ACCADEMIA di FORMAZIONE

SIMTI

Attualità nella gestione della terapia piastrinica

Il ruolo dei POCT nella terapia trasfusionale

Chiara Novelli
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ASST Ovest Milanese

La sottoscritta, in qualità di Relatrice
dichiara che

nell'esercizio della Sua funzione e per l'evento in oggetto, NON È in alcun modo portatrice di interessi commerciali propri o di terzi; e che gli eventuali rapporti avuti negli ultimi due anni con soggetti portatori di interessi commerciali non sono tali da permettere a tali soggetti di influenzare le mie funzioni al fine di trarne vantaggio.

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Objective

- Understand POCT applications in platelet transfusion
- Evaluate benefits in different clinical situation
- Review clinical evidence and guidelines
- Clinical case

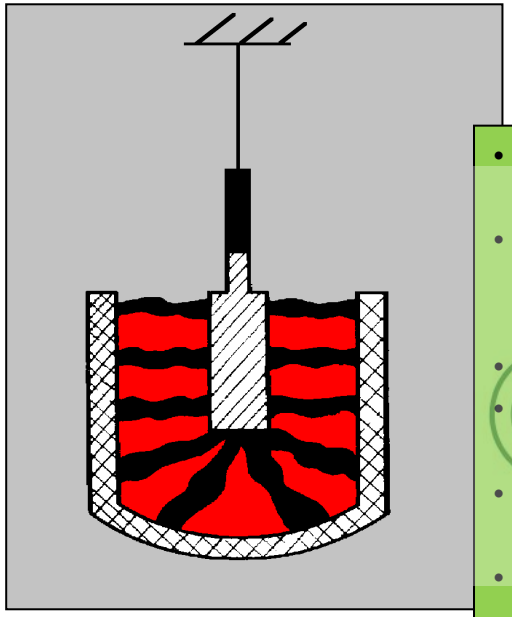
SIMTI PRO

Point-of care-testing (POCT)

Viscoelastic test (VET)

Platelets function test (PFT)

VET – from original to new generation methods

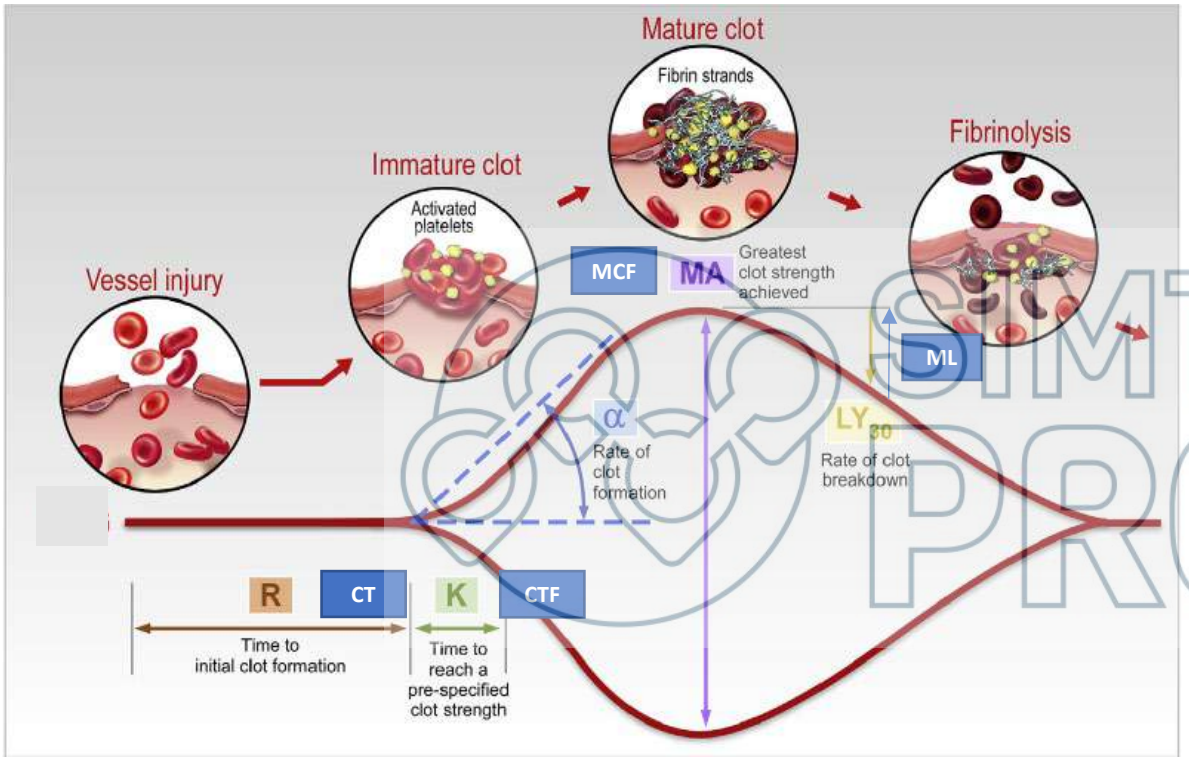


Principio originale

- Il sangue (nativo, senza anticoagulanti) è inserito nella cuvette
- Il contatto con una superficie non-fisiologica attiva la coagulazione del sangue
- La cuvetta ruota 6 x/min +/- 5 °
- Sensore collegato ad un torsion wire sospeso nel sangue
- L'attivazione della coagulazione modifica l'elasticità del sangue.
- Il movimento della cuvetta influenza il torsion wire.
- La lettura dei dati avviene mediante il cambiamento della luce riflessa
- **Risultati dopo 60-90 minuti**

Ultime generazioni

- Al sangue vengono aggiunti degli attivatori
- Diversi reagenti per vedere cose diverse..messi in una singola cartuccia
- Metodologie diverse:
  - Metodi classici coin cup e pin
  - Metodi alternativi quali: resonance frequency technique o ultrasound technology
- **Risultati nelle POCT moderni dopo 5-10 minuti**



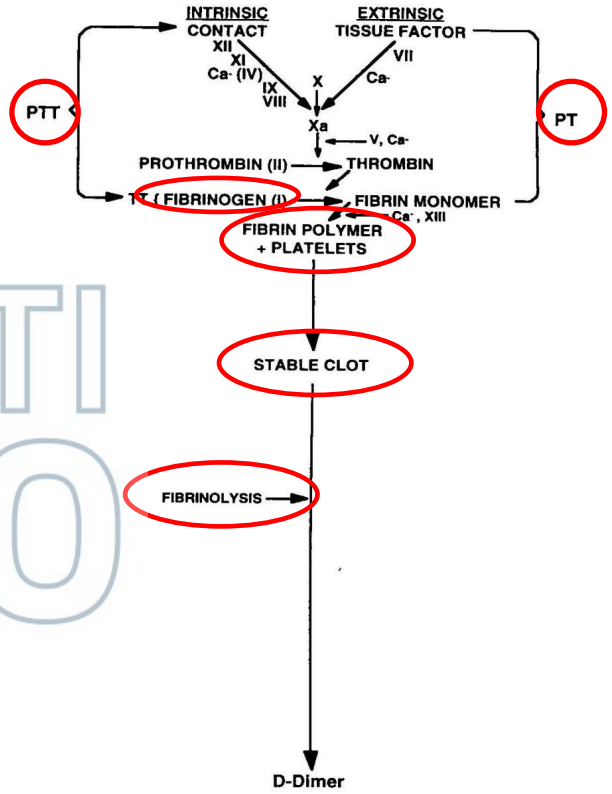
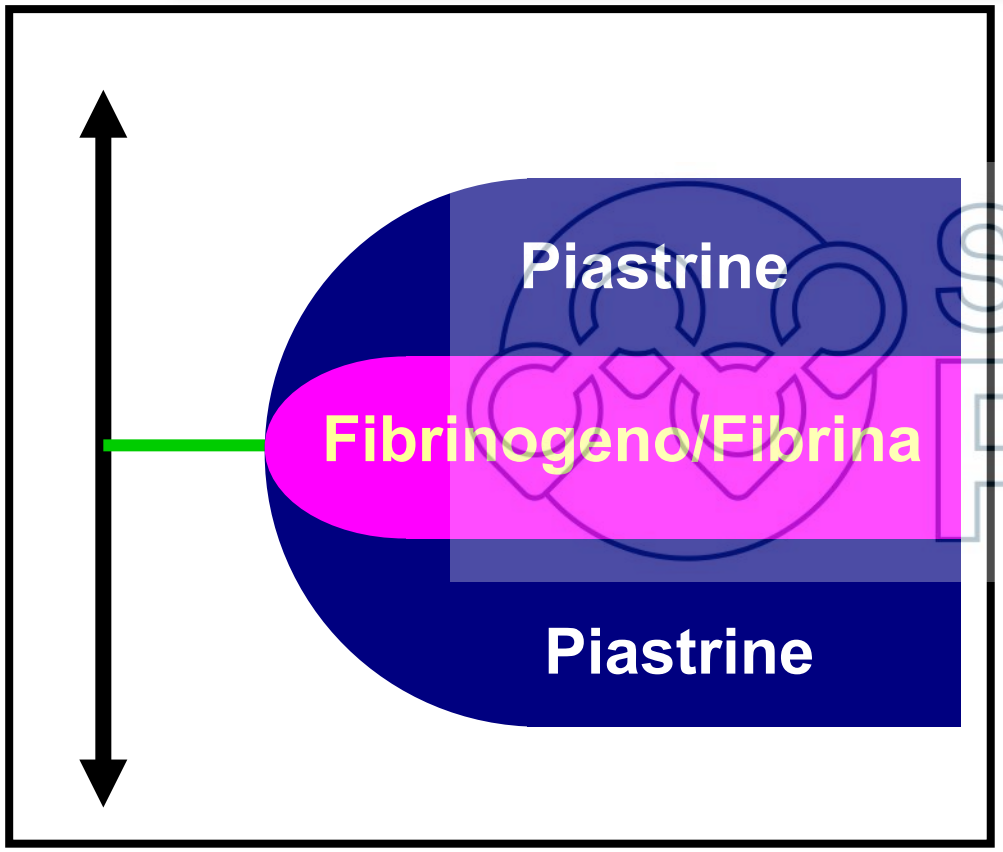
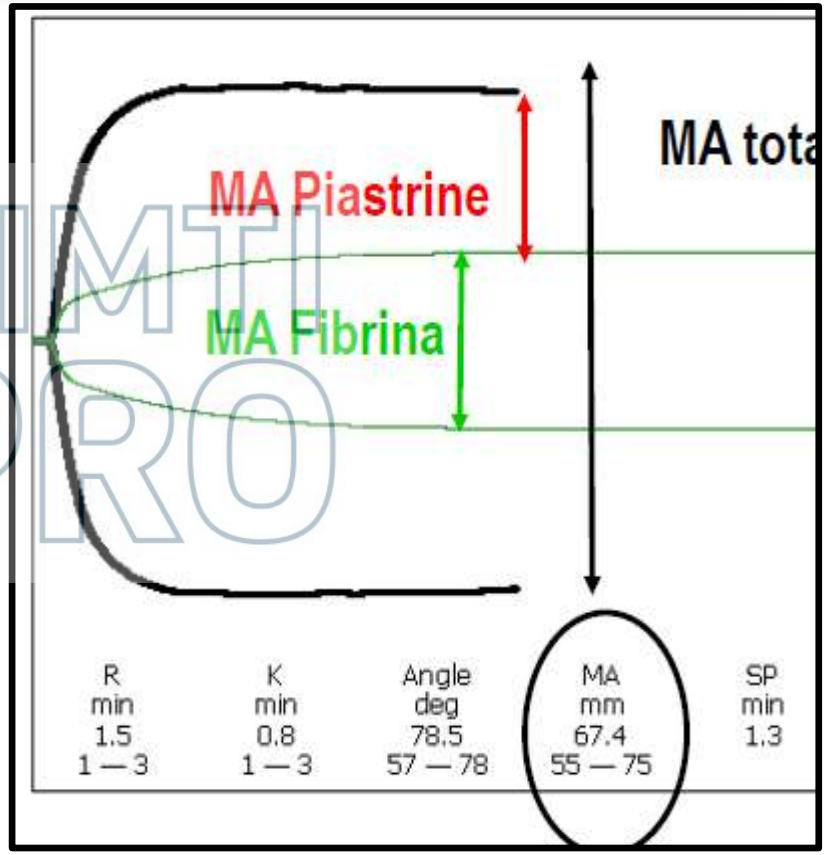


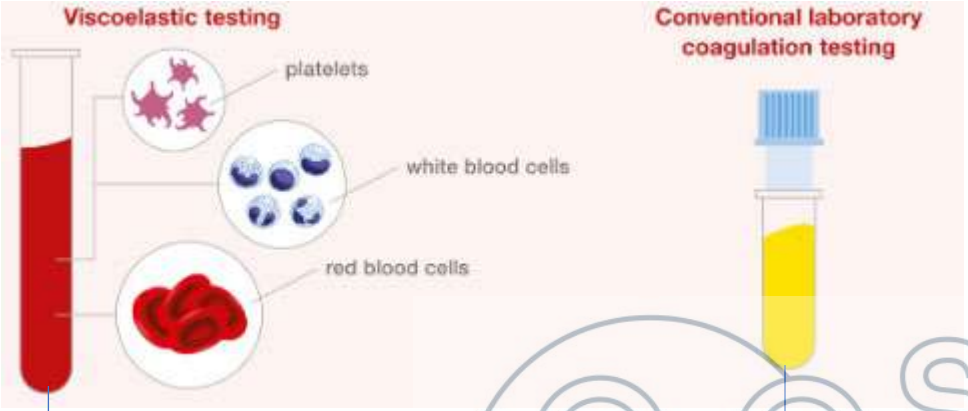
Figure modified from Ann Emerg Med 2021 Mar;77(3):357-366

Platelets/Fibrinogen





Viscoelastic test vs coagulation conventional test



Snapshot of individual steps in clotting process

Holistic overview of ex vivi clotting

Viscoleastic Test

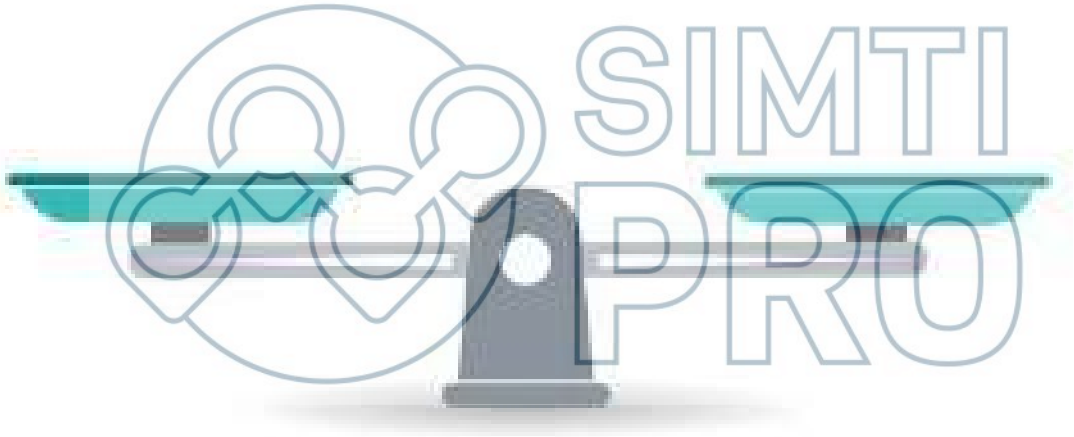
- FAST
- Whole blood
- Clot generationand propagation
- Clot quality
- Identify iperfibrinolysis

Standard Lab Test

- Cheaper
- Plasma
- Highly standardised
- Trained, professional staff
- Quality control
- Well established

https://doi.org/10.1016/j.rpth.2022.100031.

