European Society of
Regional Anaesthesia
& Pain Therapy

ESRA ITALIA

ESRA Cè

XXIX CONGRESSO NAZIONALE

ESRA Italian Chapter

CESENA, Cesena fiere

7-9 Novembre 2024

Presidente del congresso
Vanni Agnoletti
Domenico Pietro Santonastaso
Andrea Tognù

MZ EVENTS

European Society of Regional Anaesthesia & Pain Therapy
ESRA ITALIA
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XXIX CONGRESSO NAZIONALE
7-9 Novembre 2024
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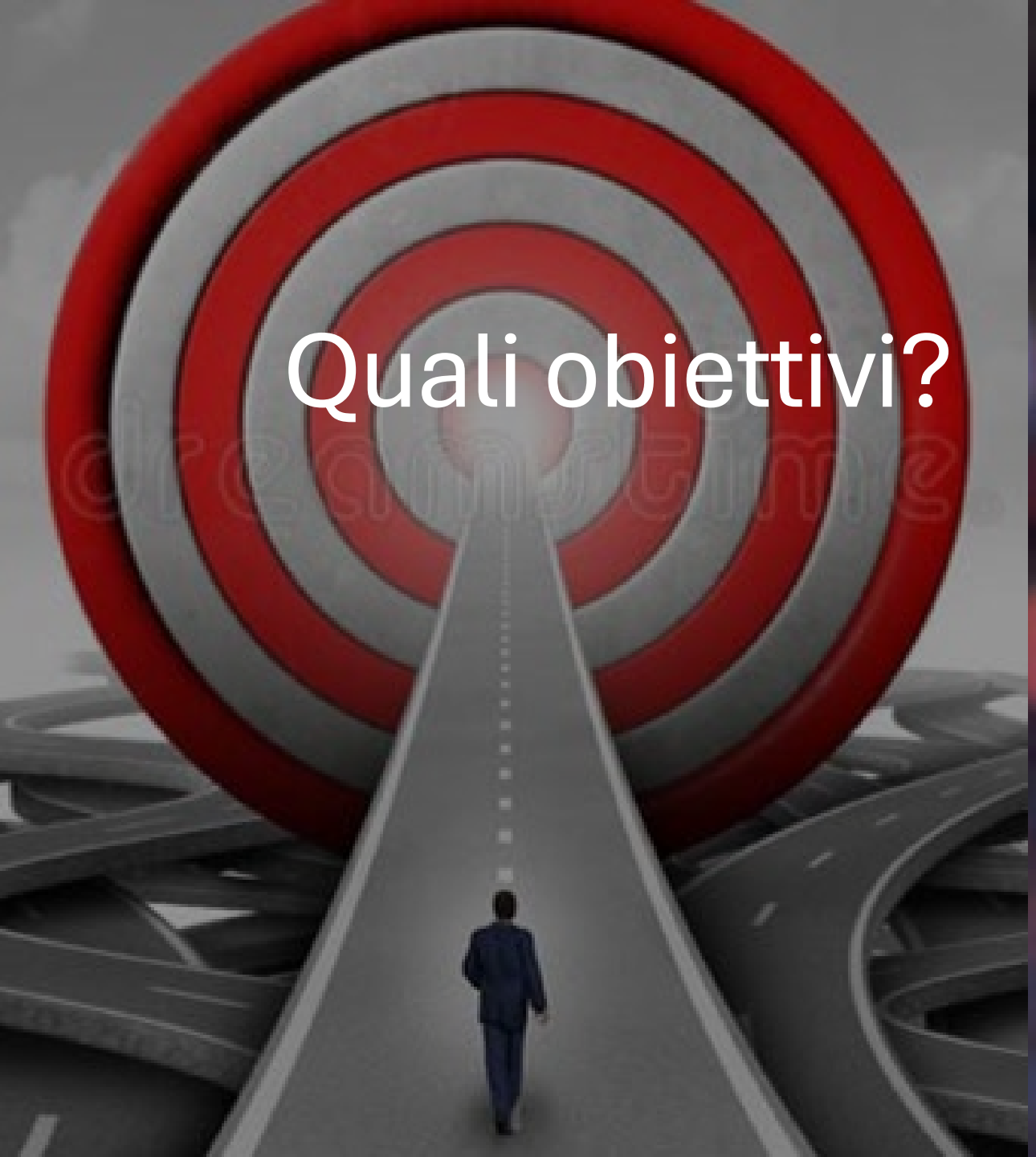
ALGORITMO NELLA GESTIONE DELL'EMORRAGIA POST PARTUM

Terapia di supporto, ripristino della volemia e impiego degli emoderivati.

Maria Grazia FRIGO

UOSID Anestesia e Rianimazione Ostetrica ,
Ospedale Isola Tiberina,Gemelli Isola, Roma


Quali obiettivi?


Quale algoritmo?
BLOCK 01
NODE 01
NODE 03
NODE 04
NODE 05

1. Riconoscere la causa eziologica
2. Mantenere la contrattilità uterina con mezzi fisici e/o farmacologici
3. Ripristinare e mantenre la volemia (e quindi la capacità di trasporto dell'O_2)
4. Prevenire/Trattare la coagulopatia emorragica eventualmente instauratesi e trasferire in SO

RIVALUTAZIONE CONTINUA

GOLDEN HOUR®

QUANTO TEMPO ABBIAMO?

Si stima, che se non adeguatamente trattata, la morte si verifichi in media in ***2h nell'EPP primaria***

ISS SNLG, RCOG, AOGOI

TONO 70%

- Anomalie uterine
- Storia di EPP
- Atomnia uterina
- Infezioni uterine
- Ossitocina
- Arresto discesa PP
- Travbaglio precipitoso o prolungato

TRAUMA 20%

- Parto strumentale
- LAcerazione cervice uterina, vagina, perineo

TESSUTO 10%

- Placenta ritenuta
- Anomalie placentari

TROMBINA 1%

- Uso di anticoagulant
- Embolia Liquido Amniotico
- MEF
- DIC

Cause sconosciute:

- Rottura/Inversione Uterina
- Emorragia non evidente (emoperitoneo)
- Cause non genitali: rotture epatiche e/o spleniche

RACCOMANDAZIONI

In presenza di EPP si raccomanda come trattamento farmacologico di prima linea:

- **ossitocina 5 UI in bolo endovenoso lento (non meno di 1-2 minuti; non meno di 5 minuti in donne con rischio cardiovascolare)**

oppure

- **ergometrina (2 fiale 0,2 mg per via intramuscolare)**

oppure

- **combinazione di ossitocina 5 UI per via endovenosa (non meno di 1-2 minuti; non meno di 5 minuti in donne con rischio cardiovascolare) ed ergometrina (2 fiale 0,2 mg intramuscolare) da associare a una terapia di mantenimento con ossitocina per infusione (10 UI in soluzione isotonica per 2 ore).**

raccomandazione forte, prove di qualità molto bassa

In presenza di EPP, si raccomanda di associare al trattamento farmacologico il massaggio del fondo dell'utero fino alla sua contrazione o alla riduzione del sanguinamento avvertendo la donna che la manovra può essere dolorosa.

raccomandazione forte, prove di qualità bassa

Si raccomanda di valutare come trattamento farmacologico di seconda linea, in presenza di EPP non responsiva al trattamento di prima linea:

- **ergometrina (2 fiale 0,2 mg intramuscolare)**

e/o

- **sulprostone (1 fiala 0,50 mg per via endovenosa in 250 cc; da 0,1 a 0,4 mg/h fino a un max di 1,5 mg nelle 24 ore).**

raccomandazione debole, prove di qualità molto bassa

In assenza di prove che permettano di raccomandare un intervento farmacologico di seconda linea come più efficace rispetto agli altri si raccomanda di scegliere il trattamento in base alle condizioni cliniche della paziente, all'expertise del professionista, alla disponibilità dei farmaci e alle loro controindicazioni.

