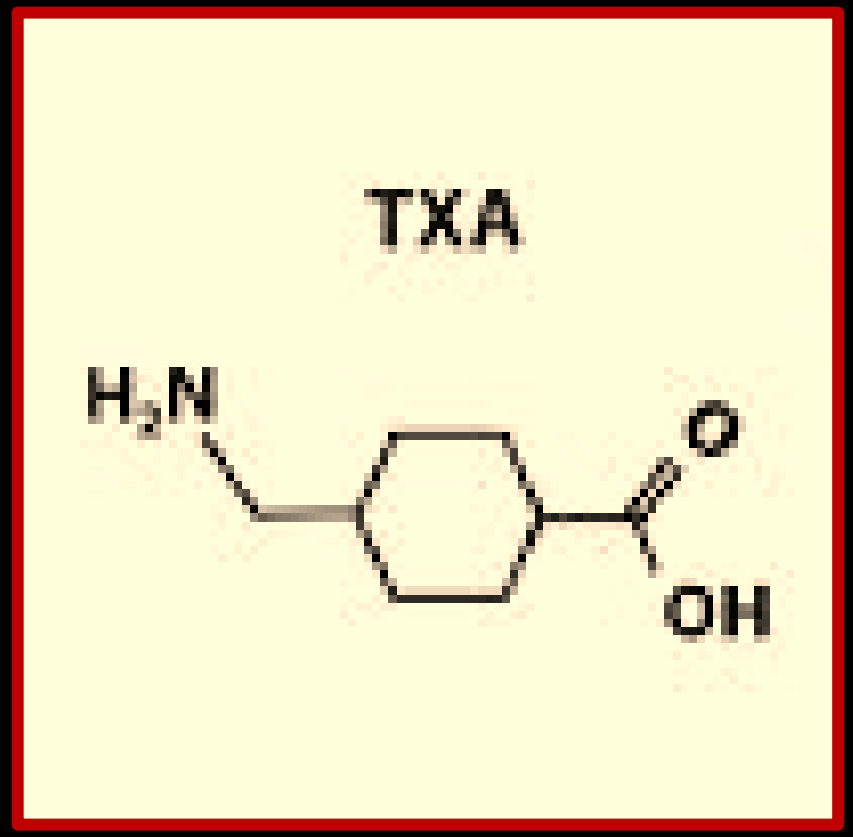
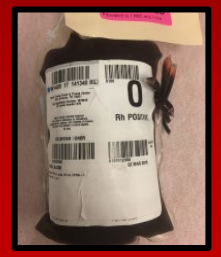
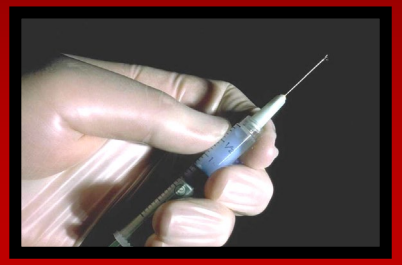
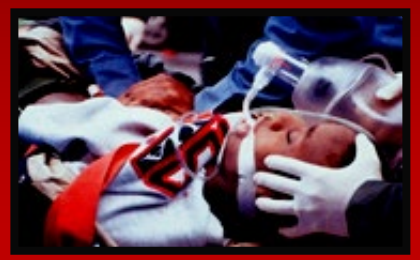
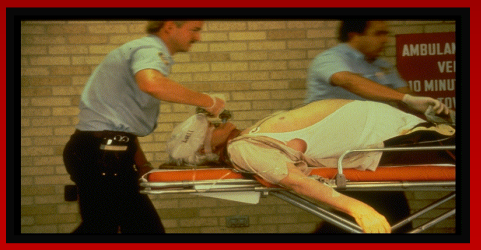
TXA



A Heads-Up on Tranexamic Acid

New Studies Predict More Routine EMS Use and Different Dosing in Trauma Patients, Particularly for Those with Severe Head Injury

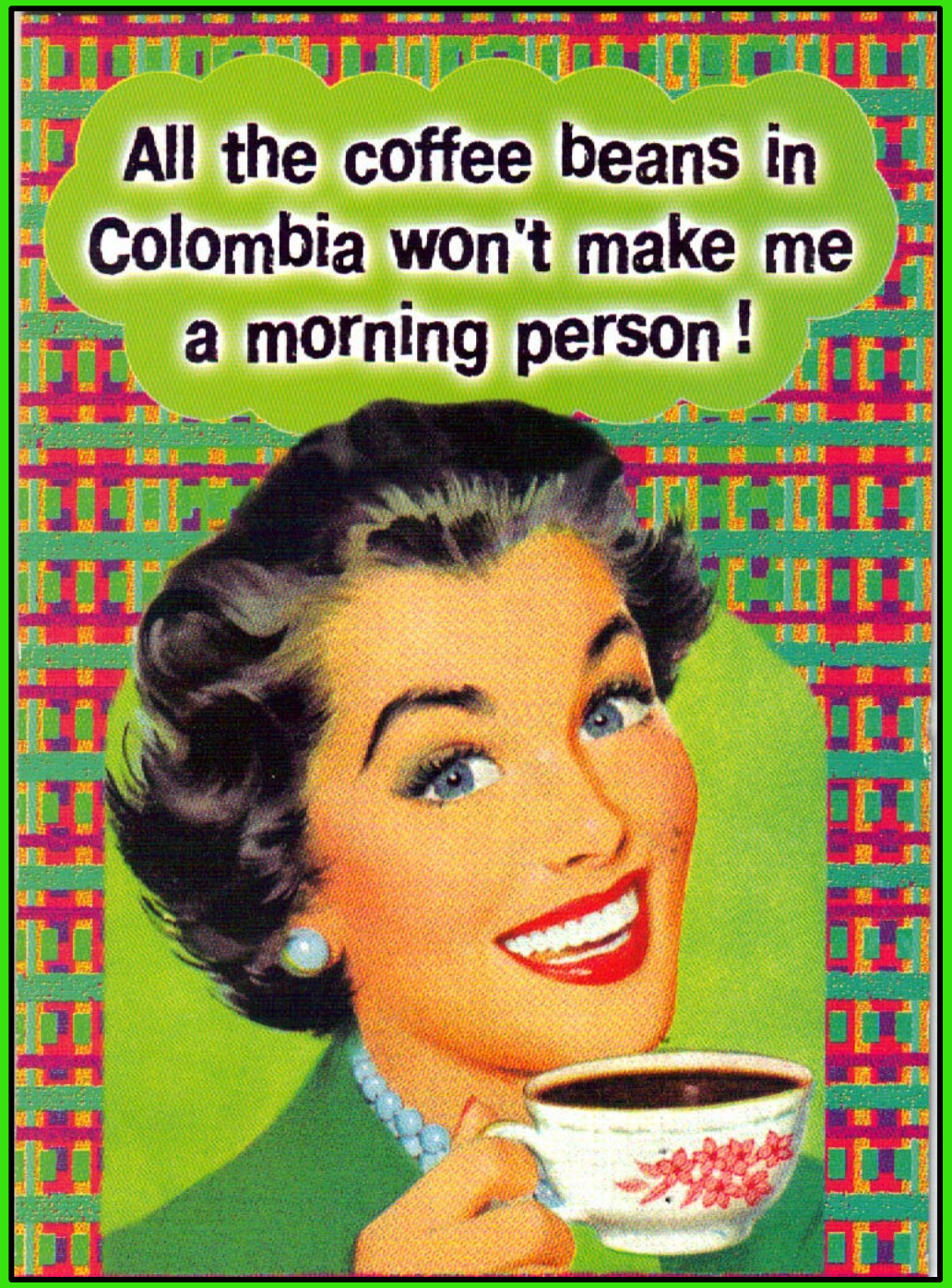


Dr Redfield ("Reddy") Wipp, MD, MCCM, FACEP, MACP, FAEMS

Professor of Management, Policy and Community Health,
University of Texas Health Sciences Center, Houston, Texas

Medical Director, EMS & Public Safety, *County of Dallas, Texas*

Research Medical Director, *Broward Sheriff's Office, Ft. Lauderdale, Florida*


All the coffee beans in Colombia won't make me a morning person!


