Updates in Transfusion^{2024}

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Transfusion Fellow
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Canadian Blood Services

Laboratory Medicine & Pathobiology
UNIVERSITY OF TORONTO

Disclosures

None

Learning objectives

- To appreciate the use of GRADE Methodology for appraising literature in transfusion medicine

- To appreciate emerging evidence in transfusion over the last year or so

Outline

RBC
N=6

Plasma Deriv.
N=5

Plt
N=1

RHIG
N=1

TXA
N=2

Outline

RBC
N=6

Plasma Deriv.
N=5

Plt
N=1

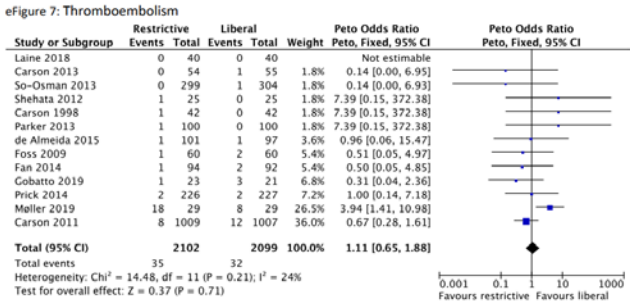
RHIG
N=1

TXA
N=1

Red Blood Cell Transfusion
2023 AABB International Guidelines

Methods

1. Systematic Review

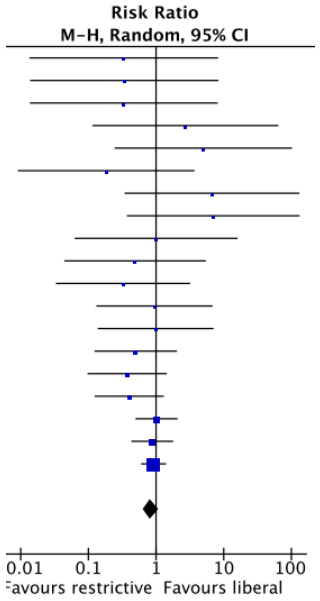

eFigure 7: Thromboembolism

Study or Subgroup	Restrictive Events	Restrictive Total	Liberal Events	Liberal Total	Weight	Peto Odds Ratio Peto, Fixed, 95% CI
Laine 2018	0	40	0	40		Not estimable
Carson 2013	0	54	1	55	1.8%	0.14 [0.00, 6.95]
So-Osman 2013	0	299	1	304	1.8%	0.14 [0.00, 6.93]
Shehata 2012	1	25	0	25	1.8%	7.39 [0.15, 372.38]
Carson 1998	1	42	0	42	1.8%	7.39 [0.15, 372.38]
Parker 2013	1	100	0	100	1.8%	7.39 [0.15, 372.38]
de Almeida 2015	1	101	1	97	3.6%	0.96 [0.06, 15.47]
Foss 2009	1	60	2	60	5.4%	0.51 [0.05, 4.97]
Fan 2014	1	94	2	92	5.4%	0.50 [0.05, 4.85]
Gobatto 2019	1	23	3	21	6.8%	0.31 [0.04, 2.36]
Prick 2014	2	226	2	227	7.2%	1.00 [0.14, 7.18]
Møller 2019	18	29	8	29	26.5%	3.94 [1.41, 10.98]
Carson 2011	8	1009	12	1007	36.0%	0.67 [0.28, 1.61]
Total (95% CI)		**2102**		**2099**	**100.0%**	**1.11 [0.65, 1.88]**
Total events	35		32			

Heterogeneity: Chi² = 14.48, df = 11 (P = 0.21); I² = 24%
Test for overall effect: Z = 0.37 (P = 0.71)

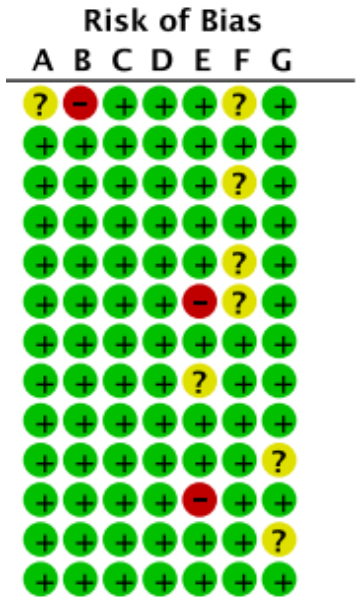
Peto Odds Ratio Peto, Fixed, 95% CI

0.001 0.1 1 10 1000
Favours restrictive Favours liberal



2. Risk of Bias Assessment

Risk of bias legend
(**A**) Random sequence generation (selection bias)
(**B**) Allocation concealment (selection bias)
(**C**) Blinding of participants and personnel (performance bias)
(**D**) Blinding of outcome assessment (detection bias): Objective measures
(**E**) Incomplete outcome data (attrition bias)
(**F**) Selective reporting (reporting bias)
(**G**) Other bias



3. GRADE Methodology

Grade of recommendation	I Strong recommendation to do	IIa Moderate recommendation to do	IIb Weak recommendation to do	III Recommendation not to do
Conclusions of evidence	Benefits >>> risk & burdens	Benefits >> risk & burdens	Benefits >= risks & burdens	No benefit / Potentially harm
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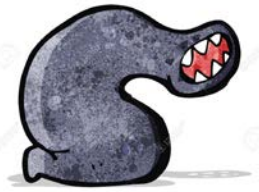
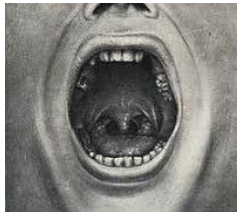
Wording in recommendations:

We recommend	We suggest	We might suggest	We do not recommend
We should	Is reasonable	Might be reasonable	Should not be performed
Is recommended	Is probably recommended	Might be considered	Is not useful
Is indicated	Can be useful	Usefulness is unknown	Is not beneficial
Is useful	Can be beneficial		Is not effective
Is beneficial	Can be effective		Is potentially harmful
Is effective			

A Detour for GRADE





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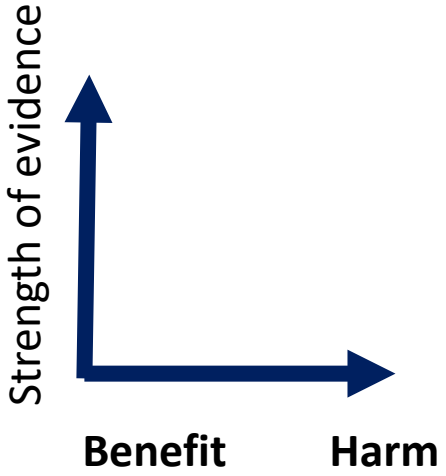
Wording in recommendations:

We recommend We should Is recommended Is indicated Is useful Is beneficial Is effective	We suggest Is reasonable Is probably recommended Can be useful Can be beneficial Can be effective	We might suggest Might be reasonable Might be considered Usefulness is unknown	We do not recommend Should not be performed Is not useful Is not beneficial Is not effective Is potentially harmful