Are you balanced?



Congenital or acquired mechanisms can disrupt hemostasis, causing bleeding or clotting, which is reflected in the viscoelastic tracing.

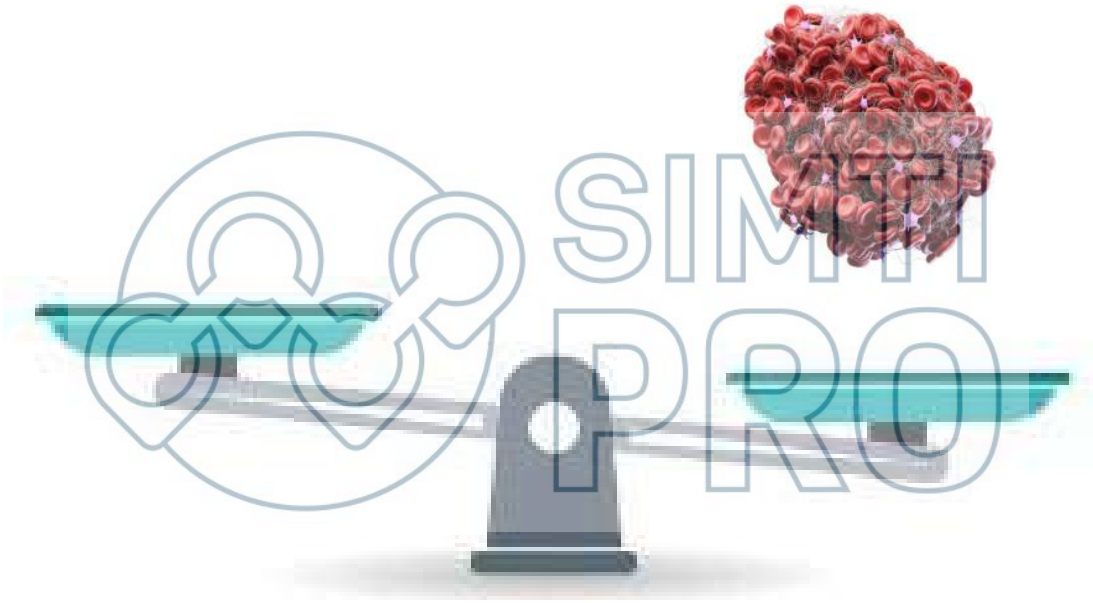
Excessive Bleeding

Hypocoagulable

Fibrinolysis

Excessive Bleeding

Excessive Clot formation



Hypercoagulable

Hypofibrinolysis

Excessive Clot formation

Hemostatic balance

Excessive Bleeding

Excessive Clot formation

Utility of the Viscoelastic test in a bleeding emergency

- **Agire prima**

Diminuizione dei tempi di analisi

Test classici media → 25-63 min

Test Viscoelastici → primi dati in 5-10 min

Non necessità di trasporto della provetta

Disordine dell'emostasi?

- **Terapia mirata**

Trasfondere solo quello che serve

- **Monitoraggio rapido**

Controllo della terapia applicata

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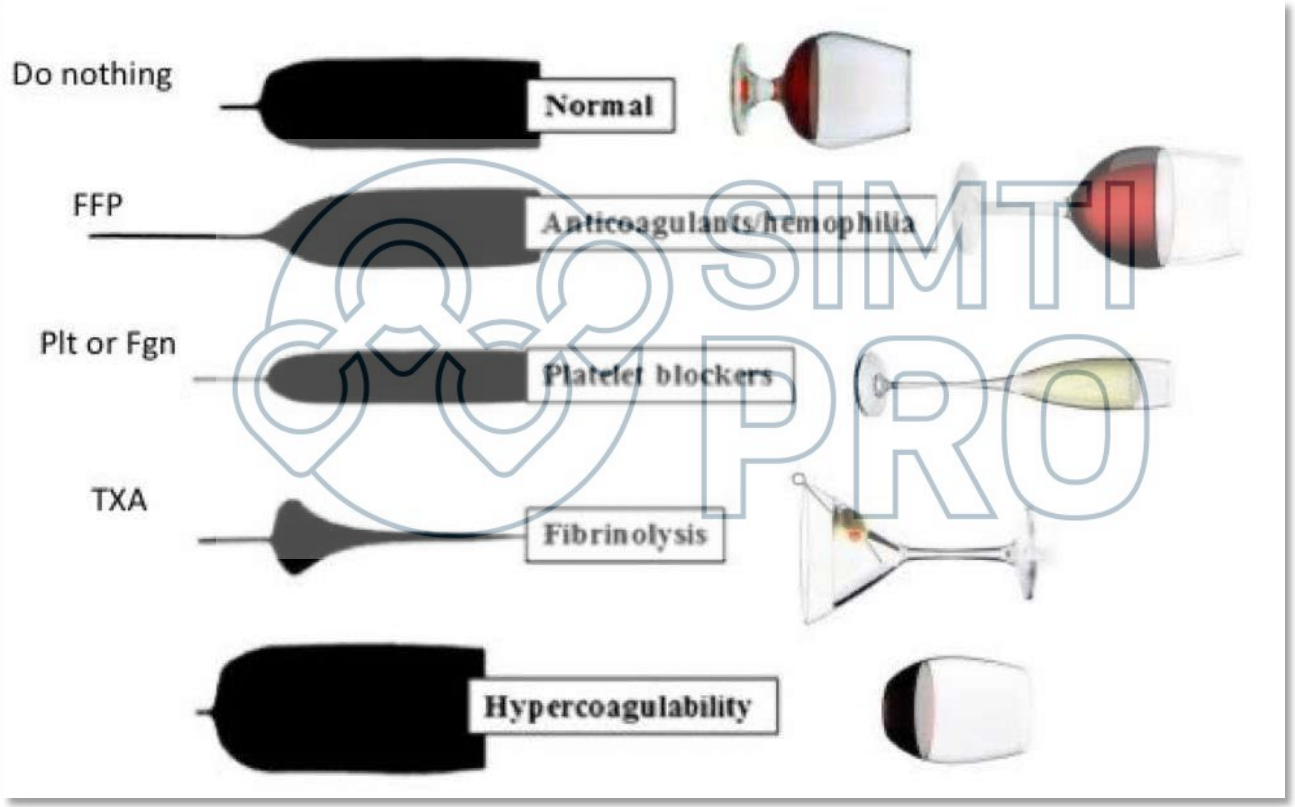
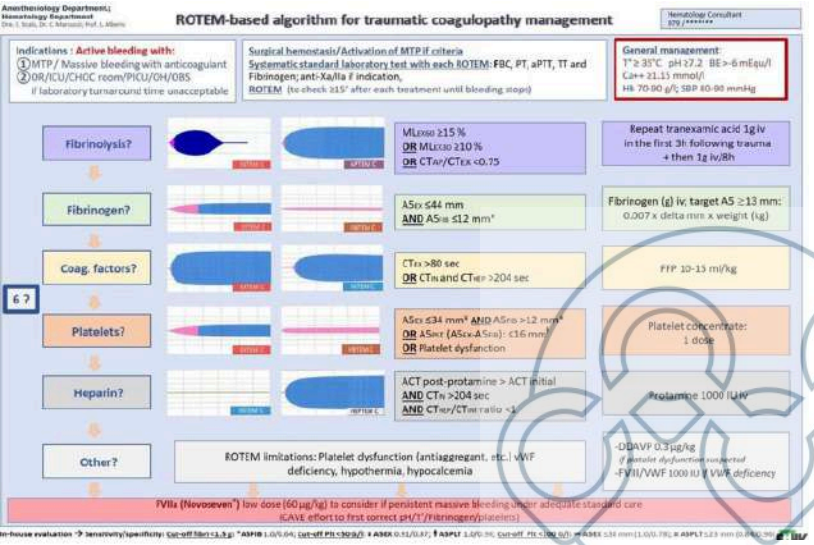
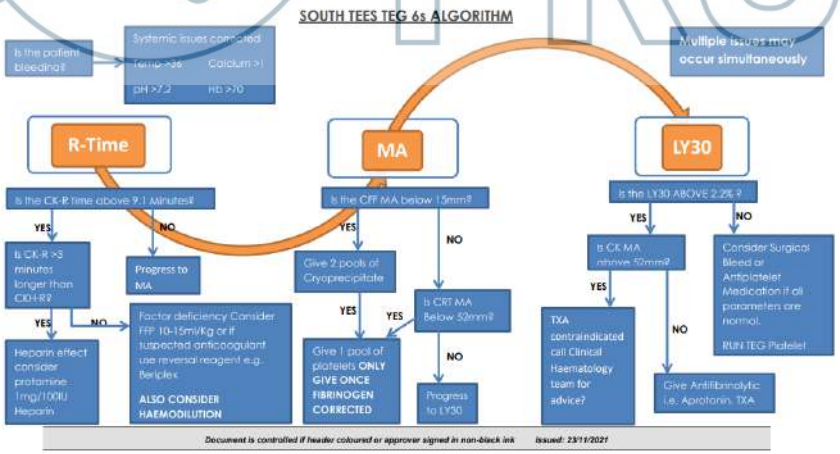
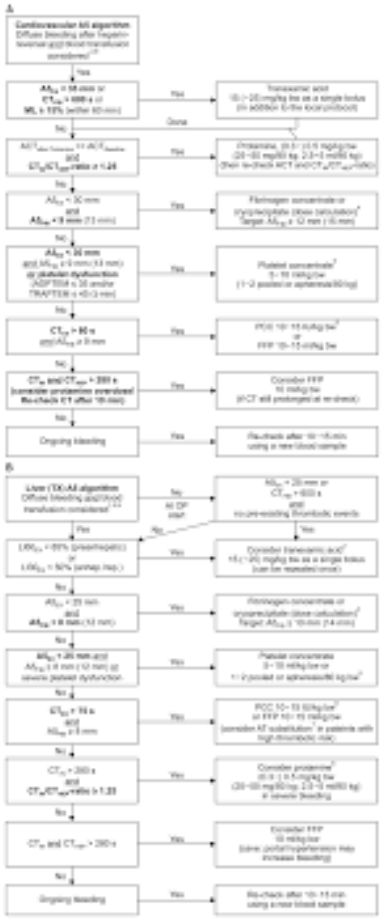
Drinker's guide to viscoelastic testing



Algorithms for different clinical conditions and different methods







Test per valutare funzionalità piastrinica

Stroke Vasc Interv Neurol. 2025;5:e001376. DOI: 10.1161/SVIN.124.001376

Table 1. Methods of Testing

Test	Mechanism	Advantages	Disadvantages	Factors affecting results	Reproducibility
Light transmittance aggregometry[8,22]	Measures increase in light transmission due to agonist-induced platelet aggregation, reported as percentage change of platelet aggregation over time	• Considered gold standard • Different platelet pathways analyzed using large number of agonists • Large number of significant antiplatelet resistance study results	• Time consuming, manual processing • Skilled technician needed • Large sample needed • Less representative of in vivo conditions (accounts for low-shear forces)	• Agonist choice and concentration used • Hemolysis and thrombocytopenia	Low across different laboratories
Platelet function analyzer (PFA-100)[22,31,32,33]	Measures platelet clotting time, reported as closure time in seconds	• POC assay – easy to use and rapid results • High sensitivity (also for aspirin resistance) • Mimics in vivo (high-shear) conditions	• Poor specificity, sensitive to variables influencing platelet function affecting results • Less sensitivity to clopidogrel resistance • High number of false positives	• Thrombocytopenia	High
VerifyNow[22,23–30]	Measures platelet aggregation in response to an agonist via optical density of fibrinogen-coated beads	• POC assay • High specificity • Most widely used in clinical practice • Moderate agreement with other platelet function assays • Sensitive for both aspirin and clopidogrel resistance; also measures thienopyridines and GpIIb/IIIa inhibitors	• Expensive; 1 test per cartridge • Less representative of in vivo conditions • Requires interpretation, no universally accepted standard for cutoff values • Does not report percentage of inhibition	• High hematocrit and platelet levels affect viscosity and artificially elevate values • Timing (ideally within 2 h of collection)	High, although batch-to-batch variation in proprietary reagents can affect results
Multiplate Multiple electrode aggregometry[22,34,35]	Measures platelet aggregation in response to multiple agonists via electrical impedance. Area under the curve value reflects extent of platelet aggregation and degree of inhibition by antiplatelet therapy	• POC assay • Highly sensitive in detecting aspirin resistance • Duplicate, simultaneous platelet aggregation testing for improved quality control of each sample • More likely to reflect in vivo activity	• Expensive; complex to perform, requiring specialized training and interpretation • Cutoff ranges for identifying resistance less defined • Limited resistance studies to date	• Agonist choice and concentration used • Hematocrit level	Moderate
Thromboelastography[36,37,38]	Measures the viscoelastic properties of clot formation and dissolution	• Uses whole blood sample, mimicking physiologic conditions • Analyzes overall hemostasis including fibrinogen levels, and clotting factor activity	• Expensive, complex to perform requiring specialized training and interpretation	• Sample handling including timing, temperature • Agonist choice and concentration used • Instrument calibration	Moderate

