Segítség.... vérzik a betegem....

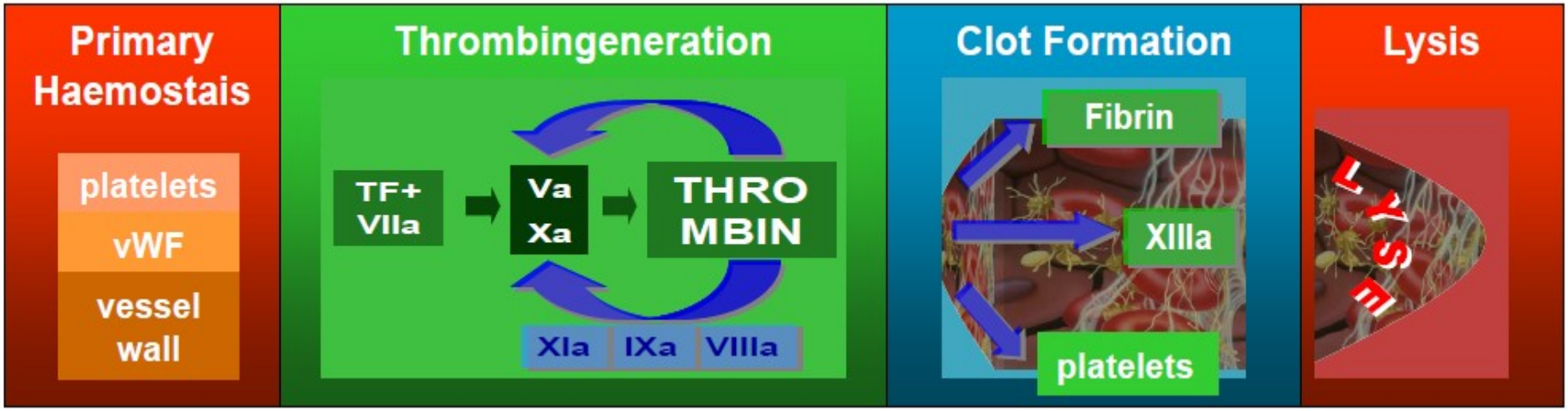
Viszkoelasztikus tesztek (TEG®, ROTEM®)

Dr. Tánczos Krisztián

SZTE Aneszteziológiai és Intenzív Terápiás Intézet

Szeged, 2013. szeptember 20-21.

Hemosztázis alapjai



Dr. Dietmar Fries: Basics of coagulation 2013; CSL Behring Symposium

Standard plazmatikus tesztek

British Journal of Anaesthesia **108** (1): 36–41 (2012)
Advance Access publication 14 November 2011 · doi:10.1093/bja/aer342

BJA

Comparison of thromboelastometry (ROTEM®) with standard plasmatic coagulation testing in paediatric surgery

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Standard coagulation test results were available after a median of **53 min** [inter-quartile range (IQR): 45–63 min], whereas **10 min values of ROTEM results** were available online after **23 min** (IQR: 21–24 min).

