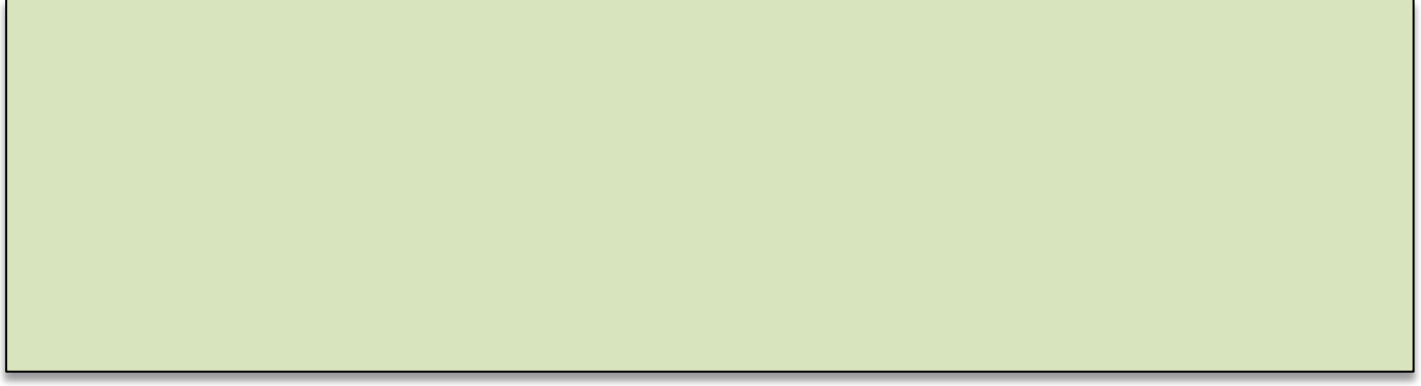
Pre-hospital conventional coagulation assay test results.

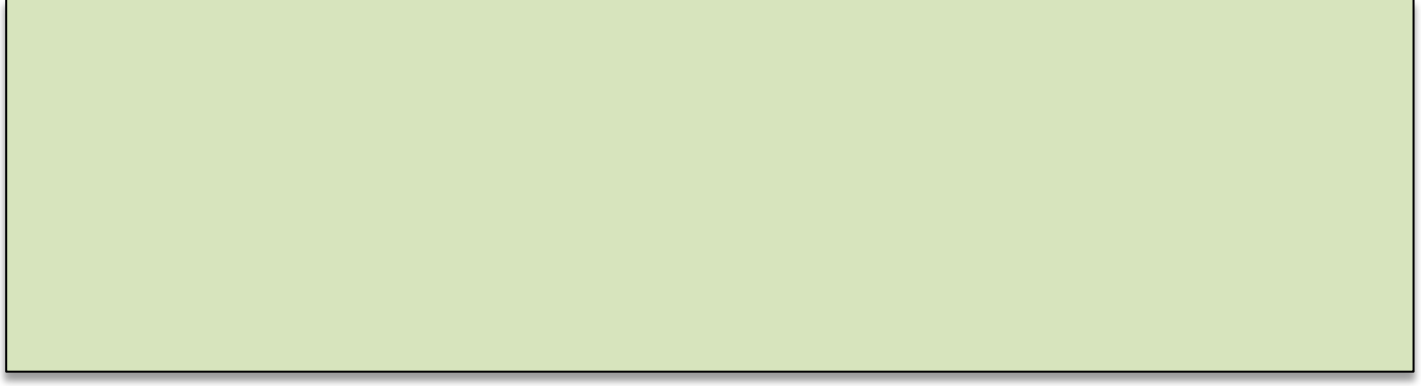
Conventional coagulation assay $n = 193$*			
CCA derangement Classification n (%)	Normal	Mod	Severe
	124 (64 %)	54 (28 %)	15 (8 %)
INR Classification n (%)	≤1.2	1.3–1.5	≥1.6
	164 (85 %)	25 (13 %)	4 (2 %)
Fibrinogenaemia Classification n (%)	>2.0 g/L	1.6–2.0 g/L	≤1.5 g/L
	142 (74 %)	39 (20 %)	12 (6 %)
Platelet Count Classification n (%)	$>100 \times 10^9$	$51–100 \times 10^9$	$\leq 50 \times 10^9$
	191 (99 %)	2 (1 %)	0 (0 %)
aPTT Classification n (%)	≤38 s	39–60 s	>60 s
	185 (96 %)	8 (4 %)	0 (0 %)
Median INR (IQR)	1.1 (1.0–1.2)		
Median Fibrinogen g/L (IQR)	2.4 (2.0–2.9)		
Median Platelet $x10^9$ (IQR)	271 (228–322)		
Median aPTT (s) (IQR)	25.0 (22.5–28.0)		



