



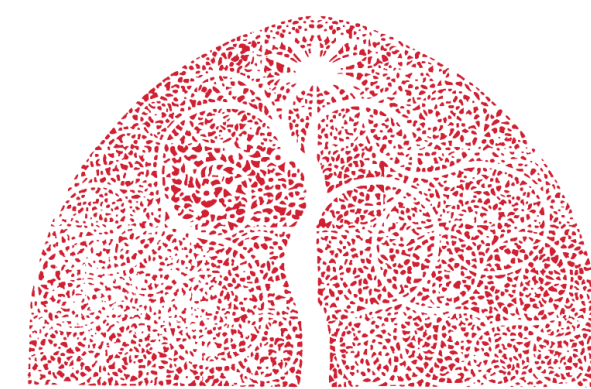
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A Retrospective Case Analysis of Cryoprecipitate Transfusion in a Patient of Chronic Liver Disease (CLD) with Disseminated Intravascular Coagulation (DIC)

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Introduction

- Liver is central to hemostasis- synthesis and clearance procoagulants and anticoagulants or components of coagulations cascade.
- Alteration to this functions--> coagulopathy.
- Thromboelastography (TEG) and ROTEM- detect and quantify dynamic changes in the viscoelastic properties of whole blood during clotting under low shear stress.
- DIC- is "widespread intravascular fibrin formation in response to excessive blood protease activity that overcome natural anticoagulant mechanisms".
- Always secondary to an underlying cause like infection/sepsis, obstetrics causes, trauma , malignancy, intravascular hemolysis etc.
- There is no single test to accurately diagnosis DIC and management is always treating underlying causes.
- Cryoprecipitate is rich in fibrinogen and other factors which are used to treat a bleeding condition associated with low coagulation factors.

Case Report

- Received a blood requisition for cryoprecipitate transfusion for a 55 year old patient, a known case of Chronic Liver Disease (CLD) presenting with bleeding manifestation and anemia.

Date	Lab. Investigation	Action Taken
Day 1 28/6/2023	- Hb = 8.3 g/dl - TLC = 5100/mm³ - Platelet count = 43x10⁹/L - HCT = 23% - ESR = 115mm/1st hour	4 units FFP transfused
Day 2 29/6/2023	- R-time=7.2 min (normal:4-8) - K-time=17.8 min (normal:1-4) - α Angle=23.1 (normal:47-74) - MA=21.8 mm(normal:54-72) - LY30=1.7%(normal:0-8)	No action taken
Day 3 30/6/2023	- PT = 30 sec - INR = 3 - D-Dimer = 0.4μg FEU/ml (normal<0.5) - Platelet count = 43x10⁹/L - Fibrinogen level?	8 units of Cryoprecipitate transfused
Day 4 1/7/2023	- R (4-8 min) : 1.6 - K (0-4min): 4 min - α Angle: 51.2° - MA(54-72 mm): 36.4 mm - LY30(0-8): 5.2	

Table 1: Lab. Investigation and blood component transfusion

Results

Significant Changes in TEG Tracing

Teg Parameters	29/6/23 (Before Cryoprecipitate tx)	2/7/23 (after cryoprecipitate tx)	Remarks
R (4-8 min)	7.2 min	1.6 min	Reduced by 5.6 min
K (0-4min)	17.8 min	4 min	Reduced by 13.8 min
α Angle	23.1°	51.2°	Increased by 28.1°
MA (54-72 mm)	21.8 mm	36.4 mm	Increased by 14.6 mm
LY30% (0-8)	1.7	5.2	Increased by 3.5

Table 2: Significant Changes in TEG Tracing before and after transfusion of cryoprecipitate