NON-ESSENTIAL

EMSWORLD PRINT ONLINE EXPO
EMS World October 2020;49(10):15-17

NONMECHANICAL HEMOSTASIS IN TRAUMA CARE

Part I: Evolving prehospital practices and the role of TXA

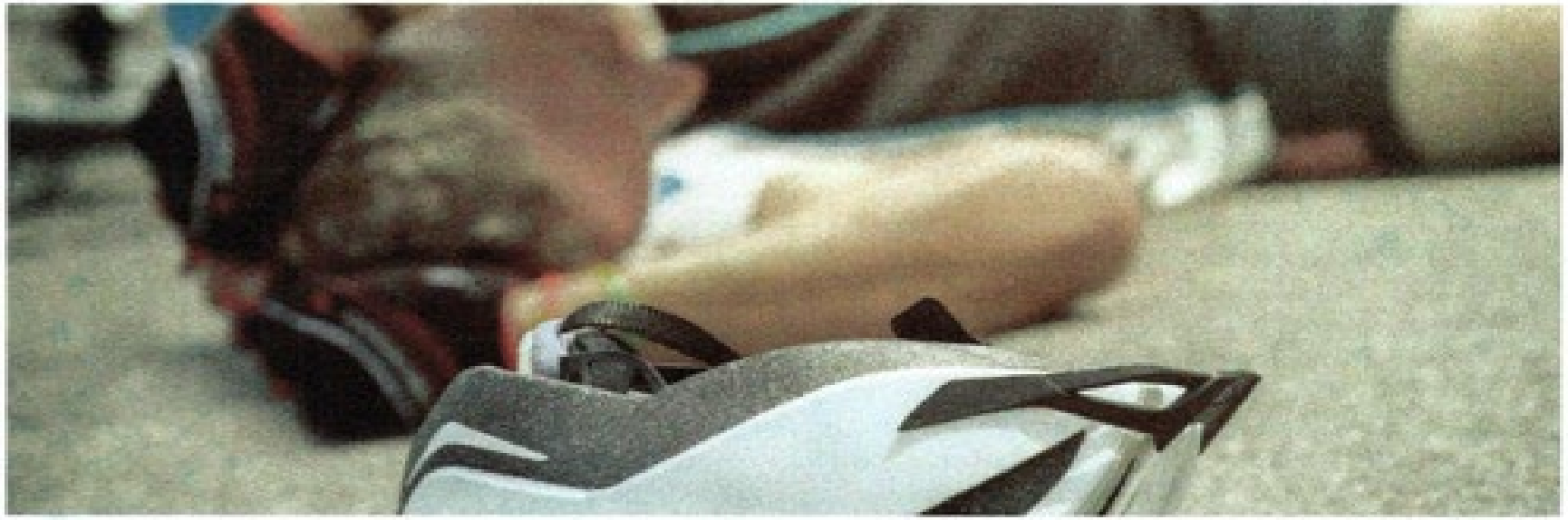
By Paul E. Pepe, MD, MPH, FAEMS, MCCM; Jonathan Jui, MD, MPH, FACEP, FAEMS; and John B. Holcomb, MD, FACS

Resident Eagle is a monthly column profiling the work of top EMS physicians and medical directors from the Metropolitan EMS Medical Directors Global Alliance (the "Eagles"), who represent America's largest and key

Modern trauma systems were created more than a half century ago to enable severely injured patients to reach a facility where surgeons were standing by around-the-clock ready to rapidly achieve

Time is of the essence. Physically clamping and repairing damaged blood vessels within the chest, abdomen, or skull must be achieved before exsanguination or fatal CNS compromise. A person's own blood is equipped with optimal clotting factors

EMSWORLD PRINT ONLINE EXPO
EMS World November 2020; (49)11):14-17.



TXA IN TBI

Part 2: The earlier the intervention, the better the outcome

By Paul E. Pepe, MD, MPH, FAEMS, MCCM; Jonathan Jui, MD, MPH, FACEP, FAEMS; James P. Roach, DO, FACEP; and John B. Holcomb, MD, FACS

As discussed in last month's opening column about nonmechanical hemostasis in prehospital trauma care, the use of TXA had even examined the use of TXA for those with mild to moderate head injury with the concern that if accompanying intracranial tion of TXA comes into play.

Like its predecessor trial in general trauma patients with bleeding, the number of

JSOM Fall 2020;20:36-43

The Use of Tranexamic Acid in Tactical Combat Casualty Care:
TCCC Proposed Change for 2020-2022

Drew B, Auten JD, Cap AP, Deaton TG, Donham B, Dorlac WC, DuBose JJ, Fisher AD, Ginn AJ, Hancock J, Holcomb JB, Knight J, Koerner AK, Littlejohn FL, Martin MJ, Morey JK, Morrison J, Schreiber MA, Spinella PC, Walrath B, Butler FK

Abstract

The literature continues to provide strong support for the early use of tranexamic acid (TXA) in severely injured trauma patients. Questions persist, however, regarding the optimal medical and tactical/logistical use, timing, and dose of this medication, both from the published TXA literature and from the TCCC user community. The use of TXA has been explored outside of trauma, new dosing strategies have been pursued, and expansion of retrospective use data has grown as well. These questions emphasize the need for a reexamination of TXA by the CoTCCC. The most significant updates to the TCCC Guidelines are (i) including significant traumatic brain injury (TBI) as an indication for TXA, (ii) changing the dosing protocol to a single 2g IV/IO administration, and (iii) recommending TXA administration via slow IV/IO push.

Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised, placebo-controlled trial

*CRASH-2 trial collaborators**

Summary

Background Tranexamic acid can reduce bleeding in patients undergoing elective surgery. We assessed the effects of early administration of a short course of tranexamic acid on death, vascular occlusive events, and the receipt of blood transfusion in trauma patients.

Methods This randomised controlled trial was undertaken in 274 hospitals in 40 countries. 20 211 adult trauma patients with, or at risk of, significant bleeding were randomly assigned within 8 h of injury to either tranexamic acid (loading dose 1 g over 10 min then infusion of 1 g over 8 h) or matching placebo. Randomisation was balanced by centre, with an allocation sequence based on a block size of eight, generated with a computer random number generator. Both participants and study staff (site investigators and trial coordinating centre staff) were masked to treatment allocation. The primary outcome was death in hospital within 4 weeks of injury, and was described with the following categories: bleeding, vascular occlusion (myocardial infarction, stroke and pulmonary embolism), multiorgan failure, head injury, and other. All analyses were by intention to treat. This study is registered as ISRCTN86750102, Clinicaltrials.gov NCT00375258, and South African Clinical Trial Register DOH-27-0607-1919.