35

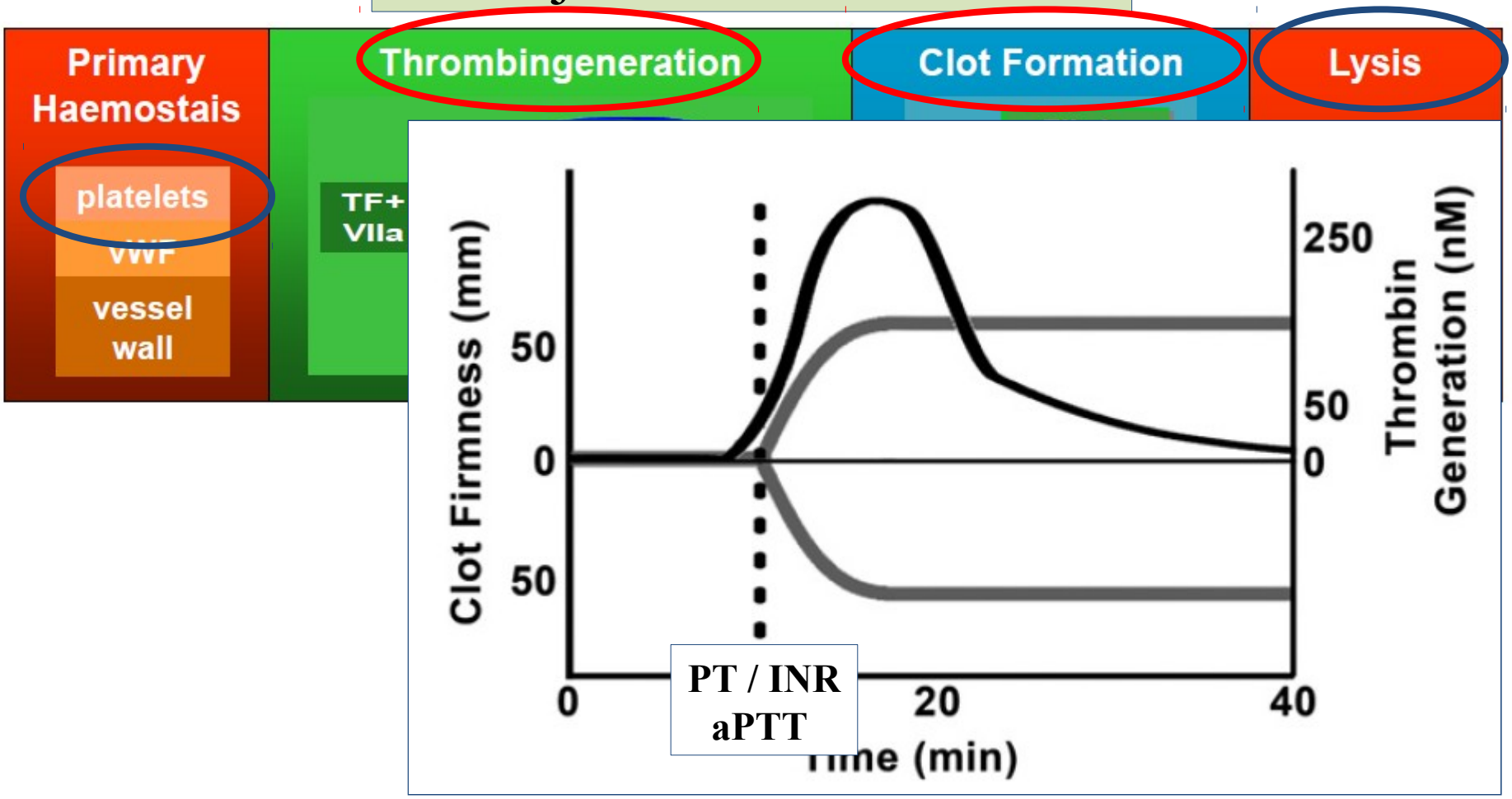
46

01

Viszkoelasztikus tesztek (TEG®, ROTEM®)