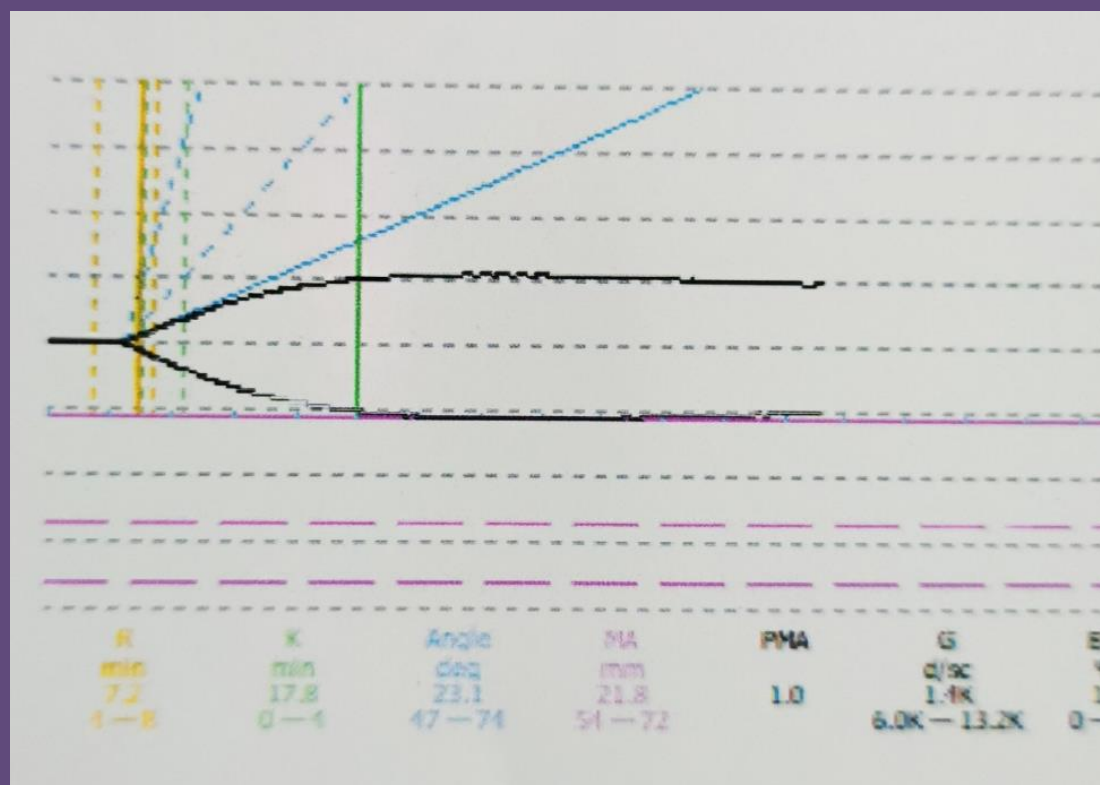


Fig 1: 29/6/2023 (Before Cryoprecipitate Tx)

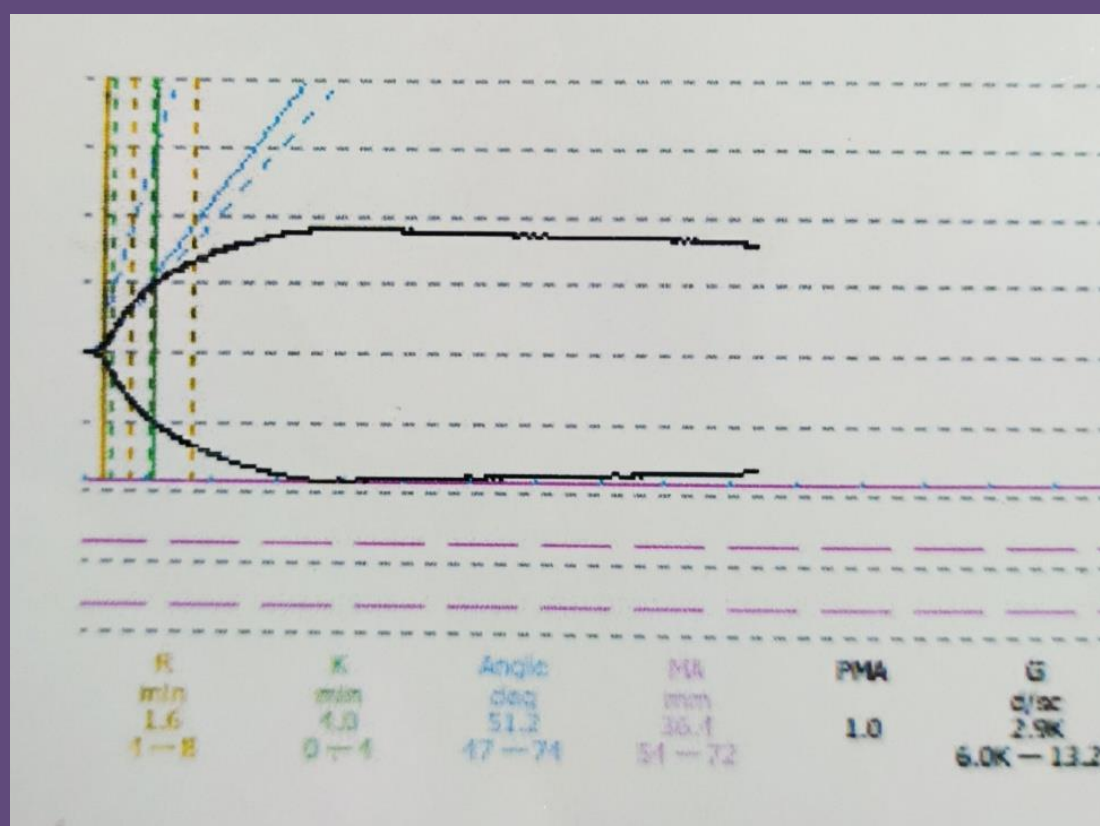


Fig 2: 1/7/2023 (After Cryoprecipitate Tx)