5 axes de correction



E-clinical med 2025



E-clinical med 2025

ANESTHESIOLOGY

Reversing Rivaroxaban Anticoagulation as Part of a Multimodal Hemostatic Intervention in a Polytrauma Animal Model

Farahnaz Rayatdoost, M.Sc., Till Braunschweig, M.D., Benjamin Maron, M.D., Herbert Schöchl, M.D., Necib Akman, M.D., Rolf Rossaint, M.D., Eva Herzog, Ph.D., Stefan Haitmeier, Ph.D., Oliver Grottke, M.D., Ph.D., M.Sc.

ANESTHESIOLOGY 2021; XXX:00–00

EDITOR'S PERSPECTIVE

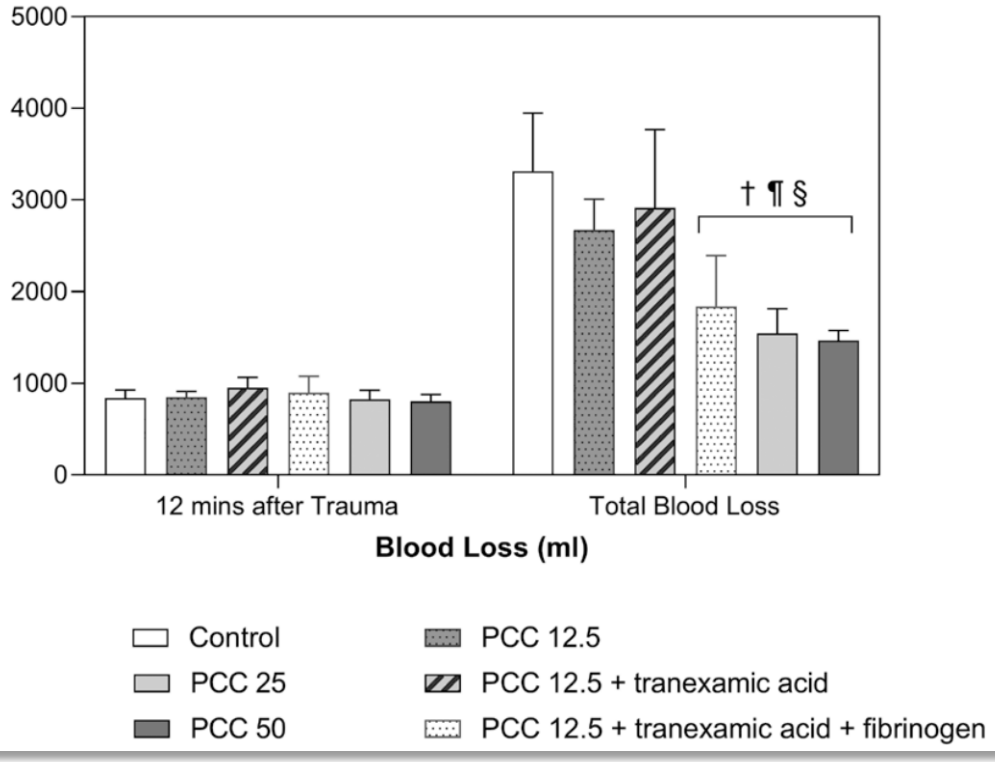
What We Already Know about This Topic

- Significant bleeding can occur after trauma, especially with pre-existing anticoagulation. Despite multiple therapeutic approaches, optimal management remains to be determined.