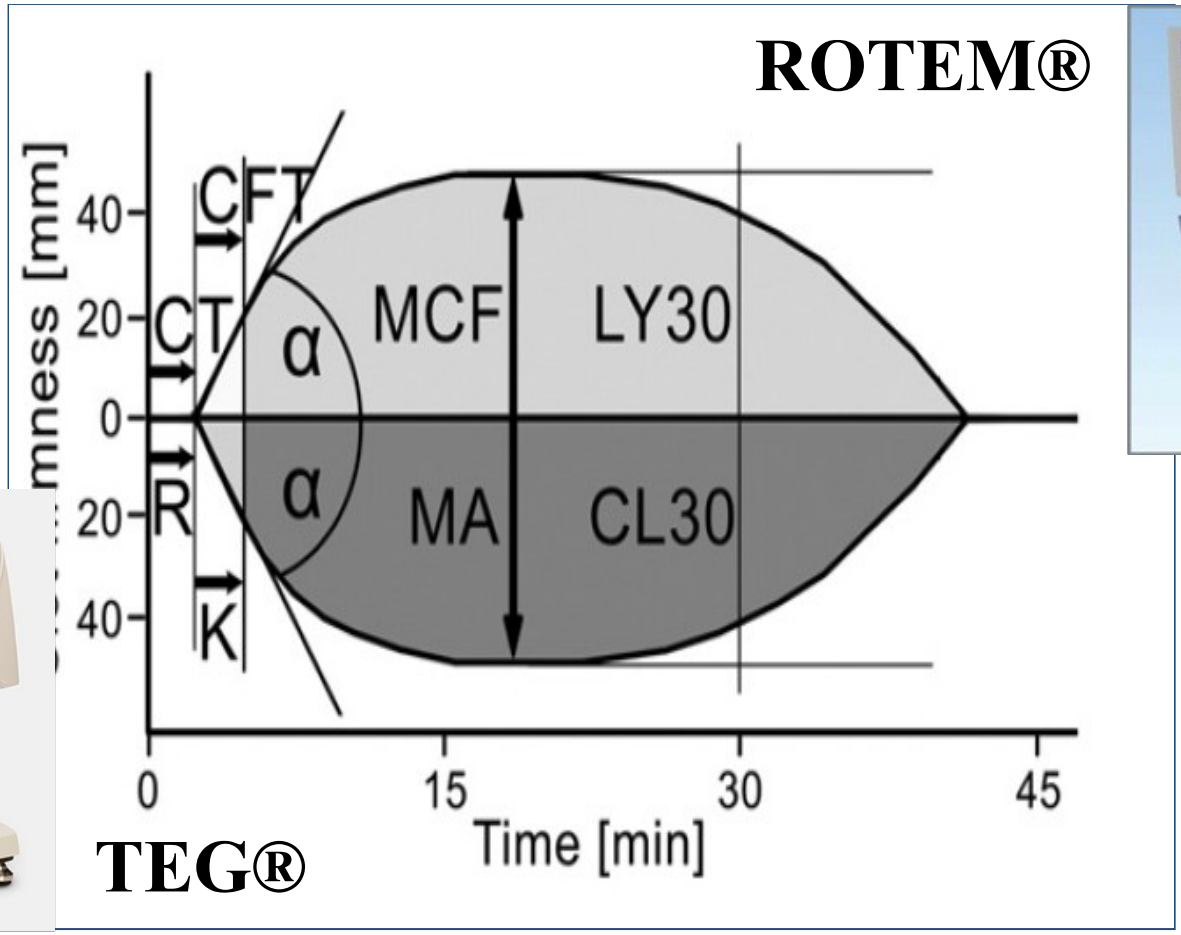
Bolliger D et al Transfusion Medicine Reviews 2012; 26: 1-13