A Detour for GRADE

Recommendation 1	For hospitalized adult patients who are hemodynamically stable, the panel recommends…less than 7 g/dL (**strong recommendation, moderate certainty evidence**). Clinicians may choose a threshold of …7.5 g/dL for patients undergoing cardiac surgery …8 g/dL for those undergoing orthopedic surgery or those with preexisting cardiovascular disease.	ADULT
Recommendation 2	For hospitalized adult patients with hematologic and oncologic disorders…less than 7 g/dL (**conditional recommendations, low certainty evidence**).	ADULT
Recommendation 3	For critically ill children and those at risk of critical illness who are hemodynamically stable and without a hemoglobinopathy, cyanotic cardiac condition, or severe hypoxemia…less than 7 g/dL (**strong recommendation, moderate certainty evidence**).	PEDIATRICS
Recommendation 4	For hemodynamically stable children with congenital heart disease …7 g/dL (biventricular repair) …9 g/dL (single-ventricle palliation) …7 to 9 g/dL (uncorrected congenital heart disease) (**conditional recommendation, low certainty evidence**).	PEDIATRICS

ORIGINAL ARTICLE

Restrictive or Liberal Transfusion Strategy in Myocardial Infarction and Anemia

MINT

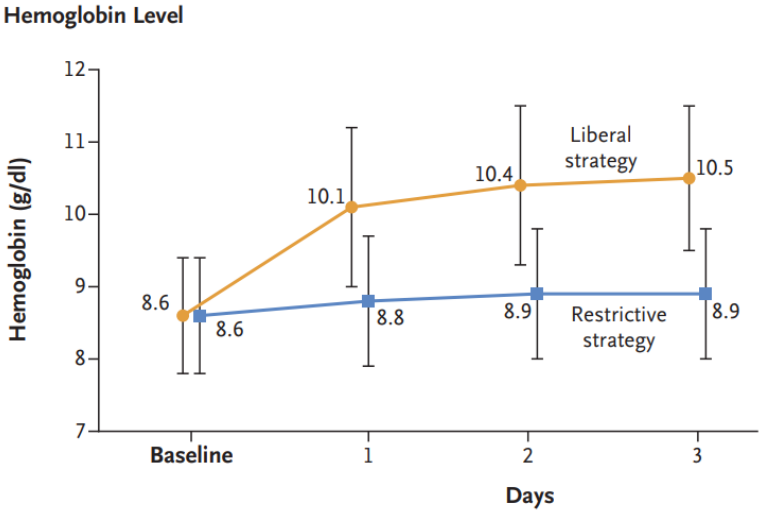
3506 Pts Randomized

Characteristic	All Patients (N=3504)	Restrictive Strategy (N=1749)	Liberal Strategy (N=1755)
NSTEMI	2848 (81.3)	1430 (81.8)	1418 (80.8)
Type 1	1460 (41.7)	730 (41.7)	730 (41.6)
Type 2	1955 (55.8)	967 (55.3)	988 (56.3)
White	2474 (70.6)	1229 (70.3)	1245 (70.9)
Black	440 (12.6)	217 (12.4)	223 (12.7)
Other	244 (7.0)	129 (7.4)	115 (6.6)
Missing	346 (9.9)	174 (9.9)	172 (9.8)

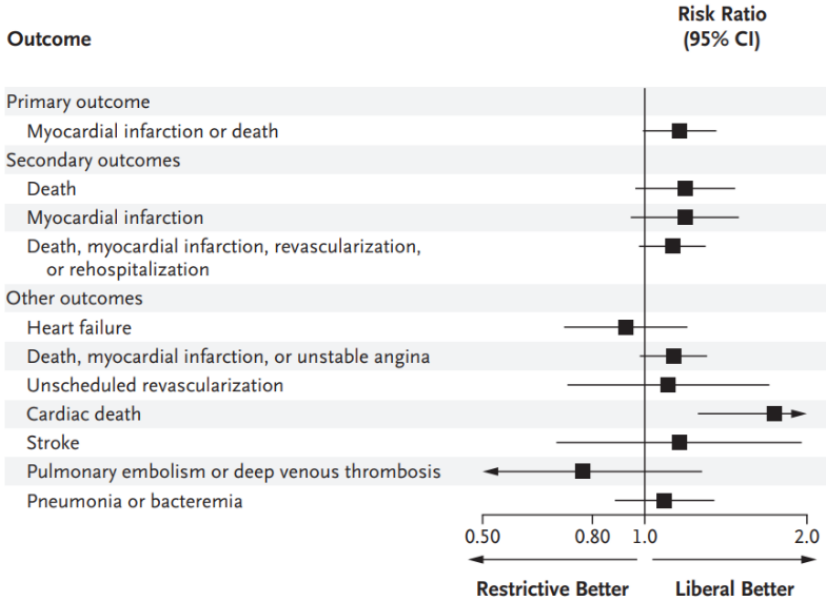
Intervention

Restrictive strategy: Hb 80
Liberal strategy: Hb 100

Open Label



Results



Cardiac death not adjudicated
Not powered for harms

MINT

ORIGINAL ARTICLE

Restrictive or Liberal Transfusion Strategy in Myocardial Infarction and Anemia

►Use case-by-case, patient-centered judgement for patients with active myocardial ischemia, as some may benefit from a liberal transfusion strategy

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Red Cells

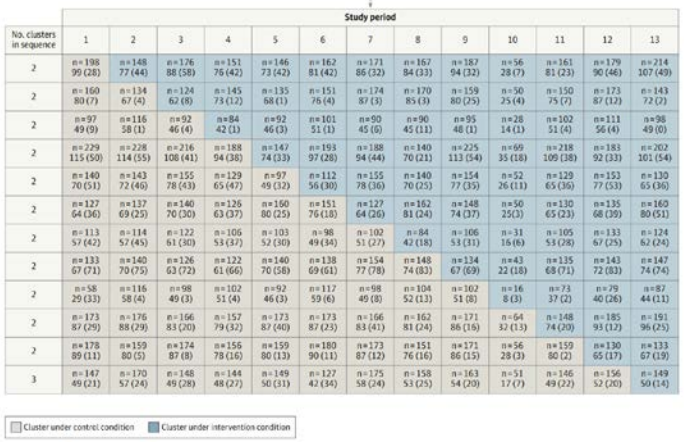
JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Small-Volume Blood Collection Tubes to Reduce Transfusions in Intensive Care

The STRATUS Randomized Clinical Trial

Deborah M. Siegal, MD; Emilie P. Belley-Côté, MD, PhD; Shun Fu Lee, PhD; Stephen Hill, MD, PhD; Frédérick D'Aragon, MD;

25 ICUs Randomized



Intervention

Switch to pediatric tubes

Standard-volume (4.0-6.0 mL)
Small-volume (1.8-3.5 mL)

Results

In a prespecified secondary analysis (n = 27 411 patients), RBC units per patient per ICU saw an absolute reduction

9.84 RBC/100 patients

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►Use small-volume blood collection tubes. No brainer!

