KARIM
1.LF UK A VFN V PRAZE

PERIPARTÁLNÍ ŽIVOT OHROŽUJÍCÍ KRVÁCENÍ

z pohledu ~~intenzivisty~~ anesteziologa

JAN BLÁHA

Klinika anesteziologie, resuscitace a intenzivní medicíny
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Možný střet zájmů:

CSL Behring

novo nordisk

Život ohrožující krvácení
Verze: 1.2.

Česká společnost anesteziologie, resuscitace a intenzivní medicíny ČLS JEP
Česká společnost intenzivní medicíny ČLS JEP
Česká společnost pro trombózu a hemostázu ČLS JEP
Česká hematologická společnost ČLS JEP
Slovenská společnost anesteziologie a intenzivní medicíny

MEZIOBOROVÝ DOPORUČENÝ POSTUP

DIAGNOSTIKA A LÉČBA ŽIVOT OHROŽUJÍCÍHO KRVÁCENÍ U DOSPĚLÝCH PACIENTŮ V INTENZIVNÍ A PERIOPERAČNÍ PÉČI

Bláha Jan
Blatný Jan
Cvachovec Karel
Černý Vladimír
Firment Jozef
Penka Miroslav
Zahorec Roman

3.6. Léčba koagulopatie a postupy k obnovení / podpoře krevního srážení

3.6.1.
Pro identifikaci typu koagulační poruchy a její léčbu doporučujeme spolupráci s hematologem (1)§ 2 (max.!)
3.6.2.
Doporučujeme monitorovat koagulaci a zahájit opatření k podpoře koagulace co nejdříve (1C)

3.6.3.
K dosažení / obnovení účinnosti endogenních hemostatických mechanismů a léčebných postupů podpory koagulace doporučujeme maximální možnou korekci hypotermie, acidózy a hladiny ionizovaného kalcia (1)§ Ano

Komentář [jB2]: Jak říká Petr Salaj, 95% hematologů se věnuje onkohematologii a o klinice ŽOK tak moc nevědí...

A jak jsme už řešili u PŽOK, dáváme tím do ruky právníkům příliš konkrétní argument.

Klasifikace podle názorů a zkušenosti jednotlivých členů pracovní skupiny
Poznámka: Pro formulaci daného doporučení muselo být dosaženo konsensu všech členů autorského týmu.

1 = "silné doporučení" (postup nebo intervence jsou doporučeny)
2 = "slabé doporučení" (postup nebo intervence jsou ke zvážení)


FORTUNA
SYNOTtip
14
INDECO
SENKÉŘÍK

Peripartální život ohrožující krvácení

Poruchy děložního tonu - poporodní hypo/atonie děložní	**70 % - 80 %**
Porodní trauma - lacerace hrdla, pochvy, perinea - pánevní hematomy - děložní ruptura, peroperační komplikace - inverze dělohy	**10 % - 15 %**
Patologie tkání - placenta adherens, placenta accreta	**1 % - 5 %**
Koagulopatie - DIC časný (embolie plodovou vodou, abrupce !!!)	**1 % - 3 %**

Pařízek A et al. Kritické stavy v porodnictví, 2012

3.6. Léčba koagulopatie a postupy k obnovení / podpoře krevního srážení

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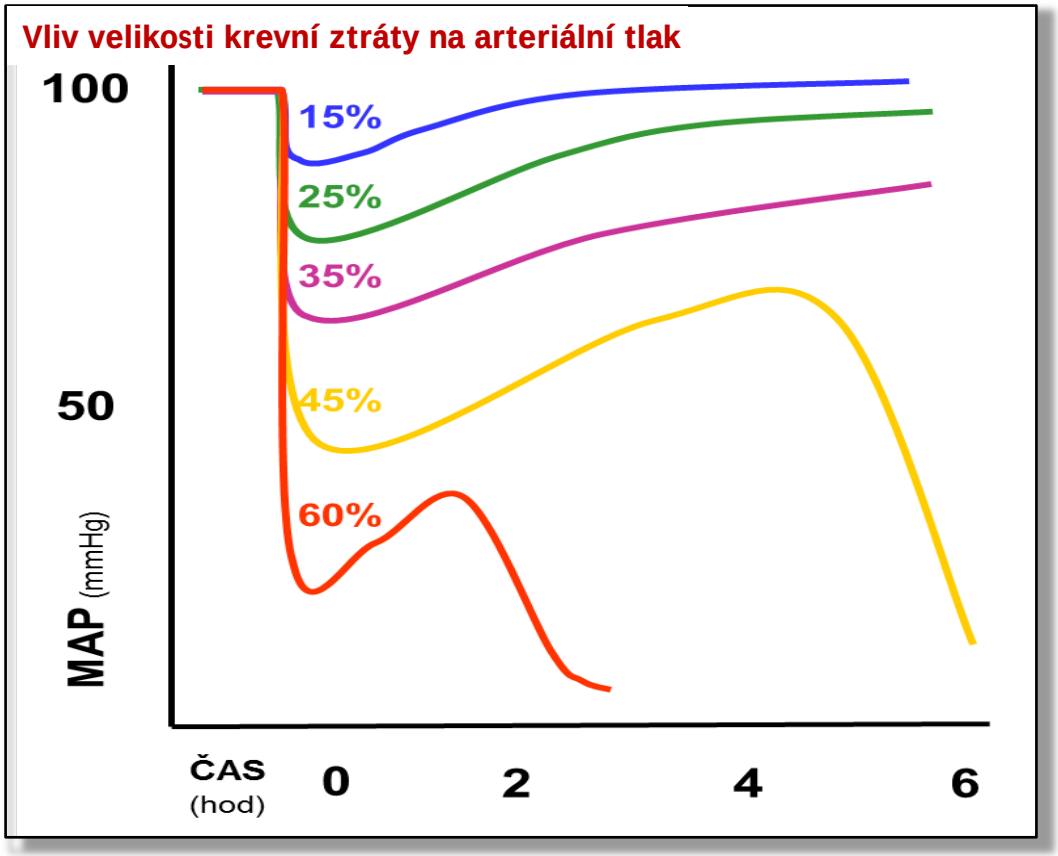
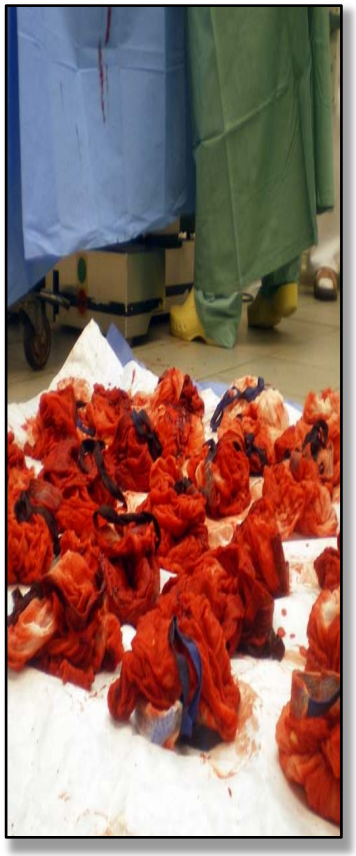
2 = "slabé doporučení" (postup nebo intervence jsou ke zvážení)

Mohla dřívější konzultace hematologa **zvýšit naději pacienta na přežití?**


REMEMBER
TIME LOST
CANNOT BE
REGAINED

ŽIVOT HROŽUJÍCÍ KRVÁCENÍ



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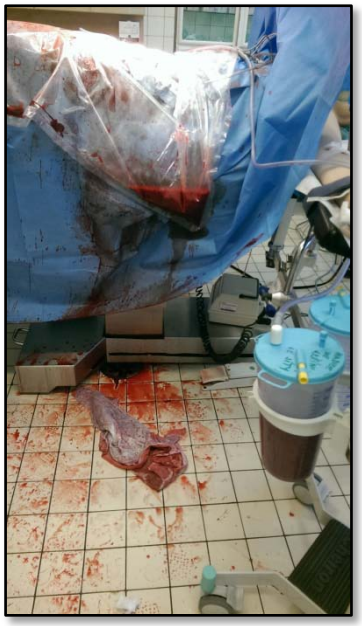


.Výsledky: [redacted] (82[redacted])

Režim Mixer Data Zobrazení Filtry Typy událostí Potvrzování Zpřístupňování Konfigurace Ž

Třídy a metody	28/06/11 11:49	28/06/11 12:01	28/06/11 12:03	28/06/11 12:31
Krevní obraz-perifer				
Leukocyty		8,20		
Erytrocyty		2,74		
Hemoglobin		80		
Hematokrit		0,245		
Stř.obj.erytr.		89,4		
Barvivo erytr.		29,2		
Stř.barev.kon.		327		
Distr.křiv.ery		14,8		
Trombocyty		69		
Stř.obj.trombo		10,3		
Destičkový hematokrit		0,070		
Distr.křiv.tr.		18,9		
Koagulační vyšetření				
Quickův test INR				
APTT				1,05
Trombinový čas				30,3
Fibrinogen koagul.				17,1
Etanol gelifik.test				5,18
Antitrombin III				Txt+His
D-dimery				78

International Journal of Obstetric Anesthesia (2011) 20, 135–141

ORIGINAL ARTICLE

Standard haemostatic tests following major obstetric haemorrhage

L. de Lloyd,[a] R. Bovington,[b] A. Kaye,[c] R.E. Collis,[a] R. Rayment,[b] J. Sanders,[c] A. Rees,[c] P.W. Collins[b]

Department of [a]Anaesthesia, [b]Haematology and [c]Obstetrics and Gynaecology, University Hospital of Wales and School of Medicine, Cardiff, UK