Lancet 2010; 376: 23–32

Published Online
June 15, 2010
DOI:10.1016/S0140-6736(10)60835-5

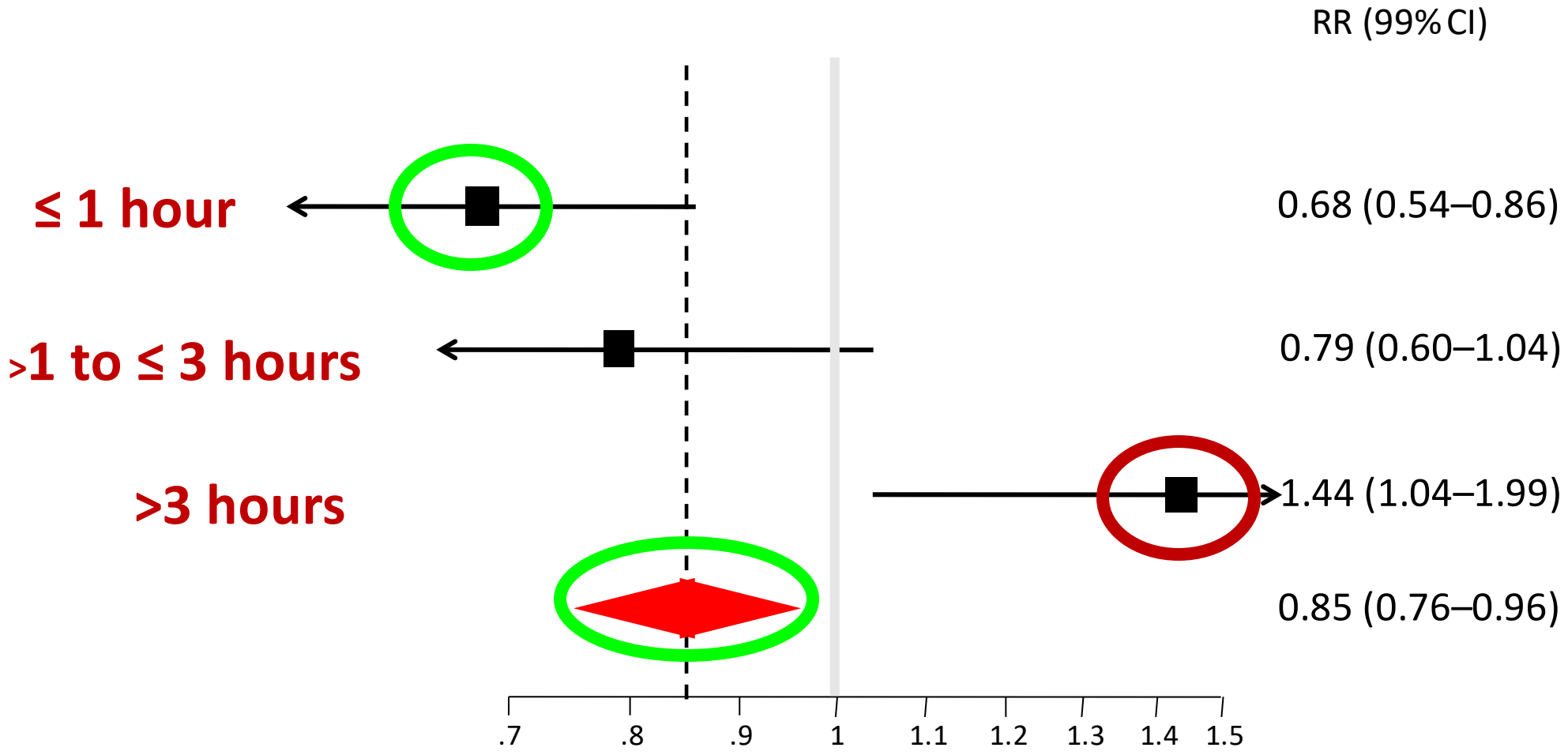
See Comment page 3

*Members listed at end of paper

Correspondence to:
Clinical Trials Unit, London School of Hygiene and Tropical Medicine, Keppel Street, London WC1E 7HT, UK
crash@lshtm.ac.uk

For Bleeding Deaths –

Early TXA Treatment is Better



BETTER OUTCOME

WORSE OUTCOME

p=0.000008

J Trauma Acute Care Surg **2019 Jan;86(1):20-27**.
doi: 10.1097/TA.0000000000002061.

Tranexamic acid administration is associated with an increased risk of posttraumatic venous thromboembolism

Sara P Myers, Matthew E Kutcher, Matthew R Rosengart, Jason L Sperry, Andrew B Peitzman, Joshua B Brown, Matthew D Neal

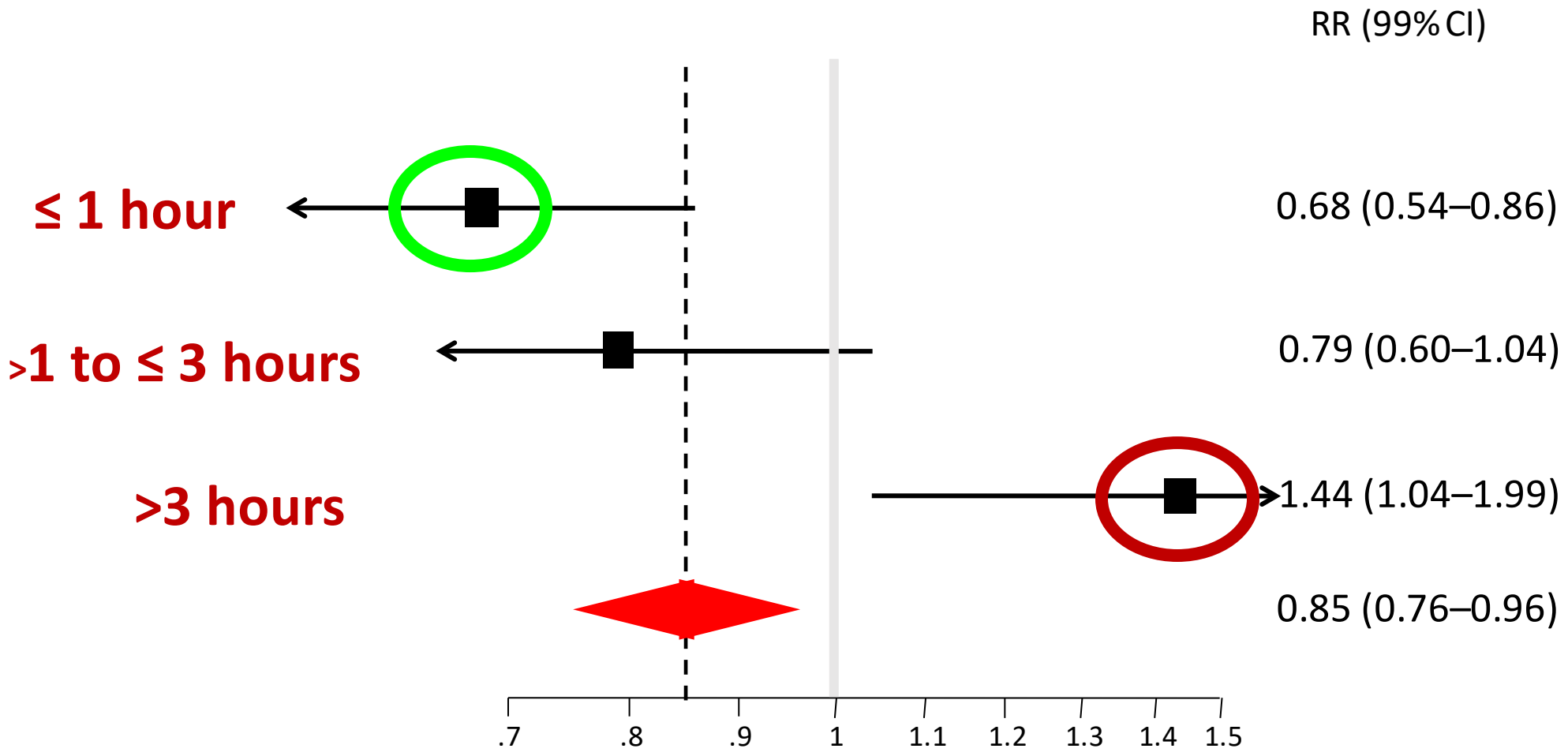
Abstract

Background: Tranexamic acid (TXA) is used as a hemostatic adjunct for hemorrhage control in the injured patient and reduces early preventable death. However, the risk of venous thromboembolism (VTE) has been incompletely explored. Previous studies investigating

But.....