raccomandazione di buona pratica clinica basata sull'esperienza del *panel*

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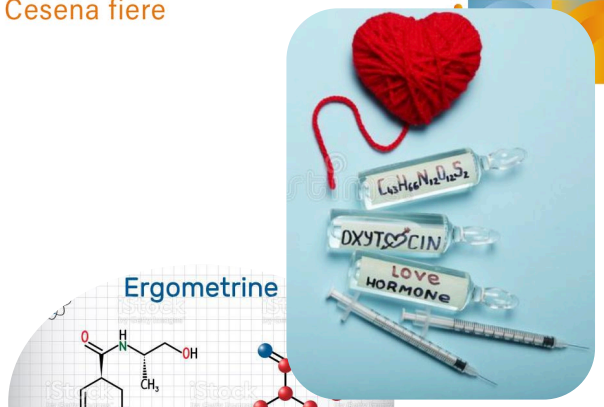

Terapia Uterotonica

LINEA GUIDA

Sistema nazionale per le linee guida

Emorragia post partum:
come prevenirla,
come curarla

PLETHORA GRAVIDARUM: ipervolemia protettiva

- La gittata cardiaca aumenta dal 30 al 50% a partire dalla 6°settimana

- Il volume totale di sangue aumenta proporzionalmente alla gittata cardiaca,

ma l'aumento del volume plasmatico è maggiore rispetto alla massa dei globuli rossi

- ☐ Volume plasmatico aumenta del 48% pari a 1250 ml
- ☐ Massa eritrocitaria aumenta del 18% pari a 250 ml
- ☐ Ematocrito dal 40% si riduce al 33%
- ☐ L' emoglobina si riduce per diluizione (da 13.3 a circa 12.1 g/dl)

Riduzione della viscosità ematica che migliora la perfusione placentare favorendo gli scambi materno fetali di gas e sostanze nutritive

La donna gravida è diversamente fisiologica

“Seeing is not believing - it is only seeing.”

George MacDonald,
The Princess and the Goblin

QUANTIFICARE E’ MEGLIO CHE STIMARE

- Non tutte le emorragie sono visibili
- La stima visiva sottostima di circa il 30-50%
- La quantificazione delle perdite di sangue (QBL) è un modo significativo più preciso di EBL
- QBL riduce il rischio di sottostima e di ritardo nel trattamento
- La simulazione può migliorare l’abilità visiva di EBL ma tale abilità si deteriora entro 9 mesi

COME MISURARE IL QBL

- Misurare la perdita di liquidi e sangue utilizzando sacca graduata e/o pesare le garze imbevute di sangue e coaguli
- Misurare la perdita prima e dopo il secondamento

1 grammo = 1 millilitro di sangue

OPEN ACCESS Freely available online

PLOS ONE

bre 2024

na fiere

A Systematic Review of the Relationship between Blood Loss and Clinical Signs

Rodolfo Carvalho Pacagnella[1]*, João Paulo Souza[2], Jill Durocher[3], Pablo Perel[4], Jennifer Blum[3], Beverly Winikoff[3], Ahmet Metin Gülmezoglu[2]

- **Introduction:** This systematic review examines the relationship between blood loss and clinical signs and explores its use to trigger clinical interventions in the management of obstetric haemorrhage.
- **Conclusion:** This systematic review found a substantial variability in the relationship between blood loss and clinical signs, making it very difficult to establish specific cut-off points for clinical signs that could be **used as triggers of clinical interventions. However, the shock index was found to be an accurate indicator of compensatory changes** in the cardiovascular system due to blood loss.

Indice di Shock
FC/PAS
0,5 – 0,7
0,7 – 0,9

Indice di Shock Ostetrico
se > 1 indicatore di gravità clinica e di necessità di trasfondere

Cochrane Database Syst Rev 2014 Feb; 2014 Treatment for primary postpartum haemorrhage
PLoS One. 2013;8(3):e57594 A systematic review of the relationship between blood loss and clinical signs.
Pacagnella RC1, Souza JP, Durocher J, Perel P, Blum J, Winikoff B, Gülmezoglu AM.

European Society of Regional Anaesthesia & Pain Therapy
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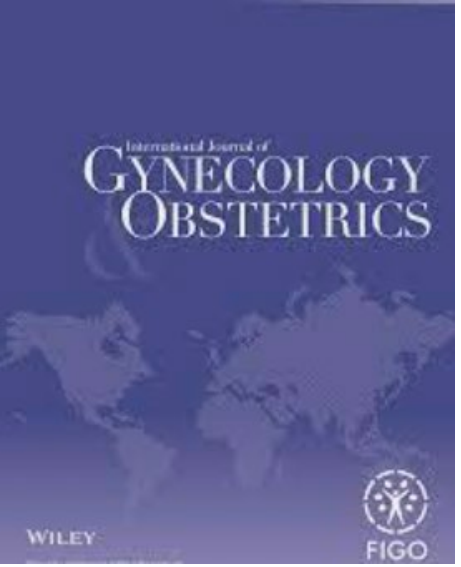
SHOCK INDEX & clinica

	CLASSE 1 Compensato	CLASSE 2 Lieve	CLASSE 3 Moderato	CLASSE 4 Grave
PERDITA EMATICA %	10-15%	15-25%	25-35%	35-45%
PRESSIONE SISTOLICA	normale	Lieve riduzione 80-100mmHg	Importante riduzione 70-80mmHg	Notevole riduzione 50-70mmHg
FREQUENZA CARDIACA	< 100 bpm	>100 bpm	>120 bpm	>140 bpm
FREQUENZA RESPIRATORIA	14-20 atti7min	20-30 atti/min	30-40 atti/min	>40 atti/min
SEGNI/ SINTOMI	Palpitazioni, tremori, tachicardia	Debolezza, sudorazion, tachicardia	Agitazione, pallore, oliguria	Collasso, fame d'aria, anuria
SHOCK INDEX	>0.6	> 0.6 <1.0	>1 <1.4	>1.4
Management	Osservazione / integrazione	Integrazione e uterotonici	Management attivo urgente	Management attivo critico

SIAARTI



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FIGO
International Federation of Gynecology and Obstetrics
the Global Voice for Women's Health

FIGO recommendations on the management of postpartum hemorrhage 2022

5 | SHOCK INDEX EVIDENCE IN POSTPARTUM HEMORRHAGE EVALUATION AND MANAGEMENT

Shock refers to a reduction in tissue perfusion, which is insufficient to meet the metabolic requirements of tissues and organs. Insufficient blood flow may be clinically identified as the development of one or more of the following: lactic acidosis, altered mental status, oliguria, and tachycardia. Vital signs monitoring is key to hemodynamic assessment and prompt intervention.[1] In healthy pregnant and postpartum women, cardiologic physiologic compensatory mechanisms prevent changes in vital signs until a large volume of blood has been lost (usually >1000 ml). Hence, changes in clinical and vital signs that result from hemorrhage appear late in the process and may not lead to early identification of PPH. This in turn makes it difficult to establish cutoff points to trigger clinical interventions. Moreover, because traditional vital signs change late and are less reliable as triggers for clinical actions, other indicators could help to characterize maternal hypovolemia caused by bleeding.[2] Although the use of conventional individual vital signs (pulse and systolic blood pressure) may lack accuracy in the assessment of hypote[illegible] both may transform routine cli[illegible]ica- tor of hypovolem[illegible] the ratio of heart[illegible] prove the predict[illegible] aids early identifica[illegible] the result of obstetric cause[illegible] proposed as a reliable indicator of adverse mate[illegible] outcomes,[6] and its values have been set to indicate clinical management.[7] However, the association between shock parameters and advanced treatment modalities in severe PPH has yet to be reported.