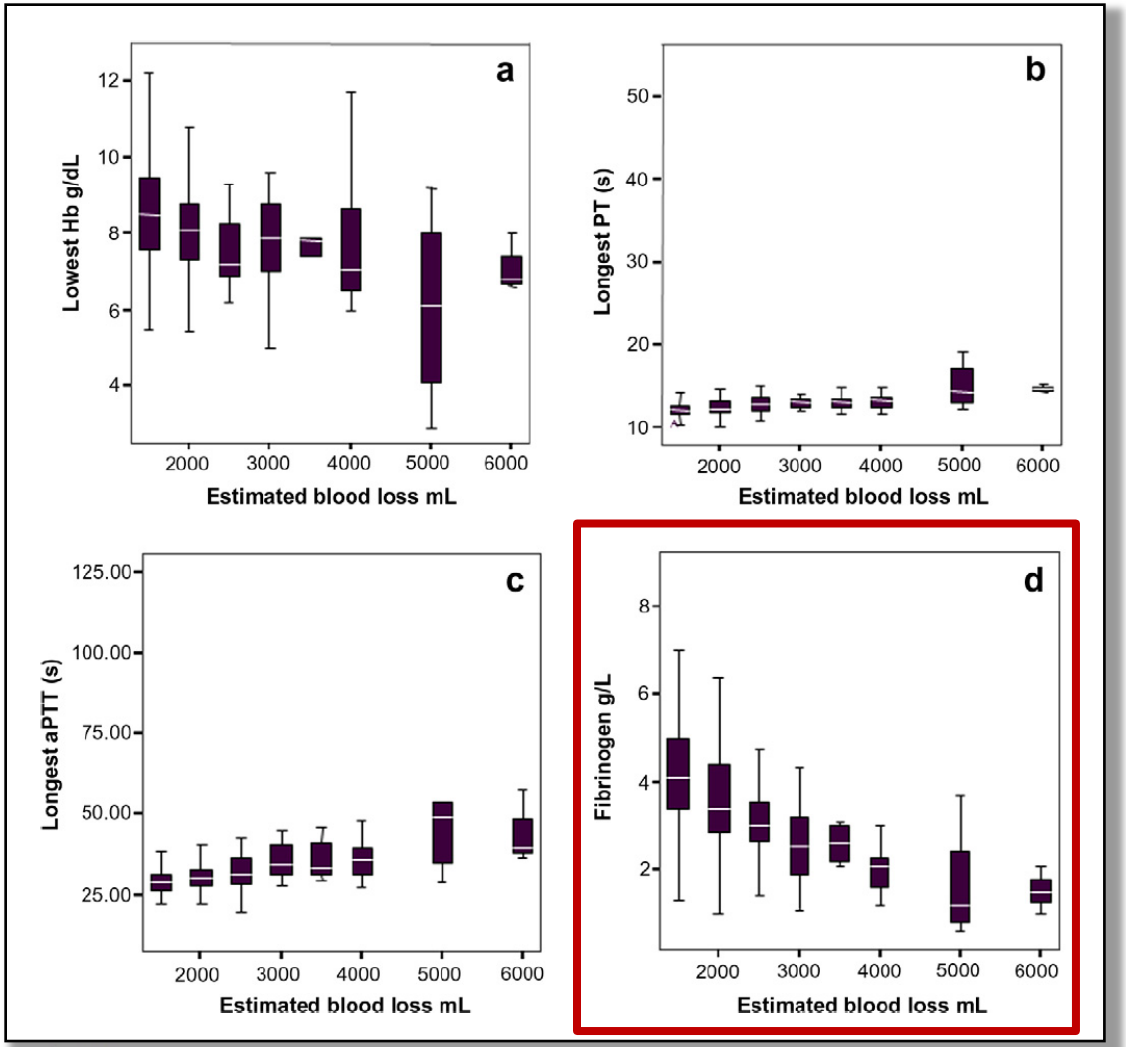
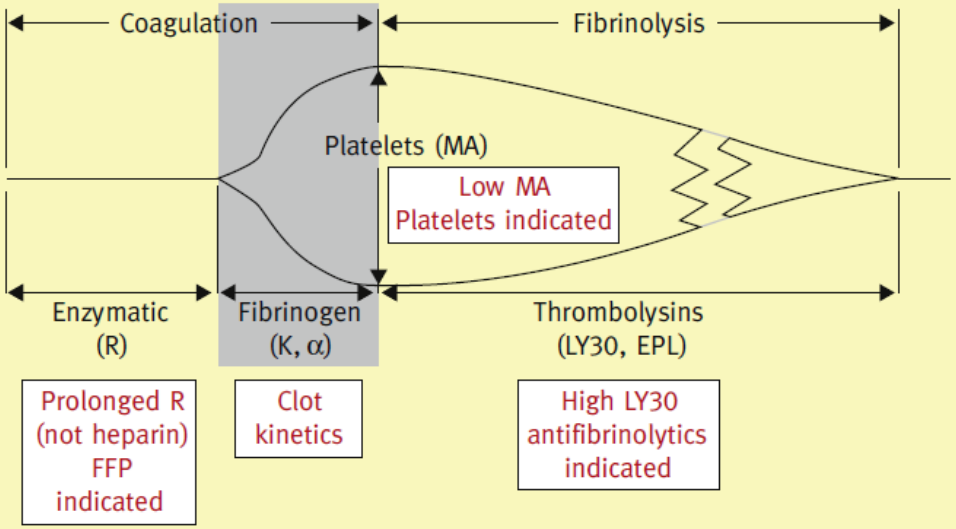
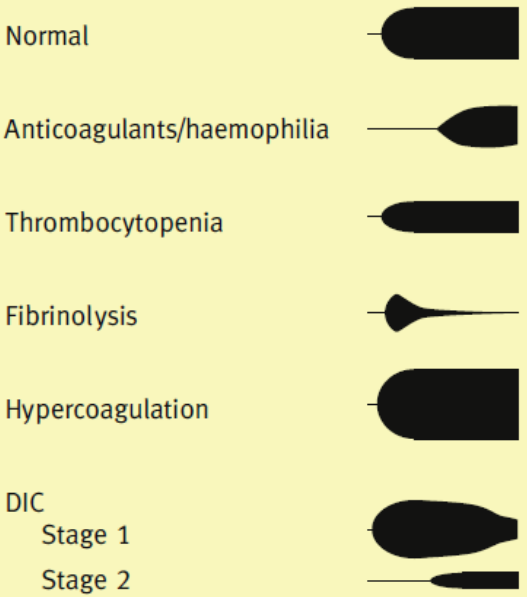


Fig. 1 Comparison of haematological parameters with estimated blood loss in major PPH. (a) Lowest haemoglobin and estimated blood loss. (b) Longest prothrombin time and estimated blood loss. (c) Longest activated partial thromboplastin time and estimated blood loss. (d) Lowest fibrinogen and estimated blood loss. The lowest recorded haemoglobin and fibrinogen and longest PT and aPTT are shown in comparison to estimated blood loss. Bleeds between 1500 and 1999 mL are included in the 1500 mL box. White line is median, box is interquartile range and bar is range.

Thromboelastogram (TEG) traces





Clotting time	R	Period of time until initial clot formation
Clot kinetics	K	A measure of the speed to reach a specific level of clot strength
	alpha	Measures the rate of clot formation
Clot strength	MA	Maximal amplitude; represents the ultimate strength of the clot (platelets and fibrin)
Haemostasis profile	CI	Coagulation index, which is a combination of the above parameters
Clot stability	LY30	Measures the amount of fibrinolysis 30 minutes after MA

Broomhead. Anaesthesia & Intensive Care Medicine 2013; 14(2): 57-62


ORIENTAČNÍ TEST SRÁŽENÍ KRVE S TROMBINEM
+ 2 ml krve
Lyofilizovaný trombin
Trombin + fibrinogen
krev se srazí
Trombin + fibrinogen
krev se nesrazí
afibrinogenemie

Spahn *et al. Critical Care* 2013, **17**:R76
http://ccforum.com/content/17/2/R76

CRITICAL CARE

RESEARCH Open Access

Management of bleeding and coagulopathy following major trauma: an updated European guideline

Sibylle A. Kozek-Langenecker, Arash Afshari, Pierre Albaladejo, Cesar Aldecoa Alvarez Santullano, Edoardo De Robertis, Daniela C. Filipescu, Dietmar Fries, Klaus Görlinger, Thorsten Haas, Georgina Imberger, Matthias Jacob, Marcus Lancé, Juan Llau, Sue Mallett, Jens Meier, Niels Rahe-Meyer, Charles Marc Samama, Andrew Smith, Cristina Solomon, Philippe Van der Linden, Anne Juul Wikkelsø, Patrick Wouters and Piet Wyffels

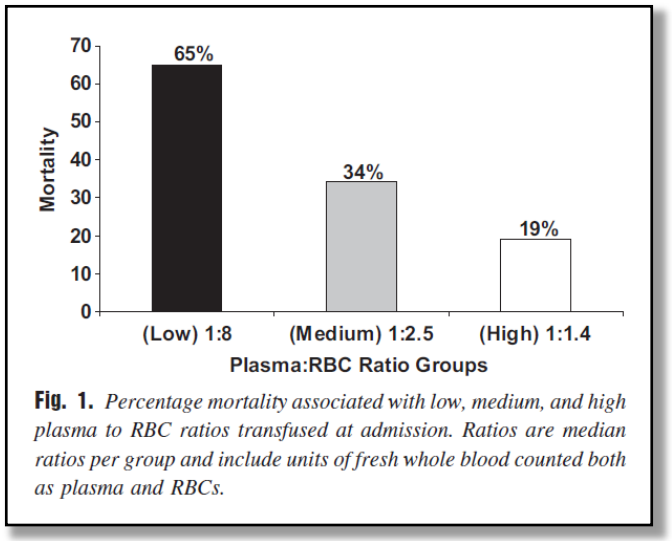
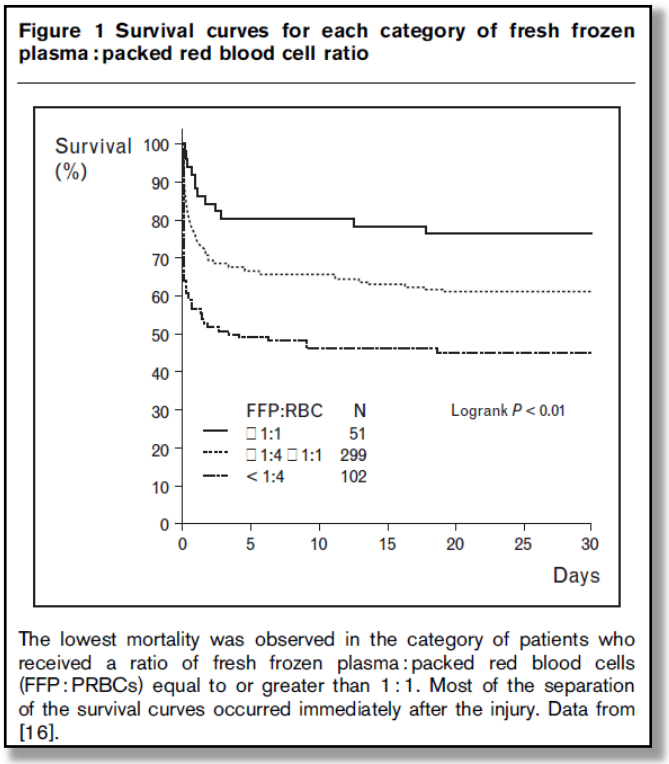


Fig. 1. *Percentage mortality associated with low, medium, and high plasma to RBC ratios transfused at admission. Ratios are median ratios per group and include units of fresh whole blood counted both as plasma and RBCs.*

Borgman et al. J Trauma. 2007;63:805–813.