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Red Cells

RESEARCH Open Access

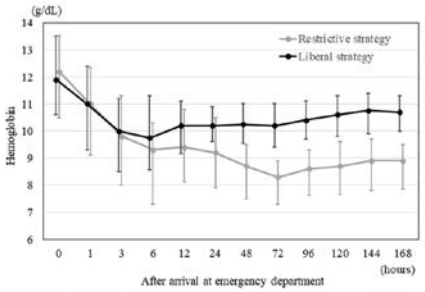
The Restrictive Red Blood Cell Transfusion Strategy for Critically Injured Patients (RESTRIC) trial: a cluster-randomized, crossover, non-inferiority multicenter trial of restrictive transfusion in trauma

Mineji Hayakawa[1*], Takashi Tagami[2,3], Daisuke Kudo[4], Kota Ono[5], Makoto Aoki[6], Akira Endo[7], Tetsuya Yumoto[8], Yosuke Matsumura[9], Shiho Irino[10], Kazuhiko Sekine[10], Noritaka Ushio[11], Takayuki Ogura[12], Sho Nachi[13], Yuhei Irie[14], Katsura Hayakawa[15], Yusuke Ito[16], Yuko Okishio[17], Tomohiro Muronoi[18], Yoshinori Kosaki[8], Kaori Ito[19], Keita Nakatsutsumi[20], Yutaka Kondo[21], Taichiro Ueda[22], Hiroshi Fukuma[23], Yuichi Saisaka[24], Naoki Tominaga[25], Takeo Kurita[26], Fumihiko Nakayama[27], Tomotaka Shibata[28] and Shigeki Kushimoto[4]

RESTRIC Trial – N=511

Randomized to one of:

- Restrictive: 70-90 g/L
- Liberal: 10–12 g/L



Inclusion Criteria:

Adults with trauma

Patients who had:

Severe (or suspected) bleeding with shock

Potential for severe bleeding postoperatively

Exclusion Criteria:

Cardiac arrest, palliation

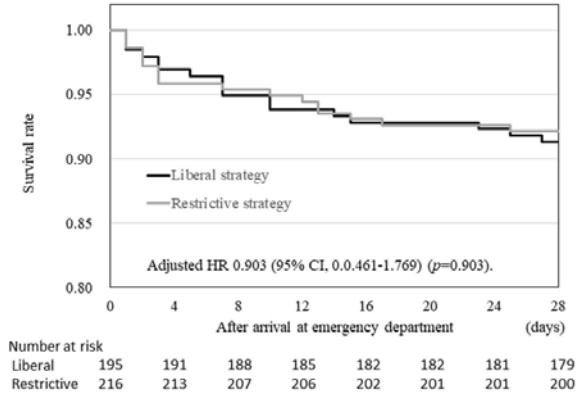
Transfer

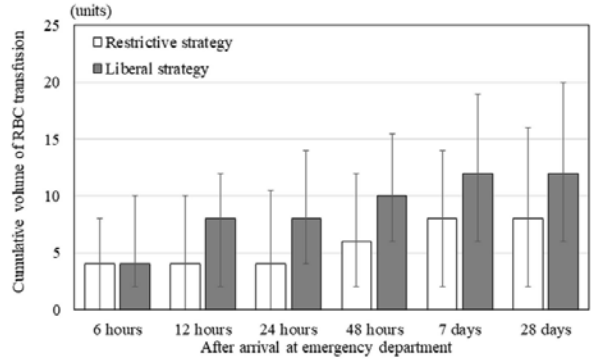
Severe burns, pregnancy

Chronic anemia

Results

- Restrictive RBC transfusion strategy did not demonstrate non-inferiority to liberal
- 28-day survival rate and survival time were similar (ICU free days, renal failure, MI…)
- Restrictive arm had smaller RBC transfusion volumes





Red Cells

Hayakawa *et al. Journal of Intensive Care* (2023) 11:34
https://doi.org/10.1186/s40560-023-00682-3

Journal of Intensive Care

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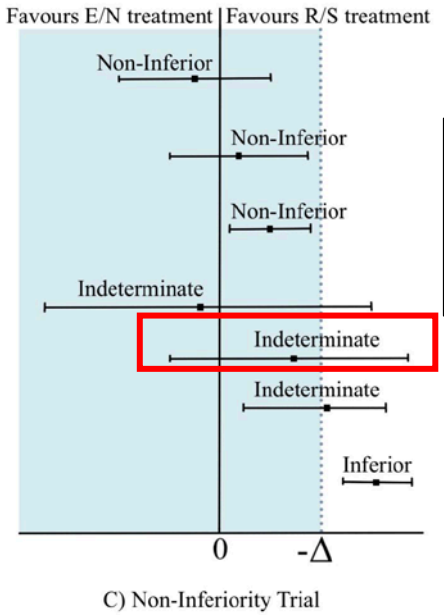

C) Non-Inferiority Trial

►Prefer restrictive transfusion thresholds for critically injured trauma patients

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ORIGINAL ARTICLE

Orthopaedic Trauma and Anemia: Conservative versus Liberal Transfusion Strategy: A Prospective Randomized Study

Brian H. Mullis, MD,[a] Leilani S. Mullis, MD,[a] Laurence B. Kempton, MD,[a] Walter Virkus, MD,[a] James E. Slaven, MS,[a] and Jennifer Bruggers, MD[b]

Intervention: Restrictive threshold 55 g/L

Control: Liberal threshold 70 g/L

Outcome: Infection at 1 year follow-up

Patients (n=65): Ortho trauma past initial resuscitation phase, hemodynamically stable, aged 18-50, Hb<90 g/L

Lower transfusion rate after randomization – 46% vs. 94%

Lower infection rate – 6 vs. 25%, p=0.012

Longer length of stay – 11.5 vs. 9 days, p=0.04

No differences in any other outcome
*Small study, loss to follow-up

Red Cells

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►Prefer restrictive transfusion thresholds for young injured trauma patients

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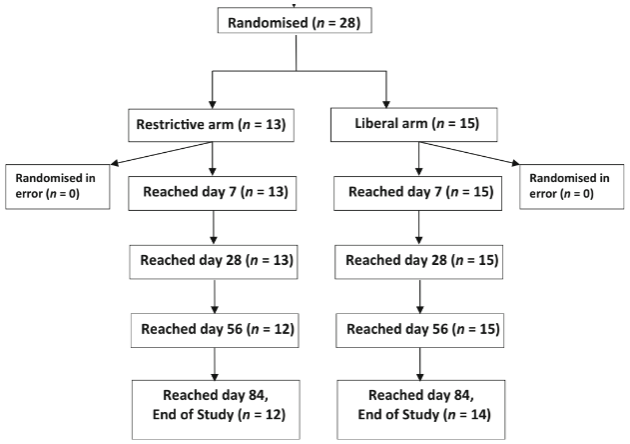
Red Cells