5.1 | Assessment of circulating blood volume in postpartum hemorrhage

The essential cornerstone of management of PPH involves prompt diagnosis and rapid replacement of lost blood volume, as well as the oxygen-carrying capacity of blood, accompanied by immediate medical and surgical measures to address the underlying cause(s), and hence prevent more loss. To assess the patient's condition, SI has been introduced as a simple and clinically effective vital sign.

The SI has been shown to have an inverse linear relationship with left ventricular stroke work in acute circulatory failure. Therefore, a concurrent reduction of left ventricular stroke work (induced by hemorrhage, trauma, or sepsis) was associated with an elevation of the SI and a deterioration in left ventricular mechanical performance. Poor left ventricular function or persistent abnormal elevation of the SI after aggressive therapy and hemodynamic stabilization was associated with increased mortality in critically ill, traumatized patients.[8] In obstetric and nonobstetric circumstances, the absence of a significant drop in blood pressure in patients with PPH may mask the actual hypovolemic status due to physiological compensatory mechani[illegible]e SI was the only promising marker th[illegible] loss.[2,5]

The SI, togeth[illegible]ols that may aid clinicians in a[illegible] blood loss and the degree o[illegible] in systolic blood pressure, he[illegible]e blood loss, and thus the SI increa[illegible]oximated blood loss of 30% of normal (70 [illegible], 100 ml/kg throughout pregnancy), defined by a fall of 30% in hematocrit, a fall of 30% in hemoglobin (approximately 3 g/dl), a fall of 30 mm Hg in systolic blood pressure, and a rise in pulse rate by 30 beats per minute.[10] It has been shown that an SI ≥0.9 is associated with increased mortality and an SI>1 increases the likelihood of blood transfusion.[11,12] To date, standard obstetric SI has been defined as 0.7–0.9 compared with 0.5–0.7 for the nonpregnant population, taking into account the hemodynamic changes of pregnancy may delay the recognition of hypovolemia.[5] If intravascular volume depletion is suspected, a rapid clinical assessment is required because the patient's clinical condition can deteriorate, leading to the development of hemorrhagic shock rapidly. Proper medical record-taking skills may highlight symptoms associated with shock such as pain and overt blood loss, as well as general malaise, anxiety, and dyspnea. Notably, in settings where few PPH treatment options exist, and in cases of home deliveries, diagnosis and treatment or referral must occur even earlier than in hospital settings to improve outcomes. For that reason, SI may be a valuable threshold in LMICs, where mortality is highest and is often related to delays in complication recognition, transportation, and level of care at the facility.[2] A threshold of SI ≥0.9 should be tested to alert community healthcare providers of the need for urgent transfer.[13]

BOX 2 FIGO recommends use of the shock index in the diagnosis and management of PPH.

FIGO considers that the shock index can be a marker of the severity of PPH and can alert teams to hemodynamic instability when its value is greater than 0.9.

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1. Schorn MN. Measurement of blood loss: review of the literature. *J Midwifery Womens Health*. 2010;55:20–27.
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3. Arulkumaran S, Karoshi M, Keith LG, Lalonde AB, B-Lynch C. *A comprehensive textbook of postpartum hemorrhage: an essential clinical reference for effective management*. Sapiens Publishing; 2012.
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5. Pacagnella RC, Souza JP, Durocher J, et al A systematic review of the relationship between blood loss and clinical signs. *PLoS One*. 2013;8:e57594.

Se.....

PAS scende di 30mmHg
Aumento Fc > 30bpm
Aumento FR > 30 atti/minuto
Output urinario <30ml/h
L'Hb e Hct diminuiscono del 30%

....è probabile che la donna abbia perso il 30% del volume di sangue circolante, configurandosi un quadro di

SHOCK da MODERATO a GRAVE

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SCHEDA MEOWS

(Modified Early Obstetrics Warning System)

		Ora											
Atti respiratori/min.	≥ 25												
	20-24												
	11-19												
	≤ 10												
SpO2	96-100%												
	≤ 95%												
Temperatura C°	≥ 38												
	37,5-37,9												
	36-37,4												
	35,1-35,9												
	≤ 35												
Frequenza cardiaca bpm	≥ 120												
	100-119												
	60-99												
	50-59												
	< 50												
Pressione sistolica mmHg	≥ 160												
	140-159												
	100-139												
	91-99												
	≤ 90												
Pressione diastolica mmHg	≥ 100												
	90-99												
	50-89												
	41-49												
	≤ 40												
Diuresi	> 30 cc/h												
	≤ 30 cc/h												
Livello di cosdenza	Vigile												
	Voce												
	Dolore												
	Non responsiva												
Dolore	0												
	1												
	2												
Totale parametri rossi													
Totale parametri gialli													

	Red trigger	Yellow trigger
Temperature; °C	< 35 or > 38	35–36
Systolic BP; mmHg	< 90 or > 160	150–160 or 90–100
Diastolic BP; mmHg	> 100	90–100
Heart rate; beats.min^{-1}	< 40 or > 120	100–120 or 40–50
Respiratory rate; breaths.min^{-1}	< 10 or > 30	21–30
Oxygen saturation; %	< 95	–
Pain score	–	2–3
Neurological response	Unresponsive, pain	Voice

1	🟨		**Ripetere controllo parametri tra i 30 e i 60 minuti**
2	🟨	**O**	**Chiamare medico per valutazione. Ripetere parametri a 30 minuti**
1	🟥		
>2	🟨	**O**	**Chiamare medico per valutazione immediata. Ripetere parametri dopo 15 minuti**
>1	🟥		

Singh S, McGlennan A, et al. A validation study of the CEMACH recommended modified early obstetric warning system (MEOWS). Anaesthesia 2012

Table 1. Changes in coagulation and fibrinolysis parameters at term gestation (6–10).

Blood coagulation factors	
Factor I (fibrinogen)	Increased
Factor II (prothrombin)	No change or increased
Factor V (proaccelerin)	No change or increased
Factor VII (proconvertin)	No change or increased
Factor VIII (antihemophilic factor)	Increased
Factor IX (Christmas factor)	No change or increased
Factor X (Stuart-Power factor)	Increased
Factor XI (thromboplastin antecedent)	No change or decreased
Factor XII (Hageman factor)	No change or increased
Factor XIII (fibrin stabilizing factor)	Increased
Von Willebrand factor	Increased
Tissue factor	No change or increased
Other coagulation parameters	
Platelet count	No change or decreased
Prothrombin time	Shortened
Activated partial thromboplastin time	Shortened
Fibrin degradation products	Increased
Blood coagulation inhibitors	
Antithrombin III	No change or decreased
Protein C	No change or increased or decreased
Protein S	Decreased
Thrombomodulin	Increased
Tissue factor pathway inhibitor	Increased
Fibrinolysis	
Plasminogen	Increased
Tissue-type plasminogen activator	No change or increased
Plasminogen activator inhibitor-1 (produced in endothelial cells)	Increased
Plasminogen activator inhibitor-2 (produced in placenta)	Increased

