

# Impact of thrombelastometry and impedance aggregometry based point-of-care coagulation management on usage of blood products in cardiovascular surgery



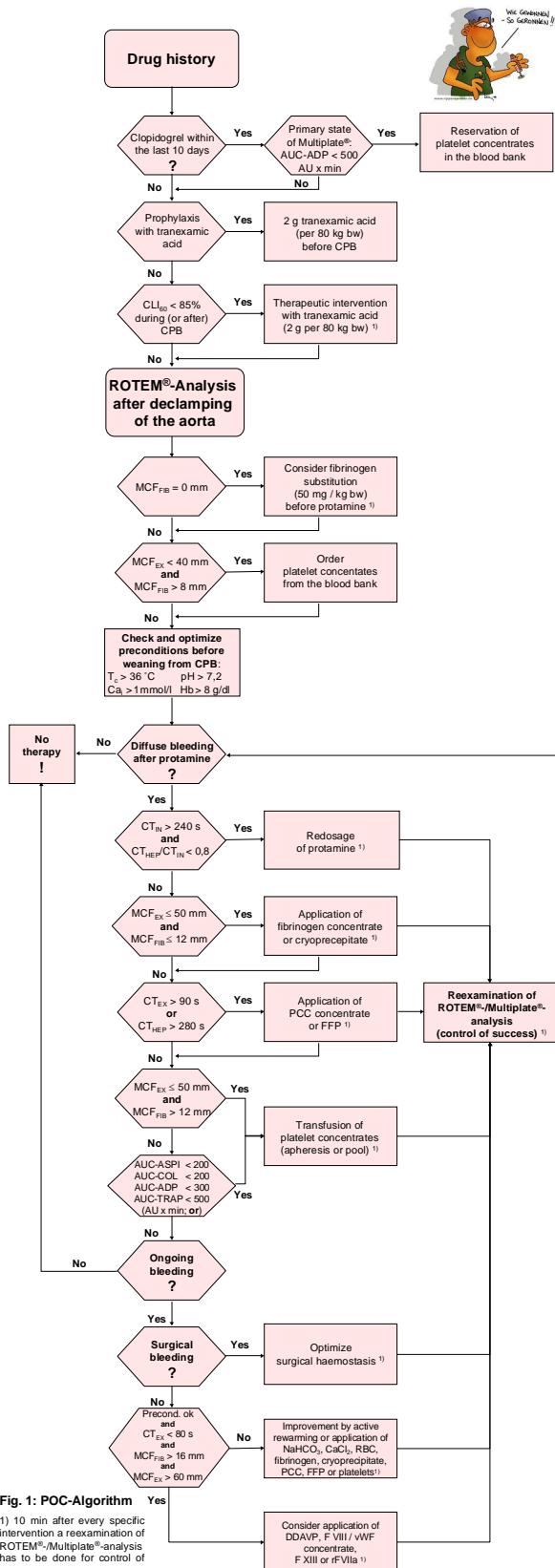
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**Background and Goal of Study:** In April 2004 we implemented rotational thrombelastometry (ROTEM®) for point-of-care (POC) coagulation management in thoracic and cardiovascular surgery. In December 2005 we complemented this management by impedance aggregometry (Multiplate®) for bedside platelet function analysis. Based on our experience in POC coagulation management in liver transplantation and multiple trauma we developed an algorithm for POC coagulation management in cardiovascular surgery in 2006 (Fig. 1). The goal of our study was to proof, if our POC coagulation management is effective in reducing transfusion rate in cardiovascular surgery.

**Materials and Methods:** To evaluate the efficiency of our POC coagulation management we analysed in our retrospective study the transfusion rate of blood products from January 2004 to December 2006.

**Results and Discussion:** The number of transfused units of red blood cells (RBC) decreased from 3276 in 2004 to 2599 in 2006 (-20.7%), and the number of transfused units of fresh frozen plasma (FFP) decreased from 1986 in 2004 to 613 in 2006 (-69.1%) (Fig. 2). Apart from the absolute reduction of transfused RBC and FFP, the RBC:FFP-ratio changed from 1.6 to 4.2 (Fig. 3). In addition, during the first nine months of 2007 the RBC:FFP-ratio showed a further increase to 8.5 (2029 RBC : 238 FFP). The reduction of FFP transfusion rate seems to be of great importance, because FFP is one of the blood products with the highest risk-benefit-ratio (1-3). In contrast to the reduction in RBC and FFP, the transfusion rate for pooled platelet concentrates (PC) increased from 336 units in 2004 to 485 units in 2006 (+44.3%) (Fig. 2). This increase is probably a consequence of the increasing number of patients with a combined antiplatelet therapy with acetylsalicylic acid and clopidogrel, particularly in cardiology and cardiovascular surgery.

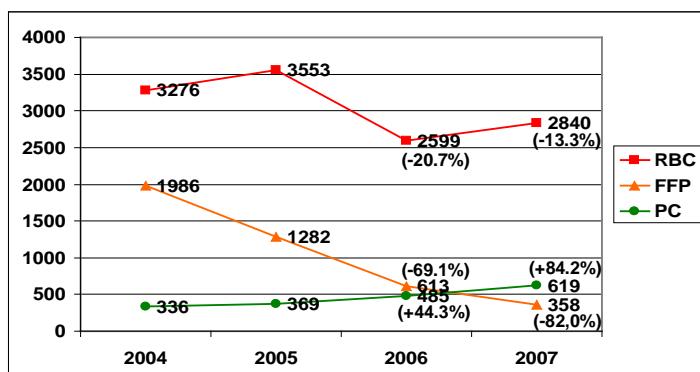


Fig. 2: Usage of blood products in cardiovascular surgery from 2004 to 2007

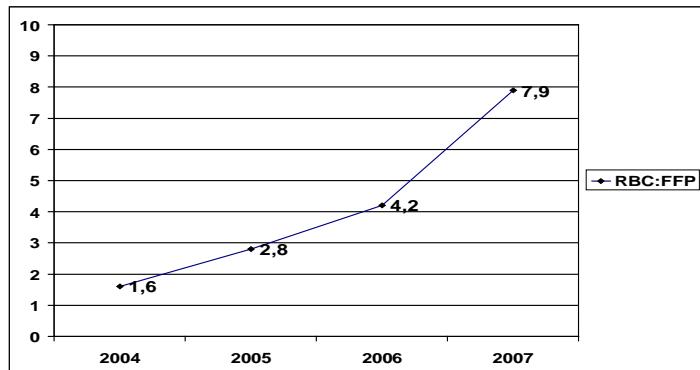


Fig. 3: Changes in RBC:FFP-ratio in cardiovascular surgery from 2004 to 2007

**Conclusions:** ROTEM®- and Multiplate®-based coagulation management is effective in reducing transfusion rate in cardiovascular surgery. This effect is most pronounced for the reduction of FFP transfusion rate. This may also be important for the reduction of FFP-induced morbidity and mortality, like transfusion-related acute lung injury (TRALI) and transfusion-associated circulatory overload (TACO) (1-3). Furthermore, the change of the RBC:FFP-ratio from 1.6 to 8.5 reflects a more goal-directed therapy of coagulopathies with specific coagulation factor concentrates.