For Bleeding Deaths –

Early TXA Treatment is Better



BETTER OUTCOME

WORSE OUTCOME

p=0.000008


SHEPHERD
DR
1400
ONE
WAY
ONE
WAY
TEXAS
AJN-996

TXA Head Injury

Effects of tranexamic acid on death, disability, vascular occlusive events and other morbidities in patients with acute traumatic brain injury (CRASH-3): a randomised, placebo-controlled trial

*The CRASH-3 trial collaborators**

Summary

Background Tranexamic acid reduces surgical bleeding and decreases mortality in patients with traumatic extracranial bleeding. Intracranial bleeding is common after traumatic brain injury (TBI) and can cause brain herniation and death. We aimed to assess the effects of tranexamic acid in patients with TBI.

Methods This randomised, placebo-controlled trial was done in 175 hospitals in 29 countries. Adults with TBI who were within 3 h of injury, had a Glasgow Coma Scale (GCS) score of 12 or lower or any intracranial bleeding on CT scan, and no major extracranial bleeding were eligible. The time window for eligibility was originally 8 h but in 2016 the protocol was changed to limit recruitment to patients within 3 h of injury. This change was made blind to the trial data, in response to external evidence suggesting that delayed treatment is unlikely to be effective. We randomly assigned (1:1) patients to receive tranexamic acid (loading dose 1 g over 10 min then infusion of 1 g over 8 h) or matching placebo. Patients were assigned by selecting a numbered treatment pack from a box containing eight packs that were identical apart from the pack number. Patients, caregivers, and those assessing outcomes were masked to allocation. The primary outcome was head injury-related death in hospital within 28 days of injury in patients treated

Lancet 2019; 394: 1713–23

Published Online
October 14, 2019
https://doi.org/10.1016/S0140-6736(19)32233-0

See Comment page 1687

*Members listed at end of paper

For the Arabic translation of the abstract see Online for appendix 1

For the Chinese translation of the abstract see Online for appendix 2

For the French translation of the

TXA for TBI

ROC TXA Study….

JAMA | Original Investigation

Effect of Out-of-Hospital Tranexamic Acid vs Placebo on 6-Month Functional Neurologic Outcomes in Patients With Moderate or Severe Traumatic Brain Injury

Susan E. Rowell, MD, MBA; Eric N. Meier, MS; Barbara McKnight, PhD; Delores Kannas, RN, MS, MHA; Susanne May, PhD; Kellie Sheehan, RN; Eileen M. Bulger, MD; Ahamed H. Idris, MD; Jim Christenson, MD; Laurie J. Morrison, MD; Ralph J. Frascone, MD; Patrick L. Bosarge, MD; M. Riccardo Colella, DO, MPH; Jay Johannigman, MD; Bryan A. Cotton, MD; Jeannie Callum, MD; Jason McMullan, MD; David J. Dries, MD; Brian Tibbs, MD; Neal J. Richmond, MD; Myron L. Weisfeldt, MD; John M. Tallon, MD, MSc; John S. Garrett, MD; Martin D. Zielinski, MD; Tom P. Aufderheide, MD; Rajesh R. Gandhi, MD, PhD; Rob Schlamp; Bryce R. H. Robinson, MD; Jonathan Jui, MD, MPH; Lauren Klein, MD, MS; Sandro Rizoli, MD; Mark Gamber, DO; Michael Fleming, BA; Jun Hwang, MS; Laura E. Vincent, RN; Carolyn Williams, RN; Audrey Hendrickson, MPH; Robert Simonson, DO; Patricia Klotz, RN; George Sopko, MD; William Witham, MD; Michael Ferrara, MS; Martin A. Schreiber, MD

IMPORTANCE Traumatic brain injury (TBI) is the leading cause of death and disability due to trauma. Early administration of tranexamic acid may benefit patients with TBI.

OBJECTIVE To determine whether tranexamic acid treatment initiated in the out-of-hospital setting within 2 hours of injury improves neurologic outcome in patients with moderate or severe TBI

Visual Abstract

Editorial page 946

Supplemental content

CME Quiz at jamacmelookup.com and CME

ROC TXA for TBI *Sept 8* JAMA

- 2 g vs. 1g+1 g (8 hrs.) vs Placebo
- Moderate to Severe TBI (vs. CRASH 3)
- Early Infusion – *40 min. median time*

- Nearly 60% Had Intracranial Bleed

vs. 44% Without (= built-in Safety Cohort)

ROC TXA for TBI JAMA

- Overall Results 65% vs. 62% GOSE p=NS (n=819)

- But, Examining Those with CT-Confirmed Intracranial Hemorrhage – *the Target Group*…