Teljes vér - dinamikus



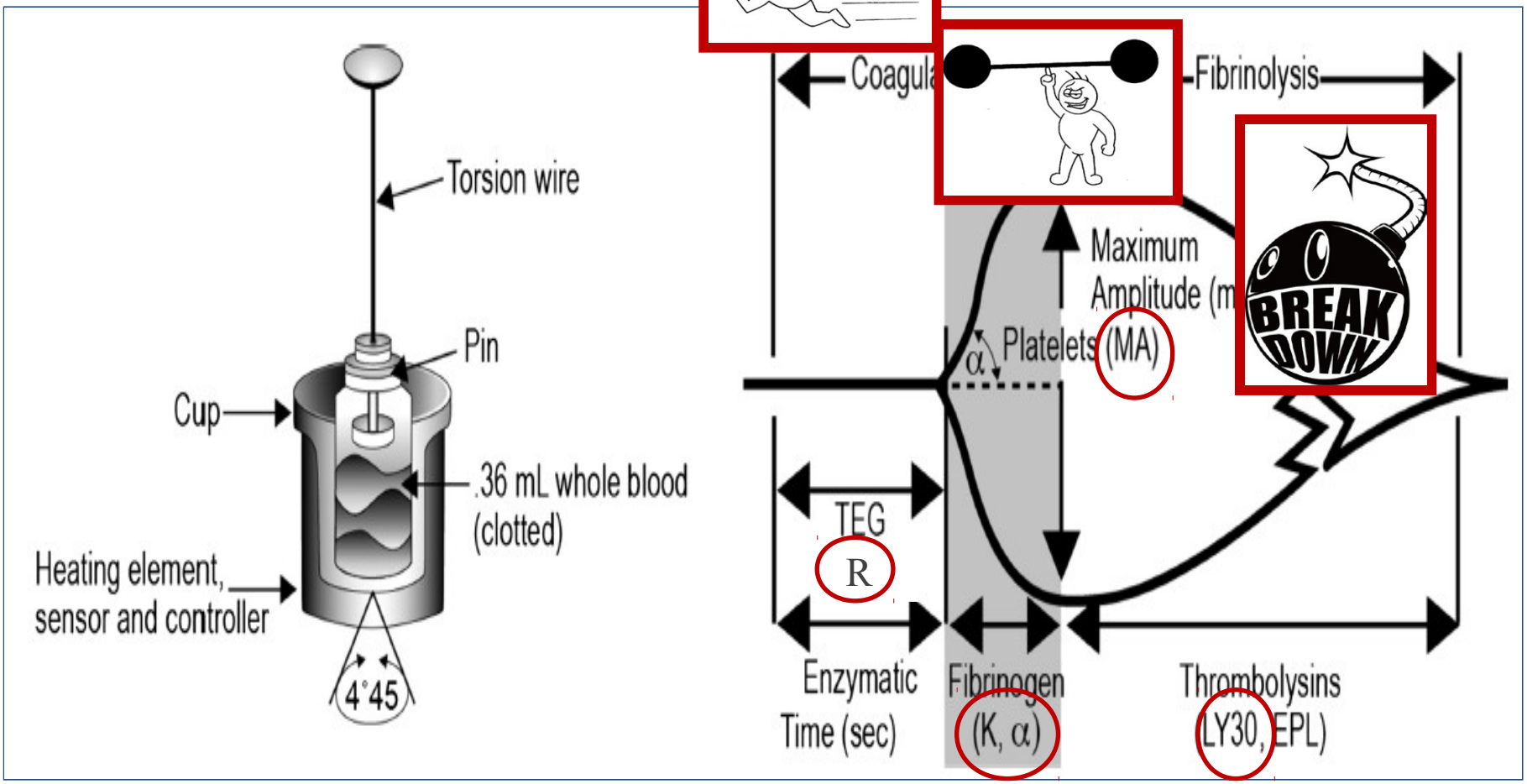
Thromboelasztográfia/metria

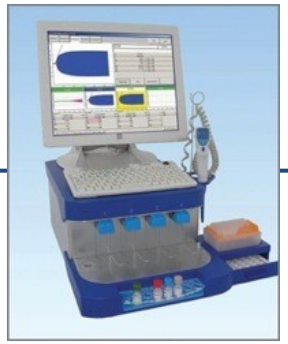
Bolliger D et al Transfusion Medicine Reviews 2012; 26: 1-13