Griffee et al. Current Opinion in Anaesthesiology 2010,23:263–268

FFP:RBC Ratio in Severe Postpartum Hemorrhage

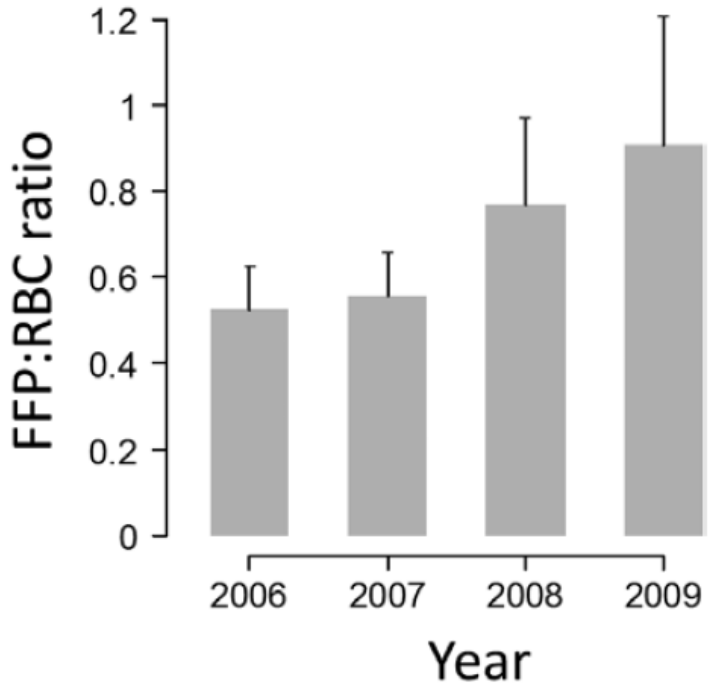


Figure 2. Trends in fresh frozen plasma:red blood cell (FFP:RBC) ratio (mean ± SD) over the 4-year study period (2006–2009) demonstrating a significant increase ($P < 0.001$, using analysis of variance).

Pasquier et al. Anesth Analg 2013;116:155–61

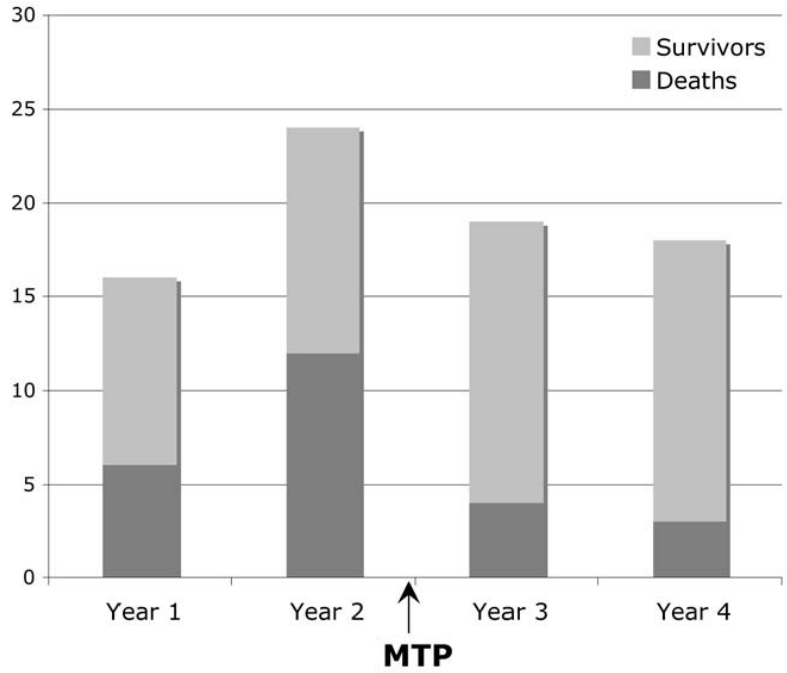


Figure 2. Patient survival by year. MTP, massive transfusion protocol.

Riskin et al. J Am Coll Surg 2009;209:198-205

Table 2. Mean Units and Ratios of Product Used, Pre- and Postmassive Transfusion Protocol Implementation

Product and ratio	Pre-MTP, mean (95% CI)	Post-MTP, mean (95% CI)	p Value
PRBCs	23.9 (18.7–29.1)	20.5 (15.5–25.5)	0.34
FFP	12.3 (9.6–15.0)	10.7 (7.8–13.6)	0.42
Plt	2.3 (1.7–2.9)	2.8 (1.8–3.7)	0.41
FFP:PRBCs	1:1.8 (1:1.5–1:2.2)	1:1.8 (1:1.5–1:2.1)	0.97
Plt:PRBCs	1:1.7 (1:1.4–1:2.1)	1:1.3 (1:1.1–1:1.5)	0.05*

*Statistically significant; $p \leq 0.05$.
FFP, fresh frozen plasma; MTP, massive transfusion protocol; Plt, platelets; PRBCs, packed red blood cells.

Table 3. Mean Minutes to First Transfusion of Type-Specific Blood Products Before and after Implementation of Massive Transfusion Protocol

Product	Pre-MTP, mean (95% CI)	Post-MTP, mean (95% CI)	p Value
PRBCs	115 (85–146)	71 (49–93)	0.02*
FFP	254 (185–323)	169 (130–209)	0.04*
Platelets	418 (316–519)	241 (169–311)	0.01*

*Statistically significant; $p \leq 0.05$.
FFP, fresh frozen plasma; MTP, massive transfusion protocol; PRBCs, packed red blood cells.

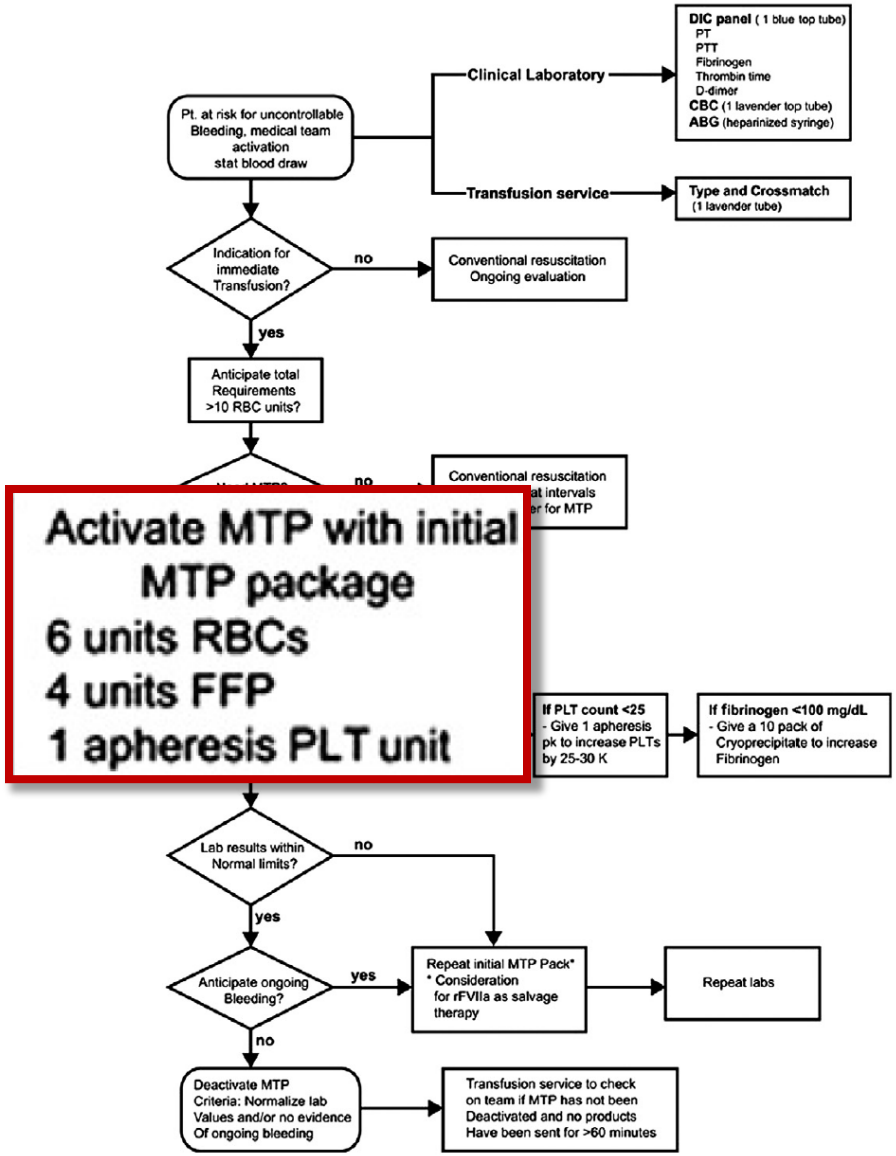


Fig. 1 Institution algorithm for the massive transfusion protocol for the labor and delivery unit. ABG: arterial blood gas; CBC: complete blood; DIC: disseminated intravascular coagulation; FFP: fresh frozen plasma; INR: international normalized ratio; MTP: massive transfusion protocol; PLT: platelet; PT: prothrombin time; Pt: patient; RBC: red blood cells; pk: pack. Figure reproduced with permission.[5]

MANAGEMENT OF BLEEDING AND COAGULOPATHY FOLLOWING MAJOR TRAUMA:
An updated European guideline

ABC Care
Advanced Bleeding

We recommend that each institution implement an evidence-based treatment algorithm for the bleeding trauma patient.

Grade 1C

We recommend that treatment checklists be used to guide clinical management.

Grade 1B

Critical Care 2013;17:R76

4 Haemorrhage

William Liston

Obstetric haemorrhage: Specific recommendations

Klíčovým doporučením této zprávy je nutnost pravidelného tréninku veškerého personálu v rozpoznávání a zvládání kolapsových stavů matky, včetně rozpoznání skrytého krvácení, a ve zvládnutí krvácení.

An early warning scoring system of the type described in the Chapter on Critical Care, another key recommendation of this Report, may help in the more timely recognition of cases of hidden bleeding.

When severe haemorrhage occurs it is good practice to call straight away for the aid of colleagues with greater gynaecological surgical experience.

The management of women with placenta percreta requires careful multidisciplinary planning in the antenatal period and the involvement of a consultant-led multidisciplinary team at delivery.

Guidelines for the management of women who refuse blood products must be made available to, and discussed with, all maternity staff as part of their routine training, postgraduate education, continuing professional development and practice.

Women should be advised that caesarean section is not an entirely risk-free procedure and can hold problems for current and future pregnancies.

All women who have had a previous caesarean section must have their placental site determined. This, too, is a key recommendation of this Report. If there is any doubt, magnetic resonance imaging (MRI) can be used along with ultrasound scanning in determining if the placenta is accreta or percreta.

Saving Mothers' Lives. Confidential Enquiry into Maternal and Child Health, UK. 2003-2005

[Intervention Review]

Continuing education meetings and workshops: effects on professional practice and health care outcomes

Louise Forsetlund[1], Arild Bjørndal[1], Arash Rashidian[2], Gro Jamtvedt[1], Mary Ann O'Brien[3], Fredric Wolf[4], Dave Davis[5], Jan Odgaard-Jensen[1], Andrew D Oxman[1]

[1]Norwegian Knowledge Centre for the Health Services, Oslo, Norway. [2]Center for Academic and Health Policy, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran. [3]Supportive Cancer Care Research Unit, Juravinski Cancer Centre, Hamilton, Canada. [4]Department of Medical Education & Biomedical Informatics, University of Washington School of Medicine, Seattle, WA, USA. [5]Continuing Health Care Education and Improvement, Association of American Medical Colleges, Washington, DC, USA

Cochrane Database of Systematic Reviews, Issue 4, 2009 (Status in this issue: *Unchanged*)

DOI: 10.1002/14651858.CD003030.pub2
This version first published online: 15 April 2009 in Issue 2, 2009. Last assessed as up-to-date: 29 June 2008. (Help document - Dates and Statuses explained).