CONGRESSO
NAZIONALE

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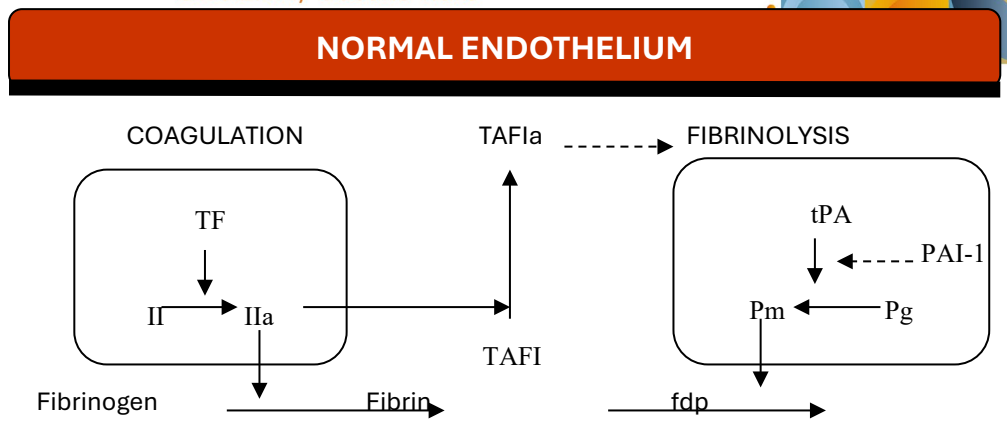
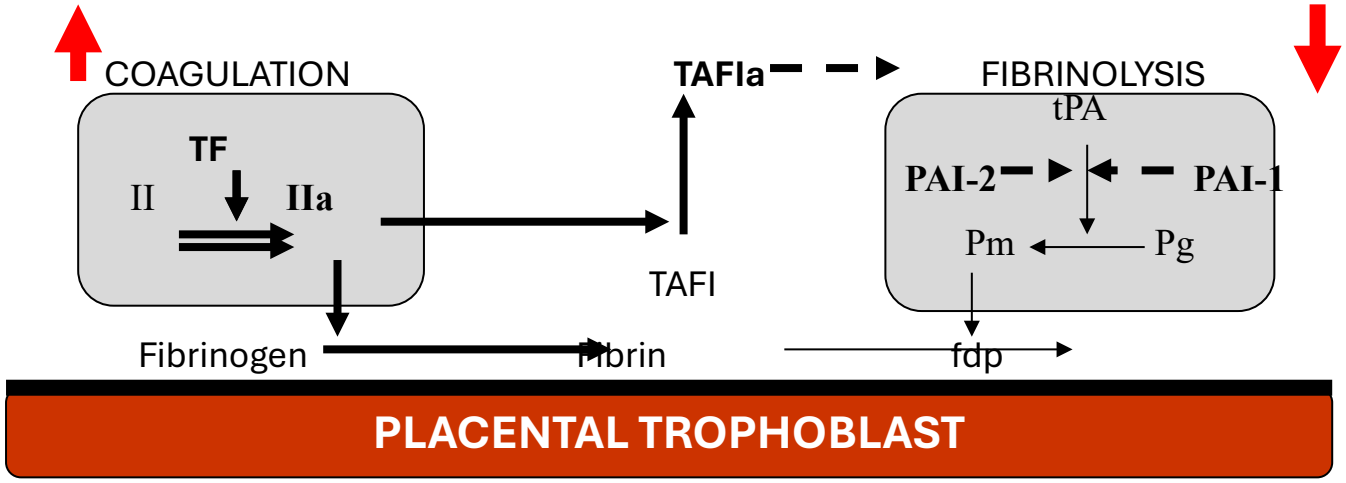




Profilo coagulativo.....

Cosa cambia in gravidanza??

NON ATTENDERE I RISULTATI DEL LABORATORIO PER INIZIARE IL TRATTAMENTO

.....rivalutare i parametri ogni 30-60 minuti

TRIADE FATALE:
ACIDOSI
IPOTERMIA
COAGULOPATIA

EGA: pH, Hb, Lattati

ESAMI DI LABORAT zione, Gruppo

ROTEM/TEG

CENTRO TRASFUSI nazie leucodeplete

EJA
Eur J Anaesthesiol 2023; 40:29–38
OPEN

REVIEW ARTICLE

Haemostatic support in postpartum haemorrhage

A review of the literature and expert opinion

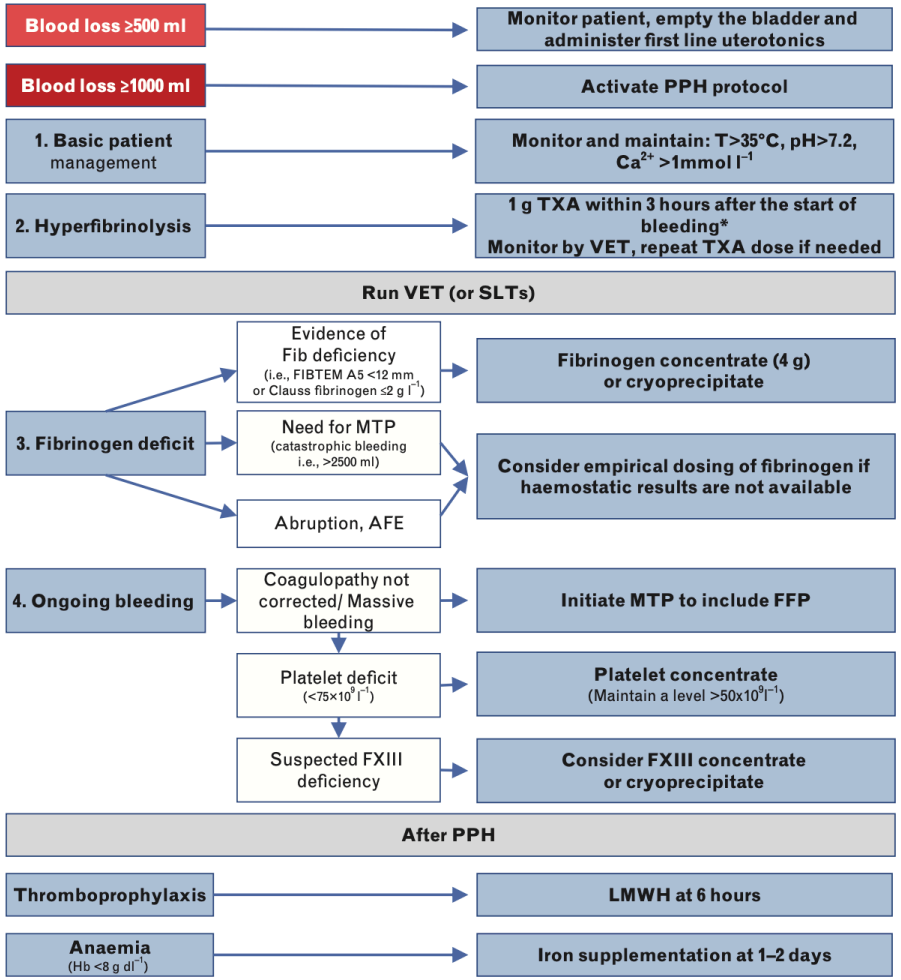
Stefan Hofer, Jan Blaha, Peter W. Collins, Anne-Sophie Ducloy-Bouthors, Emilia Guasch, Francesco Labate, Filipa Lança, Lill Trine Nyfløt, Kostja Steiner and Marc Van de Velde

*Treatment of coagulopathy should be considered **early** and **simultaneously with the other strategies**....*

*Iniziazion of haemostatic treatment is guided by the **volume of blood loss.***

Blood loss equal or greater than 500 ml should trigger infusion of TXA and close monitoring of the patient, including initial SLTs (Clauss fibrinogen) , VET (ROTEM/TEG).

Fig. 4 Suggested haemostatic treatment algorithm in PPH.



*Caution is needed in patients receiving more than 2 g day^{-1} due to potential renal and epileptogenic effects of TXA. AFE, amniotic fluid embolus; F, factor; FFP, fresh frozen plasma; FIBTEM, fibrinogen thromboelastometry; Fib, fibrinogen; Hb, haemoglobin; LMWH, low-molecular-weight heparin; MTP, massive transfusion protocol; PPH, postpartum haemorrhage; SLTs, standard laboratory tests; TXA, tranexamic acid; VET, viscoelastic testing.

