Quoi de neuf en traumatologie grave ?

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Le programme…

- TXA
- Cryoprécipités
- PCC
- Sang total
- REBOA

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Prehospital Tranexamic Acid for Severe Trauma

The PATCH-Trauma Investigators and the ANZICS Clinical Trials Group*

Adultes
COAST score > 3

Variable	Value	Score
Entrapment	Yes	1
Systolic blood pressure	<100 mmHg	1
	<90 mmHg	2
Temperature	<35 °C	1
	<32 °C	2
Chest decompression	Yes	1
Abdominal or pelvic content injury	Yes	1
Highest total possible		7

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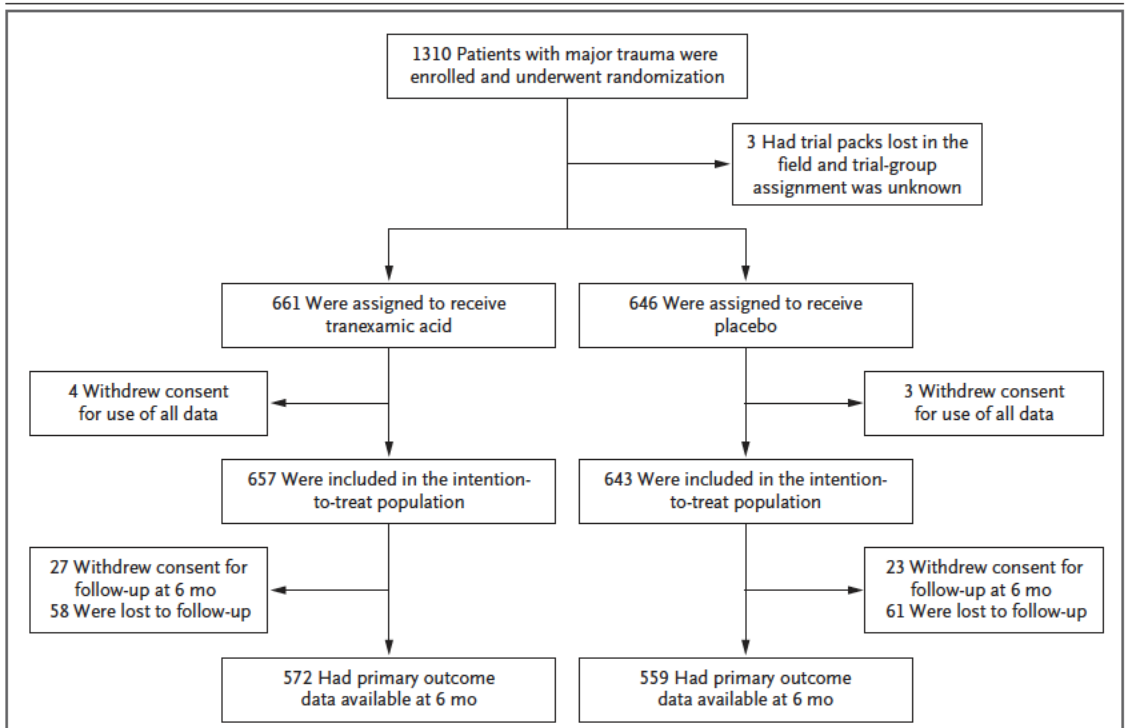
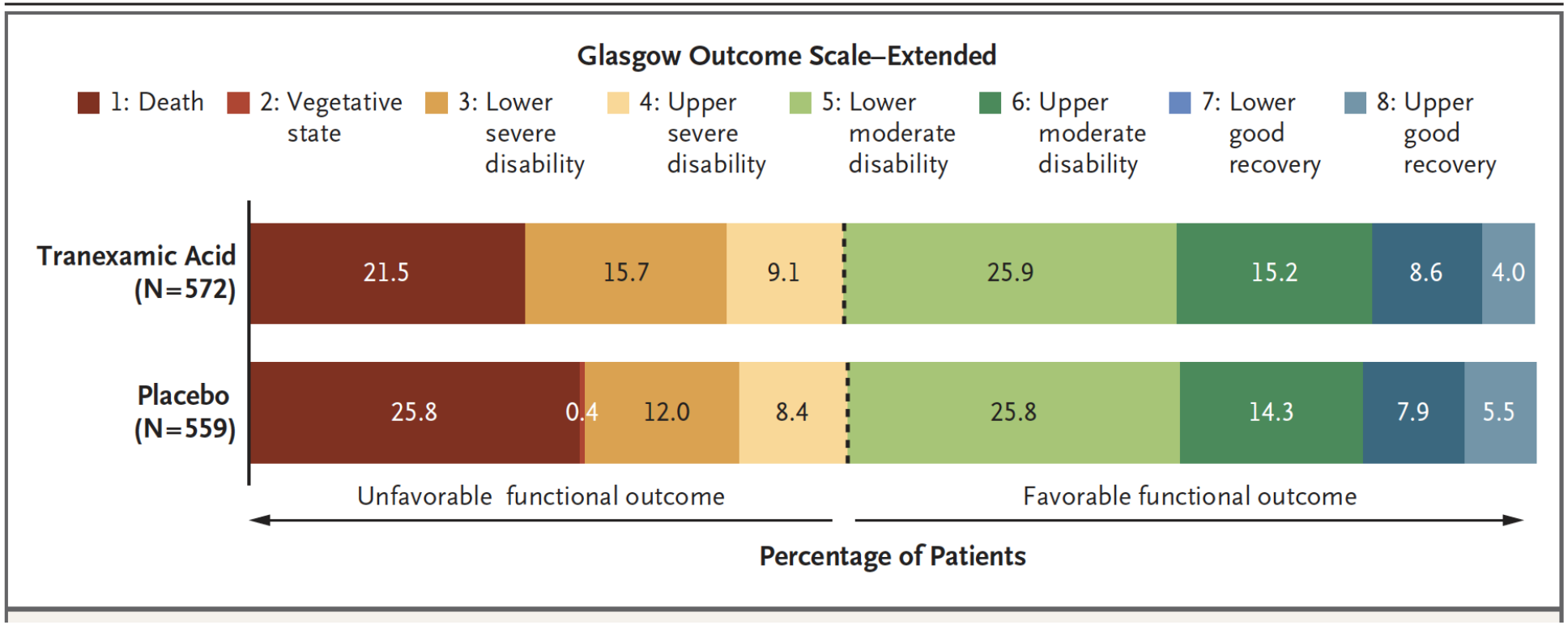