Next »

Abstract

Background

Educational meetings are widely used for continuing medical education. Previous reviews found that interactive workshops resulted in moderately large improvements in professional practice, whereas didactic sessions did not.

Objectives

To assess the effects of educational meetings on professional practice and healthcare outcomes.

Main results

In updating the review, 49 new studies were identified for inclusion. A total of 81 trials involving more than 11,000 health professionals are now included in the review. Based on 30 trials (36 comparisons), the median adjusted RD in compliance with desired practice was 6% (interquartile range 1.8 to 15.9) when any intervention in which educational meetings were a component was compared to no intervention. Educational meetings alone had similar effects (median adjusted RD 6%, interquartile range 2.9 to 15.3; based on 21 comparisons in 19 trials). For continuous outcomes the median adjusted percentage change relative to control was 10% (interquartile range 8 to 32%; 5 trials). For patient outcomes the median adjusted RD in achievement of treatment goals was 3.0 (interquartile range 0.1 to 4.0; 5 trials). Based on univariate meta-regression analyses of the 36 comparisons with dichotomous outcomes for professional practice, higher attendance at the educational meetings was associated with larger adjusted RDs ($P < 0.01$); mixed interactive and didactic education meetings (median adjusted RD 13.6) were more effective than either didactic meetings (RD 6.9) or interactive meetings (RD 3.0). Educational meetings did not appear to be effective for complex behaviours (adjusted RD -0.3) compared to less complex behaviours; they appeared to be less effective for less serious outcomes (RD 2.9) than for more serious outcomes.

Authors' conclusions

Odborné semináře jen s malou pravděpodobností povedou k významné změně postupu.

E—3.

CVIČNÝ ŘÁD

pro

cís. a kr. pěší vojska.

Exercir-Reglement.

Třetí vydání Řádu z roku 1874.

Přeložil

§. 8. Jak vycvičíme vojáka za harcovníka**). (Ausbildung zum Plänkler).

138. Abychom mohli vojáka užiti za harcovníka, musíme ho správným výcvikem připravovati, jeho soudnost bystřiti, vůli síliti a jeho sebevědomí tužiti.

On musí se učiti, že třeba stále zachovávati spojitost, i když jest volnější, a pořádek, i když přesně předepsán není, že se musí tudíž, čím samostatnějším jest, tím přísněji říditi podle zásad, které zaručují jednání jednotné.

Deviations from evidence-based clinical management guidelines increase mortality in critically injured trauma patients*

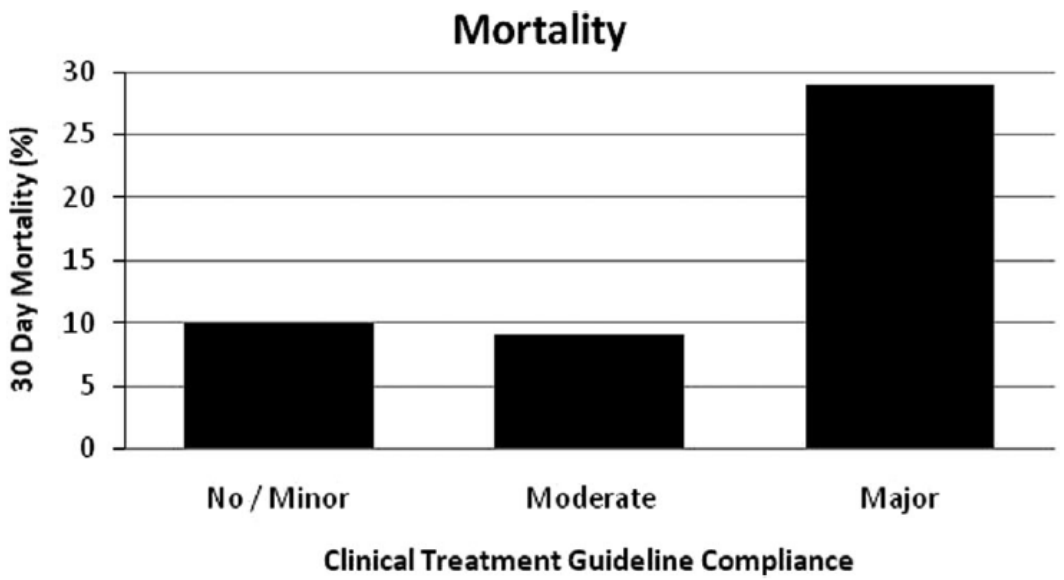


Figure 1. Effect of overall compliance with clinical management guidelines on mortality.

Rice et al. Crit Care Med 2012; 40:778-86

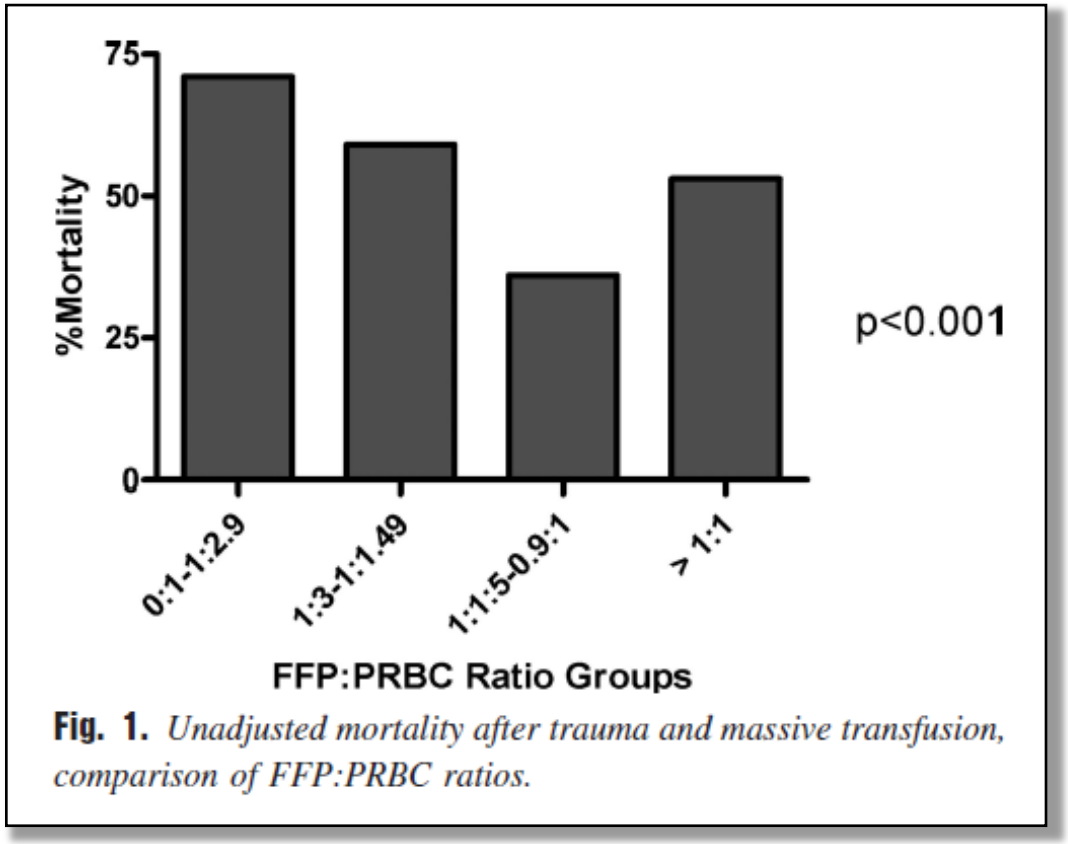


Fig. 1. *Unadjusted mortality after trauma and massive transfusion, comparison of FFP:PRBC ratios.*

Gunter et al. J Trauma. 2008;65:527–534.

ORIGINAL ARTICLE

High Ratios of Plasma and Platelets to Packed Red Blood Cells Do Not Affect Mortality in Nonmassively Transfused Patients

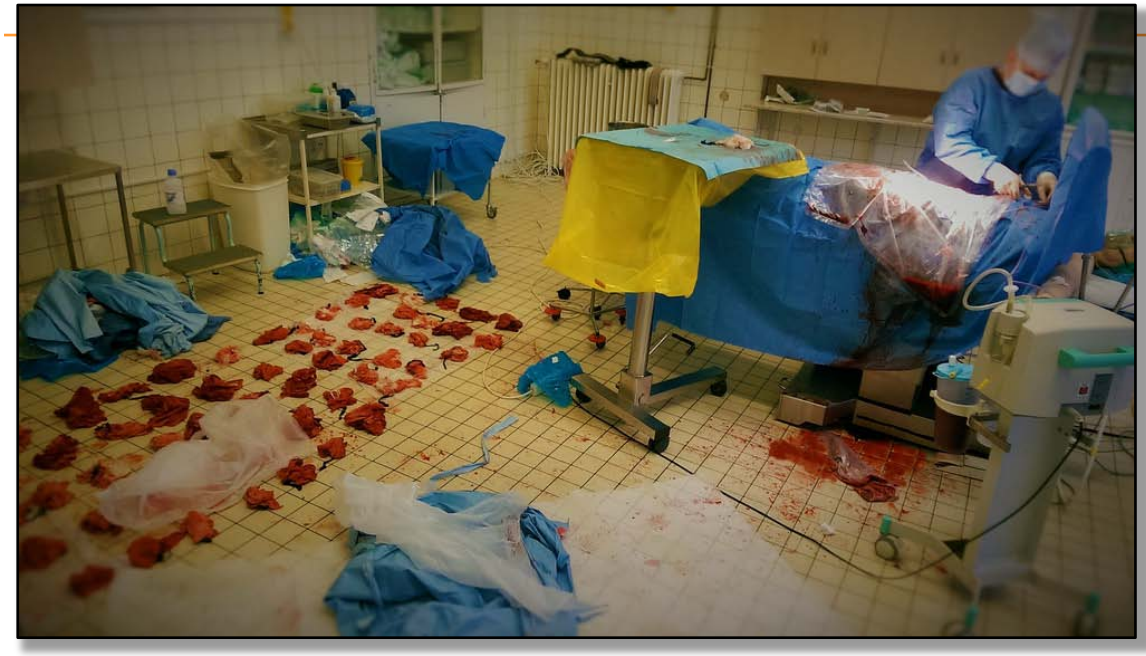
Chitra N. Sambasivan, MD, Nicholas R. Kunio, MD, Prakash V. Nair, MS, Karen A. Zink, MD, Joel E. Michalek, PhD, John B. Holcomb, MD, Martin A. Schreiber, MD, and the Trauma Outcomes Group

The Journal of **TRAUMA**® *Injury, Infection, and Critical Care* • Volume 71, Number 2, August Supplement 3, 2011 S329

J Am Coll Surg 2010;210:957–965. © 2010

Impact of Plasma Transfusion in Trauma Patients Who Do Not Require Massive Transfusion