What This Article Tells Us That Is New

- In an animal model of rivaroxaban-treated pigs that underwent complex traumatic injury, prothrombin complex concentrates alone and in combination with tranexamic acid and fibrinogen concentrate effectively reduced blood loss, restored hemostasis, and improved thrombin generation.

PCC 50 UI/kg



Utility of the Shock Index in Predicting Mortality in Traumatically Injured Patients

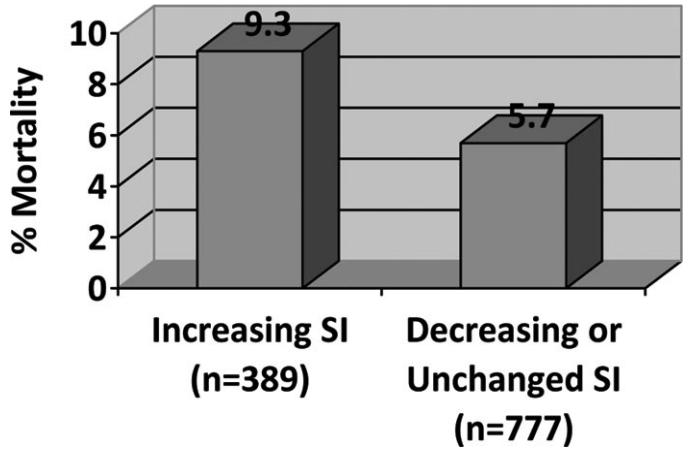
Chad M. Cannon, MD, Carla C. Braxton, MD, FACS, Mendy Kling-Smith, MD, Jonathan D. Mahnken, PhD, Elizabeth Carlton, RN, MSN, and Michael Moncure, MD, FACS

J Trauma 2018

$$\text{Prehospital Shock Index (PHSI)} = \frac{\text{prehospital pulse rate}}{\text{prehospital systolic blood pressure}}$$

TABLE 1. Field (Prehospital), n = 1,166*

	SI >0.9, (n = 392)	SI ≤0.9, (n = 774)	*p*
Mortality	8.9%	5.8%	0.05
Injury Severity Score (median)	10.0	9.0	<0.0001
Penetrating	38.5%	22.8%	<0.0001
Age in years (median)	33.0	28.0	<0.0001
Female	32.4%	22.5%	<0.001



Prédit une gravité et un besoin en soin !

Figueiredo *et al. Ann. Intensive Care (2018) 8:76*
https://doi.org/10.1186/s13613-018-0420-8

RESEARCH Open Access

How useful are hemoglobin concentration and its variations to predict significant hemorrhage in the early phase of trauma? A multicentric cohort study

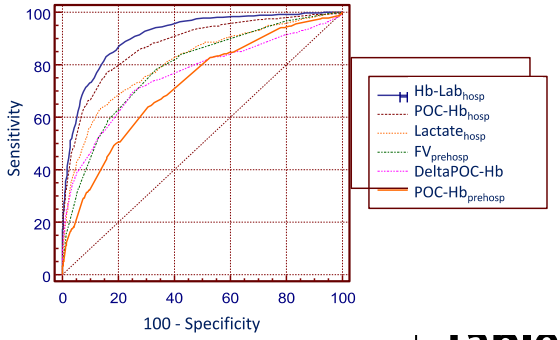


Table 2 Different hemoglobin measurements and variations

	SH $n=755$	CL $n=5647$	*p* value
POC-Hb$_{prehosp}$ (g dl^{-1})	12.5 [11–14]	14.0 [13–15]	< 0.001
POC-Hb$_{hosp}$ (g dl^{-1})	9.6 [8–11]	13.5 [12–15]	< 0.001
DeltaPOC-Hb (g dl^{-1})	− 3 [− 5;− 1]	− 1 [− 2;0]	< 0.001
Hb-Lab$_{hosp}$ (g dl^{-1})	9.3 [7.6–11]	13.5 [12–14.5]	< 0.001

JAMA Surgery | Original Investigation

Tranexamic Acid During Prehospital Transport in Patients at Risk for Hemorrhage After Injury