TRANSFUSION MEDICINE

TRANSFUSION

Red cell transfusion thresholds in outpatients with myelodysplastic syndromes: Results of a pilot randomized trial RBC-ENHANCE

28 Pts Randomized



Intervention

Randomized multi-center trial

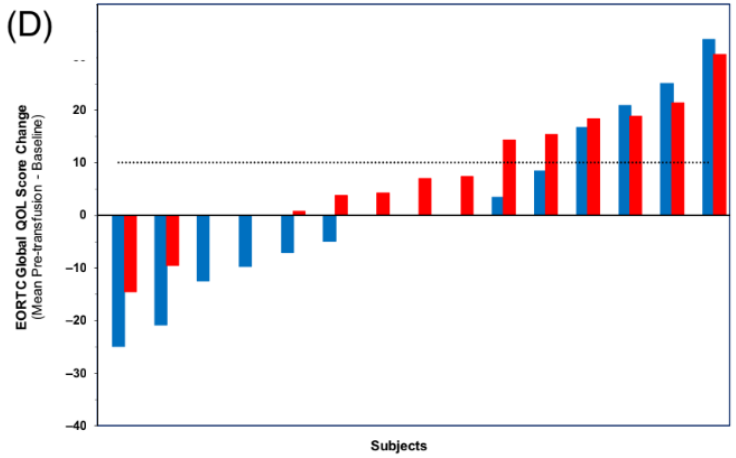
Liberal (110-120 g/L) vs. Restrictive (85-105 g/L)

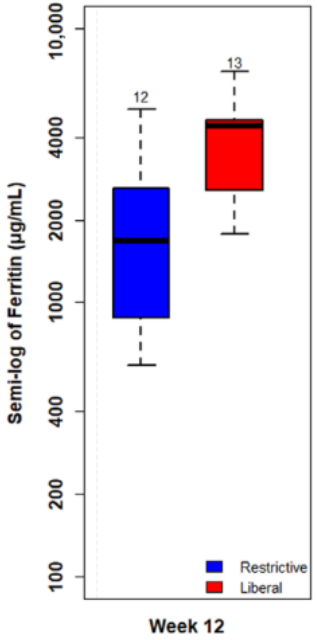
Outcomes

Mean Hb (worked?)
QOL scores (helped?)
Ferritin (harmed?)

Results

Liberal Arm
Mean Hb (98 vs 86 g/L)
QOL scores (improved)
Ferritin (higher)





Red Cells

TRANSFUSION MEDICINE

TRANSFUSION

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Rena Buckstein[1] | Jeannie Callum[2] | Anca Prica[3] | David Bowen[4] | Richard A. Wells[1] | Brian Leber[5] | Nancy Heddle[6] | Lisa Chodirker[1] | Matthew Cheung[1] | Lee Mozessohn[1] | Karen Yee[3] | Jennifer Gallagher[1] | Anne Parmentier[1] | Erin Jamula[5] | Liying Zhang[7] | Alex Mamedov[1] | Simon J. Stanworth[8,9,10] | Yulia Lin[11]

►Use a symptom-guided, case-by-case approach for transfusing patients with myelodysplastic syndrome

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Takeaways

New red cell transfusion guidelines are available!

Switch to small-volume tubes for blood collection

Hb thresholds <70 g/L may be safe for some young MSK trauma patients

Higher Hb thresholds may be judiciously chosen for symptomatic MDS patients on a case-by-case basis

Outline

RBC
N=6

Plt
N=1

Plasma
Deriv.
N=5

RHIG
N=1

TXA
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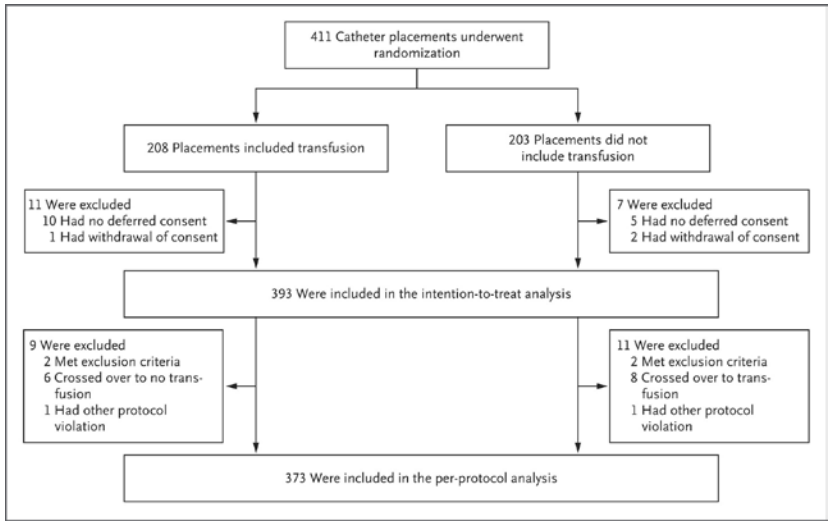
Platelets

RESEARCH SUMMARY

Platelet Transfusion before CVC Placement in Patients with Thrombocytopenia

van Baarle FLF et al. DOI: 10.1056/NEJMoa2214322

338 Patients Randomized



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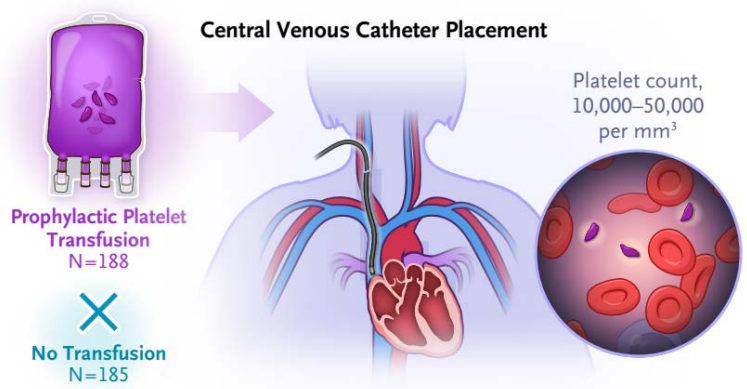
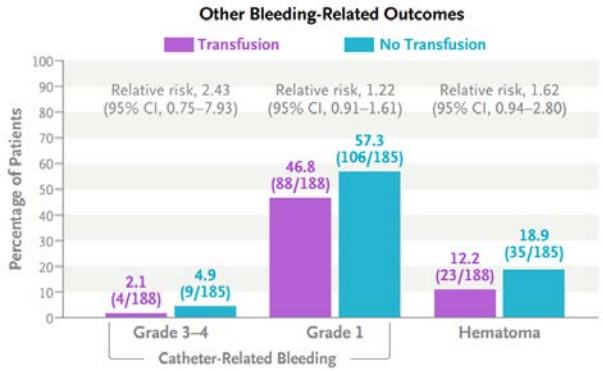
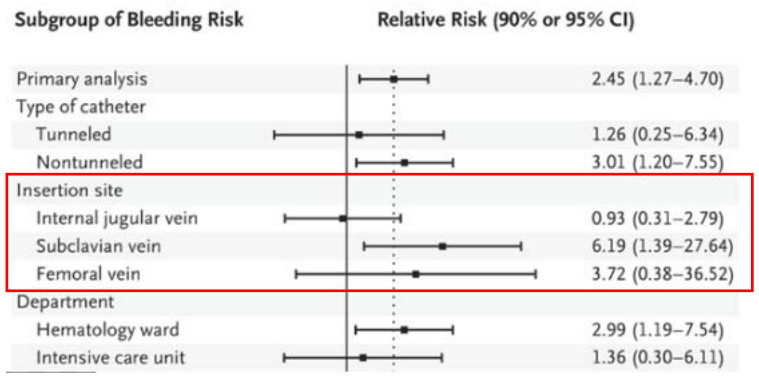


