

Unexpected massive haemorrhage  
in a peripheral clinic.

# Disclaimer / Pre-amble

- These cases have been de-identified to protect the identity of the patient and the treating teams.
- These are all real cases and real ROTEMs. The individuals involved in these difficult cases have agreed to anonymously share these with us – thank you for your generosity.
- Successful management of the bleeding patient involves much more than just administration of blood products.
- The primary aim of these cases is to teach the use ROTEM guided blood product therapy. We have deliberately not included a lot of detail about some of the other aspects of management which might detract from this focus.

# KEMH ROTEM Algorithm for Critical Bleeding

**Key Points:** This algorithm should be used in conjunction with the KEMH Critical Bleeding Protocol. Only treat abnormal values if active bleeding or at high risk of bleeding. Repeat ROTEM analysis 10 mins after intervention to assess response.

	ABNORMAL ROTEM	CRITERIA	DIAGNOSIS	INTERVENTION	CORRECTED ROTEM
FIBRINOLYSIS		Early Diagnosis EXTEM A5 ≤ 35mm or FIBTEM CT > 600s	High likelihood of excess fibrinolysis	Tranexamic acid 1g Consider repeat dose if has lost over 1 blood volume since initial dose	
		Late Diagnosis EXTEM or FIBTEM ML ≥ 5%	Excess fibrinolysis		
FIBRINOGEN		FIBTEM A5 ≤ 10mm	Low fibrinogen	Cryoprecipitate OR Fibrinogen concentrate (see dosing guide)	
PLATELETS		EXTEM A5 ≤ 35mm and FIBTEM A5 ≥ 10mm	Low platelets	Platelets: 1 adult dose (correlate with platelet count)	
		EXTEM A5 ≤ 25mm and FIBTEM A5 ≤ 10mm	Low platelets and Low fibrinogen	Platelets and fibrinogen (correlate with platelet count)	
FACTORS		EXTEM CT 80-140s and FIBTEM A5 ≤ 10mm	Low fibrinogen	Correct fibrinogen and reassess	
		EXTEM CT > 80s but FIBTEM A5 > 10mm	Low coagulation factors	FFP 1-2U or Prothrombinex 10 U/kg (+ fibrinogen if indicated)	
		EXTEM CT > 140s and FIBTEM A5 ≤ 10mm	Low fibrinogen and Low coagulation factors		

## Fibrinogen Dosing Guide

FIBTEM A5 Target: ≥ 12mm

FIBTEM A5	Increase required	Cryoprecipitate*	Fibrinogen Concentrate
9-10mm	2-3 mm	10 Units	2g
7-8mm	4-5 mm	15 Units	3g
4-6mm	6-8 mm	20 Units	4g
<4mm	≥9mm	25 Units	5g

\*Cryoprecipitate dosing is for standard adult units  
(Cryo 5 units / Fib Conc 1g = Fibrin A5 increase of approx 2mm)

## Fibrinogen Concentrate

### Guidelines For Use

- Consultant anaesthetist or haematologist approval required.
- Patients must be experiencing life threatening haemorrhage.
- Fibrinogen concentrate is indicated if the FIBTEM A5 is <7mm OR there is a high suspicion of coagulopathy in a life threatening haemorrhage.
- Use at higher FIBTEM values may be appropriate in patients refusing cryoprecipitate.

### Administration

- Reconstitute 1g in 50ml warm sterile water (use prepared kit in fluid warmer).
- Swirl gently and do not shake (to avoid foaming).
- Administer each 1g via syringe driver over 2-4 mins if life-threatening haemorrhage or over 10 mins if not.

