

ROTEM[®] delta ROTEM[®] platelet

Targeted therapy stops the bleeding.

Easy and safe handling. Fast therapeutic decisions. Advanced diagnostic safety.



ROTEM[®] -based bleeding control.



Ensuring both, the quality and the supply of blood products is becoming increasingly difficult. This is leading to a more rational use of the limited resource "blood" and to a critical view on the need of blood transfusions.

Blood loss, anaemia and blood transfusions are independent predictors for worse outcomes and patients' quality of life. This includes an increase in morbidity and mortality, as well as a prolonged stay in hospital. In short, transfusions typically lead to avoidable complications and costs.

In this context, the targeted ROTEM[®]-based bleeding control solution is integral to Patient Blood Management that is predicated on both preemptive and reactive blood-saving measures. In fact, WHA 63.12, all 193 WHO member states have been asked to implement the concept of PBM in a timely manner.



ROTEM®-based bleeding control

ROTEM[®] system in clinical use.



Complicated bleeding situations can occur intra- and post-operatively. They can be life threatening and always require immediate action. A fast differential diagnosis is vital. It is also the basis of a targeted therapy.

The ROTEM[®]- analysis offers reliable results within 5-10 minutes and provides critical information about the efficacy of the therapy. Additionally, the ROTEM[®]- analysis enables continuous monitoring and therefore any therapy changes as needed.

ROTEM[®] facilitates the management of bleeding episodes as they can occur in major surgery, such as:

- Cardiac and vascular surgery
- Organ transplantation
- Trauma
- Abdominal surgery
- Tumor removal
- Orthopedic
- Obstetrics

and others.

The result is a significantly improved patient outcome and lower healthcare cost per episode with subsequent cost savings benefit.



The complete ROTEM[®] system with ROTEM[®] *delta* and ROTEM[®] *platelet* can be performed at the patient's point of care and provides a coagulation status overview within 10 minutes of providing information on:

- Requirement for factor, fibrinogen or platelet substitution
- Detection of platelet function and aggregation
- Hyperfibrinolysis
- Extent of dilutional coagulopathy
- Heparin and protamin dosage monitoring

Easy and safe handling.



Proven technologies in one system providing flexible solutions for whole blood testing.

- Single use reagents for fast and reliable results
- Automated pipette for standardised volumes
- Easy operation via touch screen
- Graphical, step-by-step instruction that simplify the test performance
- Integrated learn programme with treatment algorithms and
- case reports from experts
- Integrated troubleshooting for fast help

Graphical instructions with touch screen



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Fast therapeutic decisions.



ROTEM[®] analysis gives results that can guide optimal treatment and monitors the success of the treatment within minutes.

- First results are available within 5 to 10 minutes
- 6 channels: differential diagnosis of coagulopathies
- Simplified interpretation of results via colour coded TEMograms/ aggregation graphs and highlighted abnormal parameter results
- Easy therapeutic control using previous patient results as overlays
- Fast interpretation by overlay of standard curves over running results
- ROTEM[®] Data solutions enabled by HIS/LIS connection for comprehensive data transfer
- Mobile use via the ROTEM® trolley



TEMograms and aggregation curves of the 6 channels



ROTEM[®] *delta* haemostasis analyser.





The ROTEM[®] *delta* haemostasis analyser measures kinetic changes of the clot elasticity of whole blood samples. It allows quantitative and qualitative assessment by measuring different parameters of the clot status of the blood sample. A comprehensive set of assays permits a differential diagnosis.

The ROTEM® delta features:

- Instrument handling in a busy operating area enabled by the ball bearing stabilised technology of the ROTEM® thromboelastometry
- Differential diagnosis by the combination of up to 8 different assays
- The barcode scanner prevents the use of wrong or expired reagents
- Quality controls: ROTROL N (Level I) and ROTROL P (Level II)
- Simple patient-ID search function for fast and safe real time data transmission

ROTEM[®] delta comprehensive reagent portfolio

Liquid reagents	in-tem [®]	r ex-tem®	fib-tem [®]	ap-tem [®] / t ap-tem [®]	hep-tem®
Single use reagents	in-tem [®] S	ex-tem [®] S	fib-tem [®] S	ap-tem [®] S	hep-tem [®] S
	Fast assessment of clot formation, fibrin poly- merization and fibrinolysis via the intrinsic pathway	Fast assessment of clot formation, fibrin polymeri- sation and fibrinolysis via the extrinsic pathway	ROTEM [®] analysis without platelets; qualitative assessment of fibrinogen status	In-vitro fibrinolysis inhibition; assessment of the possible effect of antifibrinolytic drugs	Specific detection of heparin when compared with INTEM via heparin neutralisation



(compared to EXTEM)

ROTEM[®] *platelet* module for platelet aggregation.