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JULY 6, 2023 VOL. 389 NO. 1

Randomized Trial of Early Detection and Treatment of Postpartum Hemorrhage

I. Gallos, A. Devall, J. Martin, L. Middleton, L. Beeson, H. Galadanci, F. Alwy Al-beity, Z. Qureshi, G.J. H
N. Moran, S. Fawcus, L. Sheikh, G. Gwako, A. Osoti, A. Aswat, K.-M. Mammoliti, K.N. Sindhu, M. Poc
I. Horne, R. Timms, I. Yunas, J. Okore, M. Singata-Madliki, E. Arends, A.A. Wakili, A. Mwampashi, S. Na
S. Muhammad, P. Latthe, C. Evans, S. Akter, G. Forbes, D. Lissauer, S. Meher, A. Weeks, A. Shenn
A. Ammerdorffer, E. Williams, T. Roberts, M. Widmer, O.T. Oladapo, F. Lorencatto, M.A. Bohren, S. M
F. Althabe, M. Gülmezoglu, J.M. Smith, K. Hemming, and A. Coomarasamy

E-MOTIVE

Trial randomizzato
210.132 donne, parto vaginale

Diagnosi precoce
+
Interventi combinati

↓

↓ EPP>1000ml
Laparotomia
Morte materna

E M O T IV E

Early Detection and Trigger Criteria	Massage of Uterus	Oxytocic Drugs	Tranexamic Acid	IV Fluids	Examination and Escalation
Calibrated drape for the the collection of blood, with trigger lines at 300 ml and 500 ml for the first hr after birth Observations (blood loss, blood flow, uterine tone) every 15 min documented on the blood-loss monitoring chart Blood pressure and pulse monitored once in the first hr post partum and documented on the blood-loss monitoring chart	Massage until uterus has contracted or for 1 min	10 IU IV oxytocin injected or diluted in 200–500 ml crystalloid administered over 10-min period, plus a maintenance dose of 20 IU IV oxytocin diluted in 1000 ml saline administered over 4-hr period (with misoprostol 800 μg if used)	1 g IV tranexamic acid injected or diluted in 200 ml crystalloid administered over 10-min period	IV fluids in addition to the infusion should be given if clinically indicated for resuscitation and will require a second intravenous access	Ensure bladder is empty, evacuate clots, check for tears with an internal examination and placenta for completeness Escalate if bleeding does not stop after first response or clinician is unable to identify or manage cause of bleeding

Trigger Criteria
Clinical judgment
Blood loss ≥500 ml
Blood loss ≥300 ml plus one abnormal observation

Implementation Strategies

Audit newsletters: Sharing with all staff monthly rates of detection and bundle use, along with rates of PPH, severe PPH, blood transfusion, laparotomy, and death from PPH and giving feedback at monthly departmental meetings

Champions: Midwife and doctor to oversee change, troubleshoot, give feedback on audit newsletters, connect with other champions by means of chats, meetings, and websites for sharing knowledge and lessons learned

Trolley or carry case: Restocking of all medicines and devices used for treatment of PPH after every use and completion of a stocking checklist at the start of every shift

Training: Onsite, simulation-based, and peer-assisted training, lasting from 90 min to an entire workday, facilitated by the use of provider guides, flipcharts, and job aids displayed in labor wards

Reintegrare il volume circolante con infusione di cristalloidi…
….in attesa di emazie,
per sostenere la volemia e mantenere la perfusione tissutale

- **Boli da 500ml**
- **Soluzioni bilanciate per**

ridurre il rischio di ac iperCloremica

- **Dopo ogni bolo rivalutare lo stato clinico del pz**

TARGET PRESSORIO
MAP 50-60 mmHg
PAS 80-90 mmHg
Fino al controllo dell'emorragia
(Raccomandazione 1C)

N.B. L'utilizzo di elevati volumi di cristalloidi può determinare una coagulopatia diluizionale

11.2.2 | Intravenous fluids

Among the initial strategies for reanimation, the administration of crystalloids in small boluses of 500 ml is recommended.[10] Scientific

balanced crystalloid solution at first

the worsening of kidney function with chlorine-rich fluids (saline solution).[7] This is particularly important for LMICs, where saline-based solutions are in abundance. After the administration of each bolus, physicians must assess the clinical status of patients, looking for an improvement in signs and symptoms of shock resulting from blood loss.[10]

11.2.1 | Hypotensive resuscitation

The concept of hypotensive resuscitation is because administering small crystalloid volumes reduces the risk of dilutional coagulopathy

Rossaint et al. Critical Care (2016) 20:100
DOI 10.1186/s13054-016-1265-x

Critical Care

RESEARCH Open Access

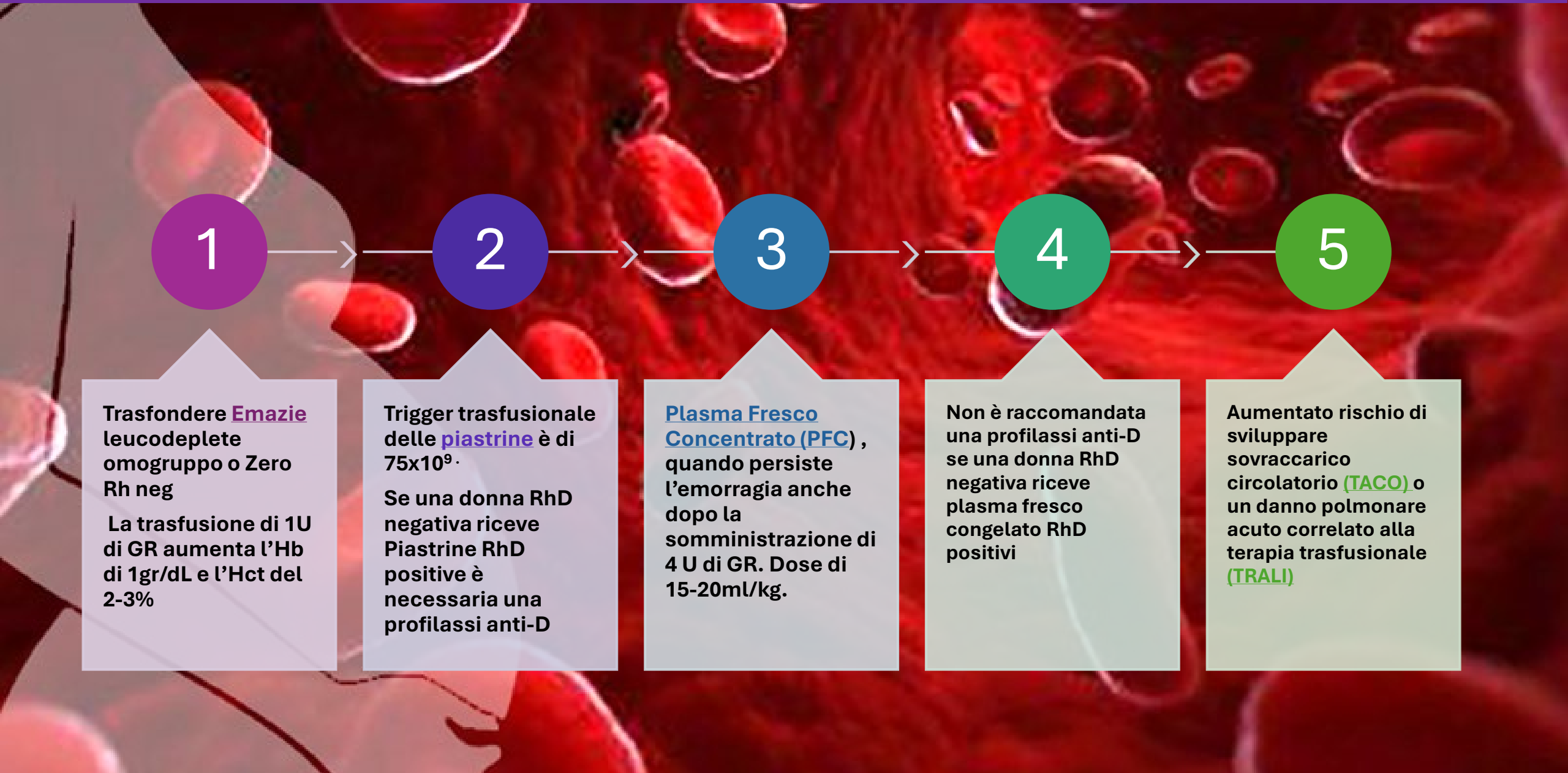
The European guideline on management of major bleeding and coagulopathy following trauma: fourth edition