A Double-blind, Placebo-Controlled, Randomized Clinical Trial

Francis X. Guyette, MD, MPH; Joshua B. Brown, MD, MSc; Mazen S. Zenati, MD, PhD; Barbara J. Early-Young, BSN; Peter W. Adams, BS; Brian J. Eastridge, MD; Raminder Nirula, MD, MPH; Gary A. Vercruysse, MD; Terence O'Keeffe, MD; Bellal Joseph, MD; Louis H. Alarcon, MD; Clifton W. Callaway, MD, PhD; Brian S. Zuckerbraun, MD; Matthew D. Neal, MD; Raquel M. Forsythe, MD; Matthew R. Rosengart, MD, MPH; Timothy R. Billiar, MD; Donald M. Yealy, MD; Andrew B. Peitzman, MD; Jason L. Sperry, MD, MPH; and the STAAMP Study Group

2020

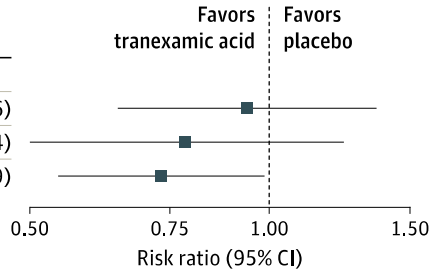
B Mortality risk by time from injury and shock severity