The ROTEM® platelet features:

- Dedicated single use cuvettes with electrodes
- 2 channels, which can be used simultaneously
- 6-minute measurement time
- 3 different parameters:
 - AUC (area under the curve in Ohm*min)
 - A6 (amplitude at 6 min in Ohm)
 - MS (maximum slope of the aggregation graph in Ohm/min)

Measurements can be performed on the ROTEM[®] *platelet* device while running measurements on the ROTEM[®] *delta* system simultaneously.

ROTEM® platelet reagent portfolio

Single use reagents	adp-tem [®]	ara-tem [®]	trap-tem [®]
	e.g. for the detection of	e.g. for the detection	e.g. for the detection
	ADP receptor blockage	of cyclooxygenase	of GP IIb/IIIa receptor
	(clopidogrel)	inhibitors (Aspirin®)	antagonists (abciximab)

ROTEM[®] platelet detection principle





ROTEM[®] Literature.



- 1. Görlinger K, Dirkmann D, Weber CF, Rahe-Meyer N, Hanke AA. Algorithms for transfusion and coagulation management in massive haemorrhage. Anästh Intensivmed 2011 Feb; 52(2): 145-59.
- Görlinger K, Dirkmann D, Hanke AA, Kamler M, Kottenberg E, Thielmann M, Jakob H, Peters J. First-line therapy with coagulation factor concentrates combined with point-of-care coagulation testing is associated with decreased allogeneic blood transfusion in cardiovascular surgery: a retrospective, single-center cohort study. Anesthesiology. 2011 Dec;115(6):1179-91.
- 3. Görlinger K, Fries D, Dirkmann D, Weber CF, Hanke AA, Schöchl H. Reduction of fresh frozen plasma requirements by perioperative point-of-care coagulation management with early calculated goal-directed therapy. Transfus Med Hemother 2012 Apr;39(2):104-13.
- 4. Weber CF, Görlinger K, Meininger D, Herrmann E, Bingold T, Moritz A, Cohn LH, Zacharowski K. Point-of-care testing: a prospective, randomized clinical trial of efficacy in coagulopathic cardiac surgery patients. Anesthesiology. 2012 Sep;117(3):531-47.
- 5. Spahn DR, Goodnough LT. Alternatives to blood transfusion. Lancet. 2013 May 25;381(9880):1855-65.
- Alamo JM, León A, Mellado P, Bernal C, Marín LM, Cepeda C, Suárez G, Serrano J, Padillo J, Gómez MÁ. Is "intra-operating room" thromboelastometry useful in liver transplantation? A case-control study in 303 patients. Transplant Proc. 2013;45(10):3637-9.
- 7. Bolliger D, Tanaka KA. Roles of thrombelastography and thromboelastometry for patient blood management in cardiac surgery. Transfus Med Rev. 2013 Oct;27(4):213-20.
- 8. Theusinger OM, Stein P, Spahn DR. Applying 'Patient Blood Management' in the trauma center. Curr Opin Anaesthesiol. 2014 Apr;27(2):225-32.
- Leahy MF, Roberts H, Mukhtar SA, Farmer S, Tovey J, Jewlachow V, Dixon T, Lau P, Ward M, Vodanovich M, Trentino K, Kruger PC, Gallagher T, Koay A, Hofmann A, Semmens JB, Towler S; Western Australian Patient Blood Management Program. A pragmatic approach to embedding patient blood management in a tertiary hospital. Transfusion. 2014 Apr;54(4):1133-45.
- 10. Fayed NA, Abdallah AR, Khalil MK, Marwan IK. Therapeutic rather than prophylactic platelet transfusion policy for severe thrombocytopenia during liver transplantation. Platelets. 2014;25(8):576-86.
- 11. Haas T, Görlinger K, Grassetto A, Agostini V, Simioni P, Nardi G, Ranucci M. Thromboelastometry for guiding bleeding management of the critically ill patient: A systematic review of the literature. Minerva Anestesiol. 2014 Dec;80(12):1320-35.