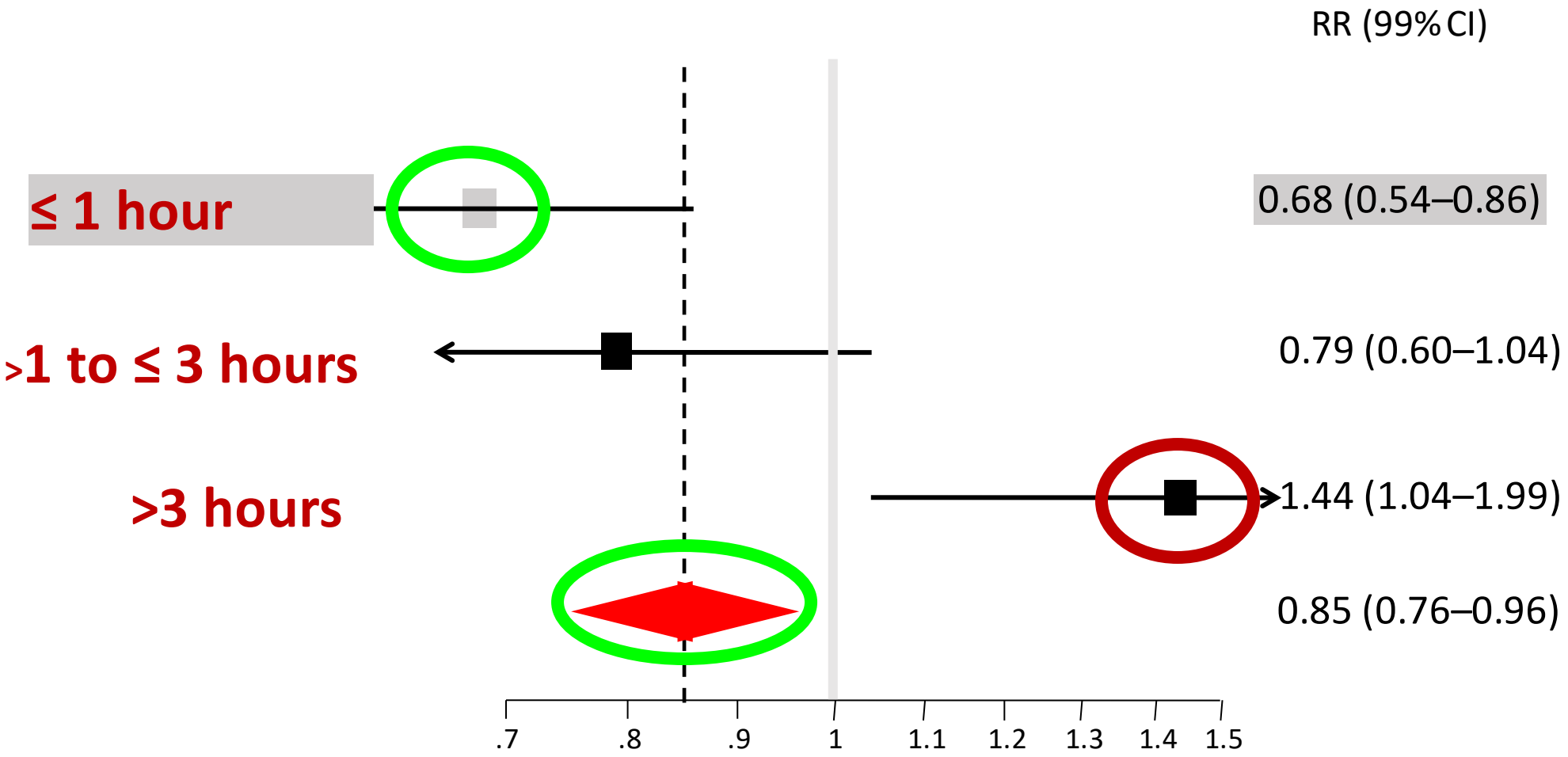
16% mortality with 2 grams upfront

vs. 27% with 1g+1g infusion vs. 26% Placebo

- Increased Risk of Seizures but good outcomes and no other increase in complications = safe

CRASH -2 For Bleeding Deaths

Early TXA Treatment (< 1 hour) is Much Better



BETTER OUTCOME

WORSE OUTCOME

p=0.000008

CRASH-3 TIME TO TX and RR of DEATH

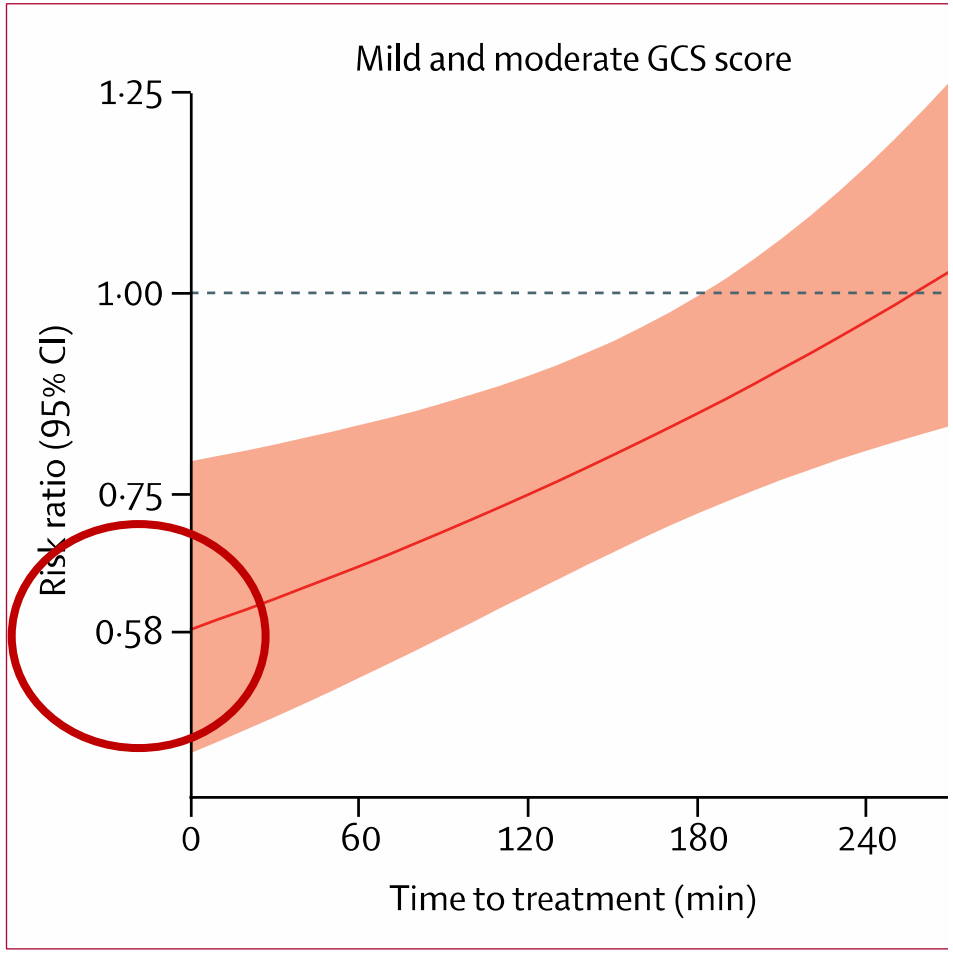
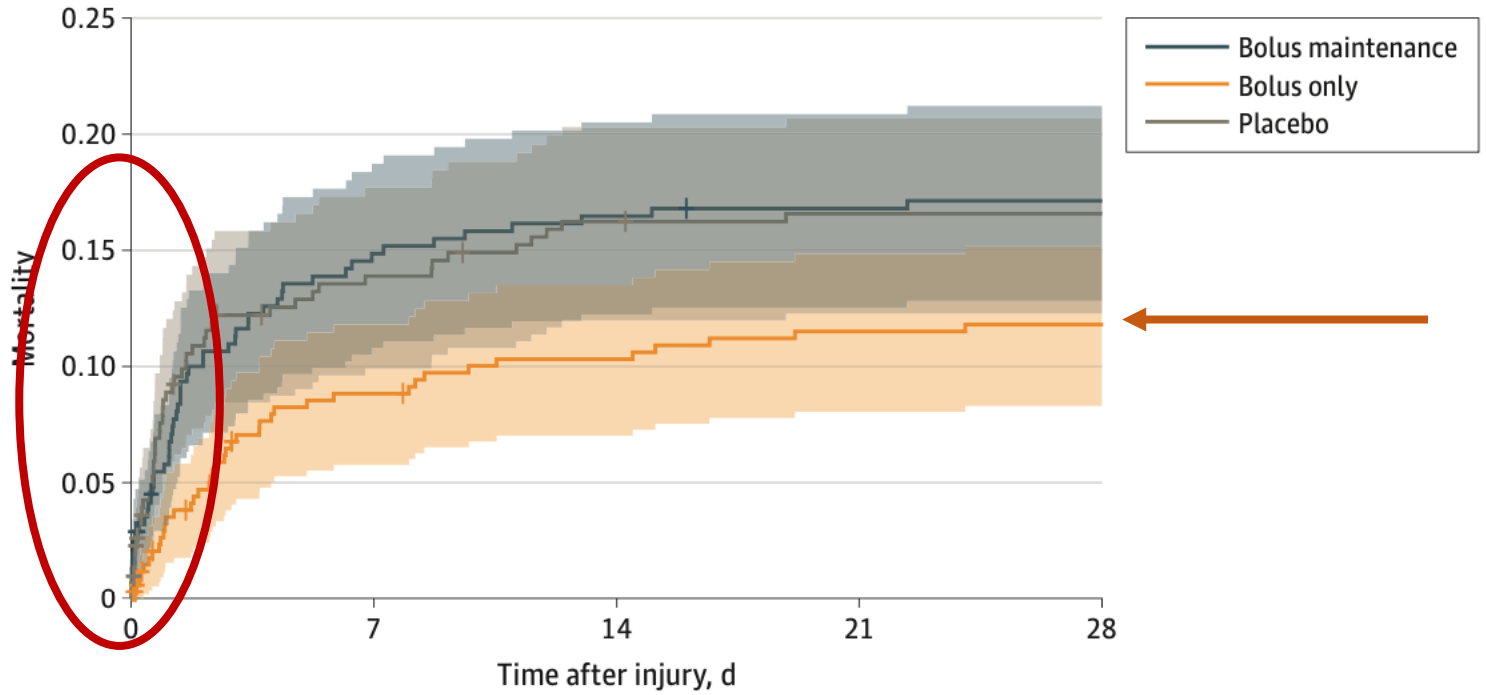


Figure 4: **Effect of tranexamic acid on head injury-related death by severity and time to treatment in all patients**
The models were adjusted for GCS score, age, and systolic blood pressure. 537 patients with mild and moderate GCS scores (9–15) and 918 patients with severe GCS scores (4–8), excluding those with a GCS score of 3 and those with no reactive pupils, died because of head injury. GCS=Glasgow Coma Scale.