POC indicates point-of-care

Test per valutare funzionalità piastrinica

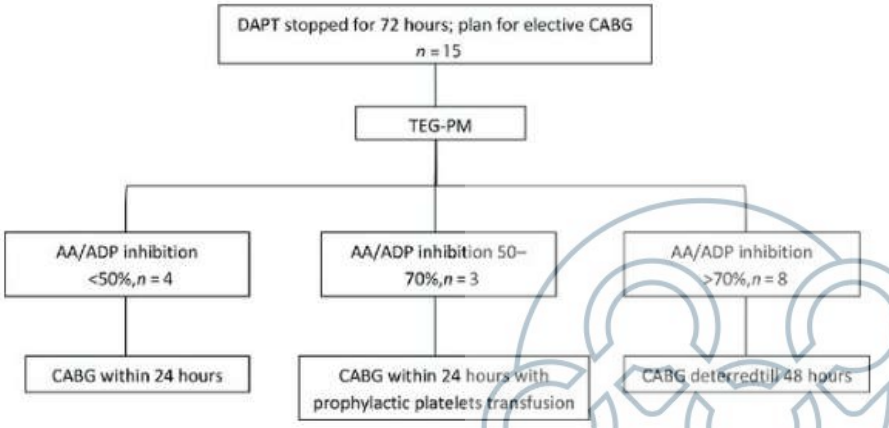
Table 1 An overview of analytical principles, indications, and advantages and disadvantages of the most commonly used platelet function tests

Apparatus	Measurement principle	Indication	Advantages	Disadvantages
Platelet Aggregation Profiler: PAP8/ PAP4-Aggregometer	• Turbidimetric-based optical detection of changes in light transmission in platelet-rich plasma	• Platelet function disorders • Effect of antiplatelet therapy • Forecast bleeding risk	• Gold standard • Wide range of agonists in different concentrations	• Time consuming • Large sample volume • Requires sample preparation • Insensitive to some storage pool deficiencies • Sensitive to thrombocytopenia • and lipidemia
Chronolog-log Multiplate Analyzer	• Changes in electrical impedance between two electrodes in whole blood	• Platelet function disorders • Effect of antiplatelet therapy • Forecast bleeding risk	• Wide range of agonists in different concentrations Chrono-Log: can also determine concurrently ATP release when using the luciferin-luciferase reagent	• Insensitive to some storage pool deficiencies • Strongly correlated to platelet count
Platelet Function Analyzer: Innovance PFA-100/200	• Time to thrombus formation in high-shear blood flow through a collagen-coated membrane in whole blood	• Rapid exclusion of severe platelet dysfunction and severe von Willebrand disease Effect of antiplatelet therapy	• Point-of-care instrument • High-shear-induced platelet aggregation • No sample preparation • Low sample volume	• Insensitive to storage pool deficiencies • Dependent on hematocrit levels and von Willebrand factor • Sensitive to thrombocytopenia
VerifyNow	• Turbidimetric-based optical detection of changes in light transmission through whole blood	• Effect of antiplatelet therapy	• Point-of-care instrument • Fast • No sample preparation	• Expensive • Sensitive to thrombocytopenia, lipidemia, anemia, and fibrinogen levels
IMPACT: Cone and Plate(Let) Analyzer	• Quantification of platelets adhered to a plate under arterial flow conditions using whole blood	• Platelet function disorders • Effect of antiplatelet therapy	• Shear-induced platelet aggregation • Fast • No sample preparation • Low sample volume	• Expensive • Dependent on von Willebrand factor
PlateletWorks	• Single platelet impedance counting in native tube and after addition of agonists	• Effect of antiplatelet therapy	• Fast • No sample preparation • Low sample volume	• Time-dependent (analysis within 10 minutes) • Few studies on clinical outcomes
Flow cytometry	• Fluorophore-labeled antibodies against surface glycoproteins and surface-bound activating markers in whole blood	• Platelet function disorders • Assessment of platelet activation state	• Independent of thrombocytopenia • Sensitive to storage pool deficiencies	• Sensitive to autoantibodies • Time consuming • Requires highly specialized operators
ROTEM Platelet	• Impedance aggregometry in whole blood	• Effect of antiplatelet therapy	• Point-of-care instrument • Rapid • Portraits global clot formation	• Lack of clinical studies
TEG Platelet mapping	• Calculation of difference between maximal hemostatic activity and AA/ADP-activated coagulation in whole blood	• Effect of antiplatelet therapy	• Point-of-care instrument • Rapid • Portraits global clot formation	• Lack of clinical studies

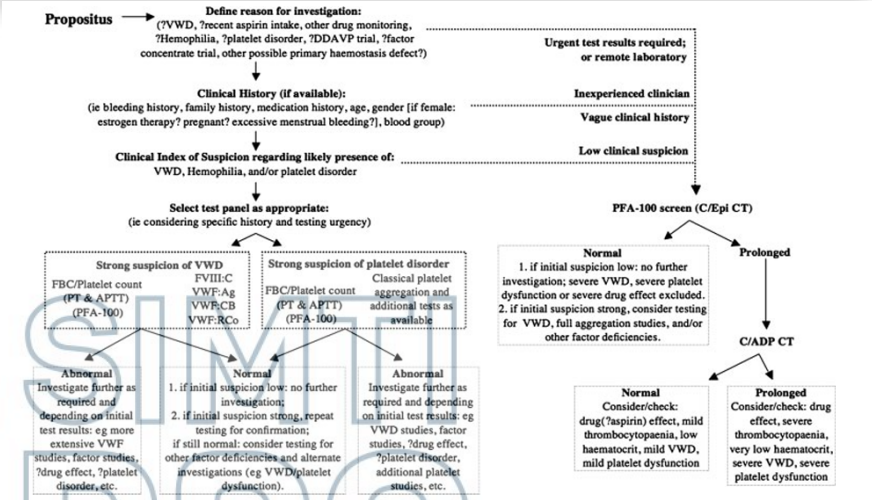
Abbreviations: AA, arachidonic acid; ADP, adenosine diphosphate; ROTEM, rotational thromboelastometry; TEG, thromboelastography.

Seminars in Thrombosis & Hemostasis Vol. 49 No. 6/2023

Algorithms for different clinical conditions and different methods



https://doi.org/10.1055/s-0041-1723622



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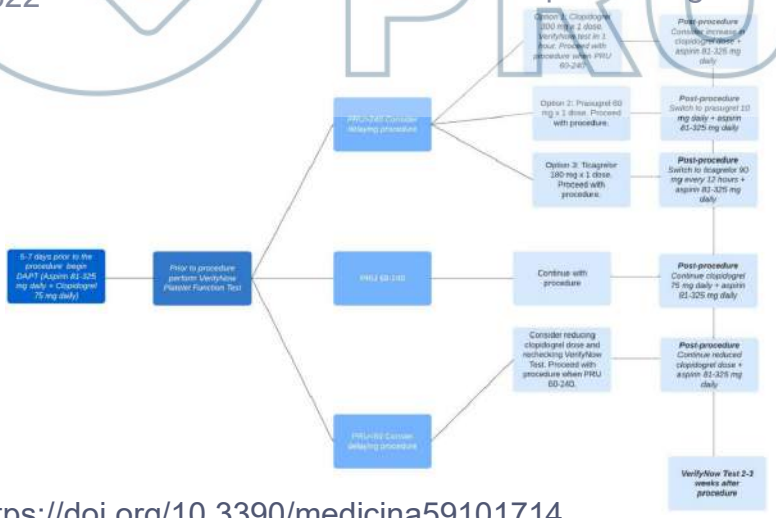

https://doi.org/10.3390/medicina59101714

POCT - ClinicalApplications

seniority

Most used

- Liver disease and transplant
- Cardiac surgery
- Trauma care
- Obstetrics
- Intensive care units (ICUs)
- Orthopedic surgery
- Intracranial hemorrhage

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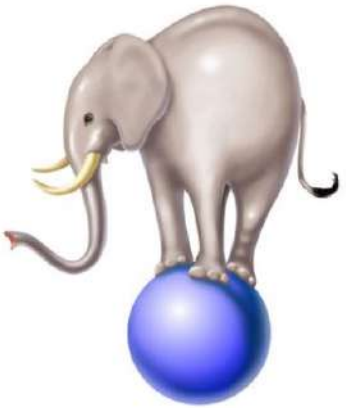
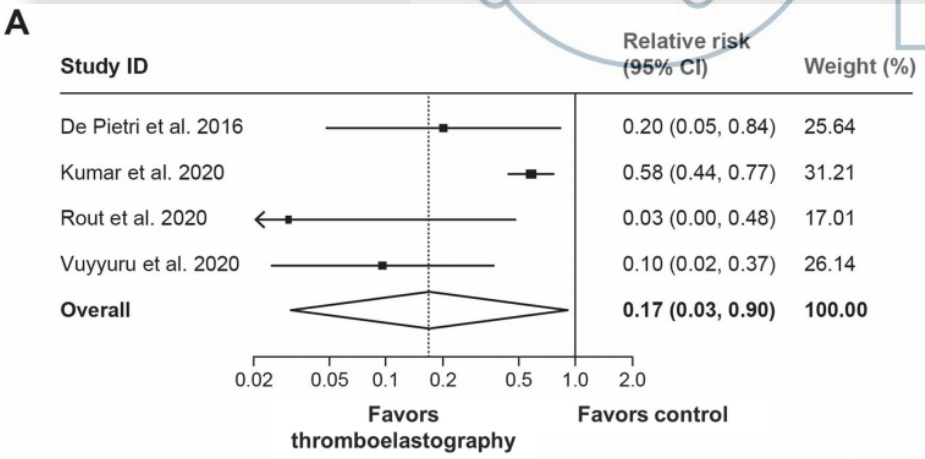
Liver disease and transplant



Cirrhosis often leads to abnormal hemostasis, which can present as both pro-hemorrhagic and pro-thrombotic profiles.

Thromboelastography reduce blood product use in patients with cirrhosis and/or undergoing liver transplantation in a meta-analysis of 5 randomized

→ the thromboelastography group having lower mortality at 7 days versus the control.



Platelet use was five times lower with thromboelastography versus the control

Thromboelastography-Guided Therapy Enhances Patient Blood Management in Cirrhotic Patients: A Meta-analysis Based on Randomized Controlled Trials Semin Thromb Hemost 2023;49:162–172.

Use of decision algorithms for viscoelastic tests and use of blood products in patients undergoing liver transplantation: A systematic review with meta-analysis

- Importance of algorithms for VETs in liver transplantation to reduced blood products.
- The use of algorithms for VETs can help improve the quality of services and standardize transfusion protocols in liver transplants.
- The effect associated to the use of algorithms for VETs on clinical outcomes can help to improve the clinical outcomes in patients undergoing liver transplantation

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Transplantation review 2025 Apr 18;39(3):100932

Cardiac surgery

Implementation of VET into an integrated transfusion algorithm can lead to:

- **Reduced red blood cell transfusions**
- **Reduced platelet transfusions**
- **Reduction in major postsurgical bleeding**

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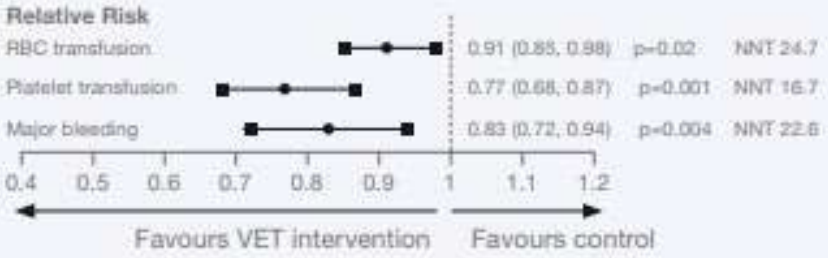
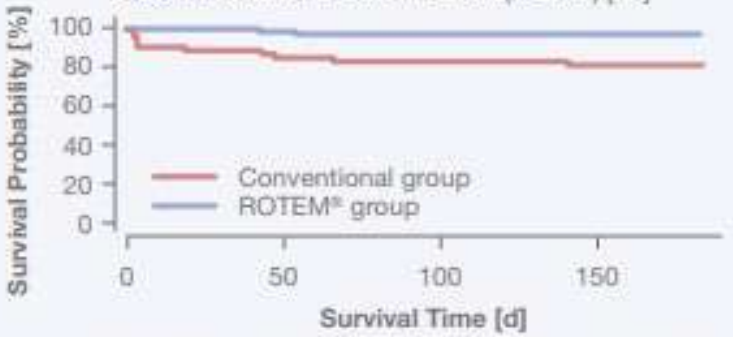
Key data: Improvements in transfusion and major bleeding [14] and Kaplan–Meier curve survival [15] with VET-algorithm management in cardiac surgery

Use of VET-guided transfusion versus current standard of care reduced transfusions and risk of major bleeding in a 2016 randomized controlled trial (n=7402) [14]