TEG®

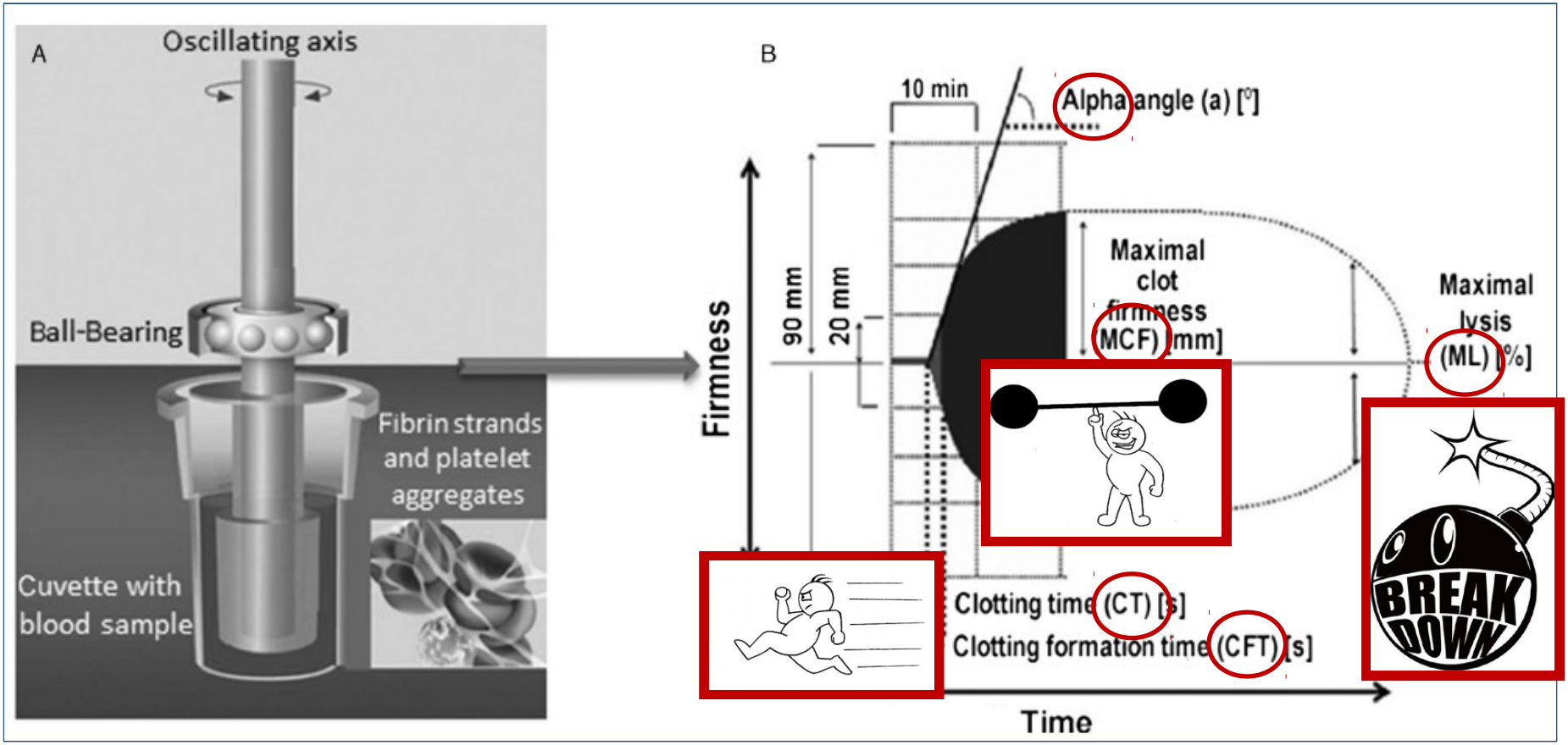
Schöchl H et al J Trauma Acute Care Surg. 2013; 74 (6):1587-1598