Results





Platelets

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Platelet Transfusion before CVC Placement in Patients with Thrombocytopenia

van Baarle FLF et al. DOI: 10.1056/NEJMoa2214322

► Consider a platelet threshold of >50 for subclavian line placement in the ICU. For other lines, consider expert consultation to determine bleeding risk and platelet transfusion thresholds

Grade of recommendation	I Strong recommendation to do	IIa Moderate recommendation to do	IIb Weak recommendation to do	III Recommendation not to do
Conclusions of evidence	Benefits >>> risk & burdens	Benefits >> risk & burdens	Benefits >= risks & burdens	No benefit / Potentially harm
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Outline

RBC
N=6

Plt
N=1

Plasma Deriv. N=5

RHIG
N=1

TXA
N=1

Albumin

Use of Intravenous Albumin

A Guideline From the International Collaboration for Transfusion Medicine Guidelines

*Jeannie Callum, MD; Nikolaos J. Skubas, MD; Aarti Bathla, MPharm, MPH; Homa Keshavarz, PhD; Edward G. Clark, MD; Bram Rochwerg, MD; Dean Fergusson, PhD; Sesmu Arbous, MD; Seth R. Bauer, PharmD; Louise China, MD; Mark Fung, MD; Rachel Jug, MD; Michael Neill; Cary Paine, MD; Katerina Pavenski, MD; Prakesh S. Shah, MD; Susan Robinson, MD; Hua Shan, MD; Zbigniew M. Szczepiorkowski, MD, PhD; Thierry Thevenot, MD; Bovey Wu; Simon Stanworth, MD, PhD; and Nadine Shehata, MD; on behalf of the International Collaboration for Transfusion Medicine Guidelines Intravenous Albumin Guideline Group**

Group	Population	Indication	Stance	Evidence
Cirrhosis	Patients with cirrhosis and spontaneous bacterial peritonitis	Reduce mortality	For	Low
	Recommended dose: 1.5 g/kg on Day 1, 1.0 g/kg on Day 3			
Cirrhosis	Patients with cirrhosis and ascites undergoing large volume paracentesis (>5 liters)	Prevent paracentesis-induced circulatory dysfunction	For	Very low
	Recommended dose: 2-8 g/L of fluid removed			
Cirrhosis	Outpatients with cirrhosis and uncomplicated ascites despite diuretic	Reduce complications associated with cirrhosis	Against	Low
Cirrhosis	Hospitalized patients with decompensated cirrhosis with hypoalbuminemia (<30 g/L)	Reduce infection, kidney dysfunction or death	Against	Low
Cirrhosis	Patients with cirrhosis and extraperitoneal infections	Reduce mortality or kidney failure	Against	Low

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Group	Population	Indication	Stance	Evidence
ICU	Critically ill adults (excluding thermal injuries and ARDS)	First-line volume replacement or increase serum albumin levels	Against	Moderate
ICU	Critically ill adults	Removal of extravascular fluid with diuretics	Against	Very low
ICU	Critically ill adults with thermal injuries or ARDS	Volume replacement or increase serum albumin level	Against	Very low
Renal	Patients undergoing renal replacement therapy	Prevention or treatment of intradialytic hypotension or improving ultrafiltration	Against	Very low

Albumin

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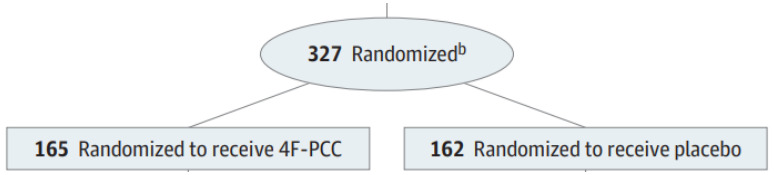
Group	Population	Indication	Stance	Evidence
Peds	Pediatric patients with infection and hypoperfusion	Reduce mortality	Against	Low
Neonate	Preterm neonates (<36 weeks) with low serum albumin levels and respiratory distress	Improve respiratory function	Against	Very low
Peds	Pediatric patients undergoing cardiovascular surgery	Priming the cardiovascular bypass circuit or volume replacement	Against	Very low
Neonate	Preterm neonates (<32 weeks or <1,500 g) with or without hypoperfusion	Volume replacement	Against	Very low

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

327 Pts Randomized



Characteristic	Median (IQR) [total No.] 4F-PCC (n = 164)	Placebo (n = 160)
Transfusion of ≥10 U of RBCs within the first 24 h	42 (26)	43 (28)
Fibrinogen concentrate treatment	141 (86)	129 (81)

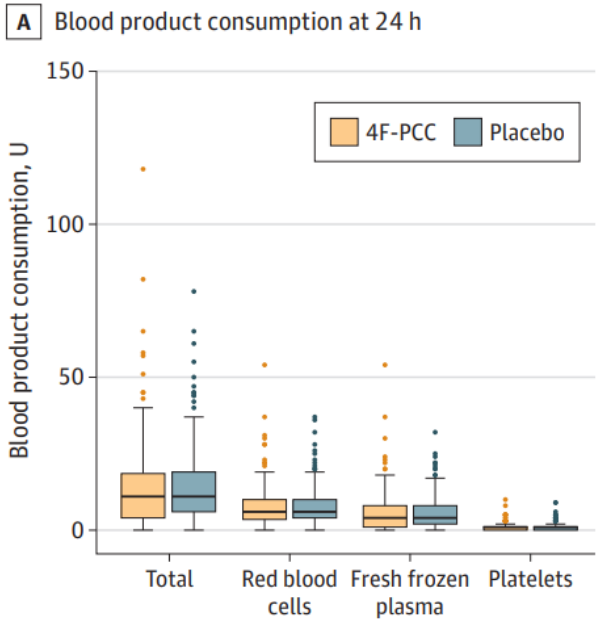
Intervention

Double-blind RCT

4F-PCC 25 IU of factor IX per kg (1 mL/kg)