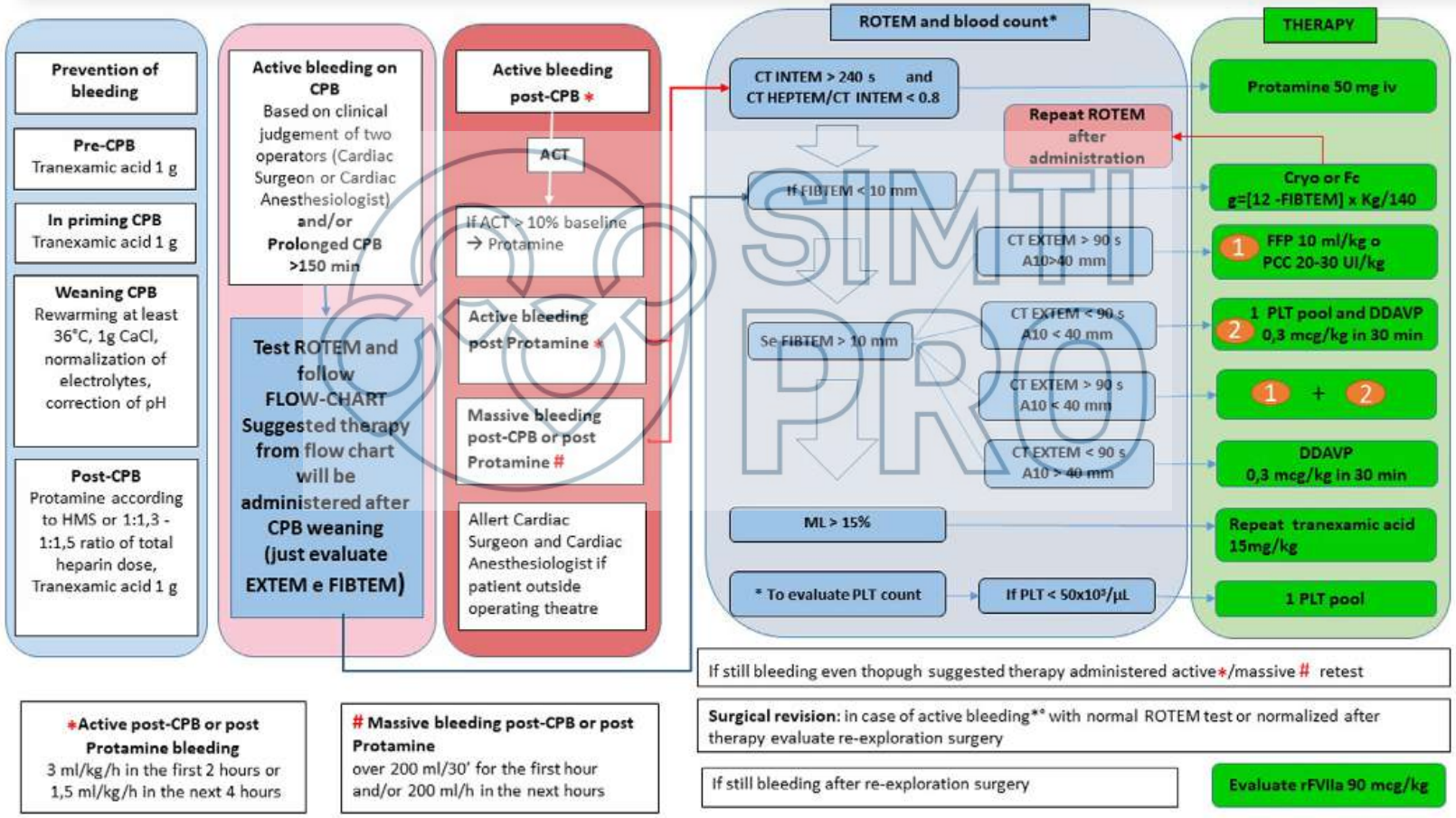
Reproduced with permissions from Karkouti 2016 [14]

Use of VET-guided transfusion improved survival in a 2012 randomized controlled trial (n=100) [15]

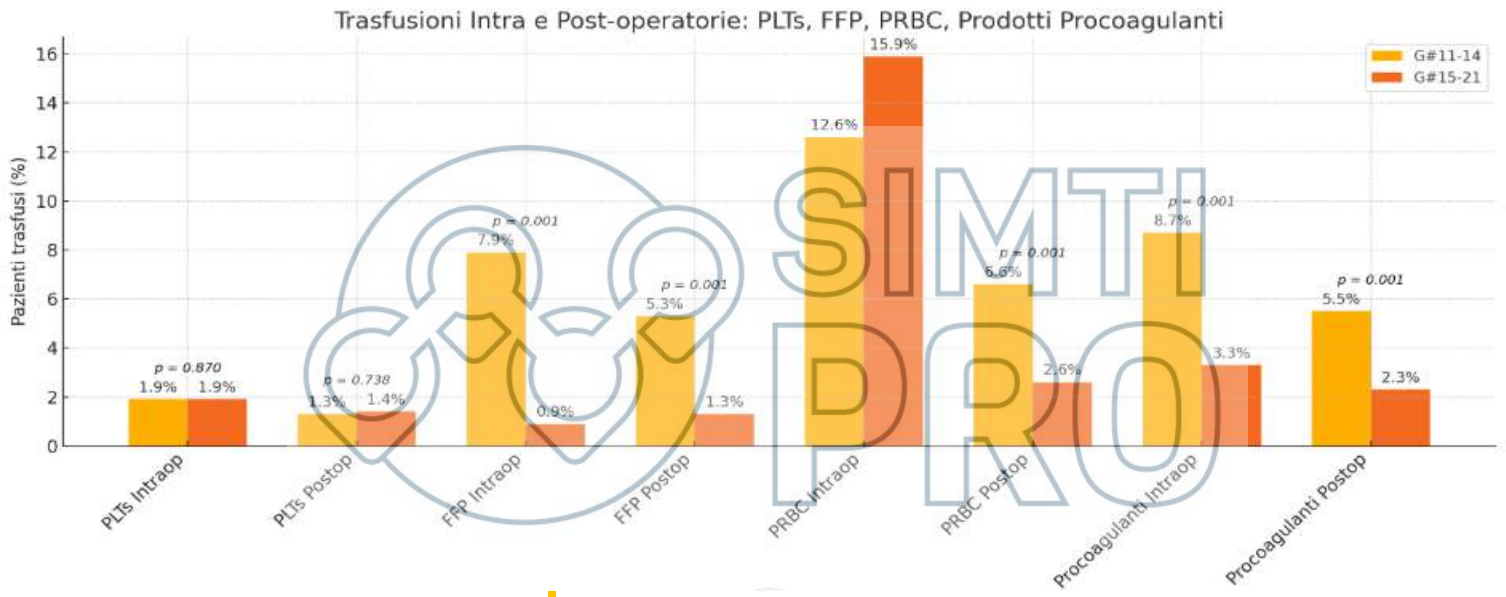


Reproduced with permissions from Weber 2012 [15]

Impact of introduction of a goal directed transfusion strategy in a patient blood management program: A single cardiac surgery centre experience



Impact of introduction of a goal directed transfusion strategy in a patient blood management program: A single cardiac surgery centre experience



Patient population underwent cardiac surgery from 2011 to 2021 was divided in two groups based on PBM protocol used (G#11–14, years 2011–2014, G#15–21, years 2015–2021): 4890 pts

In our experience, a GDT strategy for the diagnosis and treatment of the coagulopathy in patients undergone cardiac surgery led to a significant reduction in bleeding and transfusion

Transfus Med . 2024 Aug;34(4):257-267

EACTS/EACTA Guidelines on patient blood management for adult cardiac surgery 2024

Preoperative assessment:

- Viscoelastic tests has been found to have a limited association with the risk of postoperative bleeding.
- Abnormal preoperative platelet function testing has been shown to be associated with an increased risk of bleeding complications in patients with and without ongoing or recently stopped dual antiplatelet therapy (DAPT)

→Platelet function testing may be considered to guide the timing of cardiac surgery in patients who have recently received P2Y12 inhibitors

Perioperative assessment:

- All meta-analyses demonstrated a significant reduction in perioperative transfusion requirements for PRBCs, fresh frozen plasma (FFP) and platelet concentrates (PLTCs) after the implementation of VET-guided bleeding management algorithms in cardiovascular surgery.
- The latest meta-analysis published by Santos et al. (based on 21 RCTs including 8,900 participants) showed a statistically significant reduction in mortality [risk ratio and in the risk of acute kidney injury (AKI) in the VET-guided group.

Eur J Cardiothorac Surg. 2024 Oct 10:ezae352

Platelets fuctional testing – other application setting

Can this strategy be applied to other patients?

→ High variability in individual response to the drug

→ Yes, for example, patients with incracanial hemorrage.

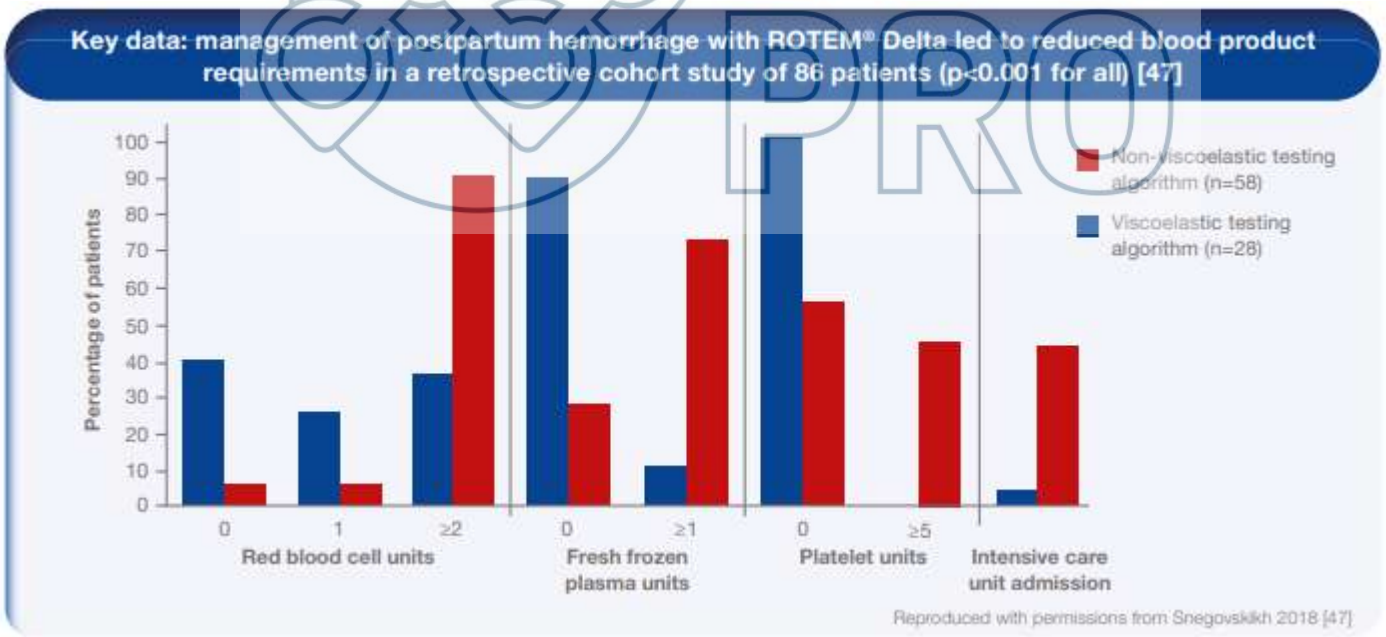
→ Important to assessment of hemorrhagic-thrombotic risk

Systematic Review (Xu *et al. European Journal of Medical Research - 2022)*

The search yielded 2,835 studies, of which seven observational studies comprising 849 patients met the inclusion criteria for this review. Overall, there is evidence that the use of POC PFT to assess bleeding risk reduced bleeding events, thromboembolic adverse outcomes, and the length of hospitalization.
However, there is currently insufficient evidence to suggest that using POC PFT improves blood product use, functional outcomes or mortality.

Postpartum hemorrhage

- Altered hemostasis in pregnancy is associated with coagulation changes that may lead to bleeding or thrombosis events, including postpartum hemorrhage



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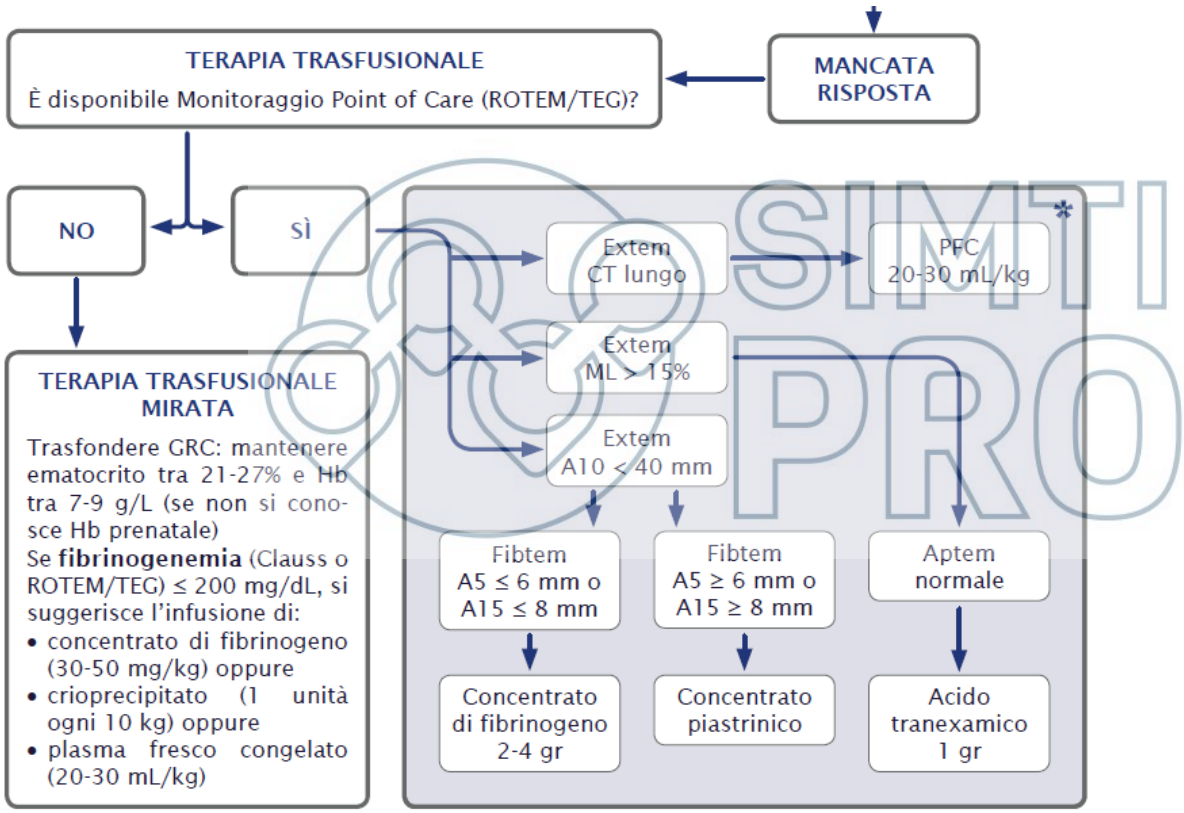
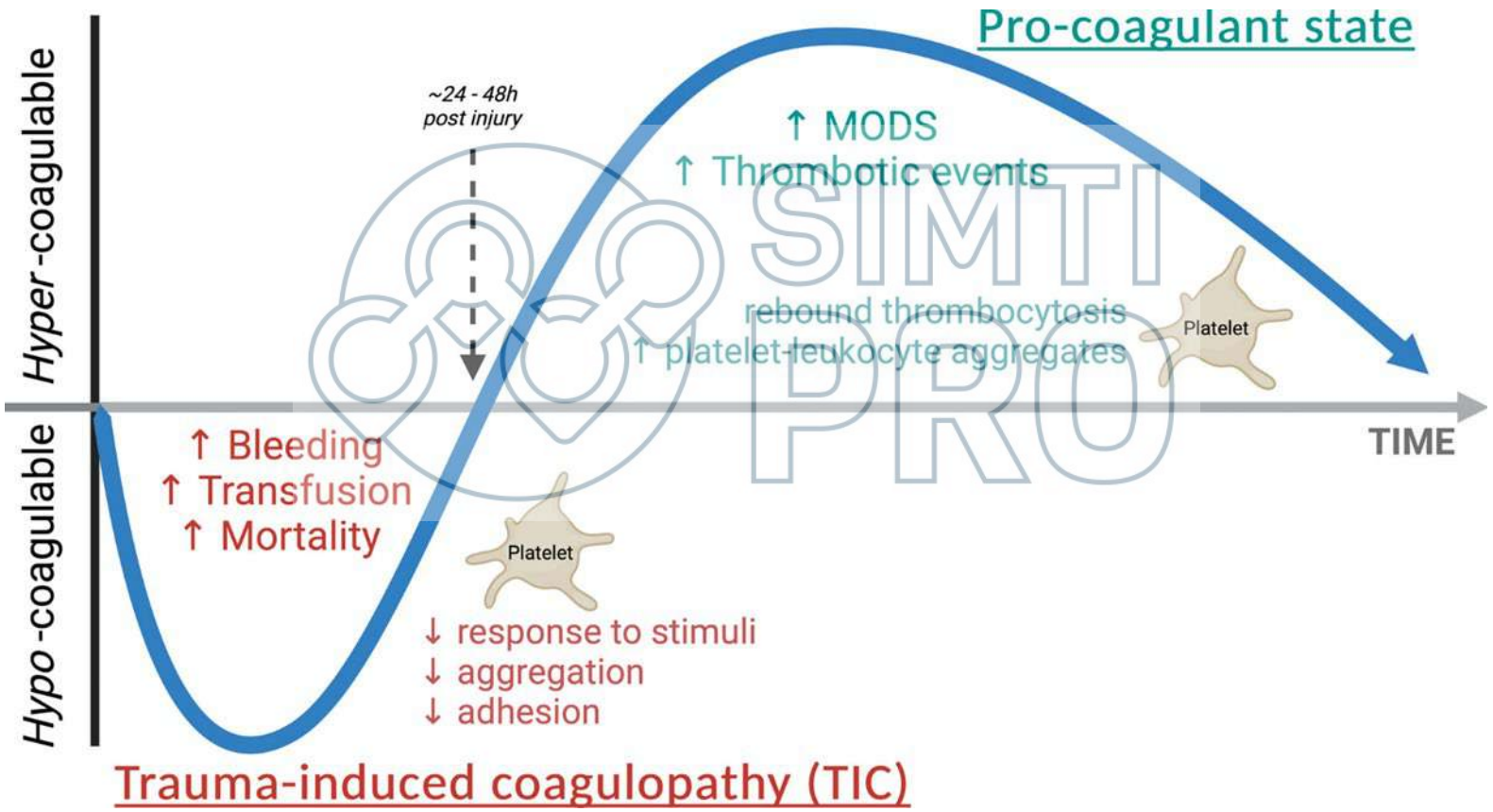
GESTIONE MULTIDISCIPLINARE DELL'EMORRAGIA POST-PARTUM (2015)