ROC TXA TBI Study in *JAMA* Sept 8, 2020

Early Time (< 1 hr.) to Therapy with 2 g bolus improves outcome

Figure 2. Post Hoc Descriptive Analysis of Mortality Through 28 Days in a Study of the Effect of Tranexamic Acid vs Placebo on Neurologic Outcomes in Patients With Traumatic Brain Injury



No. of patients at risk

Bolus maintenance	312	263	258	256	255
Bolus only	345	308	302	298	297
Placebo	309	257	249	247	247

Survival data to 28 days was available for 91% of participants in the bolus maintenance group, 92% in the bolus only group, and 92% in the placebo group. Participants who were lost to follow-up after discharge or study withdrawal prior to 28 days and who were notified themselves about their study enrollment rather than family member notification were assumed to survive through 28 days for this plot (n = 52). The remaining participants were censored before 28 days: 5 [2%] in the bolus maintenance group, 9 [3%] in the bolus only group, and 12 [4%] in the placebo group. The shaded areas represent pointwise 95% CIs for each treatment group. The median (interquartile range) observation time for all 3 groups was 28 (28-28) days.

STAAMP Trial

Guyette

JAMA Surgery

Oct 6, 2020

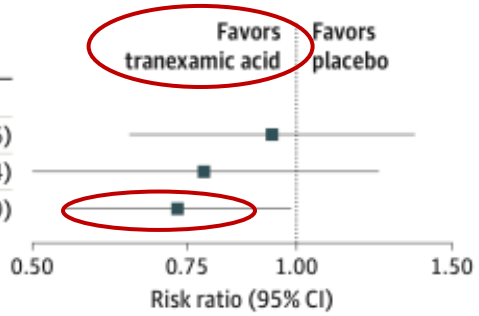
Better Outcomes with…

1) ***higher dose***
2) ***Tx <1 hour***
3) ***esp. with hypotension***

Figure 3. Prespecified Tranexamic Acid Dose Response Analysis, Time to Intervention, and Shock Severity Post Hoc Subgroup Analysis for 30-Day Mortality

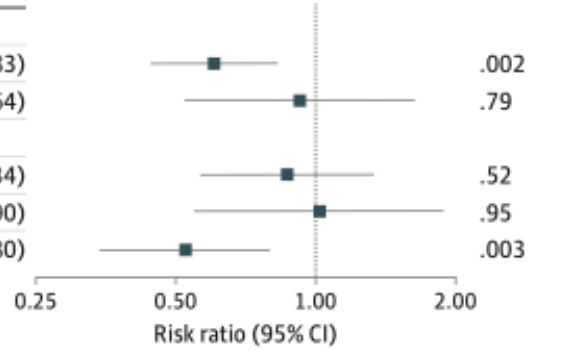
A Mortality risk by tranexamic acid prespecified dosing regimens

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



B Mortality risk by time from injury and shock severity

Subgroup	No./total No. (%) of patients: Placebo	No./total No. (%) of patients: Tranexamic acid	Risk ratio (95% CI)	*P* value
Time from injury, h				
≤1	18/238 (7.6)	10/219 (4.6)	0.60 (0.44-0.83)	.002
>1	27/214 (12.6)	26/223 (11.7)	0.92 (0.52-1.64)	.79
Shock severity				
Tachycardia only	21/320 (6.6)	18/316 (5.7)	0.87 (0.56-1.34)	.52
SBP <90 mm Hg	13/101 (12.9)	13/99 (13.1)	1.02 (0.55-1.90)	.95
SBP <70 mm Hg	11/31 (35.5)	5/27 (18.5)	0.52 (0.34-0.80)	.003



A, Risk of 30-day mortality across tranexamic acid prespecified dosing regimens, accounting for site clustering. All risk ratios are in reference to the placebo group. 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. The repeat dose had lower risk of 30-day mortality than placebo group. B, Risk of 30-day mortality of the tranexamic acid group compared with placebo accounting for site clustering across post hoc subgroups for time of tranexamic acid administration from injury and shock severity based on qualifying inclusion vital signs. The dotted vertical line represents a risk ratio of 1.0 (no difference between groups). The squares represent the point estimate of the risk ratio, with the horizontal solid lines representing the 95% CIs. Time of tranexamic acid administration from injury was stratified by 1 hour or less and greater than 1 hour. The risk of 30-day mortality was lower in the tranexamic acid group when the drug was administered within 1 hour of injury. The risk of 30-day mortality was lower in the tranexamic acid group among patients in severe shock with systolic blood pressure less than 70 mm Hg based on qualifying inclusion vital signs. SBP indicates systolic blood pressure.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

METHODS We randomly assigned adults with major trauma who were at risk for trauma-induced coagulopathy to receive tranexamic acid (administered intravenously as a bolus dose of 1 g before hospital admission, followed by a 1-g infusion over a period of 8 hours after arrival at the hospital) or matched placebo. The primary outcome was survival with a favorable functional outcome at 6 months after injury, as assessed with the use of the Glasgow Outcome Scale–Extended (GOS-E). Levels on the GOS-E range from 1 (death) to 8 ("upper good recovery" [no injury-related problems]). We defined survival with a favorable functional outcome as a GOS-E level of 5 ("lower moderate disability") or higher. Secondary outcomes included death from any cause within 28 days and within 6 months after injury.

SUMMARY TXA for TBI

- Better Outcomes – but only IF GIVEN early – as a 2 gram bolus
- Safe -- IF GIVEN early
- Likely Good for All Trauma including Internal Bleeding & TBI Cases

JSOM Fall 2020;20:36-43

The Use of Tranexamic Acid in Tactical Combat Casualty Care:

TCCC Proposed Change for 2020-2022

Drew B, Auten JD, Cap AP, Deaton TG, Donham B, Dorlac WC, DuBose JJ, Fisher AD, Ginn AJ, Hancock J, Holcomb JB, Knight J, Koerner AK, Littlejohn FL, Martin MJ, Morey JK, Morrison J, Schreiber MA, Spinella PC, Walrath B, Butler FK

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TXA In Kids?