Subgroup	No./total No. (%) of patients		Risk ratio (95% CI)
	Placebo	Tranexamic acid	
Time from injury, h			
≤1	18/238 (7.6)	10/219 (4.6)	0.60 (0.44-0.83)
>1	27/214 (12.6)	26/223 (11.7)	0.92 (0.52-1.64)
Shock severity			
Tachycardia only	21/320 (6.6)	18/316 (5.7)	0.87 (0.56-1.34)
SBP <90 mm Hg	13/101 (12.9)	13/99 (13.1)	1.02 (0.55-1.90)
SBP <70 mm Hg	11/31 (35.5)	5/27 (18.5)	0.52 (0.34-0.80)

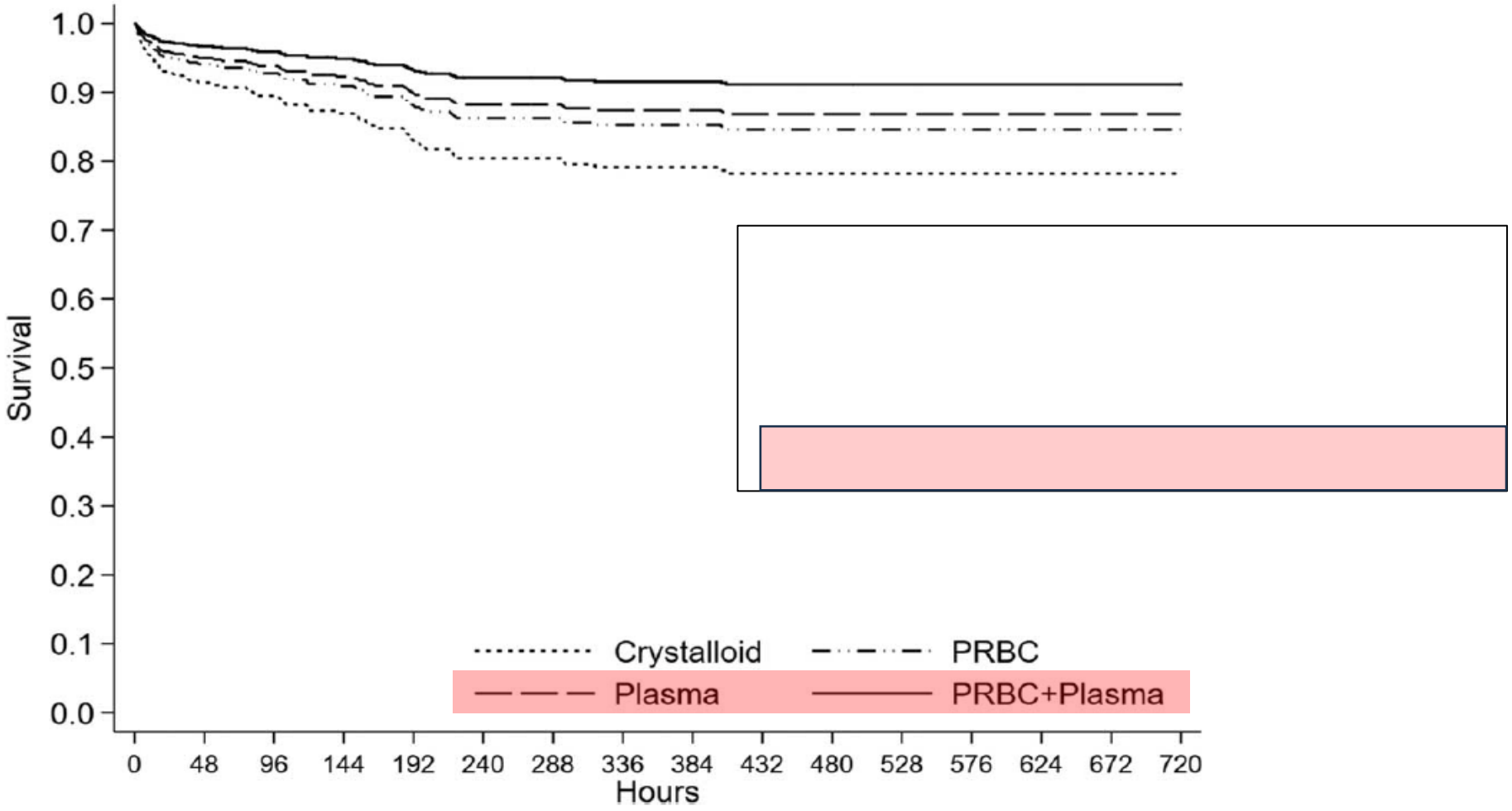
The abbreviated dose represents a single 1-g bolus dose. The standard dose represents a 2-g dose administered as a 1-g bolus dose followed by a 1-g infusion during 8 hours. The repeat dose represents a 3-g dose administered as 2 separate 1-g boluses followed by a 1-g infusion during 8 hours.