✲ Valori suggeriti sulla base dei protocolli operativi in uso dagli estensori del documento, in mancanza di parametri validati e standardizzati in letteratura

Polytrauma

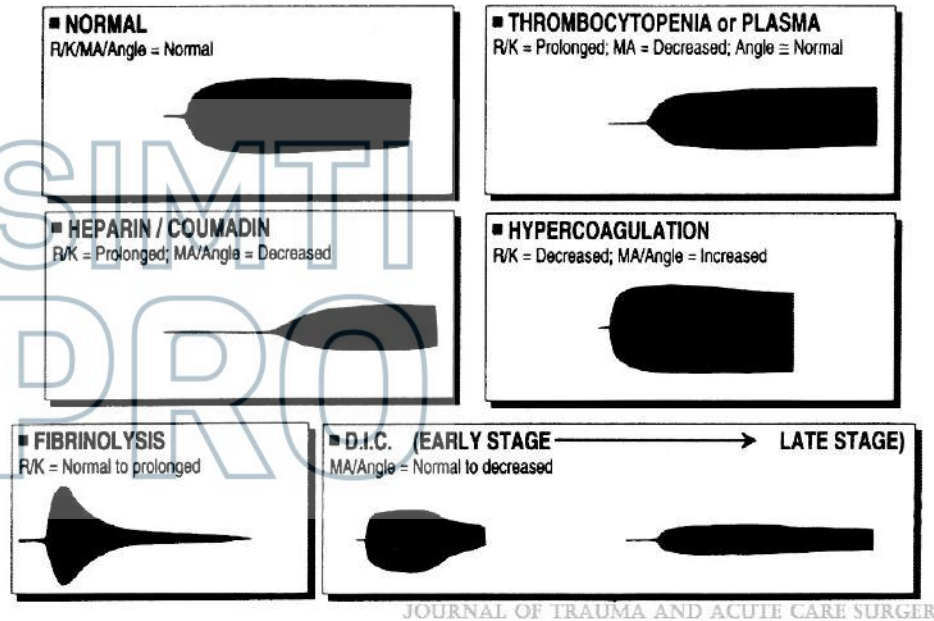

Pro-coagulant state
~24 - 48h
post injury
↑ MODS
↑ Thrombotic events
rebound thrombocytosis
↑ platelet-leukocyte aggregates
Platelet
Hyper-coagulable
Hypo-coagulable
TIME
↑ Bleeding
↑ Transfusion
↑ Mortality
Platelet
↓ response to stimuli
↓ aggregation
↓ adhesion
Trauma-induced coagulopathy (TIC)

Usefulness of Thrombelastography in Assessment of Trauma Patient Coagulation

Result	N	Injury Severity Score	Transfusion (24 hours)
Hypocoagulable	7	28.6	6
Normal	17	3.7	0
Hypercoagulable	45	13.1	2
Total	69	12.3	8

JOURNAL OF TRAUMA AND ACUTE CARE SURGERY

Only ISS ($p < 0.001$) and TEG ($p < 0.05$) are predictive of early transfusion

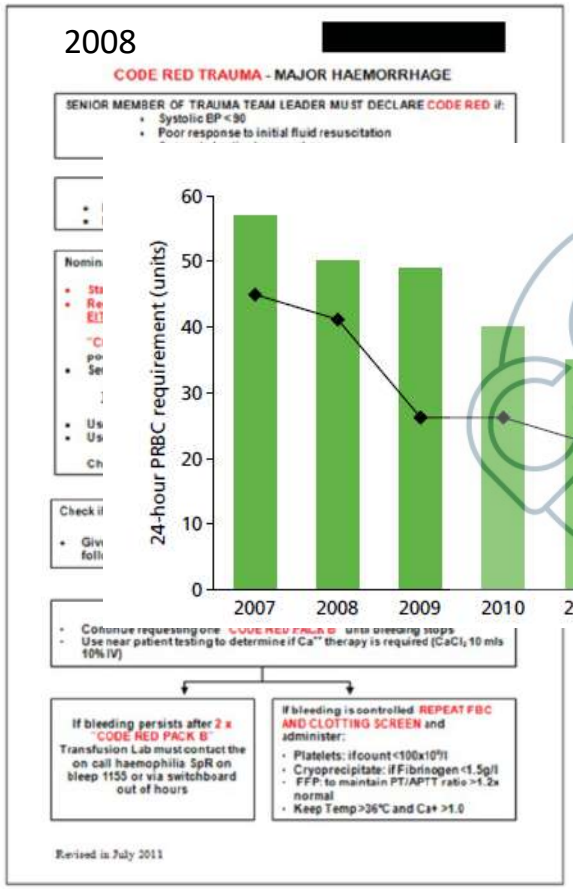


JOURNAL OF TRAUMA AND ACUTE CARE SURGERY

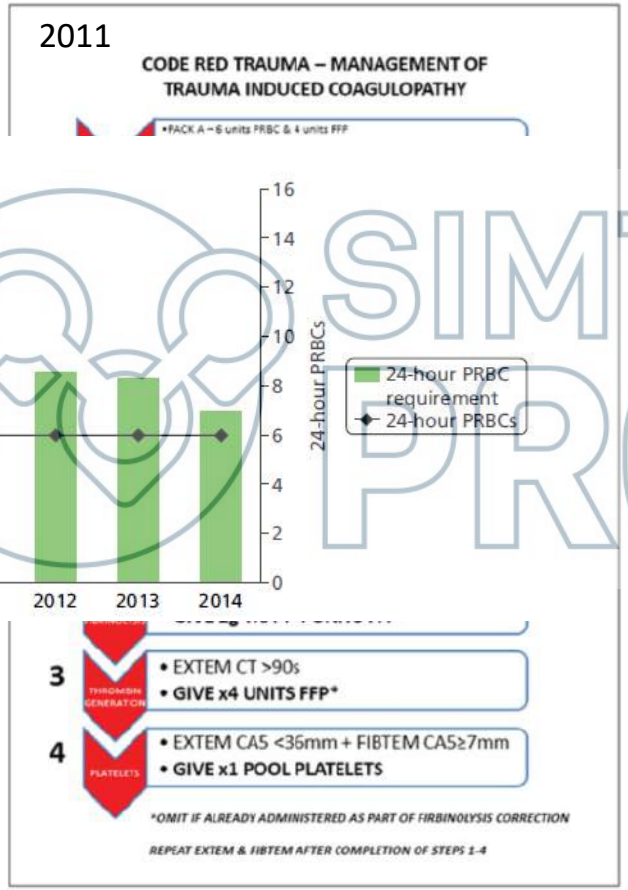
Kaufmann et al Journal of Trauma and Acute Care Surgery42(4):716-722, April 1997.

Evolution of the Royal London Hospital major trauma centre Code Red protocols

2008



2011

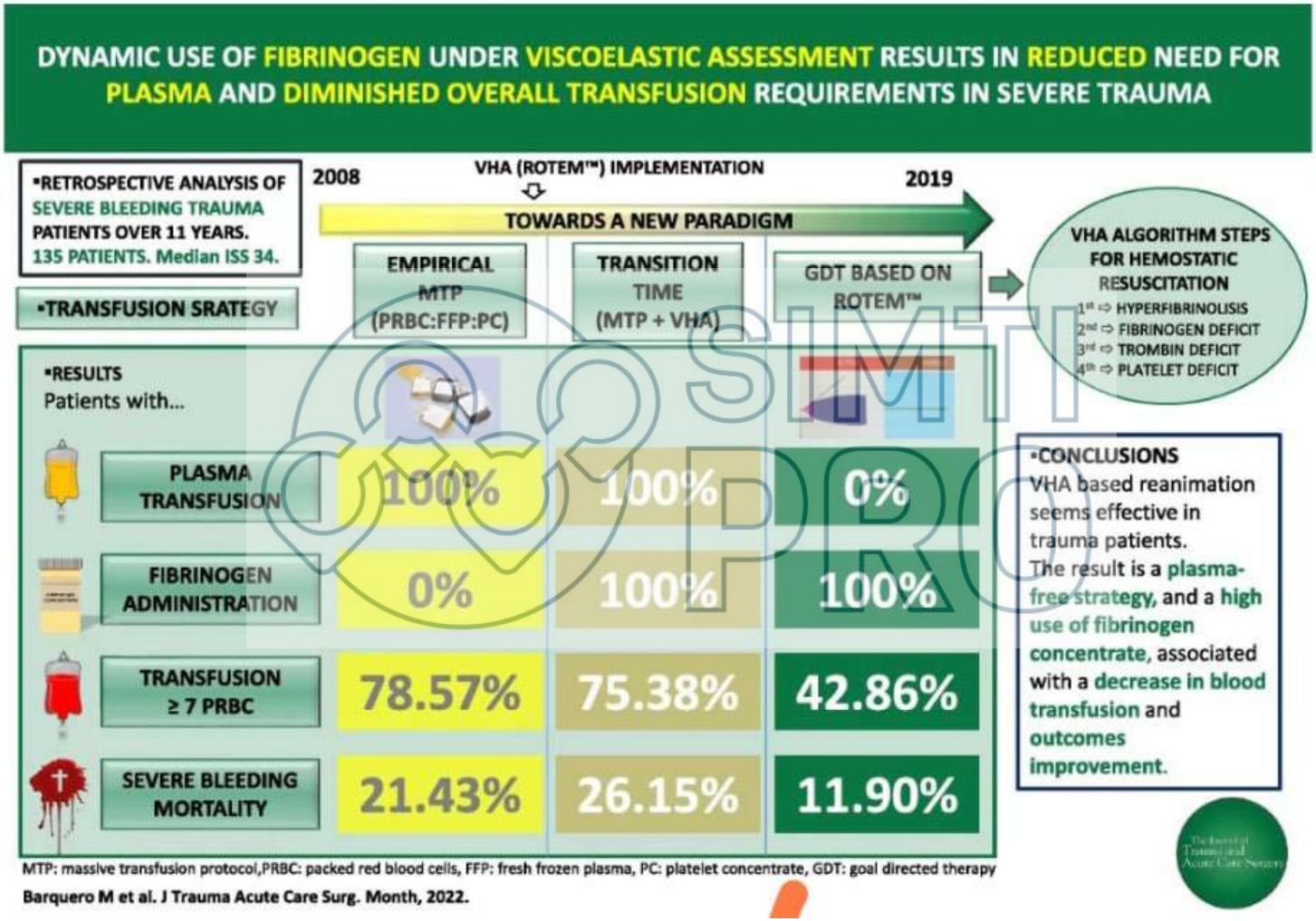


Traumatic coagulopathy and massive transfusion: improving outcomes and saving blood
(K. Brohi ;2017)

Outcomes of 'Code Red' 2007-14

- Mortality fell from 57% to 26%

- 24-hour PRBC requirements halved from 12 to 6 units.