- 12. Görlinger K, Kozek-Langenecker SA. Economic aspects and organization. In: Marcucci CE, Schoettker P (eds.). Perioperative Hemostasis: Coagulation for Anesthesiologists. Springer-Verlag Berlin Heidelberg, 2015: 412-45.
- 13. Nakayama Y, Nakajima Y, Tanaka KA, Sessler DI, Maeda S, Iida J, Ogawa S, Mizobe T. Thromboelastometry-guided intraoperative haemostatic management reduces bleeding and red cell transfusion after paediatric cardiac surgery. Br J Anaesth. 2015 Jan;114(1):91-102.
- 14. Mallaiah S, Barclay P, Harrod I, Chevannes C, Bhalla A. Introduction of an algorithm for ROTEM-guided fibrinogen concentrate administration in major obstetric haemorrhage. Anaesthesia. 2015 Feb;70(2):166-75.
- 15. Mallaiah S, Chevannes C, McNamara H, Barclay P. A reply. Anaesthesia. 2015 Jun;70(6):760-1.
- 16. Karkouti K, McCluskey SA, Callum J, Freedman J, Selby R, Timoumi T, Roy D, Rao V. Evaluation of a novel transfusion algorithm employing point-of-care coagulation assays in cardiac surgery: a retrospective cohort study with interrupted time-series analysis. Anesthesiology. 2015 Mar;122(3):560-70.
- 17. Corredor C, Wasowicz M, Karkouti K, Sharma V. The role of point-of-care platelet function testing in pre-dicting postoperative bleeding following cardiac surgery: a systematic review and meta-analysis. Anaesthesia. 2015 Jun;70(6):715-31.
- Whiting P, Al M, Westwood M, Ramos IC, Ryder S, Armstrong N, Misso K, Ross J, Severens J, Kleijnen J. Viscoelastic point-of-care testing to assist with the diagnosis, management and monitoring of haemostasis: a systematic review and cost-effectiveness analysis. Health Technol Assess. 2015 Jul;19(58):1-228, v-vi.
- Naik BI, Pajewski TN, Bogdonoff DI, Zuo Z, Clark P, Terkawi AS, Durieux ME, Shaffrey CI, Nemergut EC. Rotational thromboelastometry-guided blood product management in major spine surgery. J Neurosurg Spine. 2015 Aug;23(2):239-49.
- 20. Pearse BL, Smith I, Faulke D, Wall D, Fraser JF, Ryan EG, Drake L, Rapchuk IL, Tesar P, Ziegenfuss M, Fung YL. Protocol guided bleeding management improves cardiac surgery patient outcomes. Vox Sang. 2015 Oct;109(3):267-79.
- 21. Donohue CI, Mallett SV. Reducing transfusion requirements in liver transplantation. World J Transplant. 2015 Dec 24;5(4):165-82.
- Deppe AC, Weber C, Zimmermann J, Kuhn EW, Slottosch I, Liakopoulos OJ, Choi YH, Wahlers T. Point-of-care thromboelastography/thromboelastometry-based coagulation management in cardiac surgery: a meta-analysis of 8332 patients. J Surg Res. 2016 Jun 15;203(2):424-33.
- Straub N, Bauer E, Agarwal S, Meybohm P, Zacharowski K, Hanke AA, Weber CF. Cost-Effectiveness of POC Coagulation Testing Using Multiple Electrode Aggregometry. Clin Lab. 2016;62(6):1167-78.
- 24. Wikkelsø A, Wetterslev J, Møller AM, Afshari A. Thromboelastography (TEG) or thromboelastometry (ROTEM) to monitor haemostatic treatment versus usual care in adults or children with bleeding. Cochrane Database Syst Rev. 2016 Aug 22;(8):CD007871.
- Karkouti K, Callum J, Wijeysundera DN, Rao V, Crowther M, Grocott HP, Pinto R, Scales DC; TACS Investiga-tors. Point-of-care hemostatic testing in cardiac surgery: A stepped-wedge clustered randomized controlled trial. Circulation. 2016 Sep 21. pii: CIRCULATIONAHA.116.023956. [Epub ahead of print]

www.rotem.de info@tem-international.de

tem Redefining Bleeding Control Tem International GmbH Martin-Kollar-Strasse 13-15 D-81829 Munich T: +49 (0)89 454295-0 F: +49 (0)89 454295-22