A Mortality risk by tranexamic acid prespecified dosing regimens

Tranexamic acid dose	No./total No. (%) of patients	Risk ratio (95% CI)	*P* value
Placebo (reference)	45/452 (10.0)		
Abbreviated	14/150 (9.3)	0.94 (0.65-1.36)	.74
Standard	11/141 (7.8)	0.78 (0.50-1.24)	.30
Repeat	11/151 (7.3)	0.73 (0.54-0.99)	.04



Ann Surg 2019



2024

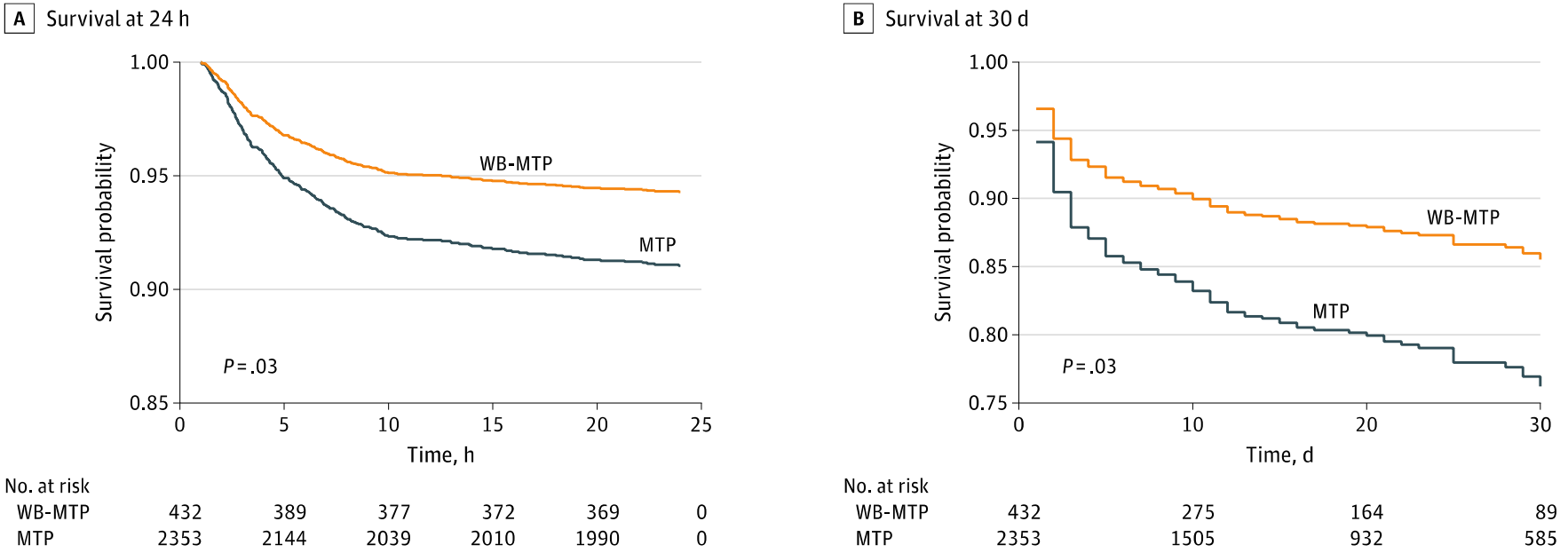
JAMA Surgery | Original Investigation

2023

Association of Whole Blood With Survival Among Patients Presenting With Severe Hemorrhage in US and Canadian Adult Civilian Trauma Centers

Crisanto M. Torres, MD, MPH; Alistair Kent, MD, MPH; Dane Scantling, DO, MPH; Bellal Joseph, MD; Elliott R. Haut, MD, PhD; Joseph V. Sakran, MD, MPH, MPA

Figure 2. Adjusted Kaplan-Meier Survival Estimates by Transfusion Group



MTP indicates massive transfusion protocol and WB-MTP, whole blood as an adjunct to component therapy–based MTP.

2024

Research

JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Efficacy and Safety of Early Administration of 4-Factor Prothrombin Complex Concentrate in Patients With Trauma at Risk of Massive Transfusion

The PROCOAG Randomized Clinical Trial

Pierre Bouzat, MD, PhD; Jonathan Charbit, MD; Paer-Selim Abback, MD; Delphine Huet-Garrigue, MD; Nathalie Delhaye, MD; Marc Leone, MD, PhD; Guillaume Marcotte, MD; Jean-Stéphane David, MD, PhD; Albrice Levrat, MD; Karim Asehnoune, MD, PhD; Julien Pottecher, MD, PhD; Jacques Duranteau, MD, PhD; Elie Courvalin, MD; Anais Adolle, MSc; Dimitri Sourd, MSc; Jean-Luc Bosson, MD, PhD; Bruno Riou, MD, PhD; Tobias Gauss, MD; Jean-François Payen, MD, PhD; for the PROCOAG Study Group

2023

Intérêt des CCP hors antagonisation des AC ?

Consecutive patients with trauma at risk of massive transfusion.

INTERVENTIONS Intravenous administration of 1 mL/kg of 4F-PCC (25 IU of factor IX/kg) vs 1 mL/kg of saline solution (placebo). Patients, investigators, and data analysts were blinded to treatment assignment. All patients received early ratio-based transfusion (packed red blood cells:fresh frozen plasma ratio of 1:1 to 2:1) and were treated according to European traumatic hemorrhage guidelines.