Rolf Rossaint[1], Bertil Bouillon[2], Vladimir Cerny[3,4,5,6], Timothy J. Coats[7], Jacques Duranteau[8], Enrique Fernández-Mondéjar[9], Daniela Filipescu[10], Beverley J. Hunt[11], Radko Komadina[12], Giuseppe Nardi[13], Edmund A. M. Neugebauer[14], Yves Ozier[15], Louis Riddez[16], Arthur Schultz[17], Jean-Louis Vincent[18] and Donat R. Spahn[19*]

...early and aggressive fluid administration to restore blood volume. This approach may, however, **increase the hydrostatic pressure on the wound**, **cause dislodgement of blood clots,** a **dilution of coagulation factors** and **undesirable cooling of the patient.**

The concept of low volume fluid resuscitation, so-called "**PERMISSIVE HYPOTENSION**", avoids the adverse effects of early aggressive resuscitation while maintaining a level of tissue perfusion that, although lower than normal, is adequate for short periods...

La decisione di iniziare la trasfusione è CLINICA



1. Trasfondere Emazie leucodeplete omogruppo o Zero Rh neg

   La trasfusione di 1U di GR aumenta l'Hb di 1gr/dL e l'Hct del 2-3%

2. Trigger trasfusionale delle piastrine è di $75x10^9$.

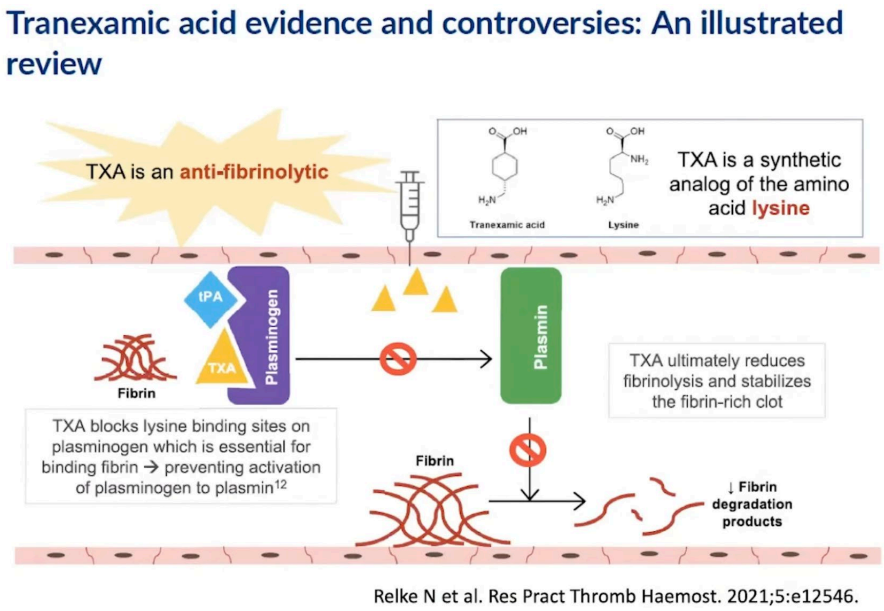
   Se una donna RhD negativa riceve Piastrine RhD positive è necessaria una profilassi anti-D

3. Plasma Fresco Concentrato (PFC) , quando persiste l'emorragia anche dopo la somministrazione di 4 U di GR. Dose di 15-20ml/kg.

4. Non è raccomandata una profilassi anti-D se una donna RhD negativa riceve plasma fresco congelato RhD positivi

5. Aumentato rischio di sviluppare sovraccarico circolatorio (TACO) o un danno polmonare acuto correlato alla terapia trasfusionale (TRALI)

ACIDO TRANEXAMICO



Raccomandazione WHO e ISS suggeriscono

somministrazione precoce antifibrinolitico, entro 3h dal parto,

di **1 gr in 10'**, in donne con EPP dopo parto vaginale o TC,

in aggiunta al trattamento standard con uterotonici,

ripetibile dopo 30' o entro 24h dalla prima dose,

in caso ripresa sanguinamento di emorragia

...l'acido tranexamico riduce la mortalità dovuta a sanguinamento nelle donne con PPH primaria,

indipendentemente dalla modalità del parto e senza aumentare i rischi di eventi tromboembolici

Cochrane Library

Cochrane Database of Systematic Reviews

Antifibrinolytic drugs for treating primary postpartum haemorrhage (Review)

Shakur H, Beaumont D, Pavord S, Gayet-Ageron A, Ker K, Mousa HA

Tranexamic acid versus oxytocin prophylaxis in reducing post-partum blood loss, in low-risk pregnant women: TRANOXY STUDY, a phase III randomized clinical trial

Antonio Ragusa,[a] Fernando Ficarola,[b,c,*] Amerigo Ferrari,[d] Nicoletta Spirito,[e] Mario Ardovino,[f] Domenico Giraldi,[f] Elisario Stuzziero,[f] Denise Rinaldo,[g] Roberto Procaccianti,[h] Giovanni Larciprete,[i] Caterina De Luca,[i] Sara D'Avino,[i] Giulia Principi,[j] Roberto Angioli,[b] and Alessandro Svelato[i]

Background To assess the equivalence of tranexamic acid (TRAN) versus synthetic oxytocin (OXY) in reducing post-partum blood loss, in full-term patients (37–42 weeks), at low risk of post-partum hemorrhage, with vaginal childbirth.

Methods Phase III, randomized (1:1), open-label, longitudinal, multi-center, prospective clinical trial (Prot. n 63209, ClinicalTrials.gov Identifier: NCT02775773). From January 7, 2020, to June 30, 2023, a total of 256 women were enrolled at two general urban community hospitals in Italy, serving a multi-ethnic patient population with National Health Insurance. The primary outcome was to explore a potential equivalence between the two treatments (OXY and TRAN) in preventing total blood loss. Therefore, we randomized 231 women into two groups: Group A (OXY), 127 women who were administered 10UI intramuscularly within 5 min from childbirth; Group B (TRAN), 104 women to whom 1-g slow intravenous infusion was administered within 5 min from childbirth.

Findings At the time of delivery, mean blood loss for OXY group versus TRAN group was 269.12 mL versus 263.88 mL, respectively, with equivalence between the two groups. Similarly, there was equivalence in total blood loss between the OXY and the TRAN group (397.66 mL versus 405.64 mL, respectively. No statistical differences between Hb levels at admission and discharge in the two groups were reported. No difference was found in terms of additional uterotonic and surgical therapies between the two groups of patients. Neither group showed thrombotic complications at check-up performed after 7 days or after a questionnaire regarding adverse effects, subjected after 40 days.

Interpretation The study shows the equivalence of tranexamic acid versus synthetic oxytocin in post-partum blood loss prophylaxis in term patients at low risk of PPH with vaginal childbirth. The safety profiles of OXY and TRAN were similar.