Tranexamic acid administration to pediatric trauma patients in a combat setting: The pediatric trauma and tranexamic acid study (PED-TRAX)

Matthew J. Eckert, MD, Thomas M. Wertin, MD, Stuart D. Tyner, PhD, Daniel W. Nelson, DO, Seth Izenberg, MD, *and* **Matthew J. Martin, MD,** *Tacoma, Washington*

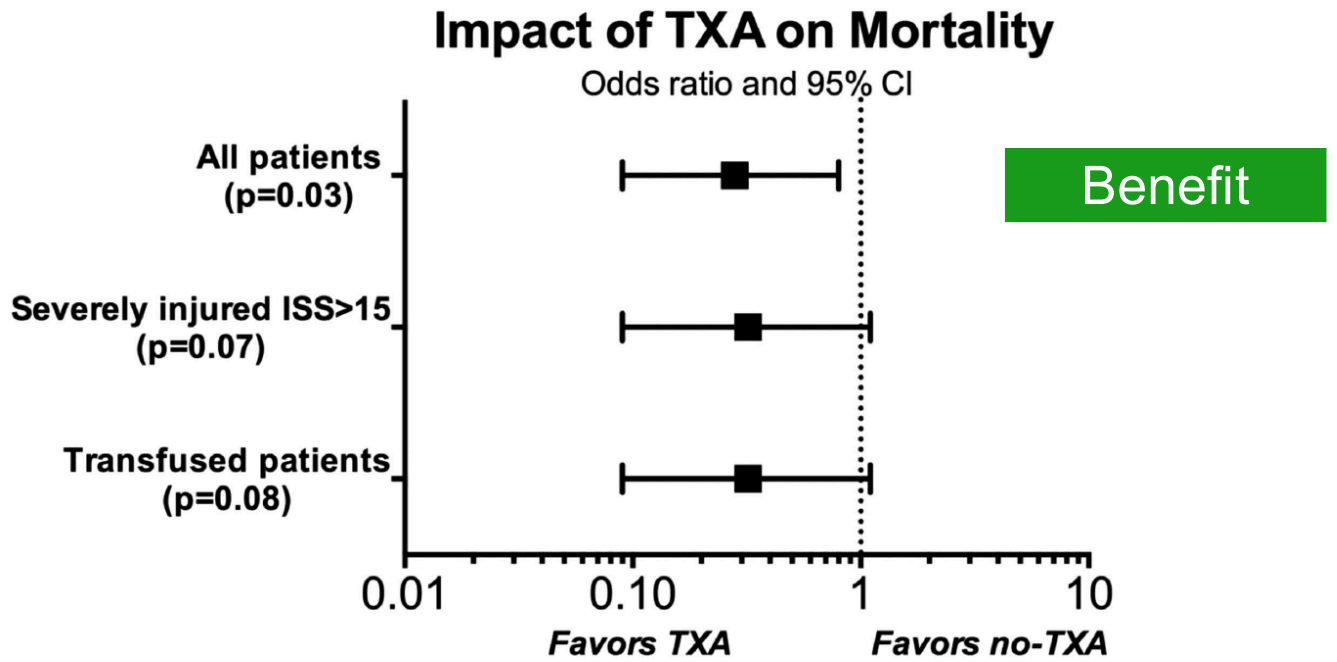


Figure 1. Population and subpopulation mortality associations of TXA.

PED-TRAX, 2014

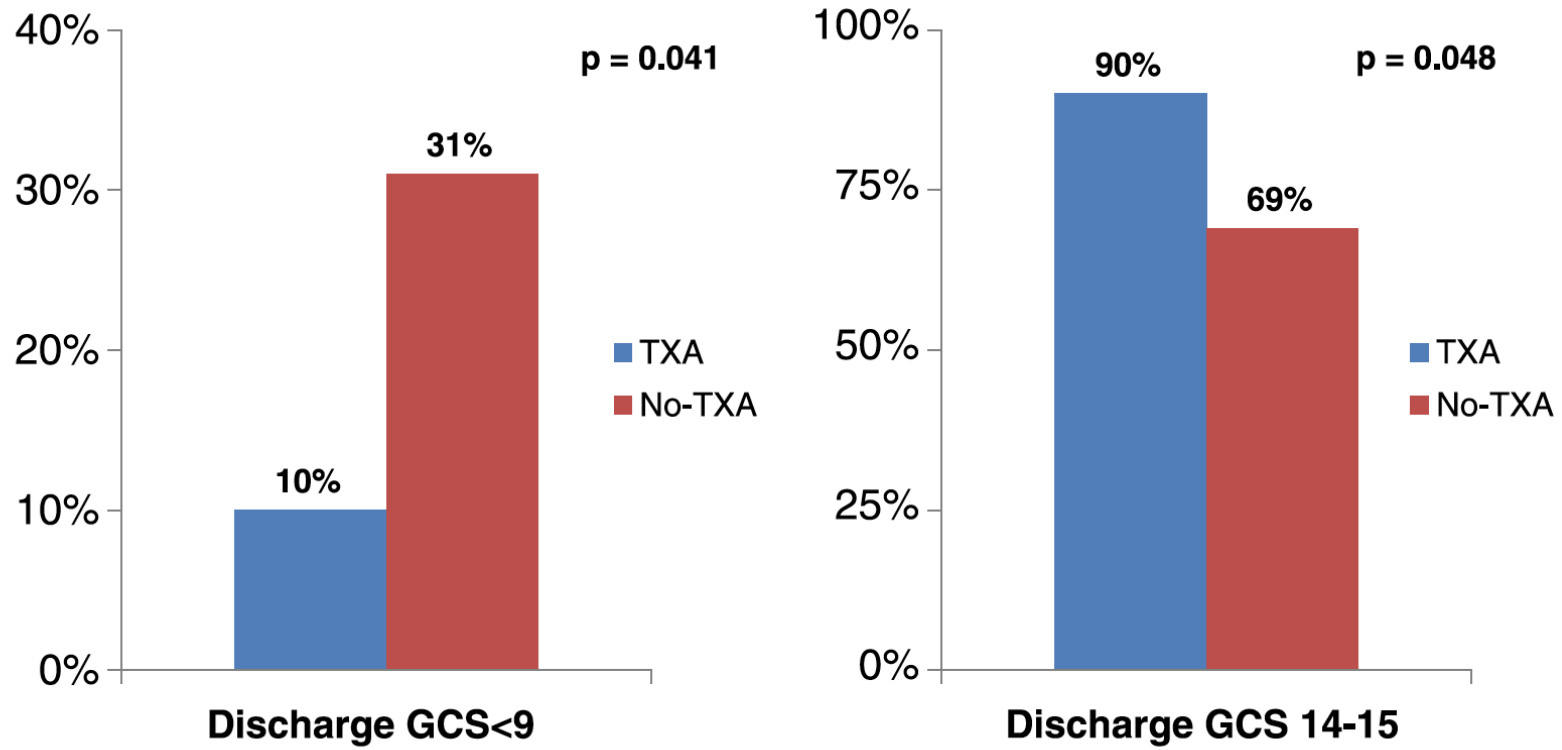


Figure 2. TXA and discharge neurologic status, LVT propensity analysis group.

Tranexamic acid in pediatric combat trauma requiring massive transfusions and mortality

Mitchell Hamele, MD, James K. Aden, PhD, *and* **Matthew A. Borgman, MD**, *Honolulu, Hawaii*

J Trauma Acute Care Surg
Volume 89, Number 2, Supplement 2

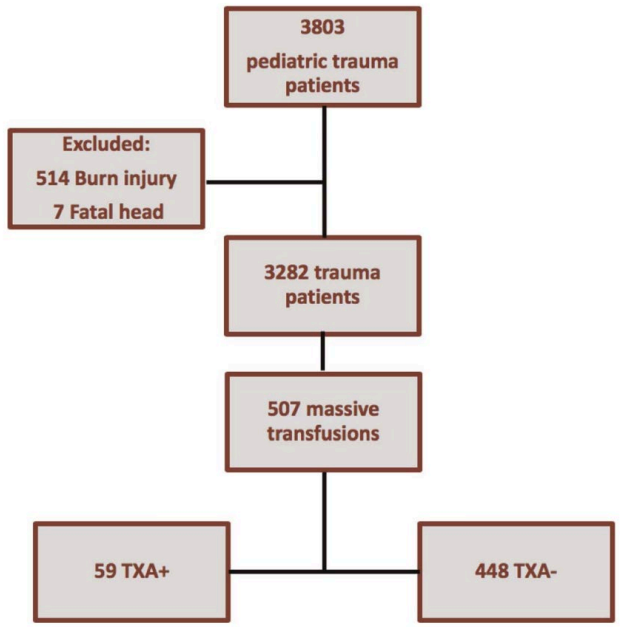


Figure 1. Patient inclusion and exclusion criteria and selection.