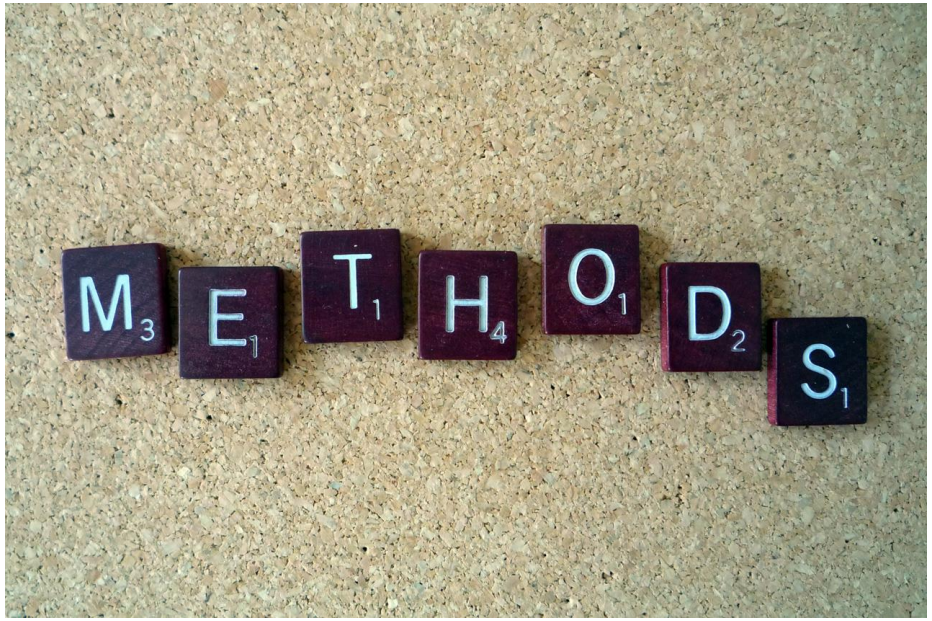
Figure 1. Randomization and Follow-up.

In this pragmatic trial involving patients with major trauma, treating clinicians determined enrollment eligibility in the field, often under adverse conditions. Information on the numbers or reasons for nonenrollment was not collected.



Oui mais différence de mortalité…

CRYOSTAT-2
EARLY CRYOPRECIPITATE IN TRAUMA



Multisite RCT, adulte avec MTP

Analyse en ITT

Sous groupes définis (timing et type)

Peu de données manquantes (5%)

Est-ce qu'une administration empirique de cryoprecipités réduit la mortalité intra?

Intervention: cryoprécipités d'emblée, max. ds les 90 min

CRYOSTAT-2
EARLY CRYOPRECIPITATE IN TRAUMA

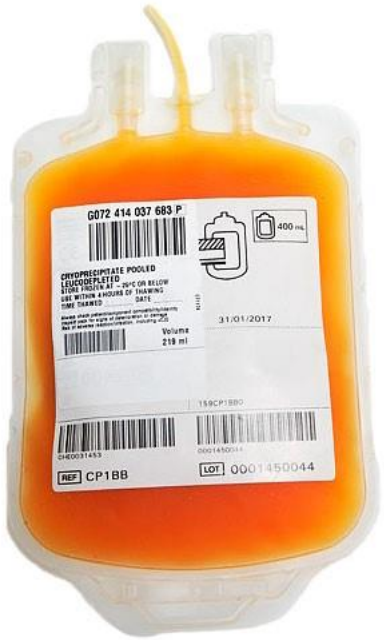
800 patients / groupe

ISS : 29 (18-43)