FIBRINOGENO

La sua concentrazione aumenta in gravidanza, 4-6gr/L nel III trimestre

Biomarker accurato di progressione dell'EPP da moderata a grave,
E' il 1° fattore della coagulazione a ridursi in corso di EPP

A causa del suo fisiologico aumento in gravidanza, una concentrazione <2gr/L riflette un livello di consumo significativo, e concentrazioni inferiori sono predittive di aggravamento

Livelli <2g/L : TARGET per il rimpiazzo

	FIBRINOGENO CONCENTRATO	CRIOPRECIPITATO
Efficacia	Buona	Buona
Tempo di preparazione	Breve	Lungo (scongelamento)
Costo	Elevato	Basso
Rischio infettivo	Basso (pastorizzazione)	Moderato (NO pastorizzazione)
Rischio Reazioni Trasfusione	Basso (anafilassi)	Elevato (reazioni allergiche)
Fattori coagulazione	I (1gr)	I (200-300mg) VIII (80-120U) XIII (40-60U) vWF (80U)
Gruppo sanguigno ABO	Non necessario	ABO noto
Conservazione	Temperatura ambiente	Congelato (max 1 anno)

Leal Noval et al,

Calcio

OBSTETRIC ANAESTHESIA

Association between ionised calcium and severity of postpartum haemorrhage: a retrospective cohort study

Danny Epstein[1,*], Neta Solomon[2,3], Alexander Korytny[4,5], Erez Marcusohn[6], Yaacov Freund[5], Ron Avrahami[7], Ami Neuberger[1,5,8], Aeyal Raz[5,9] and Asaf Miller[10]

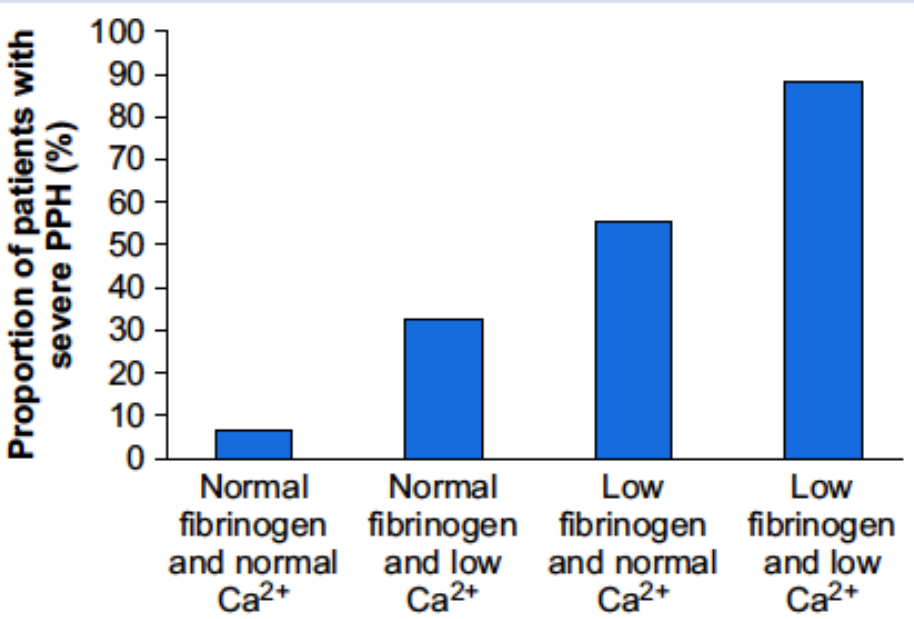


Fig 2. The relationships between fibrinogen, ionised calcium, and clinical outcome. Low fibrinogen was defined as fibrinogen <200 mg dl^{-1} and low Ca^{2+} was defined as Ca^{2+} <1.16 mmol L^{-1}. Ca^{2+}, ionised calcium; PPH, postpartum haemorrhage.

British Journal of Anaesthesia, 126 (5): 1022–1028 (2021)

doi: 10.1016/j.bja.2020.11.020

rFVIIa

...aggiornamento scheda tecnica, Maggio 2022

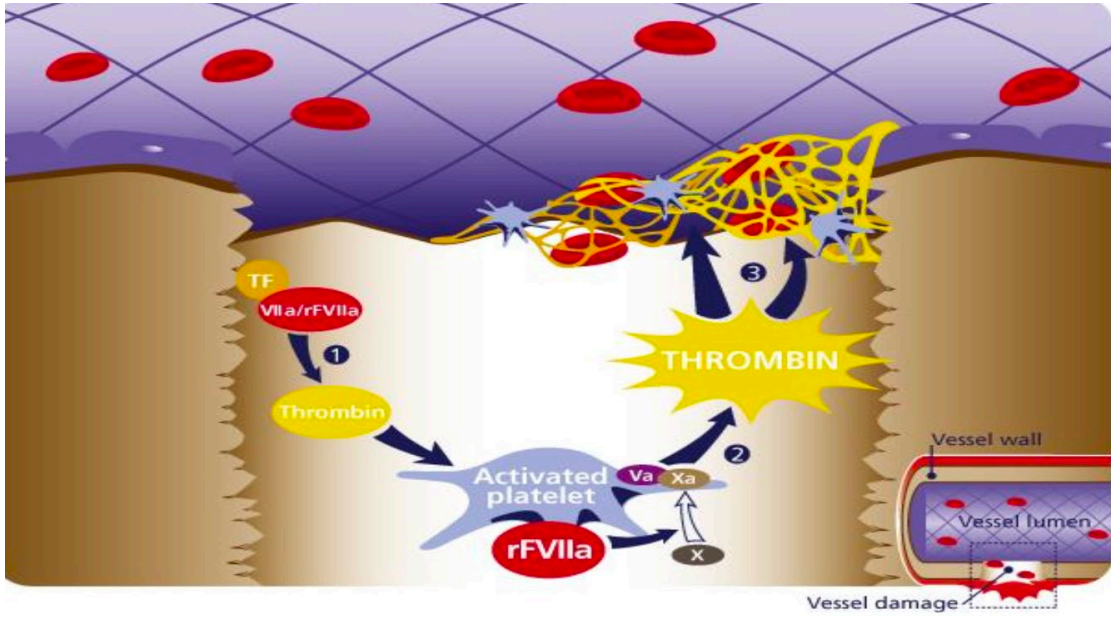
« il rFVIIa è indicato per il trattamento dell'emorragia post partum severa,

quando i gli Uterotonici non sono sufficienti a raggiungere l'emostasi.

La dose raccomandata è 60-90 µg/Kg in bolo endovenoso.