Or 1 mL/kg of 0.9% saline solution

Results



Thrombosis:
4F-PCC group, 56 patients (35%)
Saline group, 37 patients (24%) in the placebo group [95% CI, 1%-21%]

PCC

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

► Do not give early empiric 4-Factor PCC for patients with trauma and massive hemorrhage unless specifically indicated

Grade of recommendation	I Strong recommendation to do	IIa Moderate recommendation to do	IIb Weak recommendation to do	III Recommendation not to do
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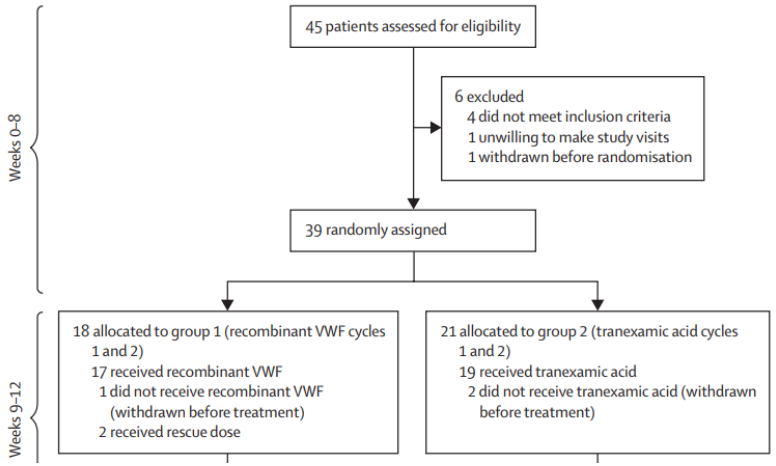
vWF Concentrate

Recombinant von Willebrand factor and tranexamic acid for heavy menstrual bleeding in patients with mild and moderate von Willebrand disease in the USA (VWDMin): a phase 3, open-label, randomised, crossover trial

Margaret V Ragni, Scott D Rothenberger, Robert Feldman, Danielle Nance, Andrew D Leavitt, Lynn Malec, Roshni Kulkarni, Robert Sidonio Jr,

45 Pts Randomized



Intervention

VWF, 40 IU/kg over 5–10 min on day 1

Oral TXA 1300 mg three times daily on days 1–5

Results

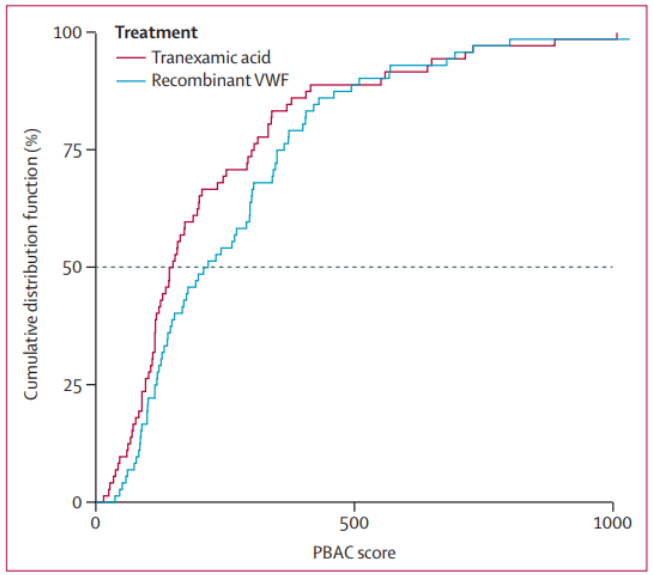


Figure 2: **PBAC score for blood loss by treatment**
Cumulative distribution function comparing PBAC score after tranexamic acid versus recombinant VWF. PBAC=pictorial blood assessment chart. Median PBAC score on tranexamic acid (ie, where the curve for tranexamic acid crosses 50% cumulative distribution function) is 146 (95% CI 117–199), while the median PBAC score on recombinant VWF is 213 (152–298; p=0·039).

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Recombinant von Willebrand factor and tranexamic acid for heavy menstrual bleeding in patients with mild and moderate von Willebrand disease in the USA (VWDMin): a phase 3, open-label, randomised, crossover trial

Margaret V Ragni, Scott D Rothenberger, Robert Feldman, Danielle Nance, Andrew D Leavitt, Lynn Malec, Roshni Kulkarni, Robert Sidonio Jr,

► Do not use vWF for heavy menstrual bleeding in <u>all</u> patients with mild-to-moderate vWD*
*trial on-going

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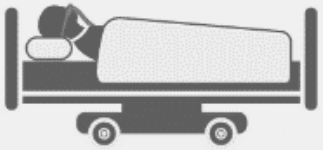
Cryoprecipitate

JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Early and Empirical High-Dose Cryoprecipitate for Hemorrhage After Traumatic Injury

The CRYOSTAT-2 Randomized Clinical Trial

1604 Pts Randomized



1251 Men 330 Women

Patients 16 years or older with major trauma hemorrhage in the emergency department

Median age: 39 years

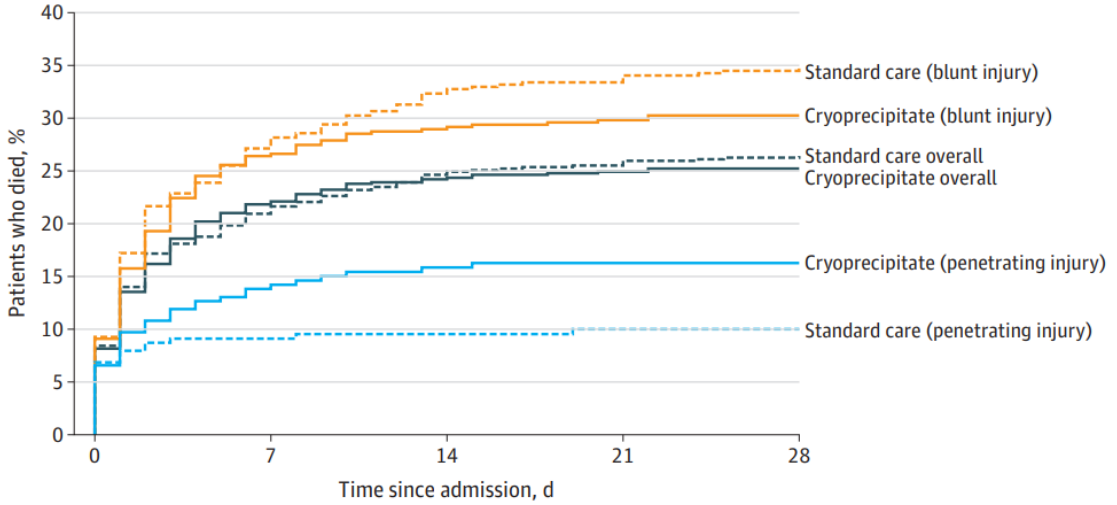
Intervention

Patients in both groups: MHP with a balanced RBC/FFP

Intervention group:
3 pools of cryoprecipitate (6-g fibrinogen equivalent) as early as possible, with the aim to start within 90 minutes of admission

vs **Standard of Care**

Results



Cryoprecipitate timing		
CRYO <= 45m from adm	1.45 (0.91, 2.31)	0.12[b]
CRYO 46-60m from adm	1.16 (0.78, 1.73)	0.46[b]
CRYO 61-90m from adm	0.57 (0.38, 0.87)	0.01[b]
CRYO > 90m from adm	1.00 (0.62, 1.60)	0.99[b]