PSL : 11 (6-20) unités

20% de transfusion massive

CRYOSTAT-2
EARLY CRYOPRECIPITATE IN TRAUMA

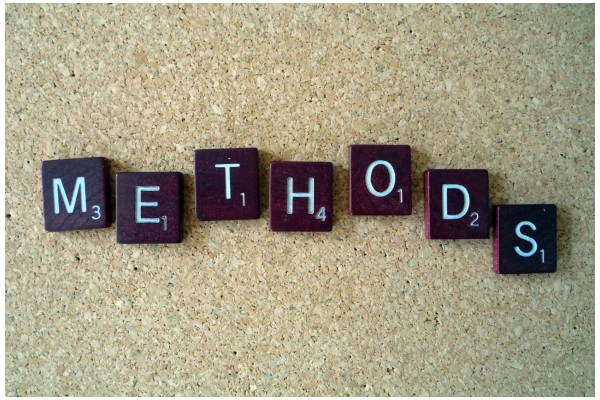


Cryoprécipités 85% vs. 32%

Administration plus précoce : 52 min plus tôt

Pas de différence sur la mortalité à J28

Limites



Taille de l'effet: 7% absolute difference à partir de 26% 28D-mortality

28D mortality vs. Early mortality

L'influence d'une seule intervention sur la mortalité J28…

Limites

Activation MTP non standardisée

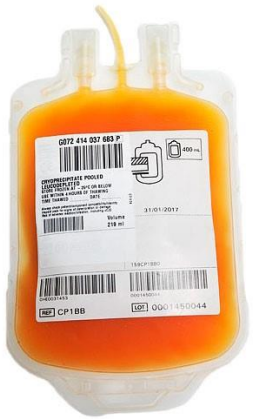
Seulement 33% avec PAS < 90 mmHg à l'admission

Pas de bio: lactate?

Procédures hémostatiques ?

MOF ?

Limites



Intervention vs control group

Dans le groupe intervention: 68% traités dans les 90 min

Trop tard?

Limites

Pas de biologie

Quel fibrinogene à l'admission?

Pas de réponse à la question du fibrinogène guidé par VET/Dosage

Limites

Evènements thrombotiques: 13%

Assez bas

Pas de screening systématique = under-reporting?

Au final: pas de réponse sur la correction de l'hypofibrinogénémie

PRO COAG

1 pRBC
+ ABC score > 2

POPULATION

233 Men **91** Women

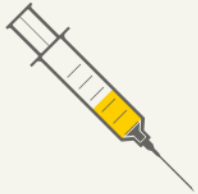
Adults with trauma at risk of major transfusion

Median age: **39** years

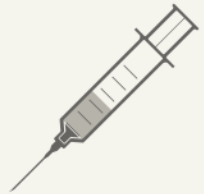
LOCATION

12
Level 1 trauma centers in France

INTERVENTION



327 Patients randomized
324 Patients analyzed



164
4F-PCC
Intravenous administration of 1 mL/kg of 4F-PCC (25 IU of factor IX/kg)

160
Placebo
Intravenous administration of 1 mL/kg of saline solution

PRIMARY OUTCOME

Total number of all blood product units (red blood cells, fresh frozen plasma, and platelet concentrate) consumed within the first 24 hours after arrival in the trauma bay

Sample size: 324
Reduction of 25%
i.e. 3 units

Both arms were treated according to European guidelines (TXA, Ratio-based transfusion, Fibrinogen)