Aucun effet sur la survie
ni sur la consommation de CG

Mais un risque accru MTE

2025

Pas d’intérêt d’ajout de CCP hors réversion

Take Home message

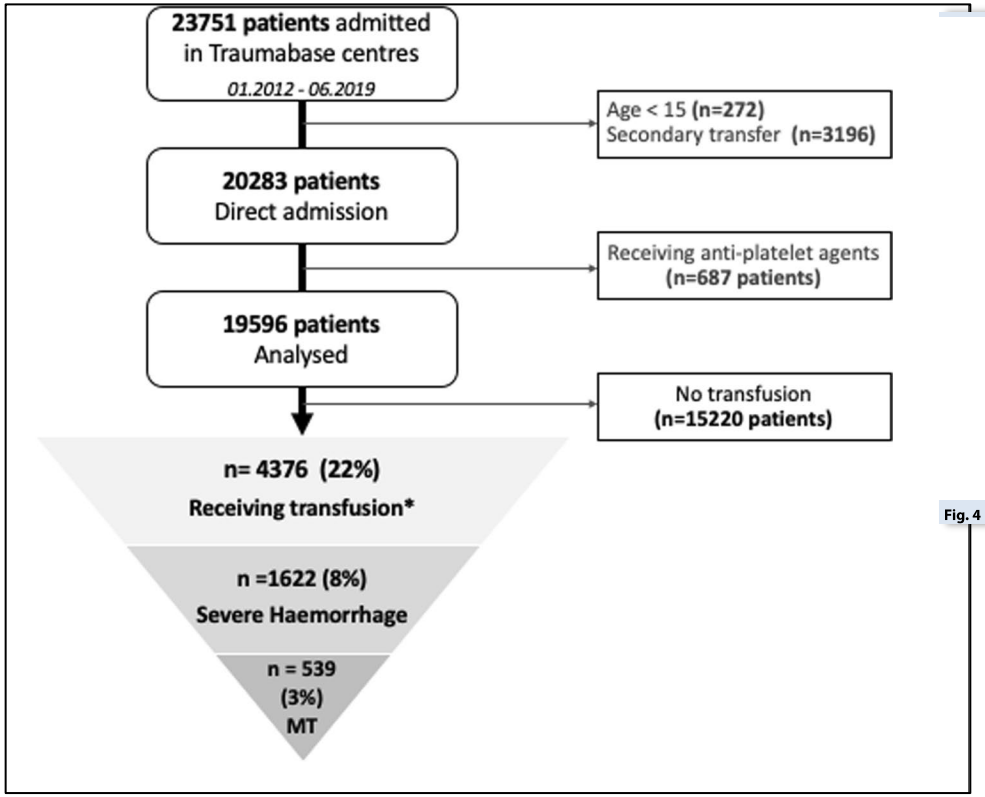
- La coagulopathie est l'enjeu majeur
- L'avenir est à une approche multiaxe de gestion de la dysfonction endothéliale et compartiment sang
- Réverser rapidement les patients sous AC lors d'un trauma sévère

Hamada *et al. Critical Care* (2022) 26:49
https://doi.org/10.1186/s13054-022-03928-y

RESEARCH Open Access

Impact of platelet transfusion on outcomes in trauma patients

S. R. Hamada[1*], D. Garrigue[2], H. Nougue[3], A. Meyer[4], M. Boutonnet[5], E. Meaudre[6], A. Culver[7], E. Gaertner[8], G. Audibert[9], B. Vigué[10], J. Duranteau[10], A. Godier[11] and and the TraumaBase Group



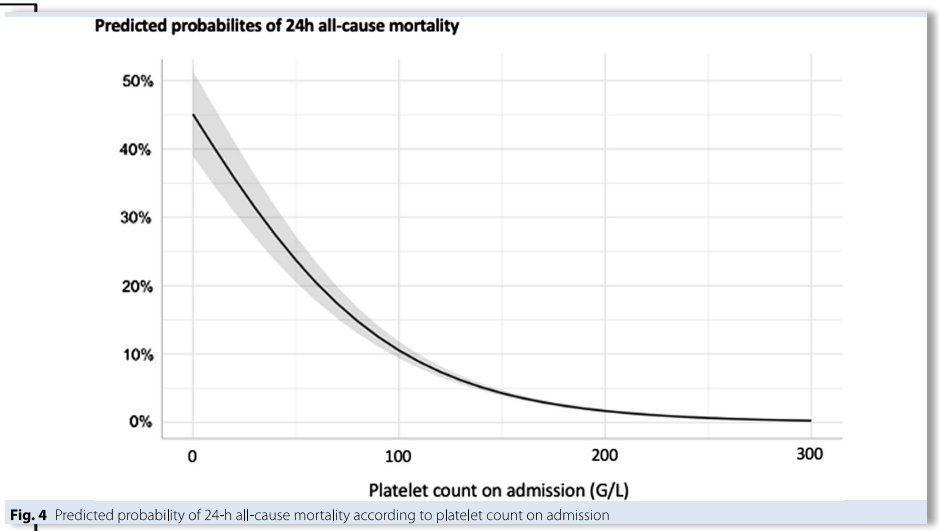


Fig. 4 Predicted probability of 24-h all-cause mortality according to platelet count on admission

