

EVALUATING THE ABILITY OF FIBRINOGEN, ROTEM AND SEER-DERIVED PARAMETERS TO PREDICT SEVERE OBSTETRIC HEMORRHAGE

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Background

- Prediction of severe obstetric hemorrhage allows timely interventions to reduce maternal morbidity.
- Fibrinogen and FIBTEM have been proposed as biomarkers to predict severe maternal hemorrhage.
- Sonic Estimation of Elasticity via Resonance (SEER) Sonorheometry is a novel VET modality, utilized by the cartridge-based Quantra® Hemostasis Analyzer that measures clot physical properties during coagulation.
- SEER-derived parameter fibrinogen contribution to clot stiffness FCS is highly correlated with fibrinogen and FIBTEM.
- FCS may have a role in predicting hemorrhage related outcomes in obstetrics

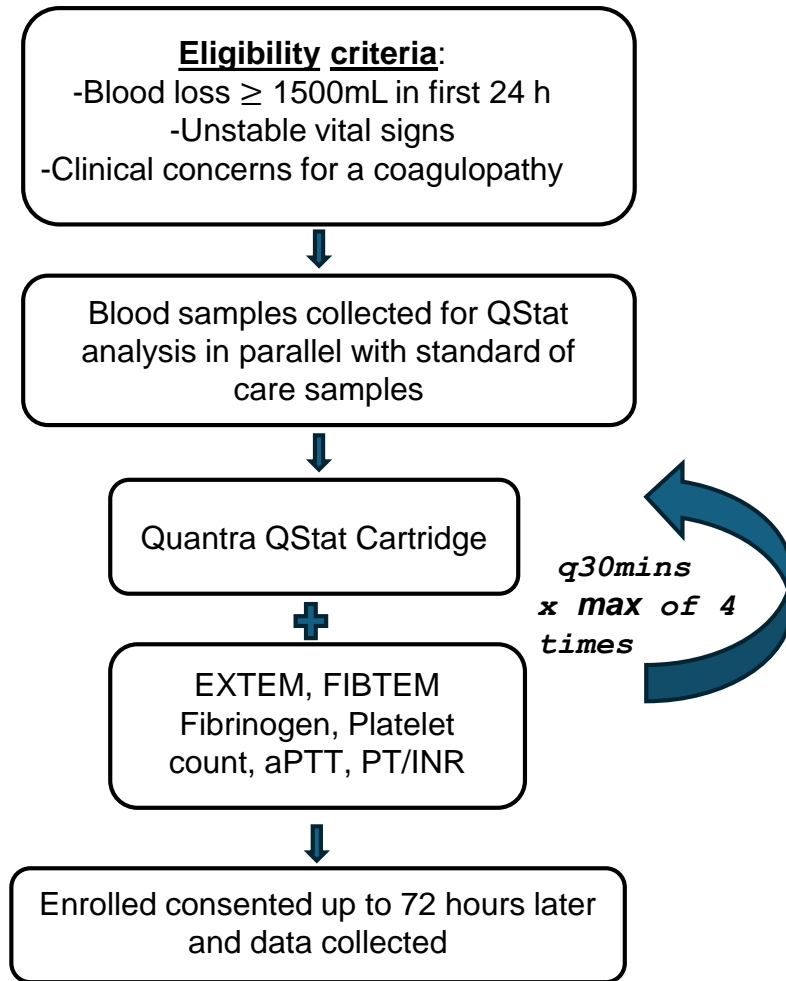
Study Aim

- To evaluate the ability of the FCS, Fibtem A10 and Fibrinogen measured early in a hemorrhage to predict severe obstetric hemorrhage in an obstetric hemorrhage cohort.



Figure 1. Multichannel QStat cartridge used for estimating the fibrinogen contribution to clot stiffness

STUDY DESIGN AND METHODS



- Sample size: 50 patients
- Area under the ROC (AUROC) analysis was used to determine the ability of Fibrinogen, FIBTEM A10 and FCS measured at study enrollment to predict severe obstetric hemorrhage.
- Optimal cut points (Youden's Index) were estimated for each parameter for the relevant outcomes.
- Severe obstetric hemorrhage outcomes defined as:
 - QBL >2.5 L
 - Transfusion of ≥ 4 units of blood products
 - Severe maternal morbidity (SMM)
 - Transfusion of ≥ 4 units blood products,
 - Hysterectomy for hemorrhage control
 - ICU admission

RESULTS

Transfusion of Blood Products				
	<4 units (n=41)	≥ 4 units (n=8)	AUROC (95% CI)	Optimal cut point
Fibrinogen (mg/dL)	378 (107)	270 (63)	0.831 (0.646, 0.966)	312
FIBTEM A10 (mm)	19 (5)	14 (5)	0.768 (0.547, 0.933)	16
FCS (hPa)	4.0 (1.7)	2.8 (0.9)	0.736 (0.551, 0.896)	3.9

Table 1

Quantitative Blood Loss (QBL)				
	QBL≤2.5 (n=41)	QBL>2.5 (n=8)	AUROC (95% CI)	Optimal cut point
Fibrinogen (mg/dL)	373 (110)	283 (50)	0.772 (0.581, 0.921)	315
FIBTEM A10 (mm)	18 (5)	16 (3)	0.656 (0.485, 0.820)	19
FCS (hPa)	4.0 (1.7)	3.0 (1.1)	0.697 (0.467, 0.874)	3.3

Table 2

Severe Maternal Morbidity (SMM)				
	No SMM (n=37)	SMM (n=13)	AUROC (95% CI)	Optimal cut point
Fibrinogen (mg/dL)	374 (104)	319 (98)	0.658 (0.449, 0.845)	259
FIBTEM A10 (mm)	18 (5)	16 (4)	0.618 (0.437, 0.784)	18
FCS (hPa)	3.9 (1.6)	3.7 (1.8)	0.547 (0.360, 0.724)	3.9

Table 3

Data are mean (sd), hPa (HectoPascal), CI- confidence interval

CONCLUSION

- All 3 parameters had good to moderate performance for predicting QBL>2.5 L and transfusion of ≥ 4 units of blood products.
- All 3 parameters performed poorly for predicting SMM.
- Fibrinogen was the best performing parameter for predicting all 3 outcomes.
- FCS and FIBTEM A10 had similar performance for predicting all 3 outcomes.
- The SEER derived FCS may have a role in predicting severe hemorrhage making it a viable alternative to fibrinogen and ROTEM.

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