Safety

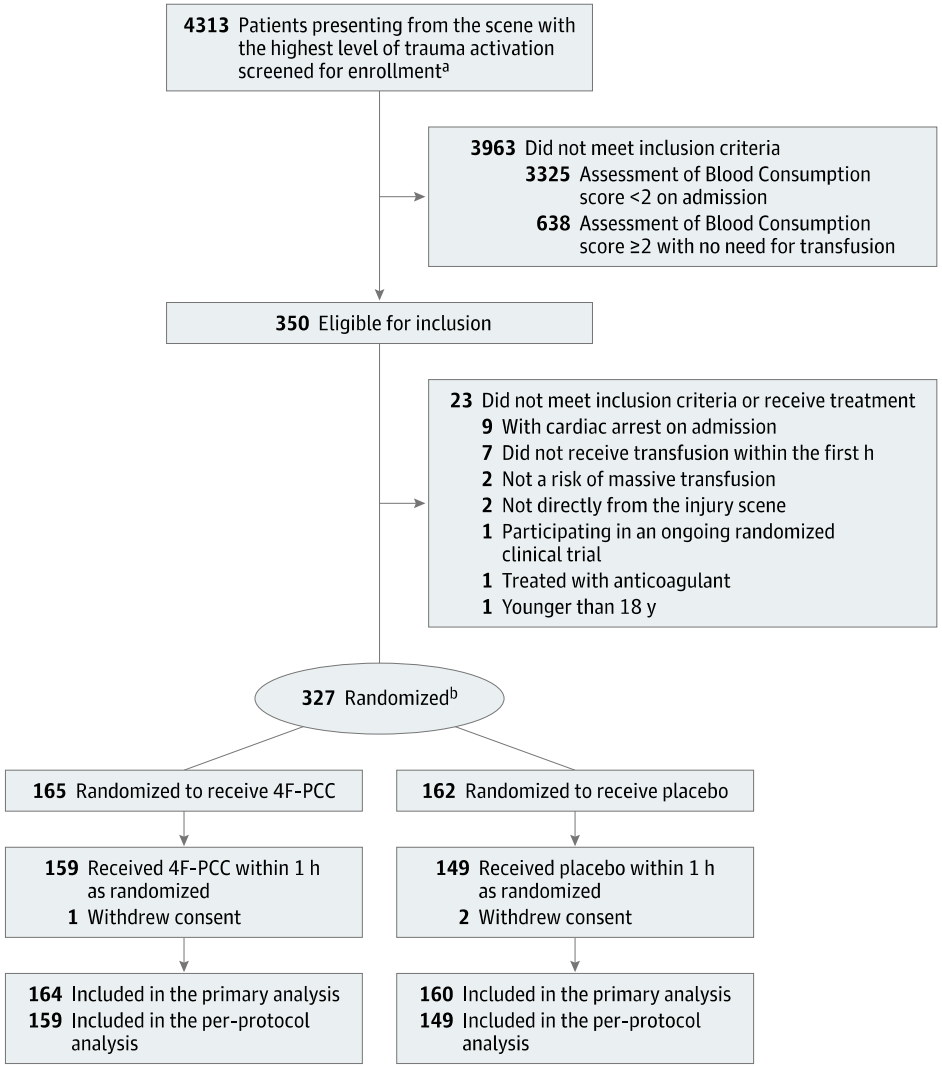
Arterial or venous thromboembolic events through day 28

No systematic screening

All events were confirmed by US or CT scan

Results

Flow chart



Patient characteristics

	4F-PCC Group (n=164)	Placebo Group (n=160)
Blunt trauma, No. (%)	135/164 (82%)	125/160 (78%)
Prehospital variables		
Systolic arterial blood pressure, median (IQR), mmHg	101 (80-121) (n=151)	90 (74-111) (n=152)
Glasgow coma score, median (IQR)	14 (9-15) (n=160)	14 (8-15) (n=153)
Tranexamic acid infused, No. (%)	125 (76%)	138 (86%)
Variables on arrival in the trauma bay		
Systolic arterial blood pressure, median (IQR), mmHg	89 (70-115) (n=160)	90 (70-110) (n=156)
Time from arrival to beginning of treatment, median (IQR), min	35 (25-45) (n=154)	30 (15-50) (n=150)

Similar baseline characteristics

Patient characteristics

	4F-PCC Group (n=164)	Placebo Group (n=160)
Lactate (mmol/L), median (IQR)	4.5 (2.7-7.1) (n=132)	4.7 (2.9-7.5) (n=129)
Fibrinogen ≤ 1.5g/L	49 (37%) (n=134)	47 (37%) (n=128)
PTr > 1.2	93 (65%) (n=142)	89 (68%) (n=130)
AIS Head > 2, No. (%)	55 (35%) (n=156)	50 (34%) (n=149)
ISS, median (IQR)	34 (25-50) (n=156)	38 (29-50) (n=149)

Patients with a high traumatic load

Resuscitation indicators

	4F-PCC Group (n=164)	Placebo Group (n=160)
Need for hemostasis control procedure (surgical or radiological), No. (%)	115 (70%)	111 (69%)
Transfusion of at least 3 units of RBCs within the first hour, No. (%)	67 (42%)	60 (38%)
Transfusion of 10 units of RBCs or more within the first 24 hours, No. (%)	42 (26%)	43 (28%)
Fibrinogen concentrate treatment, No. (%)	141 (86%)	129 (81%)
Total dose of fibrinogen concentrate, median (IQR), g	3 (3-7.5)	3 (3-6)