Cryoprecipitate

JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Early and Empirical High-Dose Cryoprecipitate for Hemorrhage After Traumatic Injury

The CRYOSTAT-2 Randomized Clinical Trial

► Do not give early empiric cryoprecipitate/fibrinogen for hemorrhage after traumatic injury (use fibrinogen levels to guide transfusion)

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Albumin

Journal Pre-proof

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	Population	Indication	Recommendation	Strength of Evidence
Cirrhosis	Patients with cirrhosis and spontaneous bacterial peritonitis **Recommended dose:** 1.5 g/kg on Day 1, 1.0 g/kg on Day 3	Reduce mortality	For	Low
Cirrhosis	Patients with cirrhosis and ascites undergoing large volume paracentesis (>5 liters) **Recommended dose:** 2-8 g/L of fluid removed	Prevent paracentesis-induced circulatory dysfunction	For	Very low
ICU	Critically ill adults (excluding thermal injuries and ARDS)	First-line volume replacement or increase serum albumin levels	Against	Moderate
CV Surg	Adult patients undergoing cardiovascular surgery	Priming the cardiovascular bypass circuit or volume replacement	Against	Moderate
Cirrhosis	Outpatients with cirrhosis and uncomplicated ascites despite diuretic therapy	Reduce complications associated with cirrhosis	Against	Low
Cirrhosis	Hospitalized patients with decompensated cirrhosis with hypoalbuminemia (<30 g/L)	Reduce infection, kidney dysfunction or death	Against	Low
Peds	Pediatric patients with infection and hypoperfusion	Reduce mortality	Against	Low
Cirrhosis	Patients with cirrhosis and extraperitoneal infections	Reduce mortality or kidney failure	Against	Low
Neonate	Preterm neonates (<36 weeks) with low serum albumin levels and respiratory distress	Improve respiratory function	Against	Very low
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Neonate	Preterm neonates (<32 weeks or <1,500 g) with or without hypoperfusion	Volume replacement	Against	Very low
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Outline

RBC
N=6

Plt
N=1

Plasma
Deriv.
N=5

RHIG
N=1

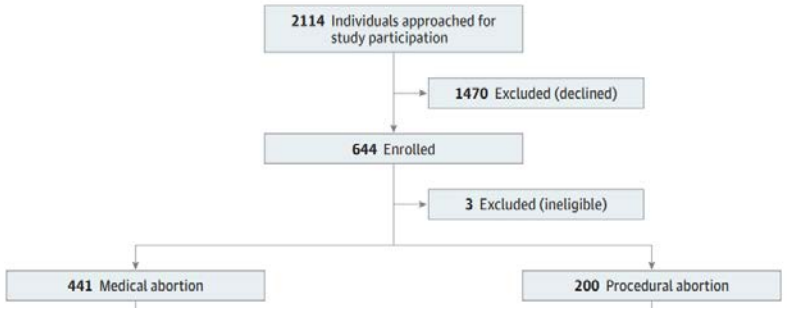
TXA
N=1

JAMA | Original Investigation

Induced Abortion and the Risk of Rh Sensitization

Is administration of Rh immunoglobulin necessary for individuals undergoing induced first-trimester abortion care?

506 Pts Randomized



All patients undergoing medication abortion at less than 12 week

Intervention

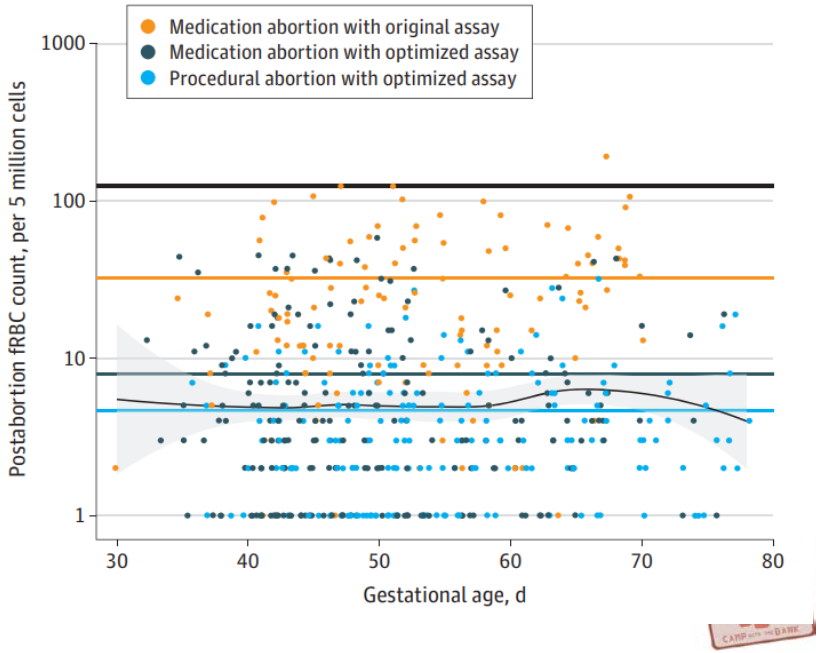
Exclusion criteria:
Sickle cell disease, β-thalassemia, hereditary persistence of fetal hemoglobin

These patients had blood drawn before abortion and after abortion at 1, 2, 4, 8, 12, 24, 48, and 72 hour

The threshold for Rh sensitization used in the study was at least 0.1% fetal red blood cells* (fRBCs) in maternal circulation following induced abortion at less than 12 weeks' gestation
*measured using flow cytometry

Results

Figure 3. Fetal Red Blood Cell (fRBC) Count After Abortion by Gestational Age



JAMA | Original Investigation

Induced Abortion and the Risk of Rh Sensitization

► Have a case-by-case discussion with patients when offering RhD prophylaxis for induced abortion during the 1st trimester*
*evolving