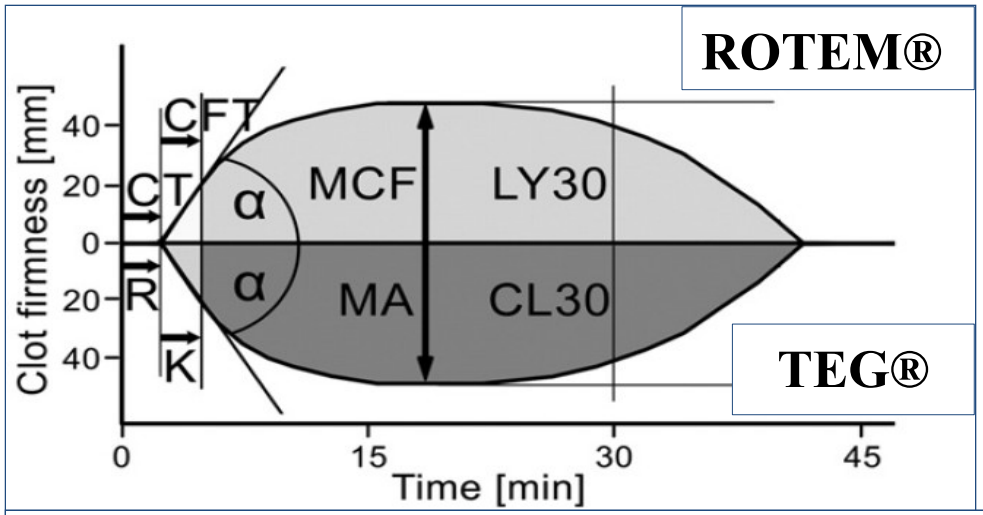
ROTEM®

Schöchl H et al J Trauma Acute Care Surg. 2013; 74 (6):1587-1598



TEG® vs. ROTEM®

Solomon C et al BJA 2012; 109 (6): 851–63



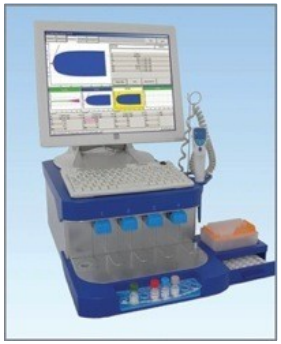


Table 1 Parameters recordable using TEG® and ROTEM®-based tests. *G=(5000×MA)/(1

Parameter recorded	TEG® value	ROTEM® value	Correlations with standard hemostatic laboratory tests
Coagulation initiation	*r* (reaction time)	CT (clotting time)	INR, aPTT, procoagulant factor levels
Clot formation	*k*	CFT (clot formation time)	Fibrinogen, platelet count
	α° (alpha angle)	α° (alpha angle)	
Clot strength/quality		A5, A10, A15, etc.	
	MA (maximum amplitude)	MCF (maximum clot firmness)	Fibrinogen, platelet count
	G (clot rigidity)	MCE (maximum clot elasticity)	
Clot lysis	LY30 (lysis)	LI30 (lysis index)	Fibrinogen, platelet count
		Ml (maximum lysis)	Fibrin degradation products

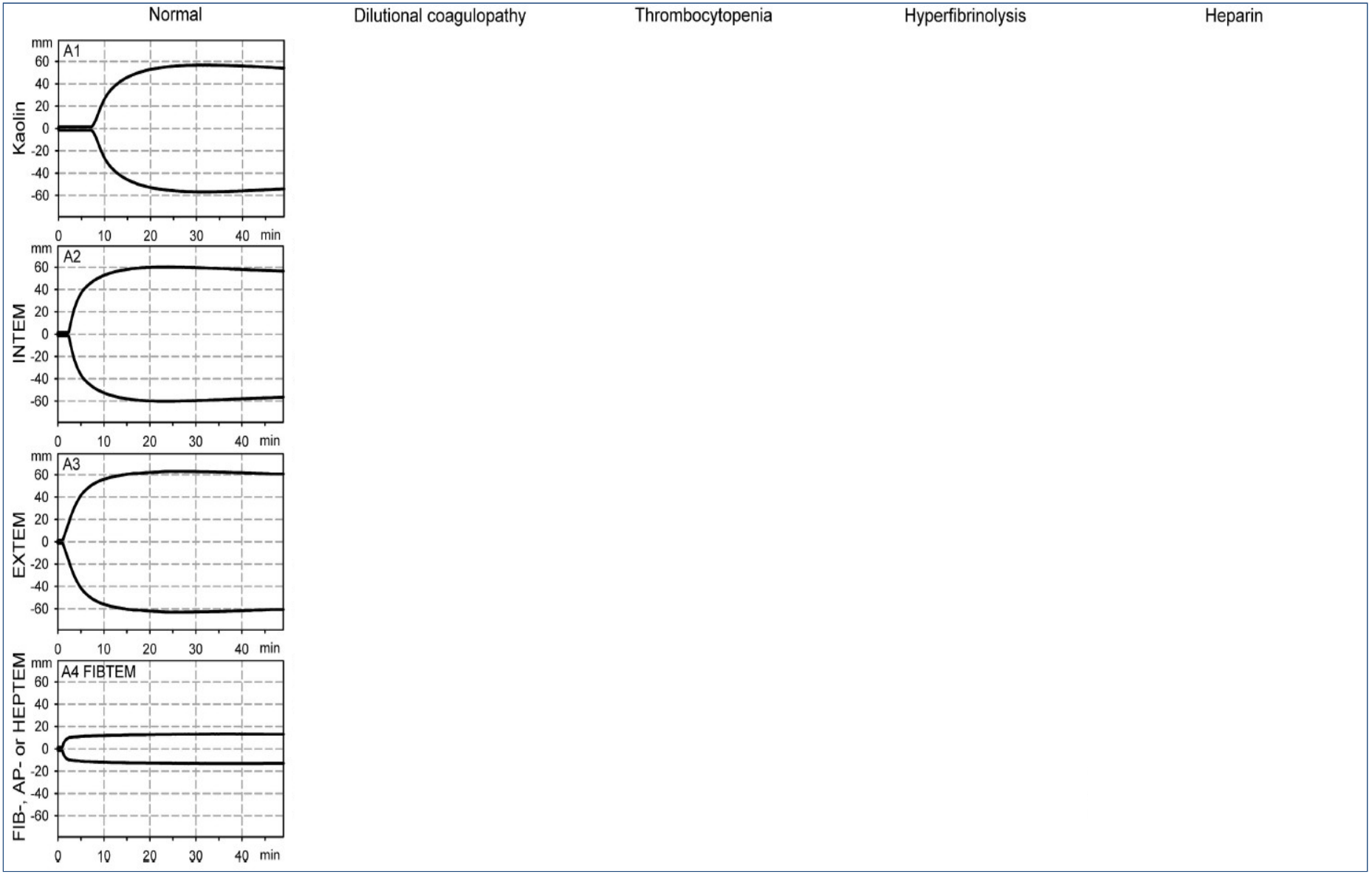
Stravicz RT et al Gastroent & Hepat 2012; 8: 513-520