Patients with a high traumatic load

Primary outcome and transfusion-related outcomes

FINDINGS

Median 24-hour blood consumption

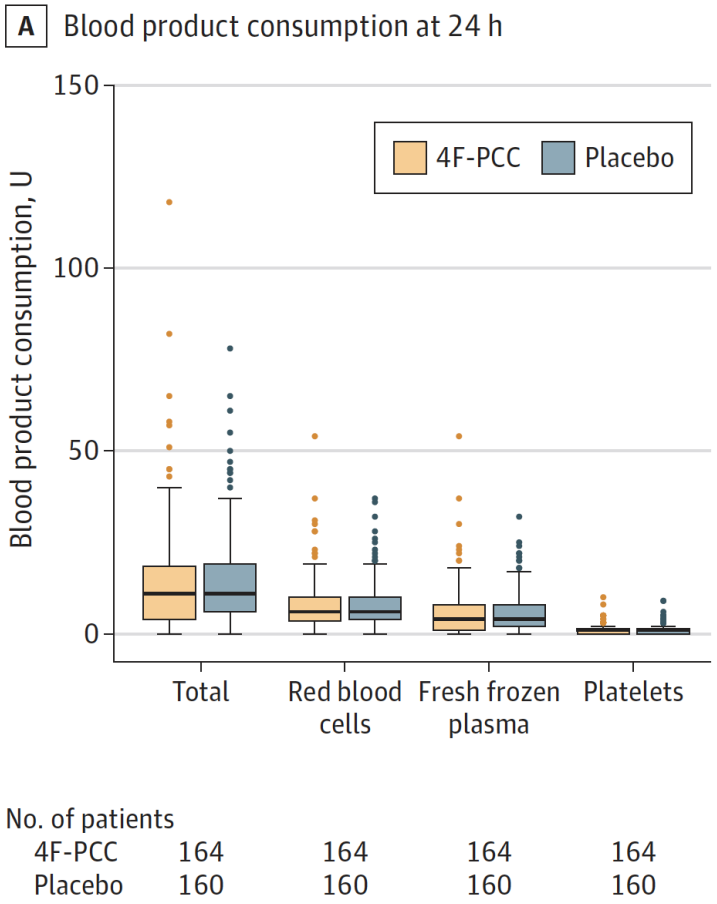
4F-PCC
12 U (IQR, 5-19)

Placebo
11 U (IQR, 6-19)