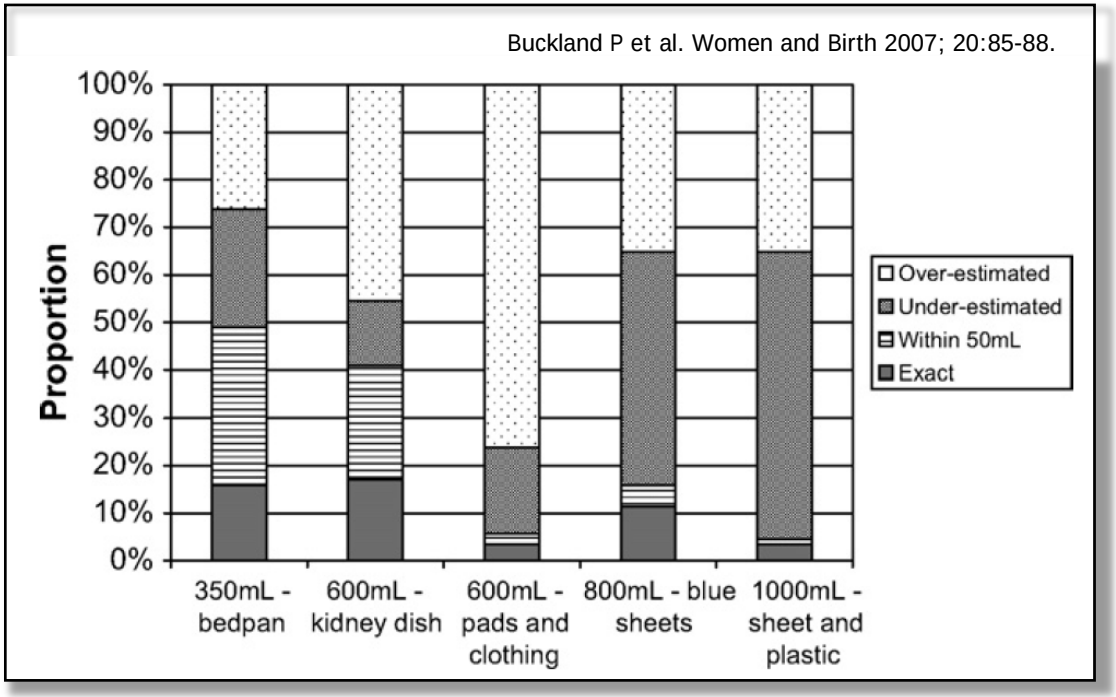
Kenji Inaba, MD, FRCSC, FACS, Bernardino C Branco, MD, Peter Rhee, MD, FACS, Lorne H Blackbourne, MD, FACS, John B Holcomb, MD, FACS, Pedro GR Teixeira, MD, Ira Shulman, MD, Janice Nelson, MD, Demetrios Demetriades, MD, PhD, FACS

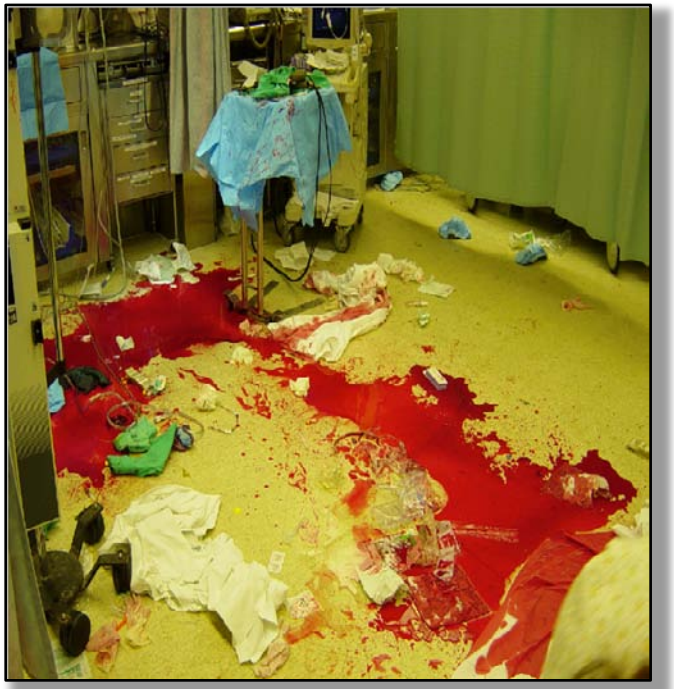


DEFINICE:

- □ ztráta objemu krve /24 h (u dospělého ekvivalent 10 TU)
- □ ztráta 50% objemu krve /3 hod
- □ pokračující krevní ztráta >150 ml/h
- □ krevní ztráta v lokalizaci vedoucí k ohrožení životních funkcí (např. krvácení do CNS)

ODHAD KREVNÍ ZTRÁTY





Decision making for transfusion amongst various specialities.

Trigger	Trauma	Anaesthesia	ED	ICU	Surgery
Expected and/or ongoing bleeding	**32% (10/31)**	**43% (12/28)**	**24% (4/17)**	0% (0/11)	0% (0/3)
Dropping haemoglobin	3% (1/31)	**46% (13/28)**	**24% (4/17)**	**55% (6/11)**	0% (0/3)
Haemorrhagic shock	**45% (14/31)**	7% (2/28)	18% (3/17)	18% (2/11)	33% (1/3)
Low SBP	10% (3/31)	4% (1/28)	12% (2/17)	9% (1/11)	33% (1/3)
Tachycardia	6% (2/31)	0% (0/28)	**24% (4/17)**	0% (0/11)	33% (1/3)
Other triggers	3% (1/31)	0% (0/28)	0% (0/17)	18% (2/11)	0% (0/3)
Total	31	28	17	11	3

SBP: systolic blood pressure; ED: emergency department; ICU: intensive care unit.

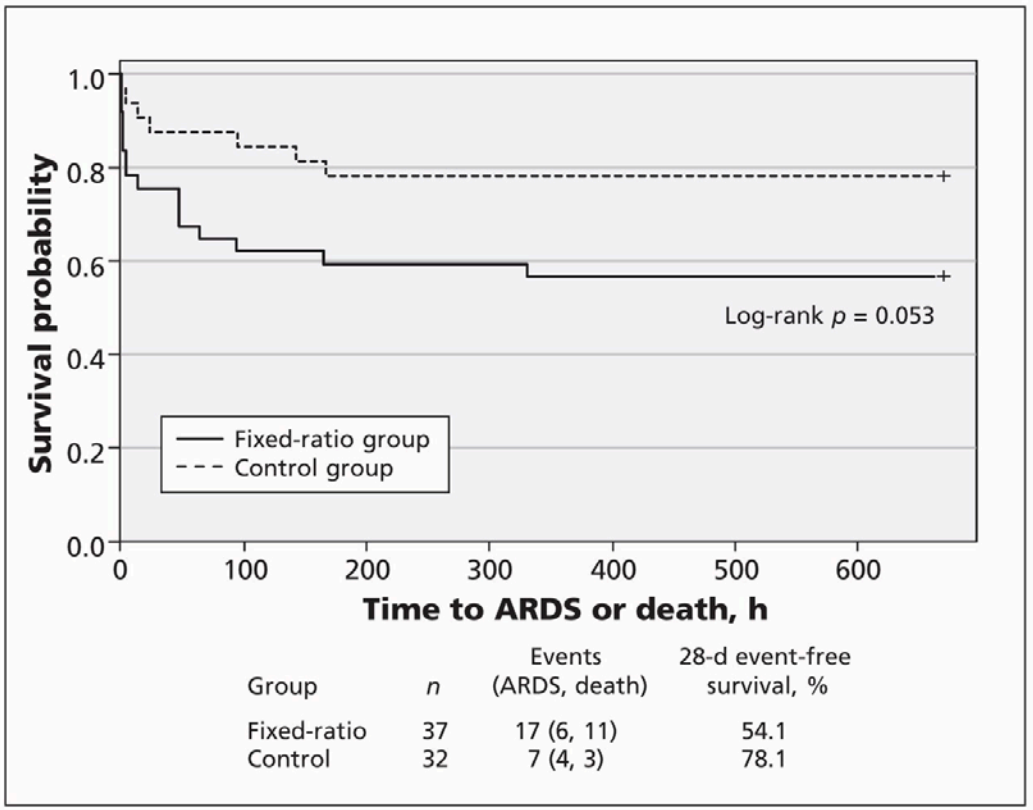
Variable	Fixed-ratio group $n = 37$	Control group $n = 32$	Difference (95% CI)*	p value†
Transfusion data				
Ratio of RBC:FP:PLT achieved,‡ median (IQR)	1 : 1 : 1 (1 to 1.3 : 1 : 0.8 to 1.3)	1.7 : 1 : 0.8 (1.2 to 2.3 : 1 : 0.5 to 1.3)	RBC: –0.7 (–1.1 to –0.3) PLT: 0.2 (–0.3 to 0.35)	RBC: < 0.01 PLT: 0.3
Received 1:1:1 ratio, no. (%)	21 (57)	2 (6)	51 (32 to 68)	< 0.01
Received only RBC:FP at 1:1 ratio, no. (%)	27 (73)	7 (22)	51 (31 to 71)	< 0.01
Total no. of RBC:FP:PLT units per patient,§ median (IQR)	7 : 6 : 8 (6 to 10 : 4 to 8 : 4 to 8)	7 : 4 : 4 (6 to 14 : 3 to 8 : 0 to 8)	RBC: 0 (–5 to 2.5) FP: 2 (0 to 4) PLT: 4 (–3 to 6)	RBC: 0.6 FP: 0.07 PLT: 0.1
Received FP transfusion, no. (%)	36 (97)	26 (81)	16.0 (1.5 to 30.5)	0.04
Received PLT transfusion, no. (%)	34 (92)	21 (66)	26.3 (7.6 to 44.9)	0.01
Received massive transfusion (≥ 10 RBC units in 24 h), no. (%)	15 (41)	15 (47)	–6.3 (–29.8 to 17.1)	0.6
Time to first RBC,¶ min, median (IQR)	25.5 (14 to 48.5)	32.5 (13 to 70.5)	–7.0 (–23.5 to 13.5)	0.8
Time to first FP,¶ min, median (IQR)	89 (65 to 150)	113 (81 to 165)	–24 (–60 to 9)	0.05
Time from first RBC to first FP, min, median (IQR)	60 (40 to 77)	78 (49 to 112)	–19 (–45 to –1)	0.05
Plasma wastage				
Total FP units thawed, no.	390	289	NA	NA
FP units wasted, no. (%)	86 (22)	30 (10)	NA	NA

Note: CI = confidence interval, FP = frozen plasma, IQR = interquartile range, NA = not applicable, PLT = platelets, RBC = red blood cells, SD = standard deviation.
*For continuous data, estimation of the 95% CI for the median difference between the 2 groups was calculated using the bootstrap technique based on 10 000 simulations.
†χ^2 test or Fisher exact test to compare proportions; Wilcoxon rank-sum test to compare distributions; p values for differences in RBC, FP and PLT utilization between study groups are reported separately.
‡Ratios of RBC:FP and FP:PLT calculated to 1 FP unit. One patient in the fixed-ratio group and 4 in the control group did not receive any FP; p values for the differences in RBC:FP and FP:PLT ratios between study groups are reported separately.
§Absolute number of units of RBC, FP and PLT transfused per patient during study protocols.
¶Time from hospital arrival to transfusion of first unit of RBC or FP; the time was not recorded for 1 patient in the fixed-ratio group.