TEG® vs. ROTEM®

Solomon C et al BJA 2012; 109 (6): 851–63

TEG®-based tests			ROTEM®-based tests			Diagnostic use
Test (reagent name)	Activator	Additional modifications*	Test (reagent name)	Activator	Additional modifications*	
—	—	—	NATEM (star-tem®)	None added	—	Sensitive test measuring coagulation without added activator, although not applicable in emergencies due to slow clotting times
Kaolin-activated TEG®	Kaolin	—	INTEM (in-tem®)	Ellagic acid	—	Defects in the intrinsic pathway of coagulation activation; heparin anticoagulation
—	—	—	EXTEM (ex-tem®)	Recombinant tissue factor	—	Defects in the extrinsic pathway of coagulation activation; prothrombin complex deficiency; platelet deficiency (in parallel with FIBTEM)
RapidTEG (RapidTEG™ reagent)	Kaolin + tissue factor	—	—	—	—	Defects in the intrinsic and extrinsic pathways of coagulation activation; more rapid assessment than using kaolin activation alone
FF/functional fibrinogen test (FF reagent)	Tissue factor	Abciximab	FIBTEM (fib-tem®)	Recombinant tissue factor	Cytochalasin D	Fibrin-based clot defects, fibrin/fibrinogen deficiency
—	—	—	APTEM (ap-tem®)	Recombinant tissue factor	Aprotinin	Hyperfibrinolysis (in comparison with EXTEM)
Kaolin-activated TEG® + heparinase	Kaolin	Heparinase	HEPTEM (hep-tem®)	Ellagic acid	Heparinase	Heparin/protamine imbalance (in conjunction with INTEM or kaolin-activated TEG)