The between-group difference was not clinically or statistically significant

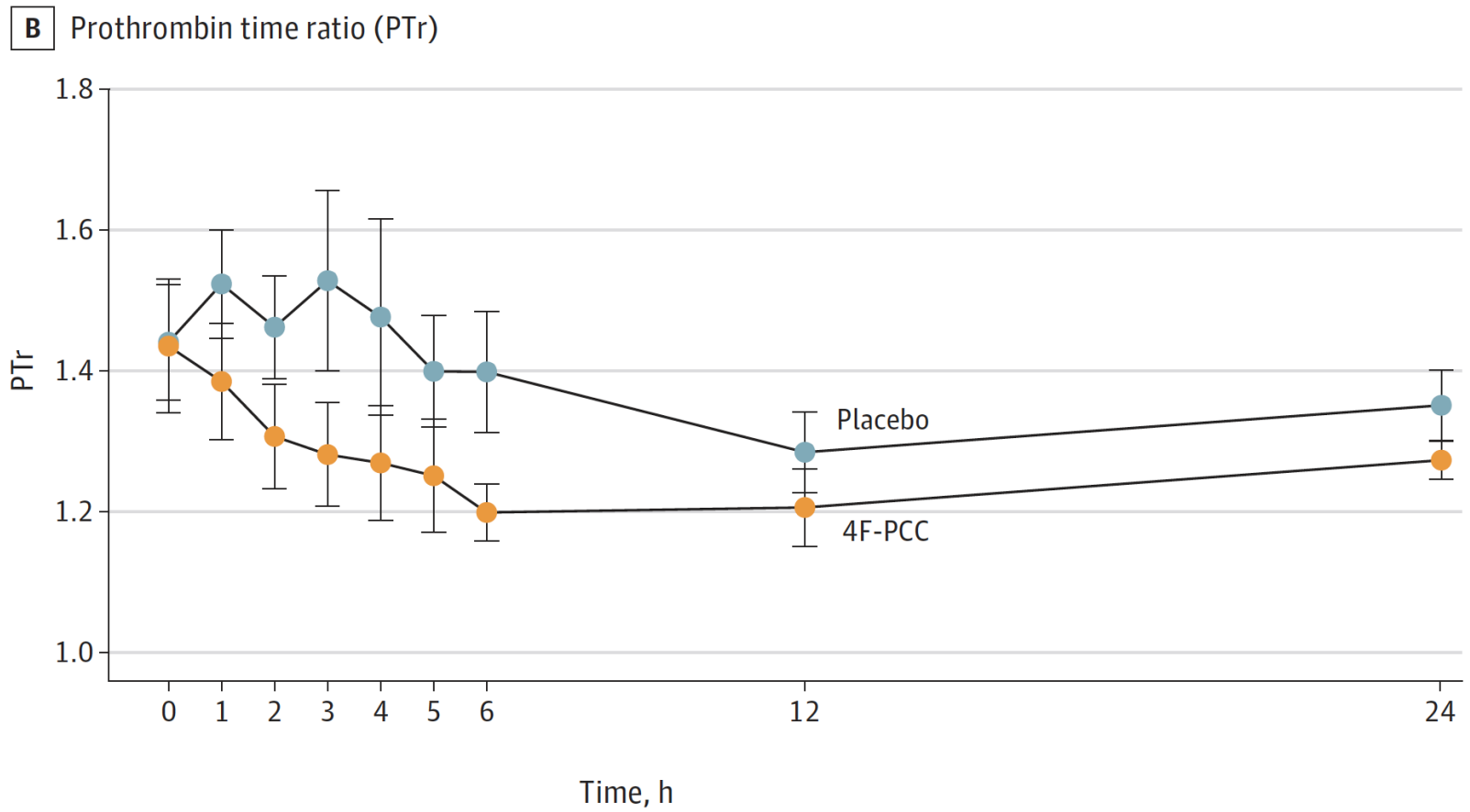
Absolute difference, 0.2 U

(95% CI, −2.99 to 3.3); *P* = .72



Same results in the per-protocol analysis and in the subgroup of patients with massive transfusion

PT ratio time course



No. of patients									
4F-PCC	142	109	126	129	128	123	127	128	123
Placebo	130	111	119	131	118	115	123	113	110
No. of patients with PTr >1.5									
4F-PCC	36	32	21	18	13	15	13	9	9
Placebo	34	42	41	40	31	29	29	11	19

Secondary outcomes

Table 2. Trial Outcomes by Treatment Group

Outcome	No. (%) 4F-PCC (n = 164)	Placebo (n = 160)	Absolute difference (95% CI), %[a]	*P* value[b]
Mortality				
24-h	18 (11)	20 (13)	−2 (−9 to 5)	.67
28-d	26 (17)	30 (21)	−3 (−12 to 5)	.48
Time to achieve anatomic hemostasis, median (IQR) [No.], min[g]	300 (203 to 423) [131]	288 (210 to 404) [128]	22 (−73.3 to 73.8)	.96
Hospital-free days through day 28, median (IQR)	6.5 (0 to 22.5)	7 (0 to 22)	−0.15 (−1.65 to 1.35)	.78
Ventilator-free days through day 28, median (IQR)	4 (0.5 to 7)	4 (0 to 8)	0.33 (−1.0 to 1.6)	.51
ICU-free days through day 28, median (IQR)	6.5 (0 to 22.5)	7 (0 to 22)	1.22 (−5.93 to 8.37)	.78
Disposition at day 28				
Remained hospitalized	44 (33)	44 (35)	0 (−10 to 10)	.81
Intensive care unit	37 (28)	28 (23)	5 (−5 to 16)	
Home	31 (23)	29 (23)	−3 (−12 to 6)	
Died	26 (17)	30 (21)	−3 (−12 to 5)	
Rehabilitation	19 (14)	22 (18)	−2 (−14 to 9)	
Other	2 (2)	1 (1)	1 (−2 to 3)	
Unknown	5 (3)	6 (4)		
Glasgow Outcome Scale-Extended score, median (IQR) [No.][h]	3 (3 to 4) [36]	3 (3 to 5) [27]	−0.5 (−1.91 to 0.91)	.45