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Outline

RBC
N=6

Plt
N=1

Plasma
Deriv.
N=5

RHIG
N=1

TXA
N=2

ORIGINAL ARTICLE

Prehospital Tranexamic Acid for Severe Trauma

1310 Pts Randomized

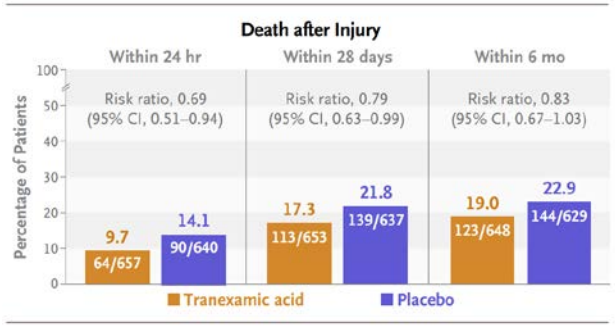
Intervention

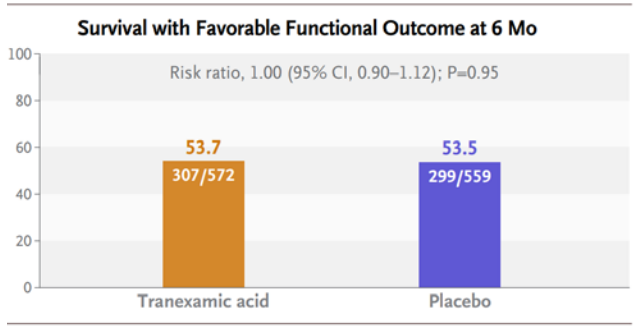
Before admission: 1-g intravenous bolus dose within 3 hr after injury
After admission: 1-g infusion over 8 hr

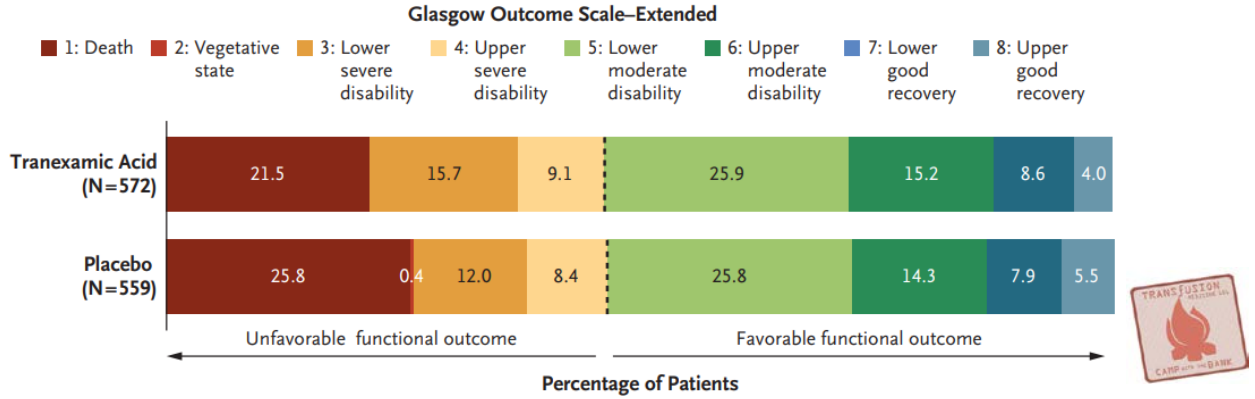
Table 1. Characteristics of the Patients at Baseline.*

Characteristic	Tranexamic Acid (N=657)	Placebo (N=643)
Age — yr	44.1±19.7	44.2±18.9
Male sex — no. (%)	459 (69.9)	459 (71.4)
Mechanism of injury — no. (%)		
Blunt	610 (92.8)	588 (91.4)
Penetrating	44 (6.7)	55 (8.6)
Burn	3 (0.5)	0

Results







ORIGINAL ARTICLE

Prehospital Tranexamic Acid for Severe Trauma

► Give 1g prehospital TXA within 3 hours of severe trauma

Grade of recommendation	I Strong recommendation to do	IIa Moderate recommendation to do	IIb Weak recommendation to do	III Recommendation not to do
Conclusions of evidence	Benefits >>> risk & burdens	Benefits >> risk & burdens	Benefits >= risks & burdens	No benefit / Potentially harm
A High level of evidence Consistent evidence from well performed and high quality studies or systematic reviews (low risk of bias, direct, consistent, precise)	Strong recommendation based on high level of evidence	Moderate recommendation based on high level of evidence	Weak recommendation based on high level of evidence	Recommendation based on high level of evidence
B Moderate /Low level of evidence Evidence from studies or systematic reviews with few important limitations	Strong recommendation based on moderate/ low level of evidence	Moderate recommendation based on moderate/ low level of evidence	Weak recommendation based on moderate/ low level of evidence	Recommendation based on moderate/ low level of evidence
C Very low level of evidence Evidence from studies with serious flaws. Only expert opinion, or standards of care	Strong recommendation based on expert opinion	Moderate recommendation based on very low level of evidence Diverging expert opinions	Weak recommendation based on very low level of evidence Diverging expert opinions	Recommendation based on very low level of evidence Expert opinion

TXA

401.BLOOD TRANSFUSION | NOVEMBER 28, 2023

Tranexamic Acid to Prevent Bleeding in Patients with Hematologic Malignancies and Severe Thrombocytopenia (TREATT trial). a Randomized Placebo-Controlled Trial

Lise J Estcourt, Zoe K McQuilten, Peter Bardy, Merrole Cole-Sinclair, Graham P. Collins, Philip J Crispin, Jennifer Curnow, Amber Degelia, Claire Dyer, Vanessa Fox, Adam Friebe, Lajos Floro, Effie Grand, Cara Hudson, Gail Jones, Joanne Joseph, Charlotte Kallmeyer, Marina Karakantza, Paul Kerr, Sara Last, Maria Lobo-Clarke, Matthew Lumley, Mary Frances McMullin, Patrick G. Medd, Suzy M Morton, Andrew David Mumford, Maria Mushkbar, Joe Parsons, Gillian Powter, Mallika Sekhar, Richard Soutar, William S. Stevenson, Elango Subramoniapillai, Robyn Sutherland, Jeff Szer, Neil A Waters, Andrew H. Wei, David Alan Westerman, Sarah A Wexler, Erica M. Wood, Simon J Stanworth

- Patients: hematologic malignancy or stem cell transplant expected to have a platelet count <10 x 10^9/L for 5+ days at 27 centres in UK and Australia

- Intervention: TXA (1 g iv or 1.5 g oral) q8h if platelet count < 30 x 10^9/L for a maximum of 30 days
- Control: Placebo
- Outcome: death or WHO grade 2+ bleeding at 30 days

- Results: Randomized 616 patients – no difference in primary outcome, bleeding, death, or ATE/VTE events
- Results: TXA treated patients were more likely to "survive to 30 days without a red cell transfusion"* (29.4% vs. 20.5%, HR 0.82, 95% CI 0.72-0.93, p=0.003)

TXA

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► Consider TXA in patients with hematologic malignancies on a case-by-case basis, as there is some benefit (fewer transfusions) and little downside in some patients

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Questions

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