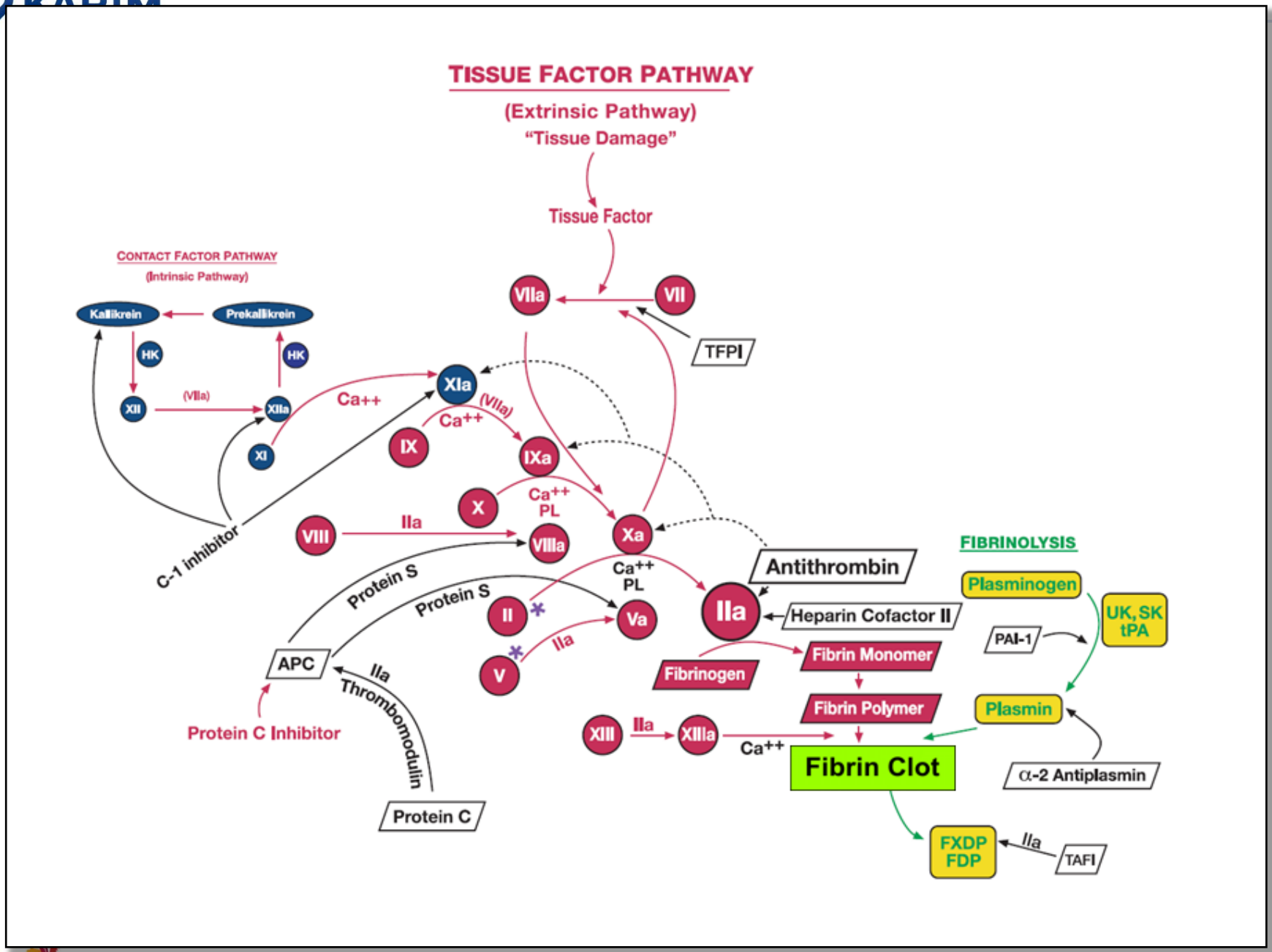
Nascimento et al. CMAJ. 2013 Sep 3;185(12):E583-9

Variable	Group; *n*/*N* (%)		Relative risk (95% CI)	Difference (95% CI)
	Fixed-ratio group *n* = 37	Control group *n* = 32		
All-cause 28-day mortality in ITT analysis*	13/40 (32.5)	5/35 (14.3)	2.27 (0.98 to 9.63)	18.2 (–0.4 to 36.8)
All-cause 28-day mortality per protocol	11/37 (29.7)	3/32 (9.4)	3.17 (1.15 to 18.24)‡	20.3 (2.5 to 38.2)
Death from exsanguination†	8/37 (21.6)	3/32 (9.4)	2.30 (0.74 to 13.03)	12.2 (–4.4 to 28.9)
Neurologic death (traumatic brain injury/withdrawal of care)	2/37 (5.4)	0/32	NA	5.4 (–1.8 to 12.7)
Death from multiple organ failure	1/37 (2.7)	0/32	NA	2.7 (–2.5 to 7.9)

Note: CI = confidence interval, IQR = interquartile range, ITT = intention-to-treat, NA = not applicable.
*For the ITT analysis, data were included for 40 patients in the fixed-r
†Median time of occurrence after arrival to hospital was 2.8 hours (IQ
‡95% CI generated by bootstrap technique with 10 000 simulations; a
of the simulations.



Nascimento et al. CMAJ. 2013 Sep 3;185(12):E583-9

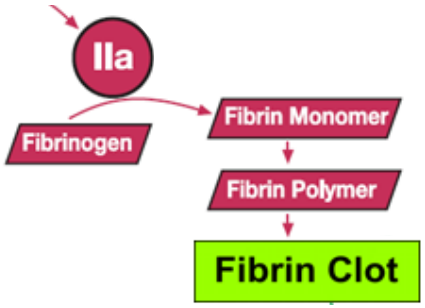

TISSUE FACTOR PATHWAY
(Extrinsic Pathway)
"Tissue Damage"
Tissue Factor
CONTACT FACTOR PATHWAY
(Intrinsic Pathway)
Kallikrein
Prekallikrein
HK
HK
XII
(VIIa)
XIIa
XI
Ca++
XIa
(VIIa)
Ca++
IX
IXa
X
Ca++
PL
Xa
VIII
IIa
VIIIa
C-1 inhibitor
VIIa
VII
TFPI
Protein S
Protein S
Ca++
PL
II
Va
V
IIa
APC
IIa
Thrombomodulin
Protein C Inhibitor
Protein C
Antithrombin
IIa
Heparin Cofactor II
Fibrinogen
Fibrin Monomer
Fibrin Polymer
XIII
IIa
XIIIa
Ca++
Fibrin Clot
FIBRINOLYSIS
Plasminogen
UK, SK
tPA
PAI-1
Plasmin
α-2 Antiplasmin
FXDP
FDP
IIa
TAFI

TISSUE FACTOR PATHWAY

(Extrinsic Pathway)

"Tissue Damage"

HIC SUNT LEONES



- **U masivního krvácení je fibrinogen prvním faktorem, který dosáhne kriticky nízké hladiny!**

Brenni M, et al. Acta Anaesthesiol Scand. 2010;54:111-117

Figure 2. A fibrin blood clot: the constituent parts of a blood clot are shown (red blood cells, red; fibrin fibers, blue; platelet aggregates, purple). From John W. Weisel, PhD, University of Pennsylvania, with permission.

Levy et al. Anesth Analg 2012;114:261-74

JULY 30, 1955 SMALL CHILDREN IN HOSPITAL BRITISH MEDICAL JOURNAL

BLOOD COAGULATION IN OBSTETRIC EMERGENCIES

In pregnancy a haemostatic defect may develop from disturbances of blood coagulation. This haemorrhagic state, arising in some obstetrical emergencies, has been recognized for many years but has recently received renewed attention, and is the subject of two papers in this week's *Journal*. The coagulation abnormality is most commonly seen in association with accidental antepartum haemorrhage,[1] but, as Dr. J. S. Scott (p. 290) and Dr. A. P. Barry and his colleagues (p. 287) point out, it can also occur in amniotic fluid embolism, in association with retention of a macerated foetus in an Rh-immunized mother, in missed abortion, and in hydatidiform mole. The exact nature of this clotting defect is not clearly understood, but two changes have been accepted as features of the condition—deficiency of fibrinogen and an active fibrinolytic system. Some believe that the depletion of fibrinogen is due to excessive utilization as a consequence of intravascular clotting or of the formation of retroplacental clot or of fibrin deposition in the uterine wall ; others suggest that it is a result of abnormally active proteolytic systems in the blood, causing fibrinolysis or possibly fibrinogenolysis.