DYNAMIC USE OF FIBRINOGEN UNDER VISCOELASTIC ASSESSMENT RESULTS IN REDUCED NEED FOR PLASMA AND DIMINISHED OVERALL TRANSFUSION REQUIREMENTS IN SEVERE TRAUMA
•RETROSPECTIVE ANALYSIS OF SEVERE BLEEDING TRAUMA PATIENTS OVER 11 YEARS. 135 PATIENTS. Median ISS 34.
•TRANSFUSION SRATEGY
2008
VHA (ROTEM™) IMPLEMENTATION
2019
TOWARDS A NEW PARADIGM
EMPIRICAL MTP (PRBC:FFP:PC)
TRANSITION TIME (MTP + VHA)
GDT BASED ON ROTEM™
VHA ALGORITHM STEPS FOR HEMOSTATIC RESUSCITATION
1st ⇨ HYPERFIBRINOLISIS
2nd ⇨ FIBRINOGEN DEFICIT
3rd ⇨ TROMBIN DEFICIT
4th ⇨ PLATELET DEFICIT
•RESULTS
Patients with...
PLASMA TRANSFUSION
100%
100%
0%
FIBRINOGEN ADMINISTRATION
0%
100%
100%
TRANSFUSION ≥ 7 PRBC
78.57%
75.38%
42.86%
SEVERE BLEEDING MORTALITY
21.43%
26.15%
11.90%
•CONCLUSIONS
VHA based reanimation seems effective in trauma patients.
The result is a plasma-free strategy, and a high use of fibrinogen concentrate, associated with a decrease in blood transfusion and outcomes improvement.
MTP: massive transfusion protocol,PRBC: packed red blood cells, FFP: fresh frozen plasma, PC: platelet concentrate, GDT: goal directed therapy
Barquero M et al. J Trauma Acute Care Surg. Month, 2022.

ORIGINAL

Viscoelastic haemostatic assay augmented protocols for major trauma haemorrhage (ITACTIC): a randomized, controlled trial

Studio multicentrico, randomizzato e controllato che confrontava i risultati nei pazienti traumatizzati che avevano ricevuto attivazione del protocollo di emorragia massiva, per vedere se la trasfusione guidata da i test viscoelastici avevano un impatto sull'outcome rispetto ai test tradizionali

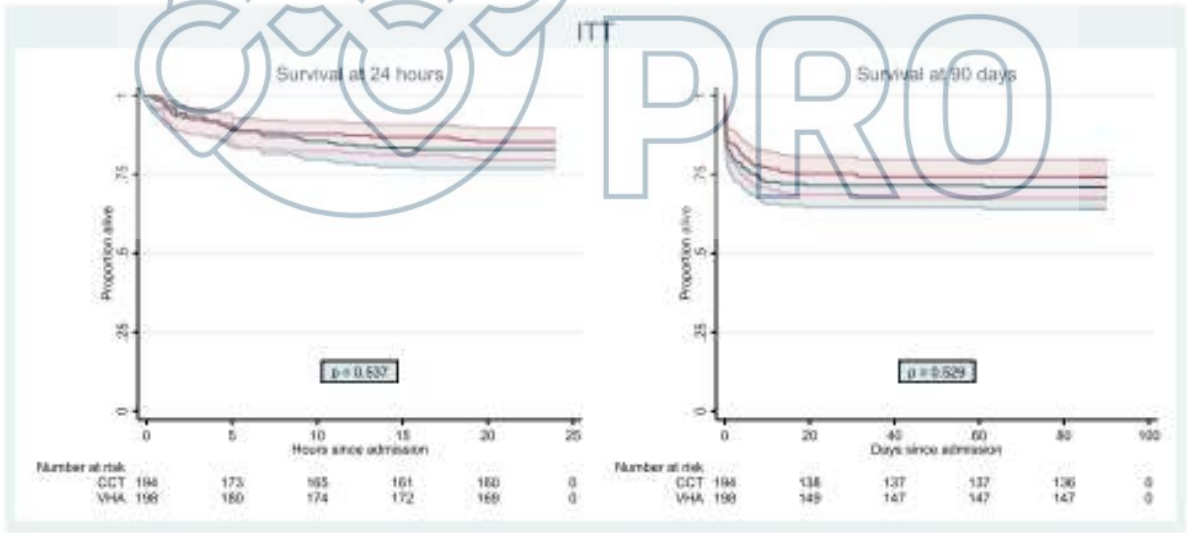
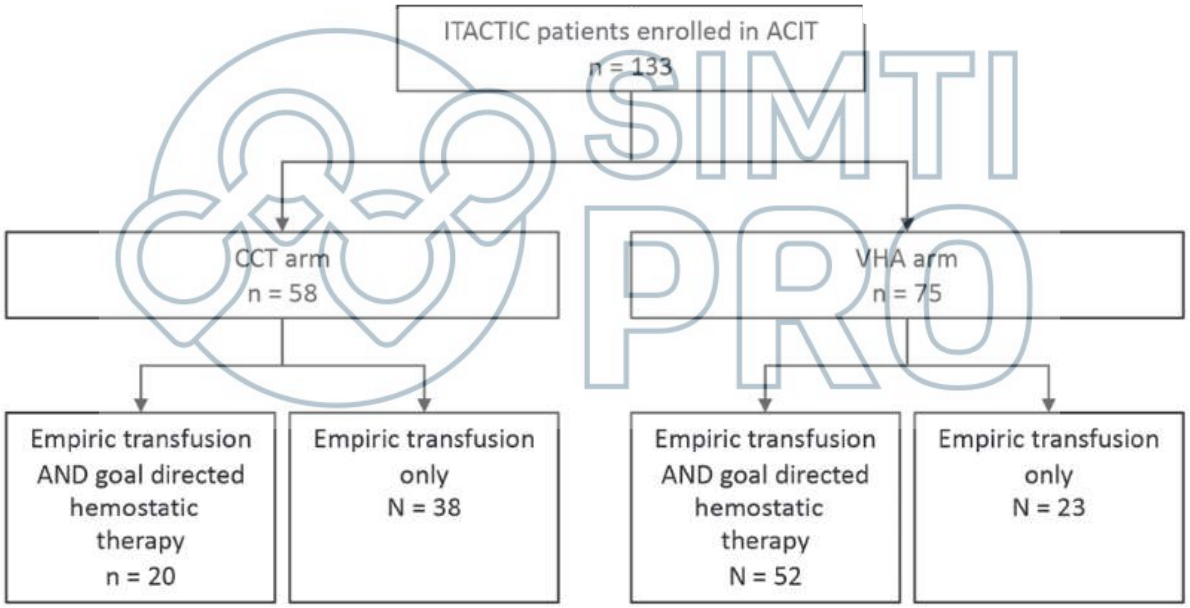


Fig. 3 Survival curves at 24 h and 90 days. Survival curves with 95% confidence intervals at 24 h and 90 days for the Intention-To-Treat (ITT) population. Blue: CCT-guided and Red: VHA-guided. The *p* values shown are the result of the log-rank test. 4 patients in the ITT population had missing date/time of events and were therefore not included in the survival curve. *CCT* conventional coagulation test, *VHA* viscoelastic haemostatic assay

Intensive Care Med . 2021 Jan;47(1):49-59

Correction of Trauma induced Coagulopathy by Goal-directed Therapy: A Secondary Analysis of the ITACTIC Trial



Adult trauma patients were enrolled if they presented with clinical signs of bleeding activating the local MHP and if RBC transfusion had been initiated

Lindsay C et al. Anesthesiology 2024; 141:904–12

A Secondary Analysis of the ITACTIC Trial

- **Coagulopathic**: 71% On admission + 16% during resuscitation.
- **Hypofibrinogenemia**: 65-66% on admission + 8 (Fib Clauss) and 12% (FIBTEM) during bleeding and resuscitation
- **Platelets**: 7% low platelet count on admission + 3% during hemorrhage

  In contrast, 70% low platelet function on admission + 25% during bleeding.
- **Plasma**: Only 8% met the thresholds for additional plasma. Subsequent triggers for plasma were rare
- **In total, 111 patients (83%) had a coagulation test result that could have triggered an algorithm-guided intervention**.

Lindsay C et al. Anesthesiology 2024; 141:904–12

A Secondary Analysis of the ITACTIC Trial

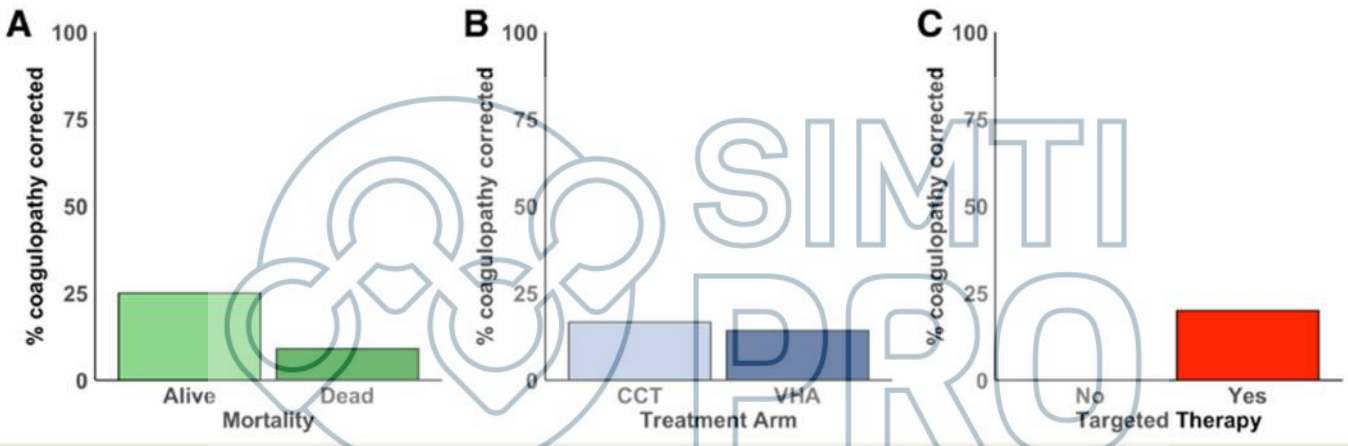


Fig. 2. Correction of coagulopathy (EXTEM A5 less than 40 mm) by mortality, treatment arm, and goal-directed therapy. Shown are the percentages of patients with admission coagulopathy (EXTEM A5 less than or equal to 40 mm) in whom coagulopathy has resolved by the final sample available for each patient. (*A*) Survivors *versus* nonsurvivors. (*B*) Conventional coagulation test (CCT) *versus* viscoelastic hemostatic assay (VHA) arm. (*C*) Goal-directed therapy *versus* empiric transfusion protocol (all P = not significant).

There are consistent results that suggest goal-directed treatments improved coagulation profiles more than empiric care alone

Lindsay C et al. Anesthesiology 2024; 141:904–12

A Secondary Analysis of the ITACTIC Trial

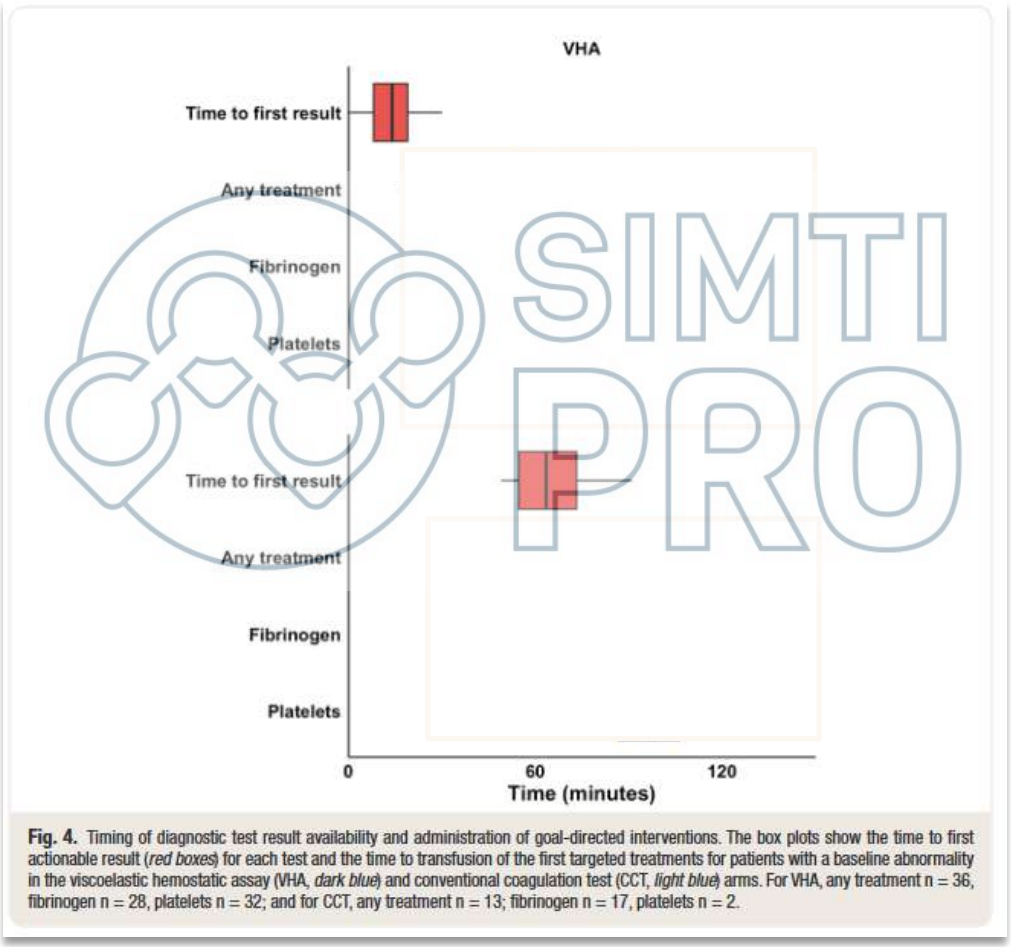
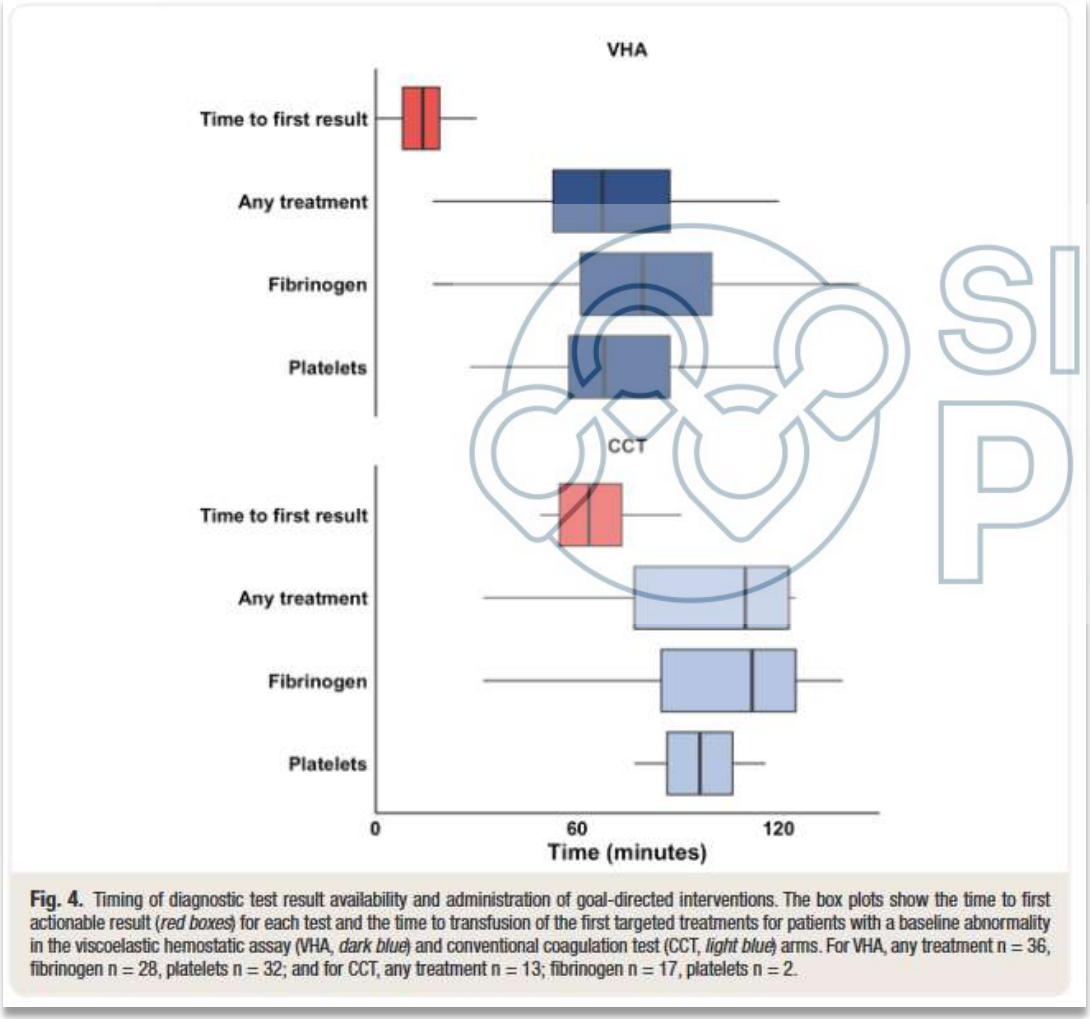