Il picco di attività anticoagulante è di 10 minuti

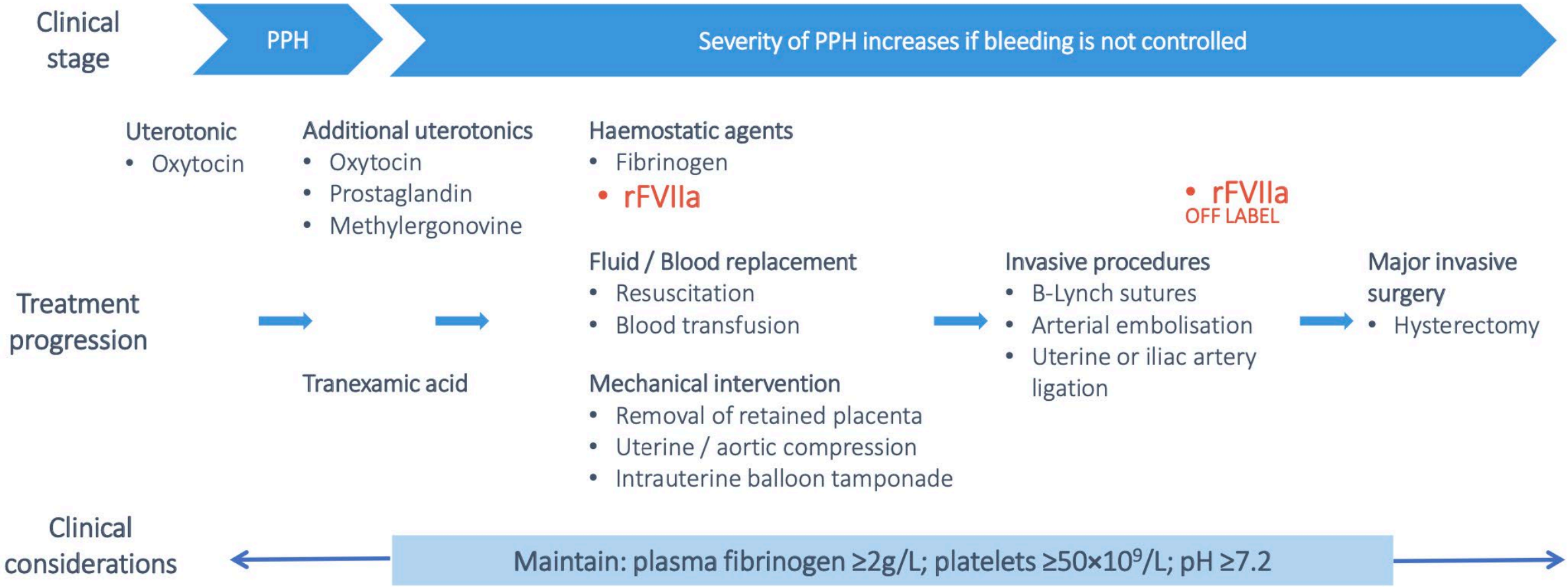
Se risposta insufficiente seconda dose 30 minuti



- Nel sito della lesione laddove viene esposto il TF
- Il legame con il TF genera piccole quantità di trombina (1)
- Dosi farmacologiche di rFVIIa attivano direttamente FX sulla superficie delle PLT attivate
- Burst di trombina (2)
- Formazione di tappo emostatico di fibrina stabile e resistente (3)

SIAARTI
PRO VITA CONTRA DOLOREM SEMPER

rFVIIa nella gestione della sPPH dopo la nuova indicazione



Eventi di TromboEmbolismo Venoso(VTE) e Arterioso(ATE)

rFVIIa treated:

VTEs: in 1.2% of patients
ATEs: in 0.2% of patients

NOT rFVIIa treated:

VTEs: in 1.4% of patients
ATEs: in 0.2% of patients

Journal of Thrombosis and Haemostasis, **13**: 520–529 DOI: 10.1111/jth.12844

ORIGINAL ARTICLE

Recombinant human FVIIa for reducing the need for invasive second-line therapies in severe refractory postpartum hemorrhage: a multicenter, randomized, open controlled trial

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E. MORAU,†† A. S. DUCLOY-BOUTHORS,‡‡ A. MIGNON,§§ M. RAUCOULES,¶¶ A. BONGAIN,***
F. BOEHLEN,††† P. DE MOERLOOSE,††† S. BOUVET,‡‡‡ P. FABBRO-PERAY‡‡‡ and J.-C. GRIS*†

RCT Franco-Svizzero
Aprile 2007 - Novembre 2010

- E' uno studio randomizzato, open label, condotto in 8 centri tra Francia e Svizzera
- Lo studio aveva lo scopo di valutare l'efficacia e la sicurezza di una dose singola di FVIIa in donne con sPPH in corso dopo fallimento con Sulprostone
- Sono state randomizzate 84 pazienti con sPPH: 42 a utilizzare rFVIIa dopo fallimento con Sulprostone e 42 a essere gestite con lo «standard of care» del centro di appartenenza

« L'uso di rFVIIa in aggiunta all'attuale standard care può migliorare i risultati senza aumentare ulteriormente i rischi associati a sPPH»

COMPLESSI PROTROMBINICI

Prothrombin Complex Concentrate: Anticoagulation Reversal and Beyond

O. Grottke and H. Schöchl

Prothrombin complex concentrate

Prothrombin complex concentrates (PCCs) contain a concentrate of coagulation factors II, VII, IX, X and proteins S and C (and some heparin), and are recommended for urgent reversal of the effect of vitamin K antagonists[119-121]. Successful use of PCC was described in a case report of massive PPH[122]. In an ongoing trial,

…the *European trauma guidelines recommend* that **PCC be administred in bleeding trauma** patients with normal Fibrinogen levels, based on evidence of delayed coagulation initiation from viscoelastic monitoring

PCC and fibrinogen are being compared to plasma in PPH (trial identifier: NCT01910675). At the moment, there is no evidence to support the use of PCCs in the management of PPH, and their use should be limited to clinical trials in order to gather evidence on their efficacy and, in particular, on their safety.

FIGO recommendations on the management of postpartum hemorrhage 2022

DCR

Damage Control Resuscitation

Il **DCR** si fonda su:

- ✓ Protocollo trasfusione massiva
- ✓ Uso limitato di cristalloidi
- ✓ Controllo del sanguinamento associando anche:
  - DCS: Damage Control Surgery
  - DCIR: Damage Control Interventional Radiology
- ✓ Stabilizzazione in ICU per:
  - Disturbi della coagulazione
  - Anomalie metaboliche
  - Emodinamica
  - Terapie di supporto

- **Minimizzare le perdite**
- **Prevenire la triade: acidosi, coagulopatia, ipotermia**
- **Massimizzare l'ossigenazione tissutale**

«STASIS»

Algoritmo di management nella PPH refrattaria

"STASIS" Algorithm	Management Steps
S: Shift	Shift to operating room (with bimanual compression anti-shock garment in place if transfer is required)
T: Tissue, trauma, tamponade	Exclude the presence of retained tissue or lacerations; proceed with tamponade (balloon)
A: Apply compression	Apply compression sutures
S: Systematic devascularization	Ligate uterine (O'Leary), ovarian, hypogastric, quadruple
I: Interventional radiology	Uterine artery embolization
S: Subtotal/total hysterectomy	Proceed with hysterectomy

Lilly Y Liu, L.Nathan et al, Review of current insights and therapeutic approaches for the treatment of refractory postpartum hemorrhage. International Journal of Women's Health 2023:15

Gilmandyar D, Thornburg LL. Surgical management of postpartum hemorrhage. *Semin Perinatol*. 2019

EMORECUPERO

EJA

Eur J Anaesthesiol 2023; **40:**226–304

GUIDELINES

Management of severe peri-operative bleeding: Guidelines from the European Society of Anaesthesiology and Intensive Care

Second update 2022

- L'emorecupero in ambito ostetrico è utilizzato,
a condizione che vengano prese precauzioni contro l'isoimmunizzazione

GRADO C

- L'utilizzo dell'emorecupero perioperatorio durante il Parto Cesareo ad alto rischio di PPH può ridurre la trasfusione omologa

GRADO 2B

EMORECUPERO

Usi:

- **Disturbi placentari**
- **Fattori di rischio per PPH**
- **Disturbi ematologici con necessità di trasfusioni**

Misure precauzionali:

- **Fonte di aspirazione separata per il liquido amniotico**
- **Iniziare la procedure di emorecupero dopo l'espulsione della placenta**
- **Uso di filtri per la deplezione dei leucociti**

L'uso di filtri a deplezione leucocitaria fa si che il livello di cellule squamose fetali sono presenti in livelli paragonabili a quelli del sangue materno dopo l'espulsione della placenta e che il TF derivato dal liquido amniotico che può causare coagulazione intravascolare può essere rimosso con successo

Transfusion Medicine and Hemotherapy 2023, Patient blood management in pregnancy, Kaserer A et

Quale strategia???