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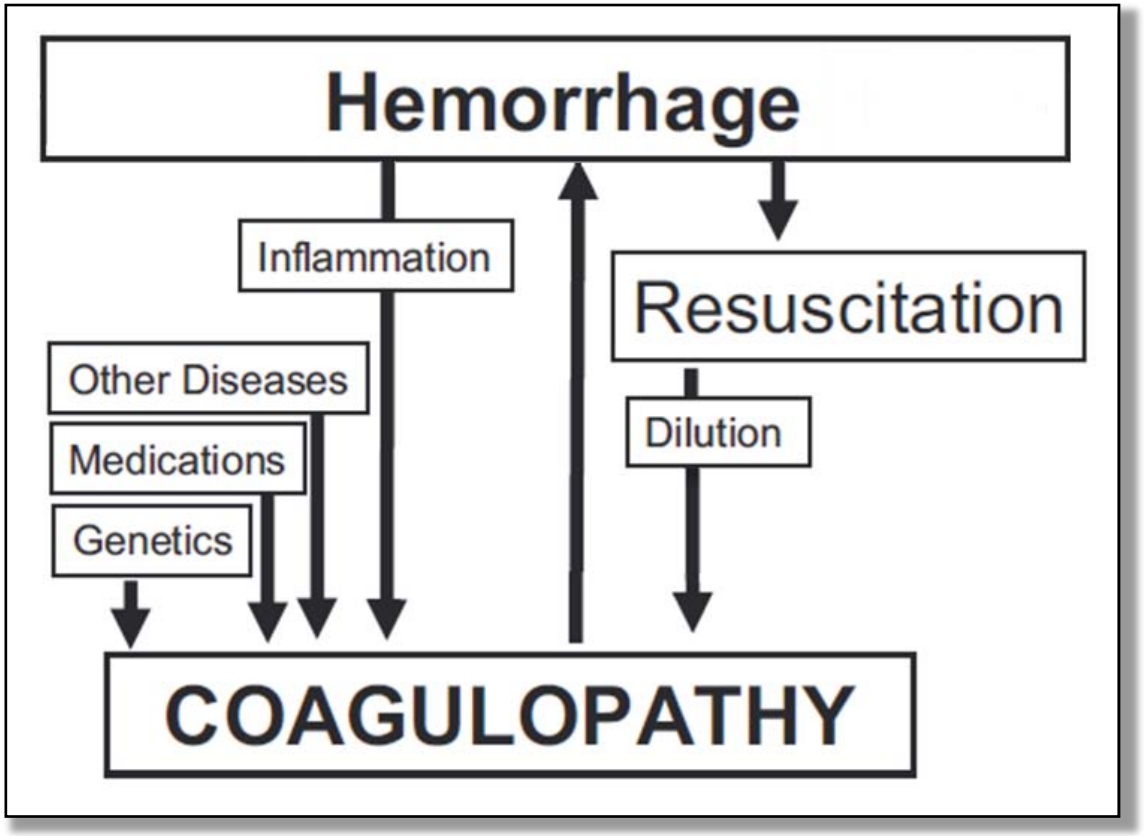
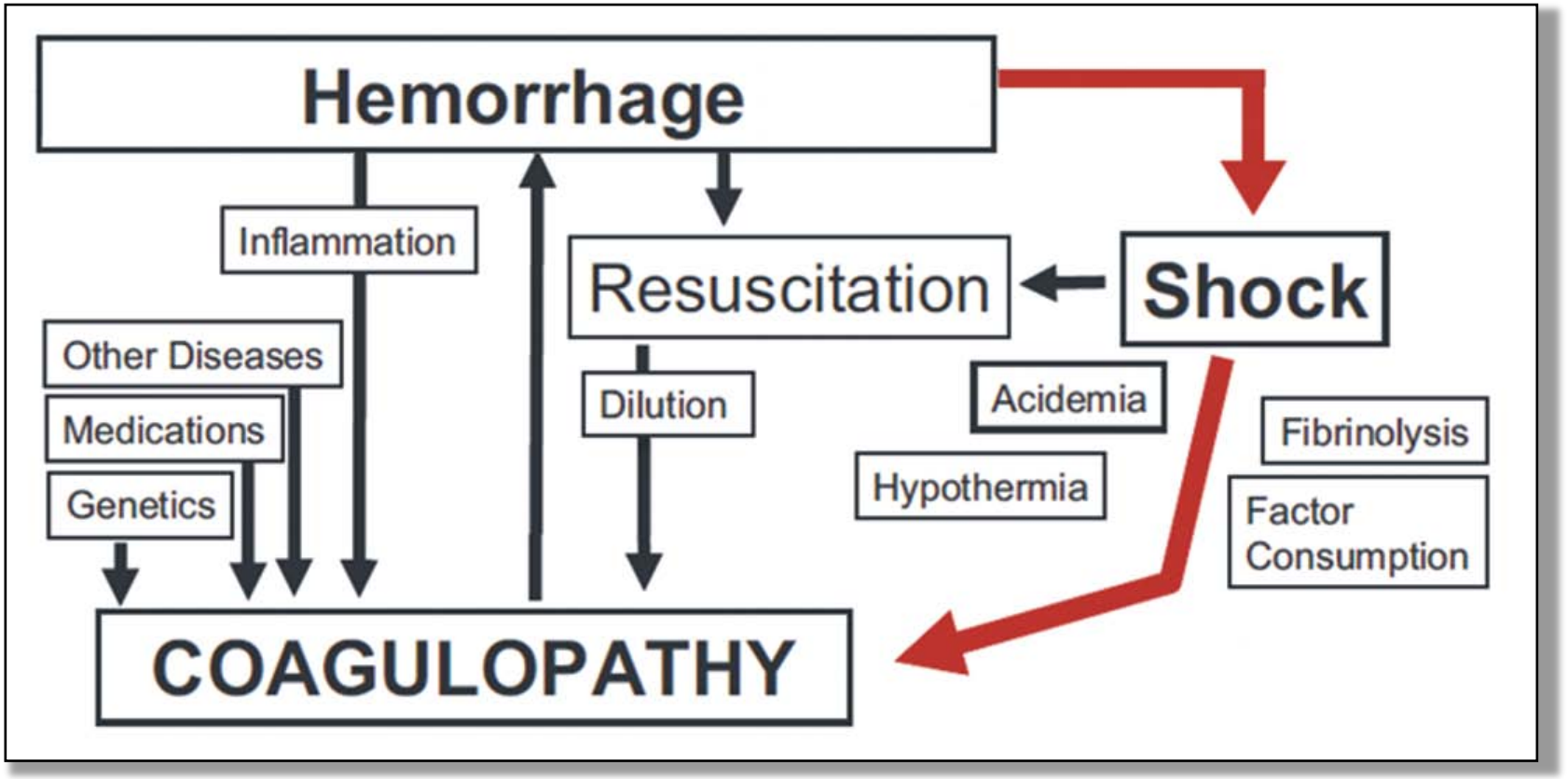
[1] Barry, A. P., Feeney, J. K., and Geoghegan, F. J., *British Medical Journal*, 1955, **2**, 12.
[2] *Surg. Gynec. Obstet.*, 1951, **92**, 27.
[3] *J. Obstet. Gynec.*, 1951, **58**, 538.
[4] *Amer. J. Obstet. Gynec.*, 1952, **64**, 141.
[5] *Renal Cortical Necrosis and the Kidney of Concealed Accidental Haemorrhage*, 1952, Oxford.



Adaptováno z Hess et al. J Trauma. 2008;65:748-54



Adaptováno z Hess et al. J Trauma. 2008;65:748-54

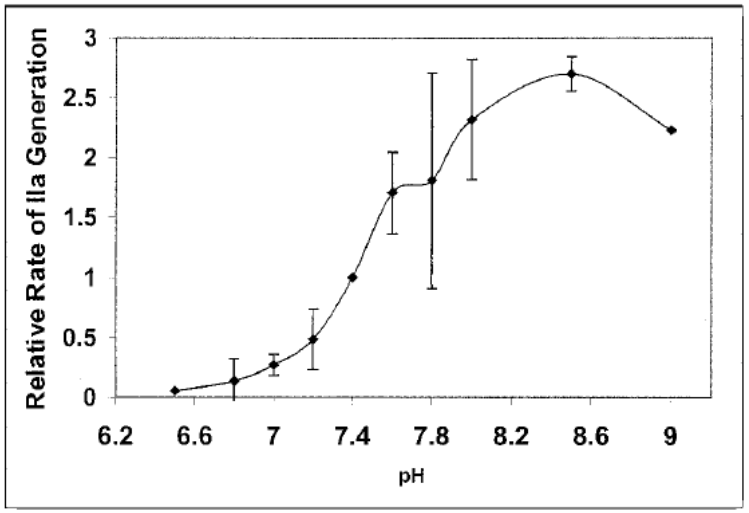


Fig. 3. *Decreasing the pH of the reaction decreased the rate of prothrombin activation by the FXa/FVa complex on phospholipid vesicles. The pattern is very similar to that seen for FVIIa activity. The rates of the reactions have all been set equal to 1 at a pH of 7.4 for comparison.*

Meng ZH et al. *J Trauma. 2003;55:886–891.*

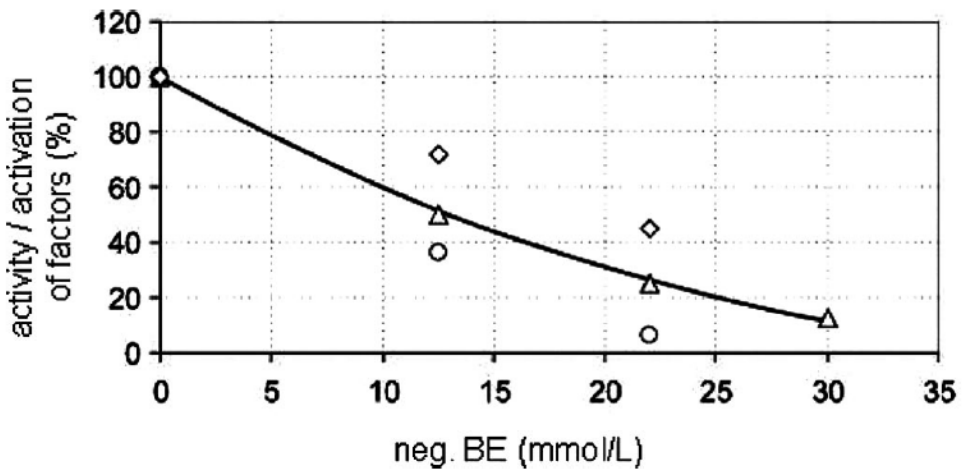
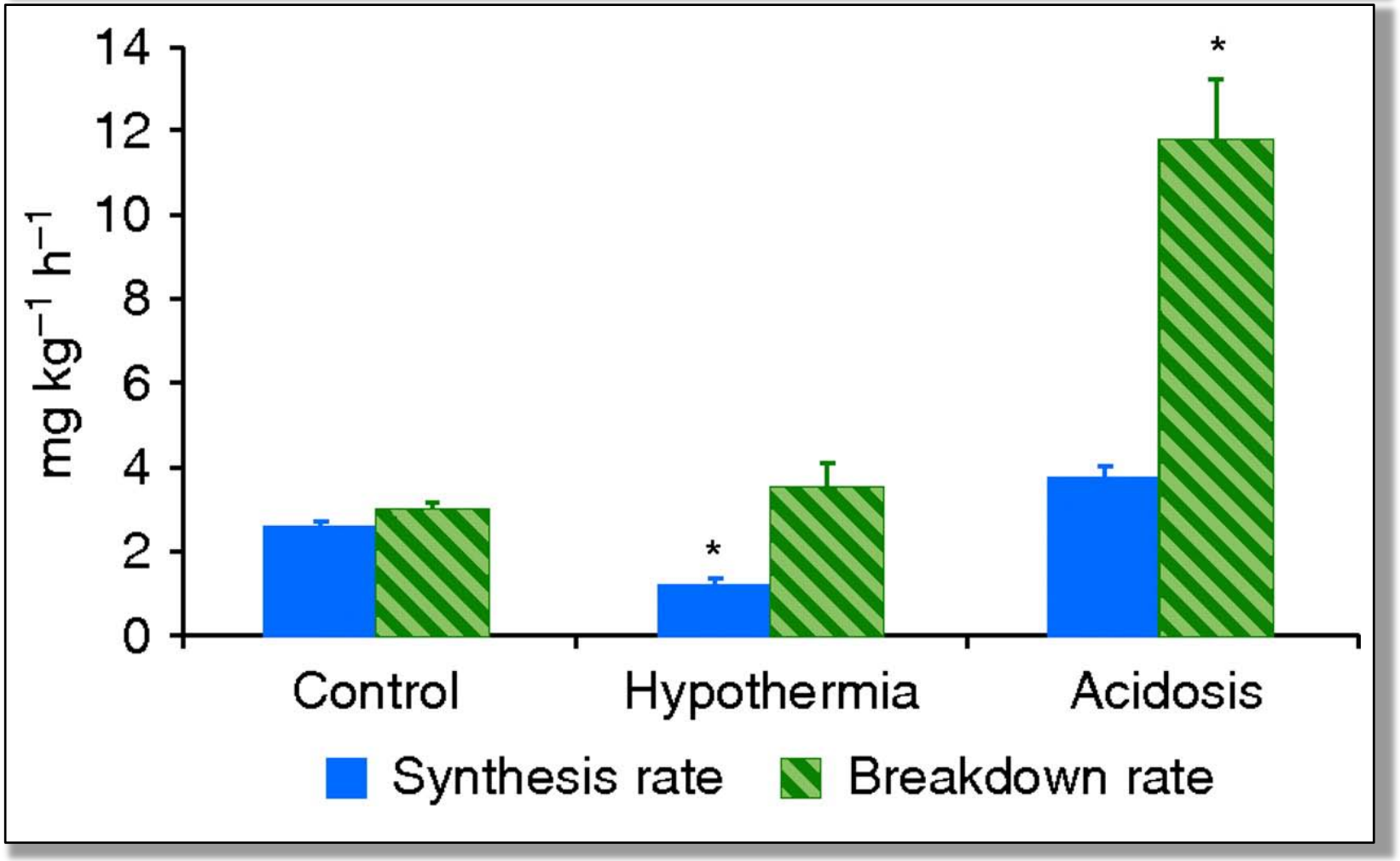


Fig. 1. *Conclusive correlation between the activity respectively activation of different coagulation factors and a negative base excess (BE) (postulating a nonrespiratoric acidosis): ◇ generation of FXa, Δ generation of FIIa, ○ activation of FVIIa (data according to Meng[18], adapted from Zander[31], with kind permission).*

Lier et al. J Trauma. 2008;65:951-60

Changes in fibrinogen synthesis and breakdown in pigs after haemorrhage, hypothermia, and acidosis.