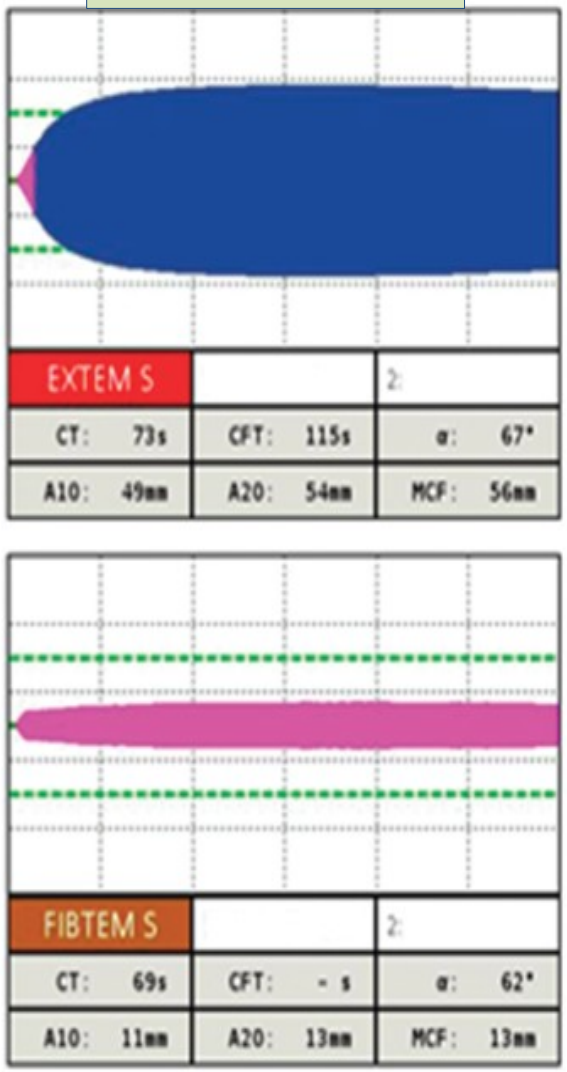
Thromboelasztográfia



Thromboelasztográfia

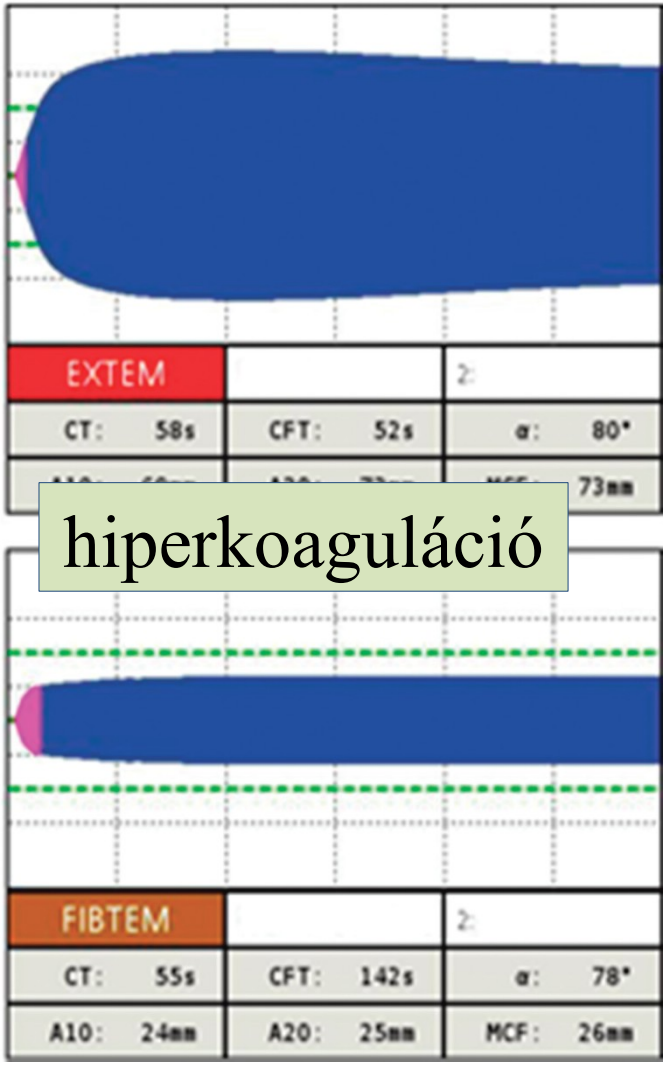
Normál

A



B

C



hiperkoaguláció

Thromboelasztográfia

Schöchl H et al J Trauma Acute Care Surg. 2013; 74 (6):1587-1598

- ✓ Dinamikus
- ✓ Teljesebben látja a hemosztázist
- ✓ Gyors (POC)
- ✓ Előnyösebb a komplex koagulopátiát okozó kórképekben (masszív vérzés, extrakorporális keringés, transzplantáció, politrauma…)

- nem látja az endothelium szerepét
- nem veszi figyelembe az áramlási viszonyokat
- von-Willebrand betegségre nem érzékeny
- koagulációs aktivátorok: K vit. antagonistákra és Tctagg. gátlókra kevésbé érzékeny (INR, PlatletMapping, Multiplate..)
- Quality kontroll