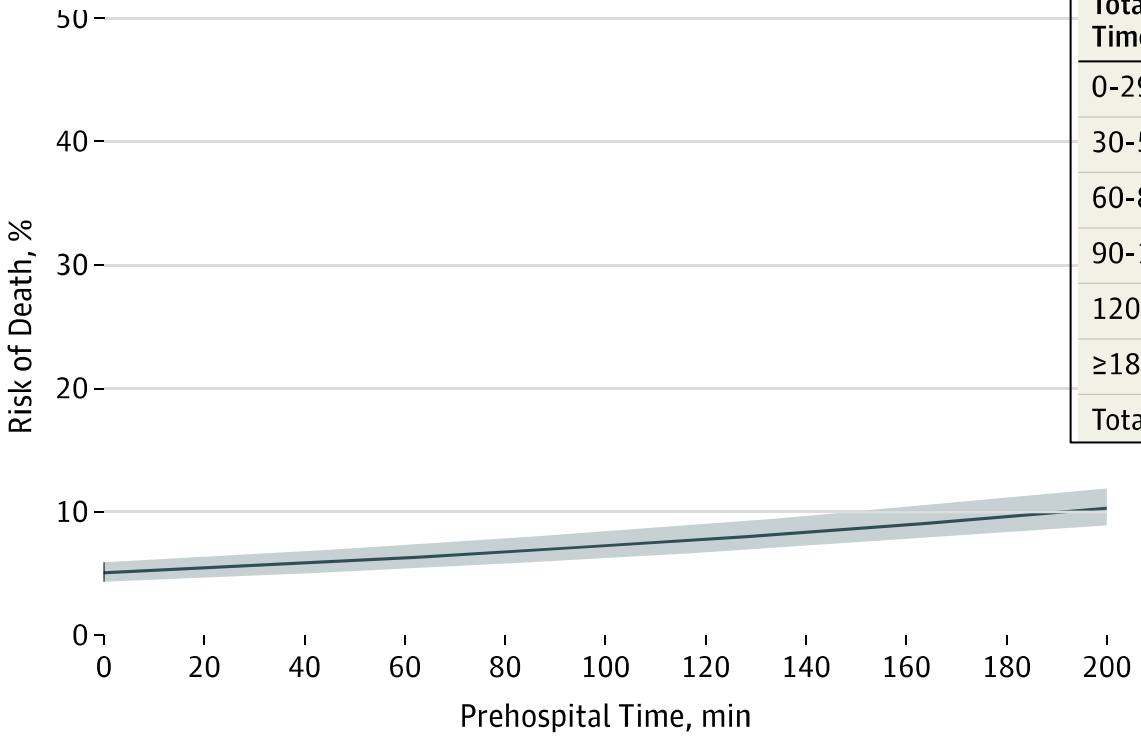
JAMA Surgery | Original Investigation

Association of Prehospital Time to In-Hospital Trauma Mortality in a Physician-Staffed Emergency Medicine System

Tobias Gauss, MD; François-Xavier Ageron, MD, PhD; Marie-Laure Devaud, MD; Guillaume Debaty, MD, PhD; Stéphane Travers, MD; Delphine Garrigue, MD; Mathieu Raux, MD, PhD; Anatole Harrois, MD, PhD; Pierre Bouzat, MD, PhD; for the French Trauma Research Initiative

2019

10216 patients were included (mean[SD]age,41[18] years;7937men [78.3%]) non penetrating injuries (9265 [91.5%]) 2009-2016



Total Prehospital Time, min[a]	Total, No.
0-29	514
30-59	3535
60-89	3459
90-119	1624
120-179	870
≥180	124
Total	10 126