Fig. 4. Timing of diagnostic test result availability and administration of goal-directed interventions. The box plots show the time to first actionable result (*red boxes*) for each test and the time to transfusion of the first targeted treatments for patients with a baseline abnormality in the viscoelastic hemostatic assay (VHA, *dark blue*) and conventional coagulation test (CCT, *light blue*) arms. For VHA, any treatment n = 36, fibrinogen n = 28, platelets n = 32; and for CCT, any treatment n = 13; fibrinogen n = 17, platelets n = 2.

A Secondary Analysis of the ITACTIC Trial



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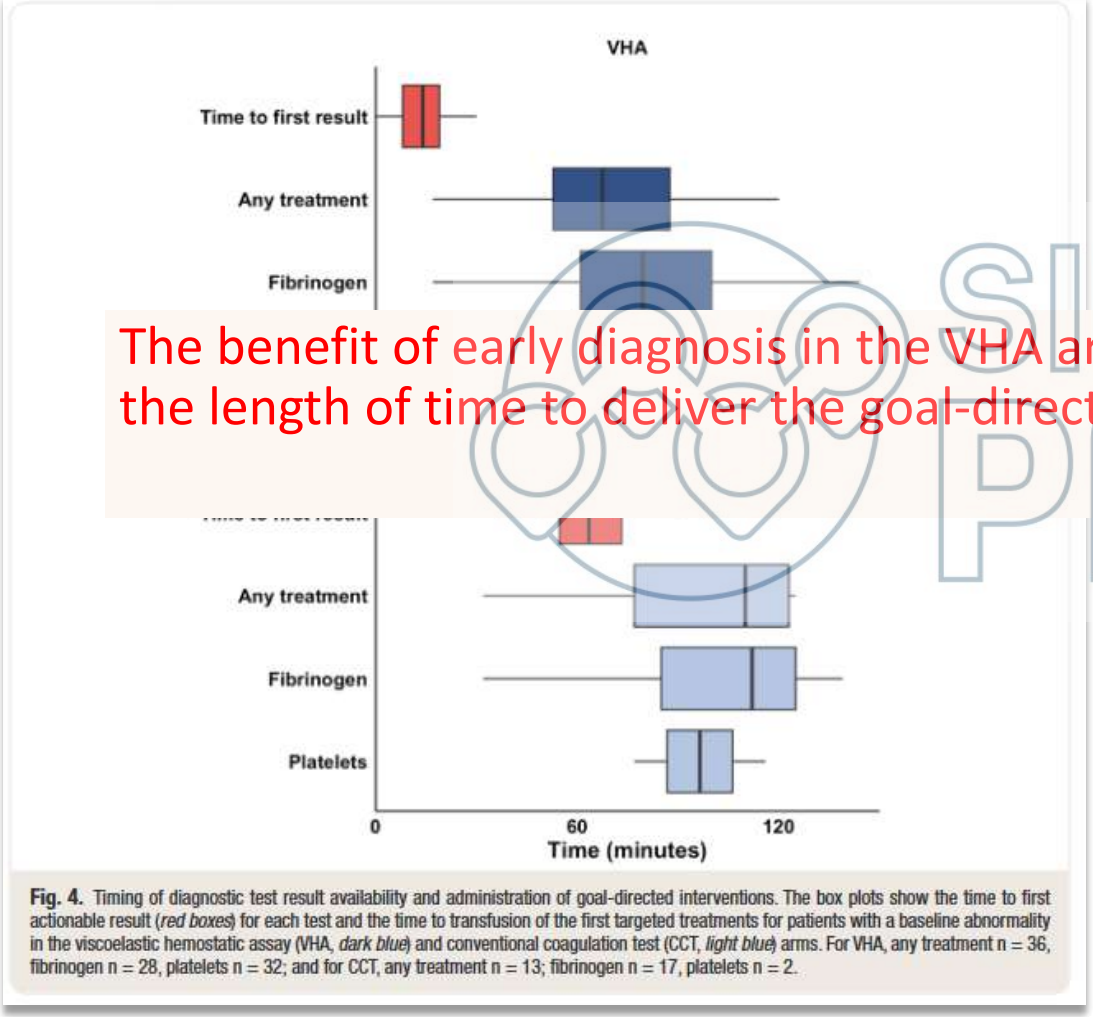
Median time to diagnosis was 14 min in the VHA arm and 64 min in the CCT arm.

The median time from diagnosis to the first goal-directed intervention was a further 76 min for VHA with a median of 42 min faster than the CCT

A Secondary Analysis of the ITACTIC Trial



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Median time to diagnosis was 14 min in the VHA arm and 64 min in the CCT arm.

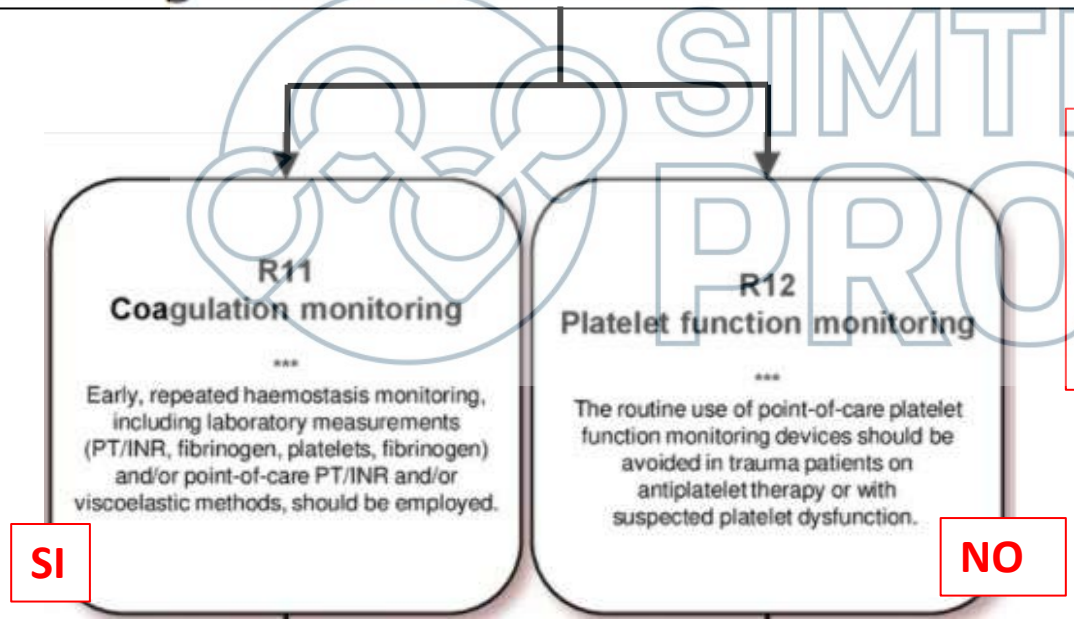
The benefit of early diagnosis in the VHA arm was overshadowed by the length of time to deliver the goal-directed intervention

further 76 min for VHA with a median of 42 min faster than the CCT

GUIDELINES Open Access

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

2023



SI

NO

1C
Strong recommendation, low-quality or very low-quality evidence
Benefits clearly outweigh risk and burdens, or vice versa

GUIDELINES Open Access

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

2023

R26
Goal-directed therapy

...

Resuscitation measures should be continued using a goal-directed strategy guided by standard laboratory coagulation values and/or viscoelastic monitoring.

1B
Strong recommendation, moderate-quality evidence
Benefits clearly outweigh risk and burdens, or vice versa

Early and goal-directed therapeutic intervention improves coagulation, which can reduce the need for transfusion of pRBC, FFP and platelets, decrease posttraumatic multiorgan failure, length of hospital stay and improve survival

Conclusioni

- I test di coagulazione convenzionali, come il tempo di protrombina (PT) e il tempo di tromboplastina parziale attivata (aPTT), sono basati sul plasma e, pertanto, insensibili alle variazioni della conta o della funzione piastrinica e non identificano difetti sulla fase fibrinolitica del processo emostatico.
- L'emocromo ci fornisce una conta piastrinica senza valutare il contributo che le piastrine apportano al processo di coagulazione (ovvero la funzione piastrinica)

I VET forniscono una panoramica olistica dello stato di coagulazione di un paziente, consentendo agli operatori sanitari di identificare un problema e fornire una terapia veloce e mirata presso il sito di cura.

Conclusioni

- ✓ Esistono Linee guida per l'uso dei test viscoleastici per diverse condizioni cliniche → le raccomandazioni per l'implementazione siano limitate in alcune aree cliniche a causa della mancanza di studi che costituiscano evidenze di alto livello.
- ✓ I test di funzionalità piastrinica mostrano molta variabilità tra i diversi test. Possono essere utili nel decidere la tempistica dell'intervento e il sanguinamento principalmente nella chirurgia cardiaca.

  L'utilità di eseguire ulteriori test di funzionalità piastrinica specifici in combinazione con VET non è attualmente ben definita.

L'utilizzo dei POCT perioperatori può ridurre potenzialmente:

- Trasfusione di emocomonenti (piastrine e plasma)
- gli eventi avversi (incluso sanguinamento)
- La mortalità

Take home message

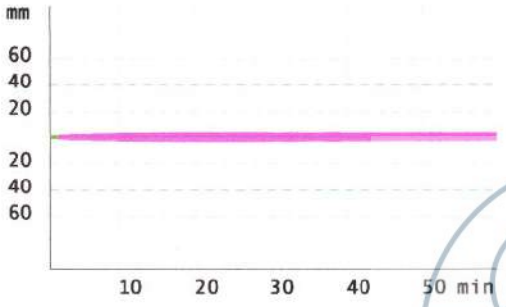
- ✓ Importante avere algoritmi validati per lo specifico POCT che guidino la terapia trasfusionale nei diversi setting
- ✓ fornire un adeguato training del personale.

Il trasfusionale può/deve svolgere un ruolo fondamentale per ridurre il gap tra velocità dell'esecuzione dei test e la somministrazione ritardata degli emocomponenti

A chi è ancora sveglio: grazie per l'attenzione!