## Cryoprecipitate

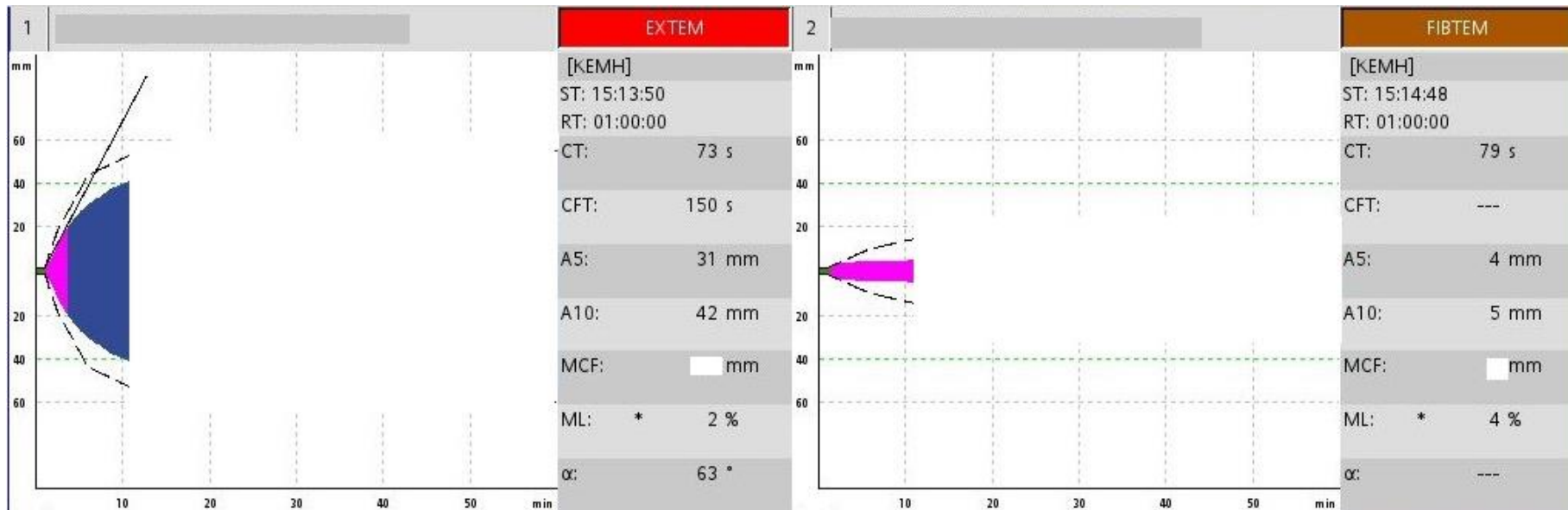
May be supplied as standard adult units or as aphaeresis units (or a combination)  
1 aphaeresis unit = 2 standard adult units.  
Dosing guide is for standard adult units.

### Prothrombinex

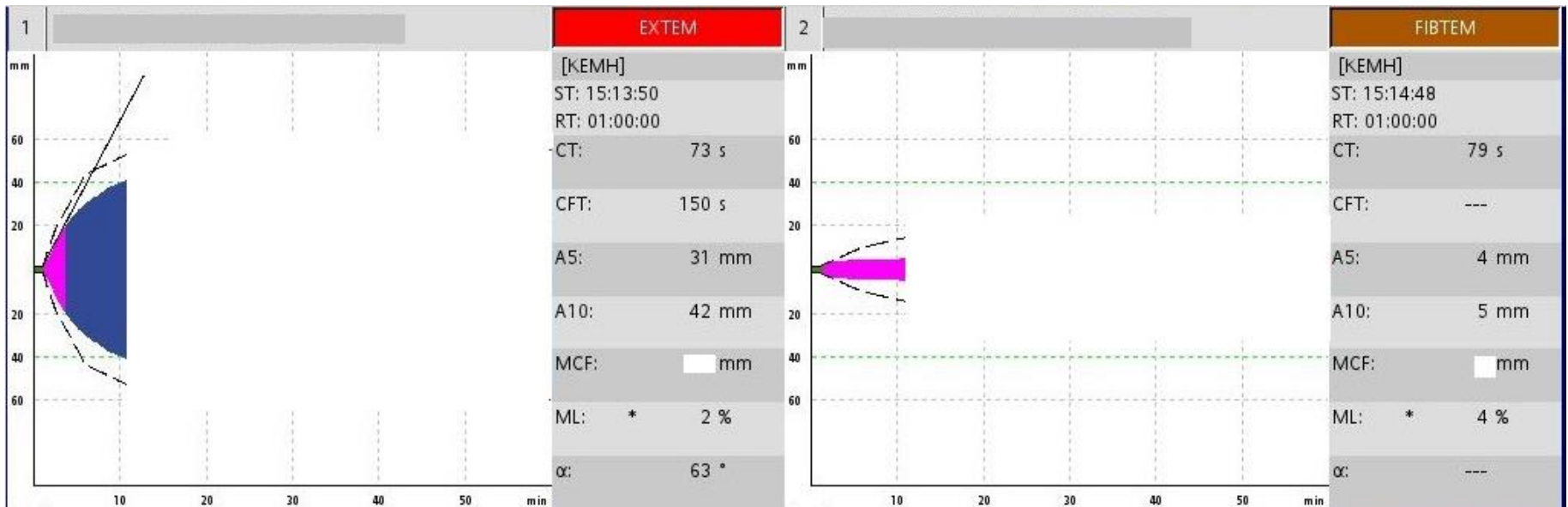
1. Warfarin Reversal: Indicated for urgent reversal of warfarin in critical bleeding, usual dose 25-50U/kg (+/- FFP) discuss with haematologist.
2. Consider as an alternative to FFP for patients with coagulation factor deficiency (e.g. prolonged EXTEM CT see above) in the following circumstances:
  - Circulatory overload
  - FFP not easily available (e.g. off site laboratory or staff)
  - Rapid correction in extreme coagulopathy
  - Consider lower dose 10U/kg (round to nearest 500U).