Fries D , and Martini WZ. Br. J. Anaesth. 2010;105:116-121

Table 2

FI concentration–response via thrombelastography.

mg dl^{-1}	R	α
75	237 (198–261)	33.6 (32.4–34.8)
100	156 (141–168)*	49.4 (46.2–53.2)*
150	144 (138–159)*	63.2 (60.7–65.6)*†
200	138 (135–156)*	71.6 (70.2–74.0)*†‡
250	132 (126–144)*	75.8 (75.3–76.9)*†‡ §
300	141 (135–147)*	78.6 (77.9–79.9)*†‡§¶
345	156 (141–165)*	79.8 (78.4–80.4)*†‡§¶

Values are expressed as median (1st–3rd quartiles).
All conditions were the results of eight separate experiments.
*$P < 0.05$ vs. 75 mg dl^{-1},
†$P < 0.05$ vs. 100 mg dl^{-1},
‡$P < 0.05$ vs. 150 mg dl^{-1},
§$P < 0.05$ vs. 200 mg dl^{-1},
¶$P < 0.05$ vs. 250 mg dl^{-1}.

Table 3

FII activity–response via thrombelastography.

%	R	α
1	297 (279–318)	56.6 (55.8–58.4)
6.25	144 (138–156)*	67.3 (65.2–69.2)*
12.5	141 (129–144)*†	67.4 (66.2–69.4)*
25	129 (120–138)*†	72.2 (67.9–72.5)*
50	138 (123–144)*†	75.8 (74.7–77.0)*†‡§
100	156 (141–165)*†‡§¶	79.8 (78.4–80.4)*†‡§¶

Values are expressed as median (1st–3rd quartiles).
All conditions were the results of eight separate experiments.
*$P < 0.05$ vs. 1%,
†$P < 0.05$ vs. 6.25%,
‡$P < 0.05$ vs. 12.5%,
§$P < 0.05$ vs. 25%
¶$P < 0.05$ vs. 50%.

Nielsen VG et al. Acta Anaesthesiol Scand. 2005 Feb;49(2):222-31

- **Hodnoty <1 g/l mohou být samy přímou příčinou masivního krvácení**

Danés AF, et al. *Vox Sang*. 2008;94:221-226

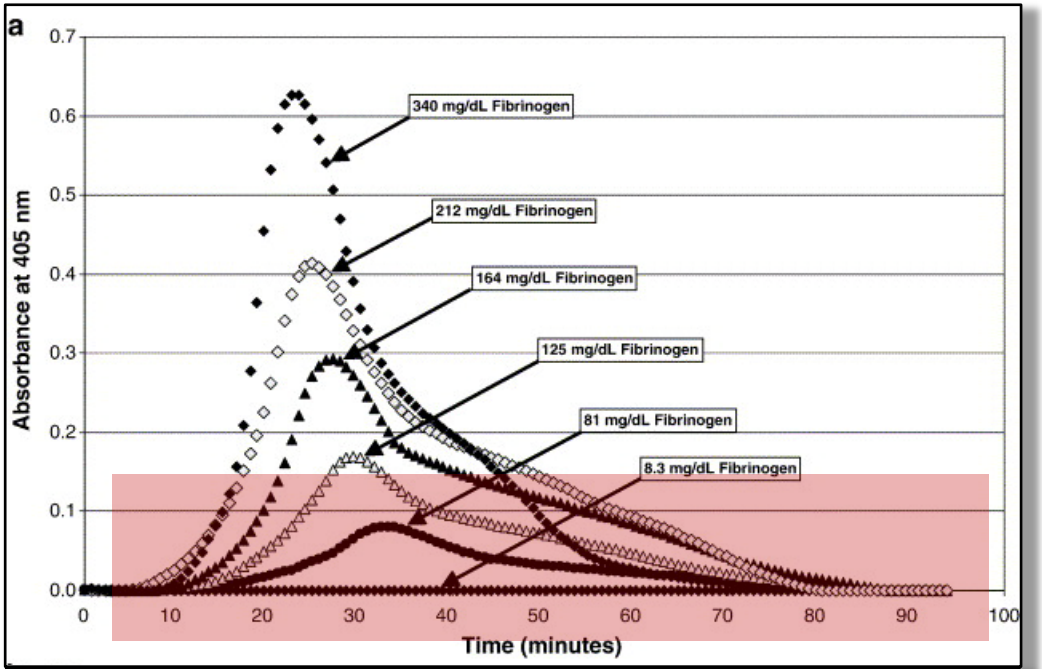


Fig 3. Influence of (a) fibrinogen concentration upon the Clot Formation and Lysis (CloFAL) assay curve.

Goldenberg et al. Thrombosis Research 2005, 116(4):345–356

Table 1 Fibrinogen Content in Various Blood Products

1 unit of FFP	400 mg fibrinogen in ~~200–250 mL~~
1 six-pack of platelets	80 mg × 6 units = 480 mg in 300 mL
1 unit of apheresis platelets	300 mg in 200–250 mL
1 10-unit bag of cryoprecipitate	2,500 mg fibrinogen in about 150 mL
1 unit of fresh whole blood	1,000 mg fibrinogen
1 unit of PRBCs	<100 mg fibrinogen

Source: Dr. John Hess, Pathologist, University of Maryland School of Medicine and R. Adams Cowley Shock Trauma Center; Dr. Clayton Simon, Blood Bank Pathologist, Brooke Army Medical Center.

Stinger H K, et al. J Trauma.2008;64:S79–S85.

Table II. PT, aPTT and coagulation factor levels before and after the infusion of FFP.

	Group 1 **± 12.2 ml/kg**			Group 2 **± 33.5 ml/kg**		
	Preinfusion	Postinfusion	Observed increment	Preinfusion	Postinfusion	Observed increment
PT (s)	22·8 (17–222)	19 (15–36)		24 (17–44)	16 (14–20)	
aPTT (s)	46·4 (30–223)	37 (30–158)		41 (28–198)	30** (24–45)	
FI (g/l)	2·7 (0·2–4·4)	3·4 (0·2–7·2)	0·4 (−1·5–2·9)	1·5 (0·4–4·5)	2·7 (1·7–4·1)	1·0 (−0·9–2·4)
FII (IU/dl)	36·5 (22–65)	56 (43–76)	16 (7–42)	35 (16–73)	83** (60–102)	41* (15–61)
FV (IU/dl)	36 (2–126)	58 (14–121)	10 (−4·7–37)	41 (10–99)	69 (39–119)	28* (−16–51)
FVII (IU/dl)	43 (6·6–99)	55 (17–114)	11 (4–32)	48 (16–91)	85** (54–127)	38* (−3–75)
FVIII (IU/dl)	146 (8–391)	159 (18–360)	10 (−49–46)	157 (58–535)	175 (120–313)	17 (−250–96)
FIX (IU/dl)	83 (29–165)	98 (41–167)	8 (−6–30)	73 (43–174)	114 (65–156)	28* (−35–53)
FX (IU/dl)	49 (28–133)	61 (50–94)	15 (−73–43)	53 (16–94)	88** (65–104)	37* (−5–65)
FXI (IU/dl)	38 (20–105)	48 (38–101)	9 (−4·3–32)	34 (15–58)	55** (41–80)	23* (6–37)
FXII (IU/dl)	39 (27–64)	57 (44–83)	30 (1–37)	30 (5–69)	73** (60–105)	44* (23–66)

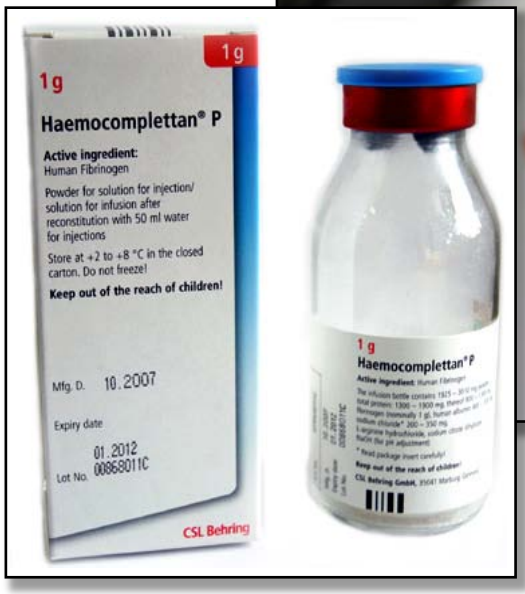
The median and 10th and 90th percentiles for PT, apt and coagulation factor levels in groups 1 and 2 before and after FFP infusion and observed increments are shown. The coagulation factor levels were not statistically different between the two groups before the infusion.

*Observed increment in group 2 was significantly greater than group 1 (Mann–Whitney *U*-test, $P < 0{\cdot}05$).

**Significant difference when comparing groups 1 and 2 post-transfusion (Mann–Whitney *U*-test, $P < 0{\cdot}05$).


11
12


12
11


1g
Haemocomplettan® P
Active ingredient:
Human Fibrinogen
Powder for solution for injection/ solution for infusion after reconstitution with 50 ml water for injections
Store at +2 to +8 °C in the closed carton. Do not freeze!
Keep out of the reach of children!
Mfg. D. 10.2007
Expiry date
01.2012
Lot No. 00868011C
CSL Behring
1g
Haemocomplettan® P

Peripartální život ohrožující krvácení

Poruchy děložního tonu - poporodní hypo/atonie děložní	**70 % - 80 %**
Porodní trauma - lacerace hrdla, pochvy, perinea - pánevní hematomy - děložní ruptura, peroperační komplikace - inverze dělohy	**10 % - 15 %**
Patologie tkání - placenta adherens, placenta accreta	**1 % - 5 %**
Koagulopatie - DIC časný (embolie plodovou vodou, abrupce !!!)	**1 % - 3 %**

Pařízek A et al. Kritické stavy v porodnictví, 2012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