Caso clinico: Politrauma

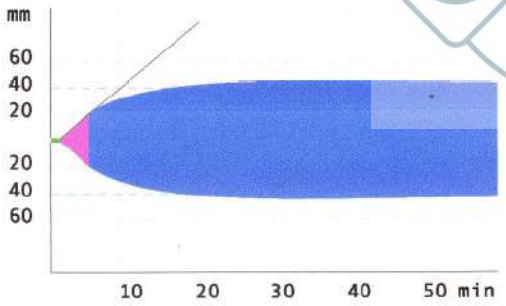
Pedone investito → trauma toracico (No fonti emorragiche esterna)
Efast positiva torace sx e addome; messo drenaggio → uscita aria e 400ml di sangue (+ altri 700ml)
TAC →lesione splenica →sala



FIBTEM S

RT: 01:00:27 ST: 2015-

CT	:	72	s	
CFT	:		s	
α	:		°	
A10	:	3	mm	[7 - 23]
A20	:	4	mm	[8 - 24]
MCF	:	4	mm	[9 - 25]
ML	:*	16	%	
LI30	:	91	%	
LI45	:	90	%	
LI60	:		%	



EXTEM S

RT: 01:00:30 ST: 2015-

CT	:	88	s	[38 - 79]
CFT	:	218	s	[34 - 159]
α	:	52	°	[63 - 83]
A10	:	35	mm	[43 - 65]
A20	:	43	mm	[50 - 71]
MCF	:	45	mm	[50 - 72]
ML	:*	4	%	[0 - 15]
LI30	:	100	%	[94 - 100]
LI45	:	99	%	
LI60	:		%	

ESAMI

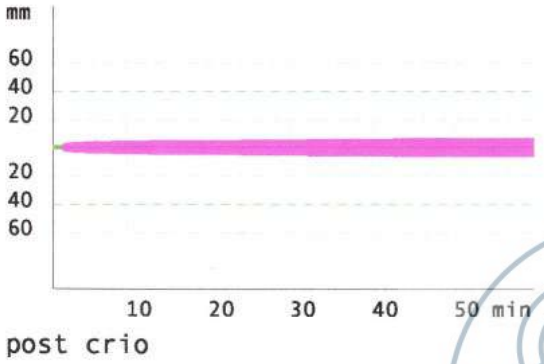
Hb 10.7
Plt 150
PT 1.71
APTT 1.04
FIB 79

cosa abbiamo fatto

4 EC
2 pool Crio
3 PFC da 250

Ipofibrinogenemia (allungamento tempi coagulazione forse tutto da ipofib); no iperfibrinolisi

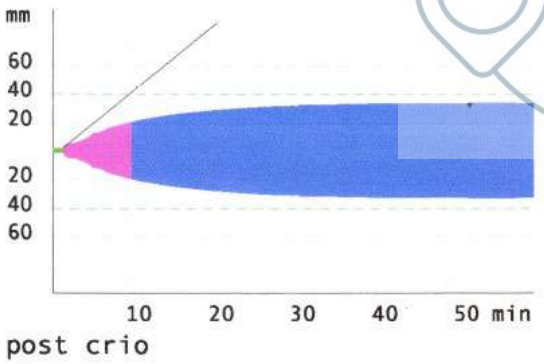
Caso clinico: Ipofibrinoegenemia e non solo



FIBTEM S de pad

RT: 01:00:18 ST: 2015-

CT	:	74	s	
CFT	:		s	
α	:		°	
A10	:	5	mm	[7 - 23]
A20	:	5	mm	[8 - 24]
MCF	:	5	mm	[9 - 25]
ML	:*	2	%	
LI30	:	100	%	
LI45	:	100	%	
LI60	:		%	



EXTEM S de pad

RT: 01:00:21 ST: 2015-

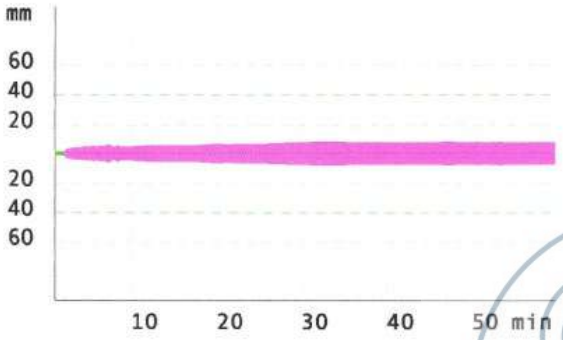
CT	:	82	s	[38 - 79]
CFT	:	496	s	[34 - 159]
α	:	51	°	[63 - 83]
A10	:	22	mm	[43 - 65]
A20	:	29	mm	[50 - 71]
MCF	:	33	mm	[50 - 72]
ML	:*	0	%	[0 - 15]
LI30	:	100	%	[94 - 100]
LI45	:	100	%	
LI60	:		%	

Cosa abbiamo fatto

1 pool PLT
4 EC
2 pool Crio
4 PFC da 250
(1 da reazione trasfusionale)

SIMTI PRO

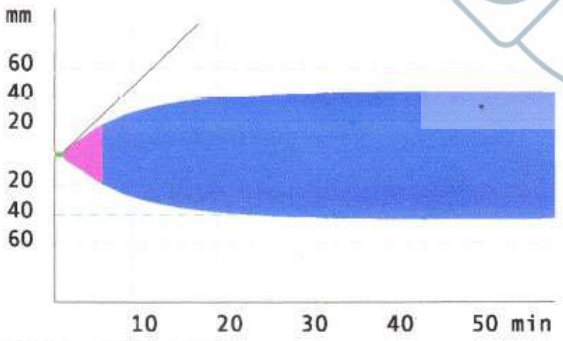
Caso clinico



FIBTEM S

RT: 01:00:19 ST: 2015-

CT	:	75	s			
CFT	:		s			
α	:		°			
A10	:	6	mm	[	7 -	23]
A20	:	7	mm	[	8 -	24]
MCF	:	6	mm	[	9 -	25]
ML	:*	9	%			
LI30	:	100	%			
LI45	:	100	%			
LI60	:		%			



post chirurgia

EXTEM S

RT: 01:00:21 ST: 2015-

CT	:	69	s	[	38 -	79]
CFT	:	268	s	[	34 -	159]
α	:	56	°	[	63 -	83]
A10	:	32	mm	[	43 -	65]
A20	:	40	mm	[	50 -	71]
MCF	:	44	mm	[	50 -	72]
ML	:*	1	%	[	0 -	15]
LI30	:	100	%	[	94 -	100]
LI45	:	100	%			
LI60	:		%			

ESAMI mandati insieme al rotem

Hb 9.1
Plt 62
PT 1.50
APTT 1.48
FIB 153

Cosa abbiamo fatto

1 pool Crio
1 pool plt

STOP BLEEDING

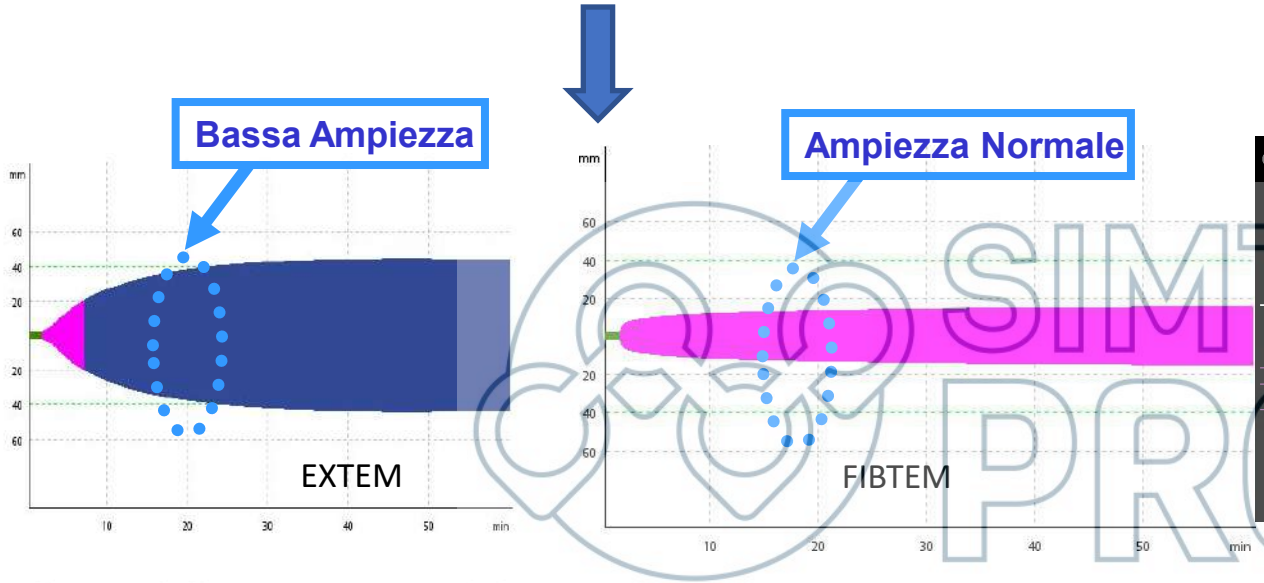
ESAMI pz in Ria

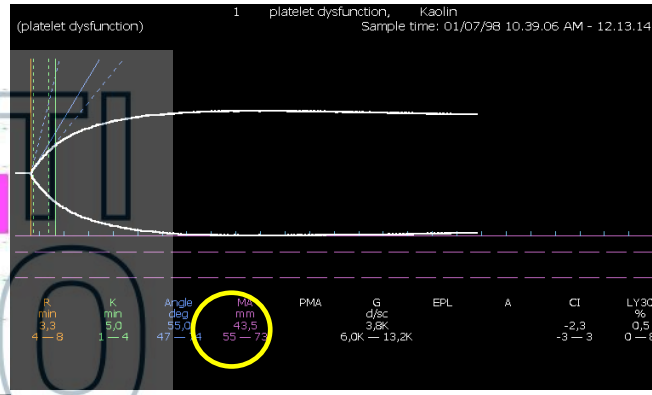
Plt 117
PT 1.36
APTT 1.03
FIB 182

SIMTI PRO

Do not forget the platelets…

Se mi trovassi nel caso di un fibrinogeno normale





Il problema sarebbero le piastrine

Ipofibrinogenemia (allungamento tempi coagulazione forse tutto da ipofib); no iperfibrinolisi

Carenza di fibrinogeno

Risultati stampati: 24-set-2023 21:53
ID paziente: 2023036846
PPID non mostrato
Nota: aclf
Data/ora test: 29-lug-2023 10:28
Utente: milano
Nome strumento: TEG 6s
Posizione: SAR1 TI DEA

CM Citrated K,KH,RT,FF

CK

Parametro	Valore paziente	Range riferimento
R (min)	7,5	4,6 - 9,1
K (min)	3,2!	0,8 - 2,1
Ang (gradi)	63,3	63 - 78
MA (mm)	36,5!	52 - 69
LY30 (%)	0,0	0,0 - 2,6

Range riferimento: Definito da produttore

CRT

Parametro	Valore paziente	Range riferimento
R (min)	2,0!	0,3 - 1,1
K (min)	3,5!	0,8 - 2,7
Ang (gradi)	60,1	60 - 78
MA (mm)	36,3!	52 - 70
LY30 (%)	0,0	0,0 - 2,2
TEG-ACT (sec)	237,6!	82 - 152
A10 (mm)	28,7!	44 - 67

Range riferimento: Definito da produttore

CKH

Parametro	Valore paziente	Range riferimento
R (min)	7,0	4,3 - 8,3
K (min)	3,2!	0,8 - 1,9
Ang (gradi)	63,8!	64 - 77
MA (mm)	36,8!	52 - 69

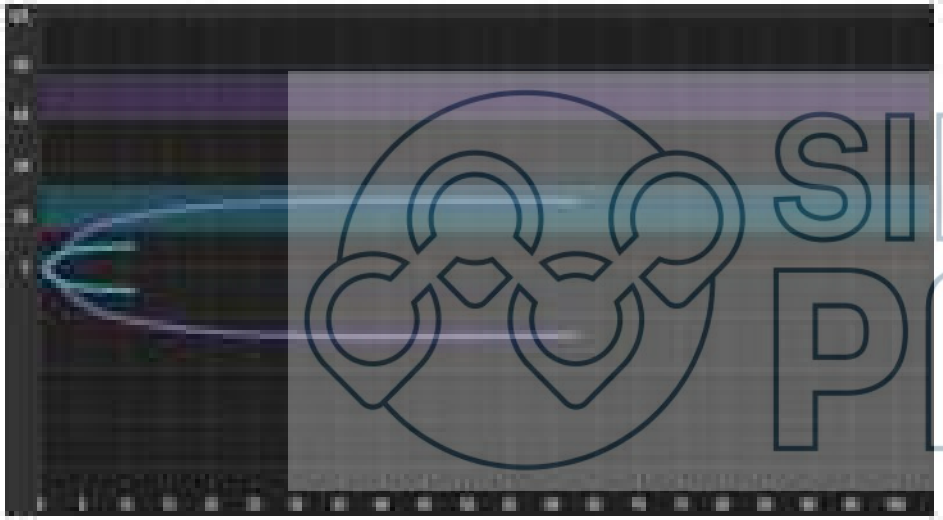
Range riferimento: Definito da produttore

CFF

Parametro	Valore paziente	Range riferimento
MA (mm)	7,5!	15 - 32
A10 (mm)	*	15 - 30

Range riferimento: Definito da produttore

Lotto cartuccia: 051723-2
Data scadenza cartuccia: 30-apr-2025
NS TEG 6s: T1-22C-102988
Firmware: 1.6.92.4536



Carenza di piastrine e fibrinogeno

Risultati stampati: 24-set-2023 21:51
ID paziente: 2023037080
PPID non mostrato
Nota:
Data/ora test: 17-ago-2023 17:29
Utente: milano
Nome strumento: TEG 6s
Posizione: SAR1 TI DEA

CM Citrated K,KH,RT,FF

CK

Parametro	Valore paziente	Range riferimento
R (min)	9,6!	4,6 - 9,1
K (min)	4,9!	0,8 - 2,1
Ang (gradi)	56,4!	63 - 78
MA (mm)	28,2!	52 - 69
LY30 (%)	0,0	0,0 - 2,6

Range riferimento: Definito da produttore

CRT

Parametro	Valore paziente	Range riferimento
R (min)	1,8!	0,3 - 1,1
K (min)	5,5!	0,8 - 2,7
Ang (gradi)	49,6!	60 - 78
MA (mm)	28,8!	52 - 70
LY30 (%)	0,0	0,0 - 2,2
TEG-ACT (sec)	218,9!	82 - 152
A10 (mm)	24,4!	44 - 67

Range riferimento: Definito da produttore

CKH

Parametro	Valore paziente	Range riferimento
R (min)	10,2!	4,3 - 8,3
K (min)	4,3!	0,8 - 1,9
Ang (gradi)	58,3!	64 - 77
MA (mm)	29,3!	52 - 69

Range riferimento: Definito da produttore

CFF

Parametro	Valore paziente	Range riferimento
MA (mm)	4,6!	15 - 32
A10 (mm)	*	15 - 30

Range riferimento: Definito da produttore

Lotto cartuccia: 052623-5
Data scadenza cartuccia: 30-apr-2025
NS TEG 6s: T1-22C-102988
Firmware: 1.6.92.4536

Limiti…

VET

- Scarsa sensibilità:

→ ai disordini dell'emostasi primaria
→ alla malattia di von Willebrand
→ antiaggreganti piastrinici
→ EBPM, fondaparinux

- moderata correlazione:

→con i test di screening plasmatici
→DOACS

- Pochi studi sull'effetto degli inibitori, nuovi anticoagulanti ecc

Platelet function testing

- Non usare per la determinazione del vWF (von Willebrand Factor)
- o disordini congeniti della funzionalità piastrinica

Limiti di tutti i sistemi che valutano l'aggregazione piastrinica:

- Assunzione di Farmaci o cibo che influenzano i test di aggregazione piastrinica
- Bassa Conta piastrinica (< 100.000 – 150.000 plt/μl)

Antistaminici, antibiotici, antidepressivi

Alcool, cipolle, aglio, peperone