## CASE 1

- Termination of pregnancy at small metropolitan peripheral clinic.
- Unrecognised scar ectopic and major haemorrhage
- Emergency 30min transfer via ambulance to tertiary hospital
- Peri-arrest on arrival – no peripheral pulses / Hb 40ish



- Apply the KEMH ROTEM algorithm – even better use your hospitals if it has one.
- What blood products will you give?
- Don't cheat & look at the next slide until you have written down what you think you should give.



### Quick look: Typical ROTEM for very low fibrinogen

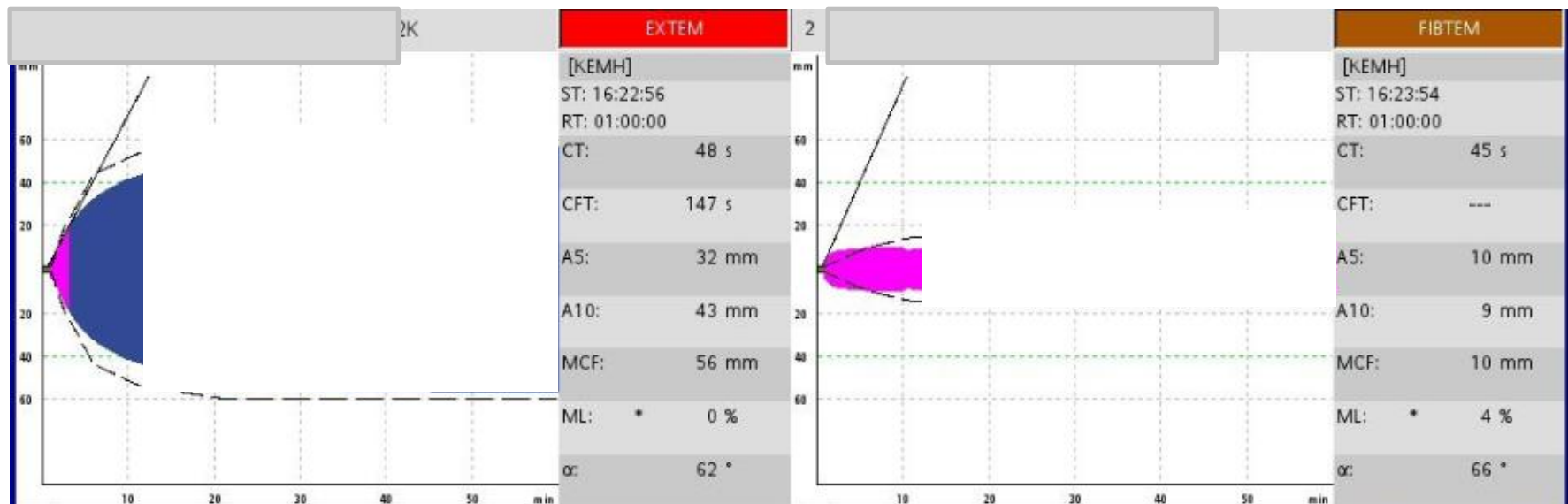
- **Fibrinolysis:** Extem A5 < 35mm – at high risk of fibrinolysis give TXA 1g.
- **Fibrinogen:** Fibtem A5 = 4mm, give fibrinogen concentrate 4g (or cryoprecipitate 20units)
- **Platelets:** Extem A5 = 31mm, no need for platelets (as > 25mm)
- **Factors:** Extem CT = 79s , no need for FFP / PTX

- She was given:
  - red cells 6 units
  - fibrinogen concentrate 4g
  - TXA 1g
  - FFP 2 units

Now the ROTEM shows what? – you interpret this one on your own!

### Surgery:

- Laparoscopy and diathermy of scar ectopic.
- Bakri balloon
- Transfer to another hospital for uterine artery embolisation then ICU



# Take Home Points

1. Small sites without onsite resources should plan for and have access to emergency treatments whilst organising transfer
2. TXA and fibrinogen seem sensible.
3. Consider emergency application of manual aortic occlusion – this is difficult during transport.