In-Hospital Mortality

- **No TXA = 18.3%**
- **TXA = 8.5%** Benefit

P=0.055

Effectiveness and safety of tranexamic acid in pediatric trauma: A systematic review and meta-analysis

Emily Kornelsen, BSc [a], Nathan Kuppermann, MD, MPH [b], Daniel K. Nishijima, MD, MAS [c], Lily Y. Ren, MI [d], Maggie Rumantir, MD [e], Peter J. Gill, MD, DPhil [f,g,h,1], Yaron Finkelstein, MD [e,f,h,i,j,*,1]

American Journal of Emergency Medicinev55(2022)103–110

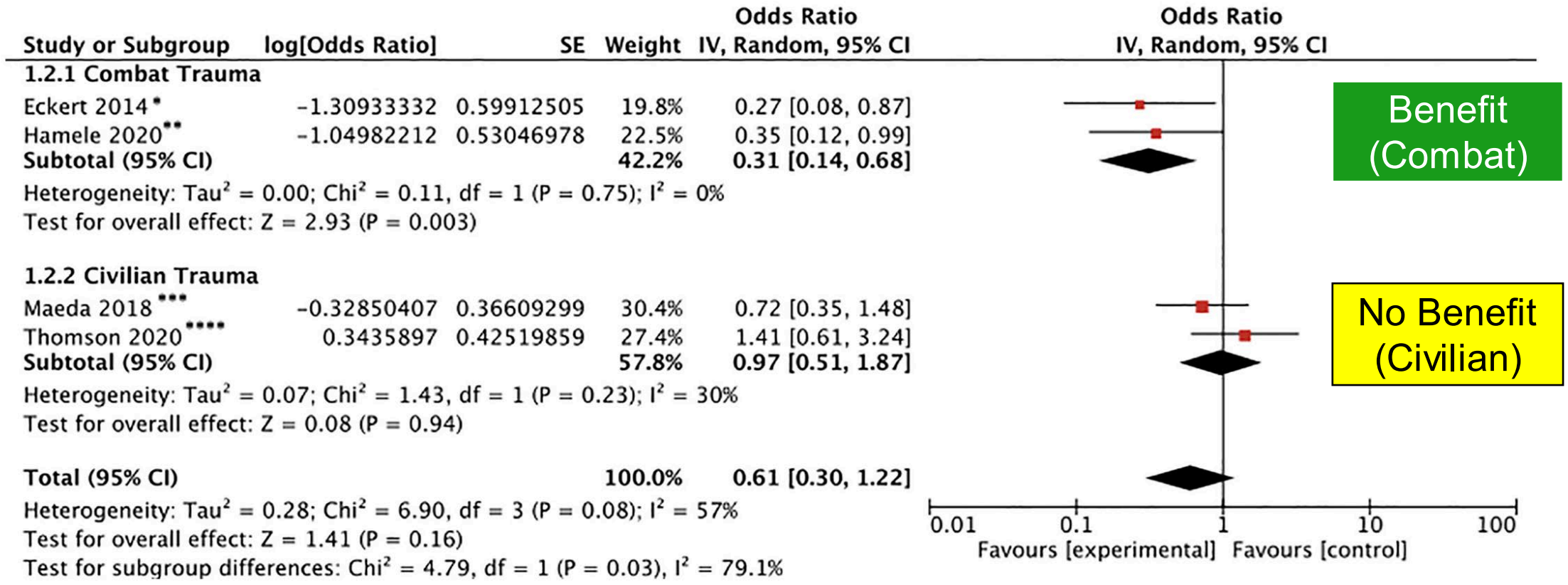


Fig. 2. Meta-analysis of mortality outcome in included studies ($n = 4$).
*Adjusted for mechanism, injury severity score (ISS), serum base deficit, hypotension, and Glasgow coma scale (GCS) score.
**Adjusted for age, sex, head component of abbreviated injury scale, serum base deficit, and mechanism of injury.
***Propensity matching based on age, gender, body weight, height, trauma sites, hospital type, PICU admission, ambulance transfer, and hospital volume.
****Adjusted for age and gender.

TXA can be used in Peds

Benefit in Combat

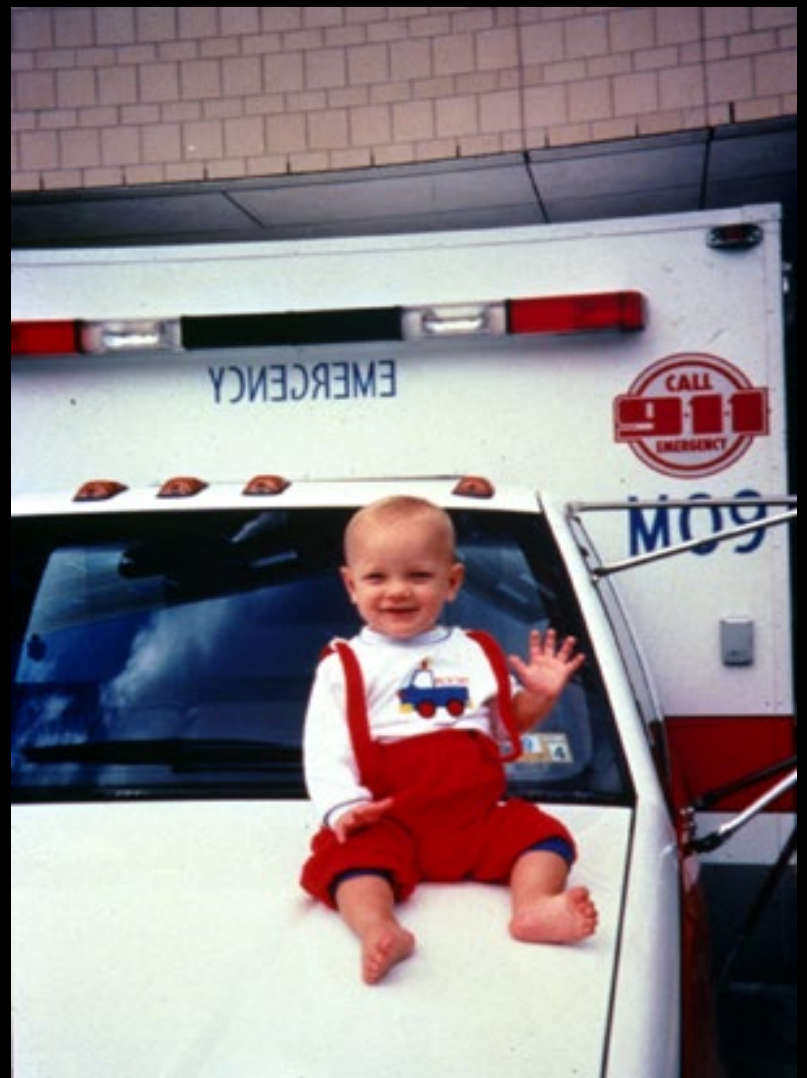
No Increase Adverse Events

In Conclusion …


You mean you're still
ALIVE!?

On the Road to the 22nd Century...

We'll Make Life Better for Future Generations ….



And the Next .....

Beau .....is Beau-dacious !

German Coast Guard Dispatcher:
1st Day on the Job !

I’m Paul Pepe…

… *and I Approved this Message*


you hated
College people you hated
Work colleagues you hate
Actual friends
GraphJam