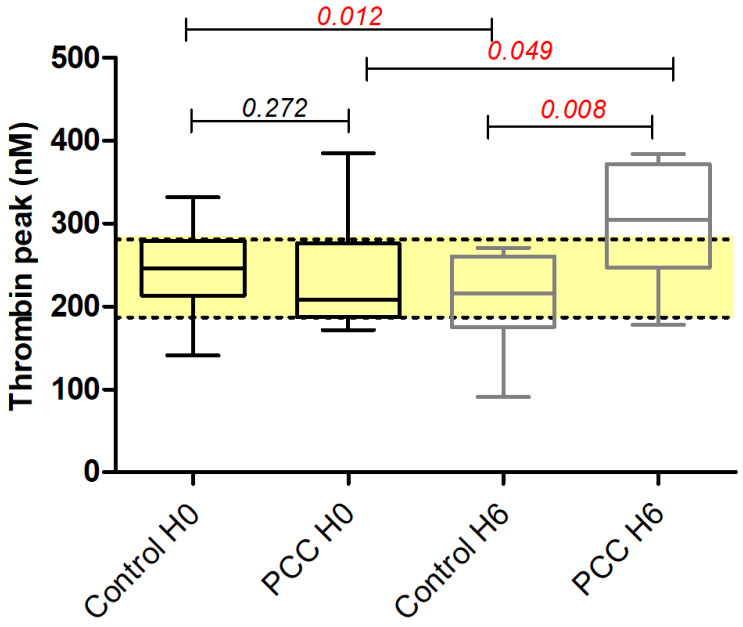
Safety

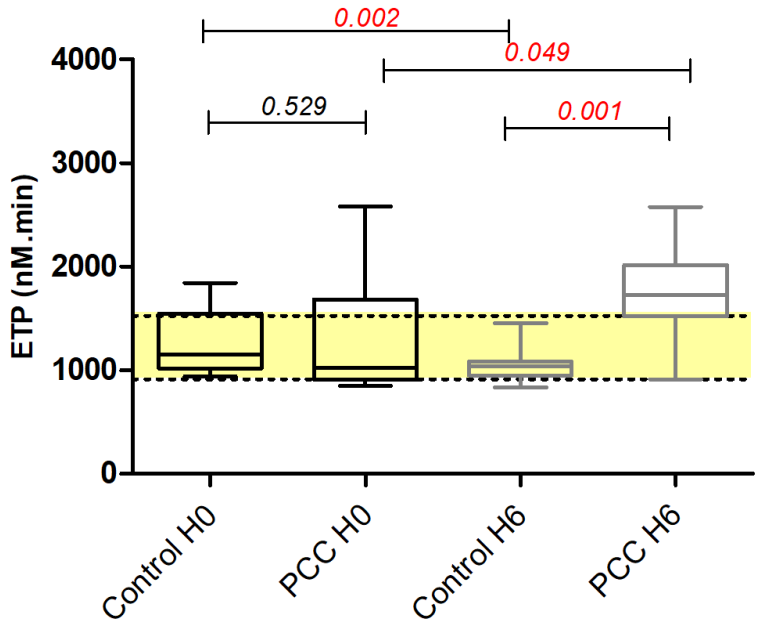
Table 3. Thromboembolic Events by Treatment Group

Thromboembolic event	No. (%) 4F-PCC (n = 164)	No. (%) Placebo (n = 160)	Absolute difference (95% CI), %[a]	Relative risk (95% CI)	*P* value[b]
Patients with at least 1 thromboembolic event, No. (%) [No.]	56 (35) [161]	37 (24) [157]	11 (1 to 21)	1.48 (1.04 to 2.10)	.03
Superficial venous thrombosis	5 (3.1)	1 (0.6)	2 (−1 to 5)		
Deep venous thrombosis	27 (16.8)	23 (14.6)	2 (−6 to 10)		
Pulmonary embolism	20 (12.4)	17 (10.8)	2 (−5 to 9)		
Stroke[c]	2 (1.2)	0	1 (−1 to 3)		
Other[d]	9 (5.6)	5 (3.2)	2 (−2 to 7)		

A post-hoc analysis revealed a higher proportion of thromboembolic events in patients with a PTr > 1.2 given 4F-PCC (31/90, 34%) vs placebo (19/87, 22%) (p=0.06)

Blood samples





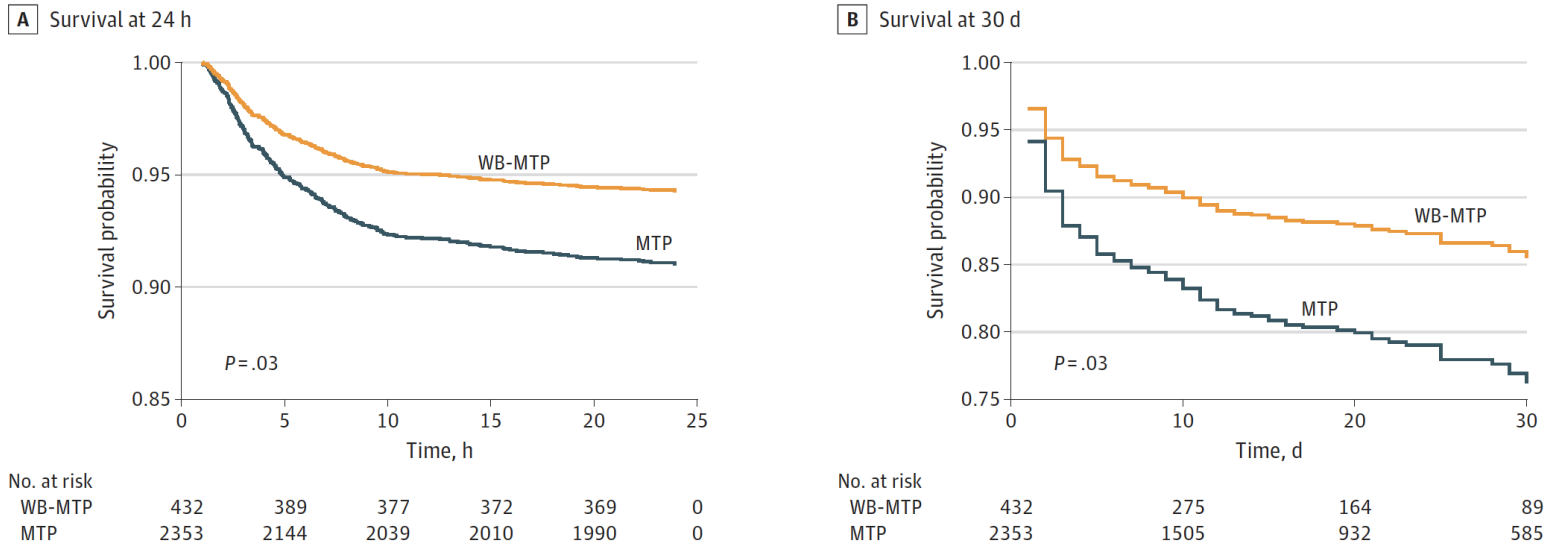
Unpublished data
N= 11 patients / group

JAMA Surgery | Original Investigation

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.

