

The Role of Point of Care Viscoelastic Testing in Hemorrhaging Obstetric Patients

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Background: Post-partum hemorrhage (PPH) is a major cause of maternal morbidity and mortality. Worldwide PPH accounts for at least 30% of all maternal deaths¹ PPH is defined as blood loss of more than 1000 mL within 24h after vaginal delivery or cesarean delivery. Fibrinogen is a critical factor of hemostasis during PPH and it is recognized as the most sensitive and earliest predictor² of severe hemorrhage. Whereas the gold standard laboratory testing for obtaining fibrinogen level (Clauss Fibrinogen) can take up to one hour whereas Point of Care Viscoelastic Testing (POCVT), provides fibrinogen function within 10 min. The aim of this study is to determine the correlation between Clauss Fibrinogen and fibrinogen function measured by; FIBTEM A10 (Fibrinogen ThromboElastoMestery amplitude at 10 min) and the CFF-MA (Citrated Functional Fibrinogen – Maximum Amplitude) from the Rotational thromboelastometry (ROTEM) and the thromboelastography (TEG6) devices, respectively as shown in figure 1-A. The secondary aim was to compare FIBTEM A10 to CFF-MA.

Methods: We obtained 2 blood samples from 48 pregnant women without comorbidities for the coagulopathy assays: ROTEM, TEG6s, and the lab coagulation test. Each fibrinogen equivalent (FIBTEM A10, CFF-MA, and Clauss fibrinogen as gold standard) was compared with each other through Pearson's correlation coefficients. The cutoffs for the coefficients were determined as 0.30 to 0.50 as low, 0.50 to 0.70 as moderate, 0.70 to 0.90 as high, and 0.90 to 1.00 as very high.

Results: The Clauss fibrinogen and FIBTEM A10 had a Pearson's 2-sided t-test of $r = 0.76$; Clauss fibrinogen to CFF-MA was $r=0.72$. The fibrinogen values of the POCVT devices had a correlation of $r = 0.88$, $P < .0001$ (as shown in figure 1-B, C, D)

Discussion: The high correlation between CFF-MA and FIBTEM-A10, and the Clauss Fibrinogen, makes these devices ideal for the early recognition and management of hypofibrinogenemia. The main advantage of POCVT is that it allows for goal directed blood product management instead of formulaic blood product management (the traditional 1:1:1). Recent reports demonstrated a rising trend in severe maternal morbidity during US delivery hospitalizations that was attributable largely to the increased use of blood transfusions³. Furthermore, decreased blood product transfusion related to utilization of POCVT has been shown to decrease both morbidity and hospital costs by decreasing blood transfusion complications (e.g. transfusion circulatory overload) and intensive care unit admissions.

Conclusion: The use of POCVT will not only provide patients with personalized care, but it will also save hospital resources and ease the financial burden of PPH on the healthcare system. Furthermore, TTEG-6s is simple, self-contained cartridge system, thus decreases operator variability. This study is still under collection, the goal is to delineate the baseline parameters for pregnant women to create an algorithm for management of PPH based on goal directed blood product transfusion.

References:

¹Khan KS, et al. *The lancet*. 2006; 367(9516):1066-74

²Charbit B, et al. *Journal of Thrombosis and Haemostasis*. 2007; 5(2):266-73.

³W.M. Callaghan, A.P. MacKay, C.J. Berg. *Am J Obstet Gynecol*, 199 (2008), pp. 133.e1-133.e8

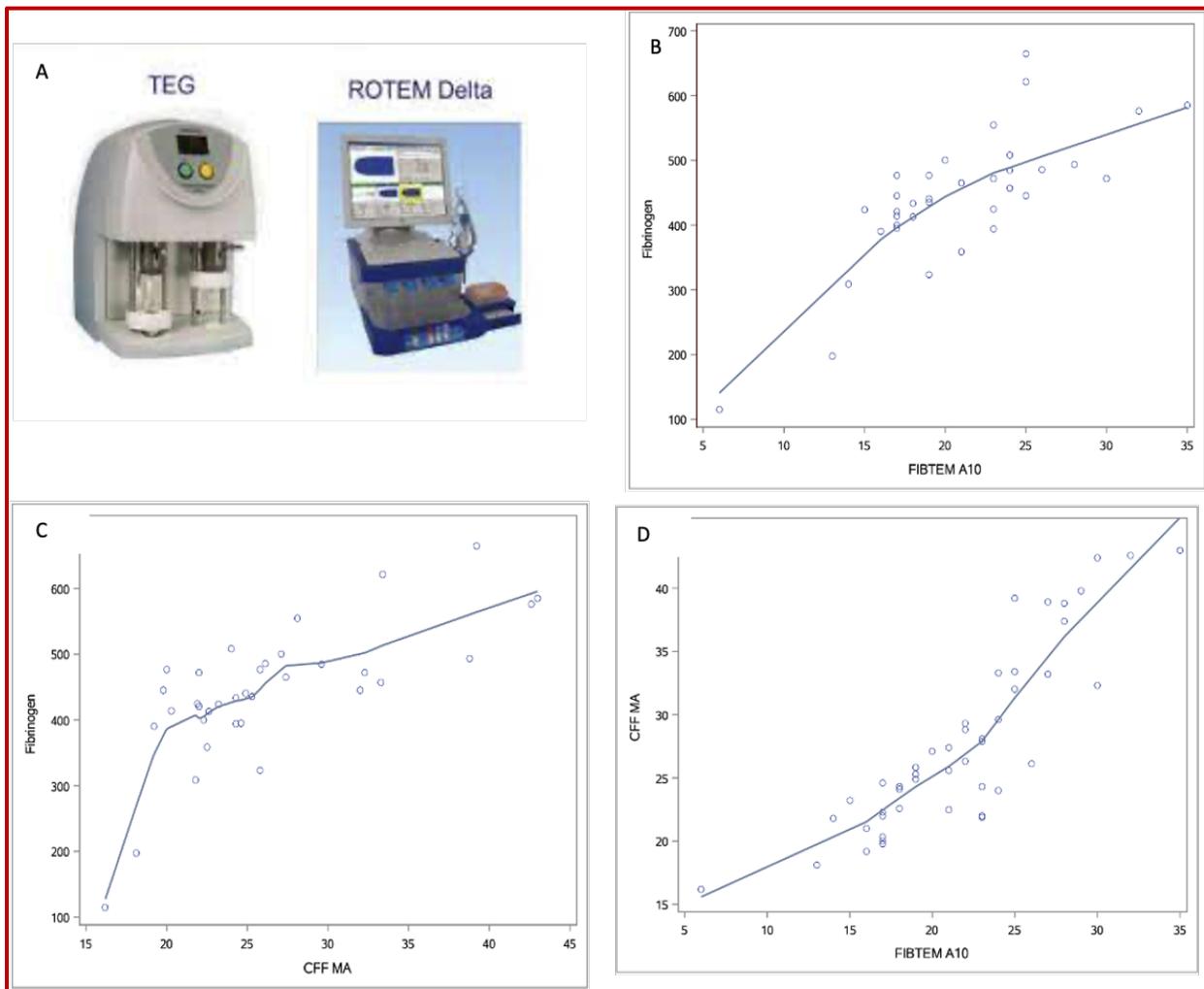


Figure 1: (A): Picture of devices TEG-B ((left) and ROTEM (right) (B): FIBTEM A10 vs fibrinogen level (C) CFF MA vs fibrinogen level (D) CFF- MA vs. FIBTEM-A10