Discussion

TEG Tracing & Relevant Parameters

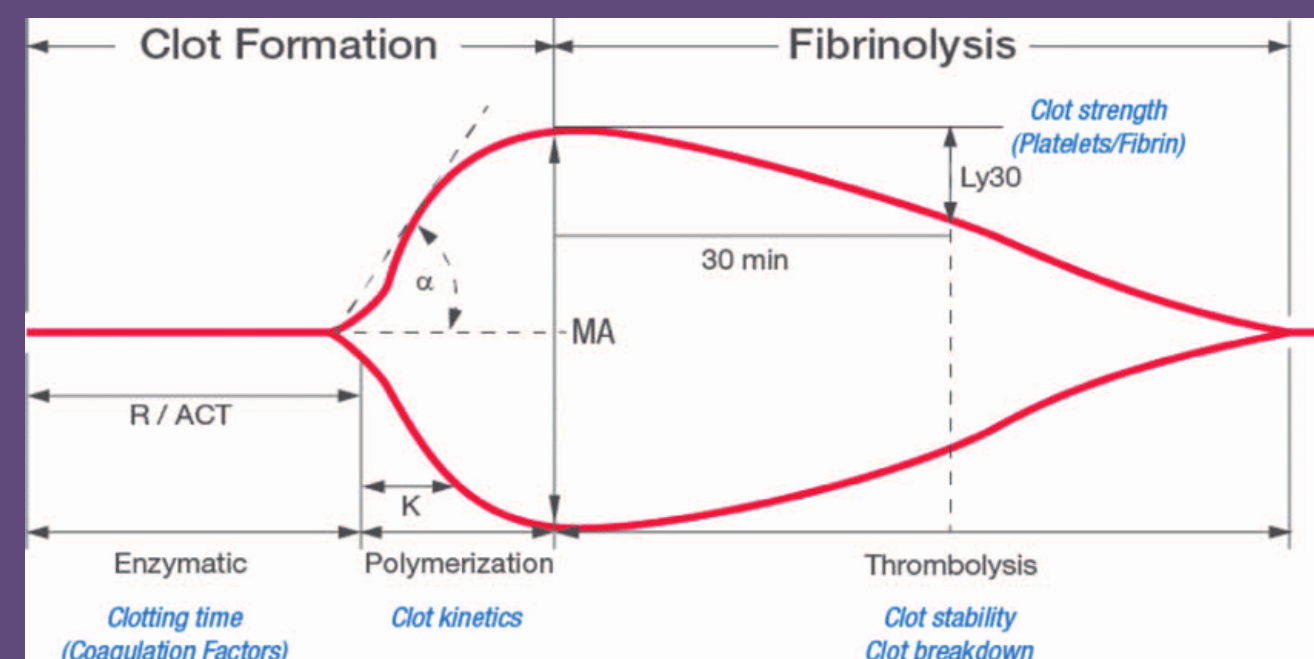


Fig 3: TEG Tracing

Parameter	Normal value	Indication
R-Time	4-8 minutes	Time to reach an amplitude of 2mm (detectable clot)
K-Time	0-4 minutes	Time from clot formation to curve reaches 20mm (clot kinetics)
α Angle	47°-74°	Slope between R and K (clot kinetics)
MA	54-72 mm	Strength of clot due to platelet fibrin bonding (clot strength)
LY 30	0-8 %	Rate of amplitude reduction 30 min after MA (clot stability)

Table 3: Relevant TEG Parameters & Indication

Diagnosis of DIC

- International society on thrombosis and hemostasis (ISTH): scoring system for diagnosis of DIC
- DIC score: sensitivity =93%, specificity=98%
- A score of 5 or more is compatible with DIC

Parameter & Score	Our Patient
Platelet Count, 10 ⁹ /L > 100 = 0 < 100 = 1 < 50 = 2	Platelet Count = 43/L Score=2
D-dimer/FDP: No increase = 0 Increased but <5x upper limit of normal = 2 Strong increase (≥5x of upper limit normal) = 3	D-dimer = normal Score=0
Prothrombin Time (PT): <3 s = 0 ≥3 s but <6 s = 1 (INR>1.3)=1 (INR>1.5)=2	INR=3 Score=2
Fibrinogen level >1g/L = 0 ≤1 g/L = 1	?

Table 4: ISTH Scoring system for diagnosis of DIC

Critical comments or limitations

- Prospective study on larger population can give more insight on utility of TEG
- Multi-centric clinical trials for comparative study

Conclusion

- Transfusion of Cryoprecipitate is seen to improve coagulations profile significantly in our patient, which are apparent from TEG recording.
- TEG provide us a point of care, real-time diagnosis and management support in case of coagulopathy like DIC or Invasive procedure in ICU and operation theatre instead of CCTs.
- TEG also shows the functional co-relationship among the different blood component in coagulation process
- It is also helpful for rational use of blood and its components and reduce wastage.

References

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