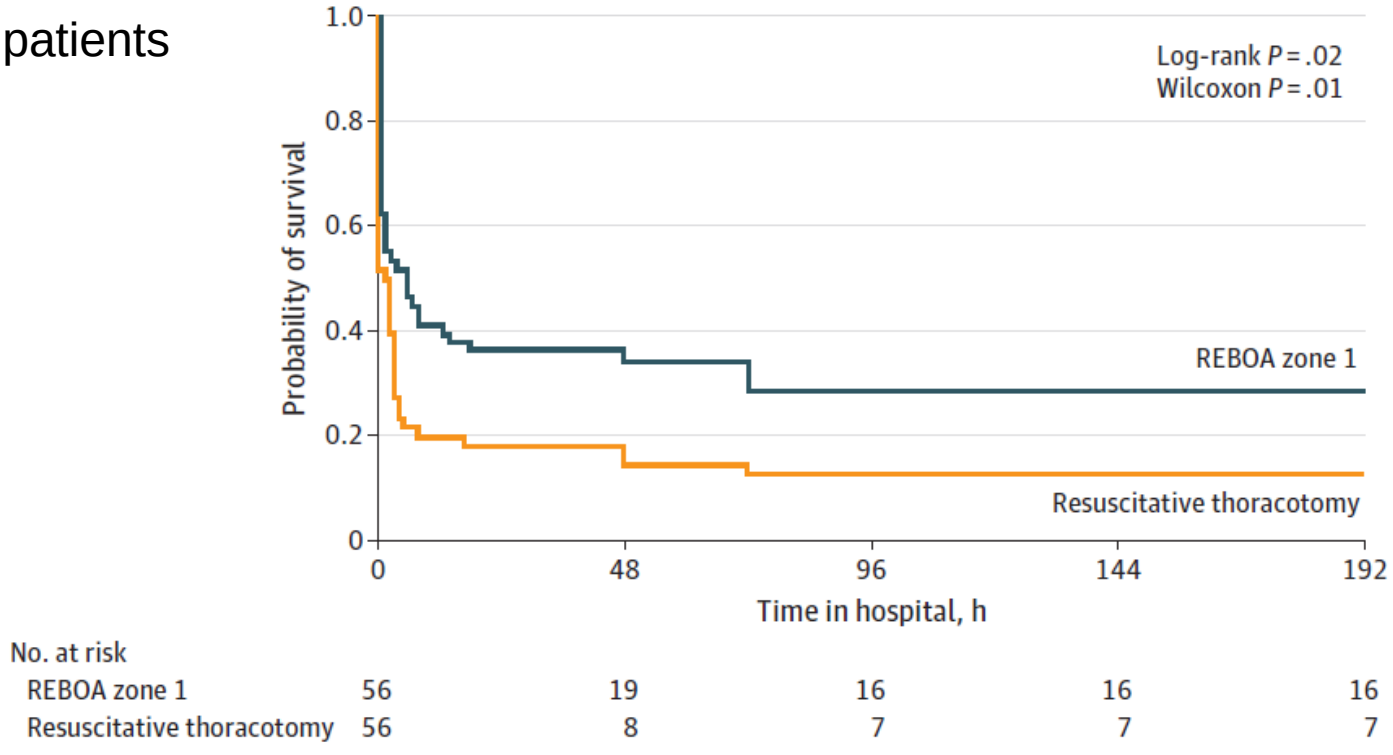
Une nouvelle étude en faveur du sang total

JAMA Surgery | Original Investigation

Zone 1 Endovascular Balloon Occlusion of the Aorta vs Resuscitative Thoracotomy for Patient Resuscitation After Severe Hemorrhagic Shock

Alexis L. Cralley, MD; Navin Vigneshwar, MD, MPH; Ernest E. Moore, MD; Joseph Dubose, MD; Megan L. Brenner, MD, MS; Angela Sauaia, MD, PhD; for the AAST AORTA Study Group

56 paires de patients



Mortalité REBOA vs RT : 44 (78,6%) vs 52 (92,9%)

Critères d’inclusion: REBOA à l’admission…

Arret prématuré car plus de décès dans groupe REBOA

Publication à venir…

Bénéfice individuel vs. Collectif…

Pour résumé

- TXA: oui toujours!
- Facteurs de coagulation: du plomb dans l’aile
- Sang total ? T-STHORM en cours actuellement
- REBOA ou comment montrer le benefice d’une technique d’exception…