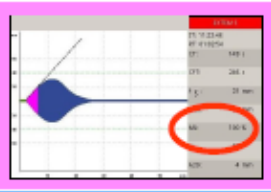
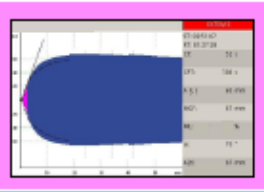
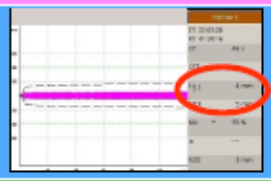
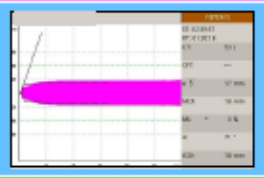
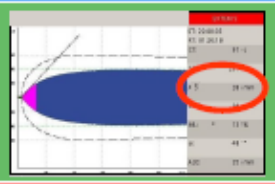
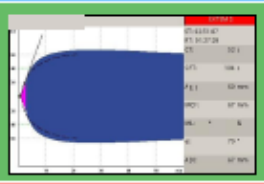
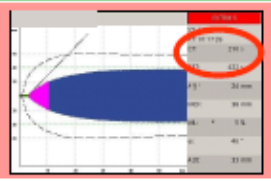
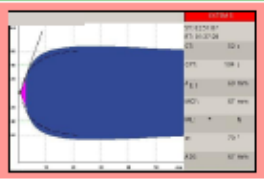
Major cancer surgery and bleeding after termination

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 = Fibtem 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

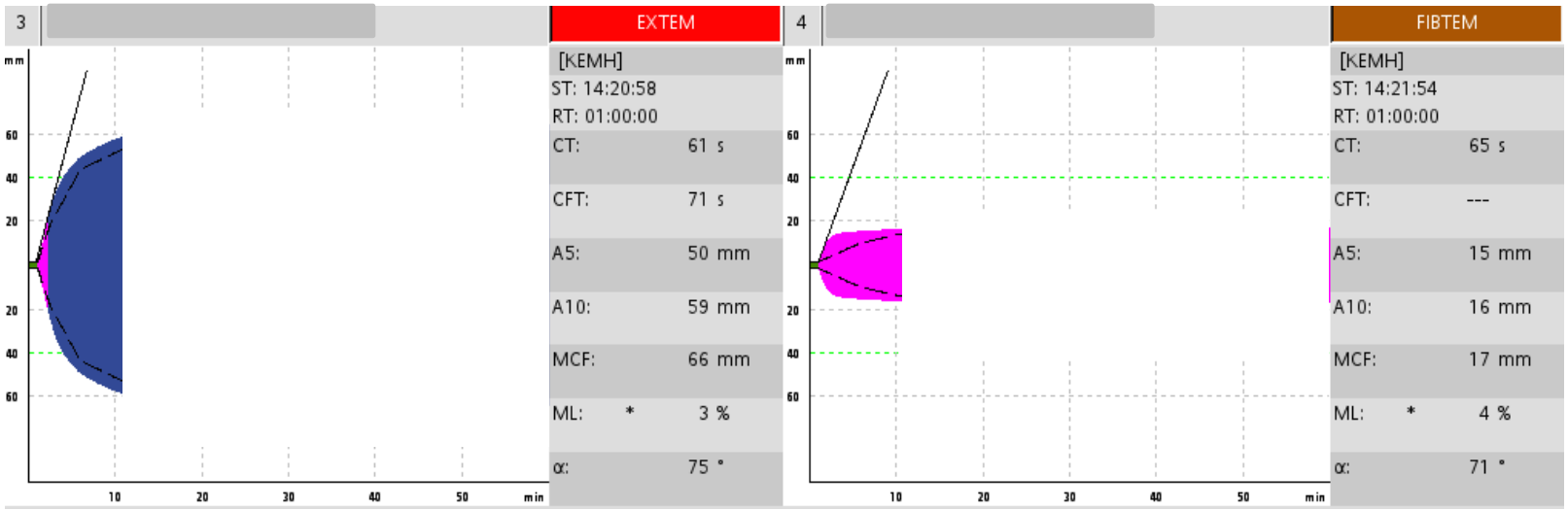
1. Warfarin Reversal: Indicated for urgent reversal of warfarin in critical bleeding, usual dose 25-50U/kg (+/- FFP) discuss with haematologist.

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).

Endorsed by the Department of Anaesthesia and Pain Medicine and the Hospital Transfusion Committee on xxxx

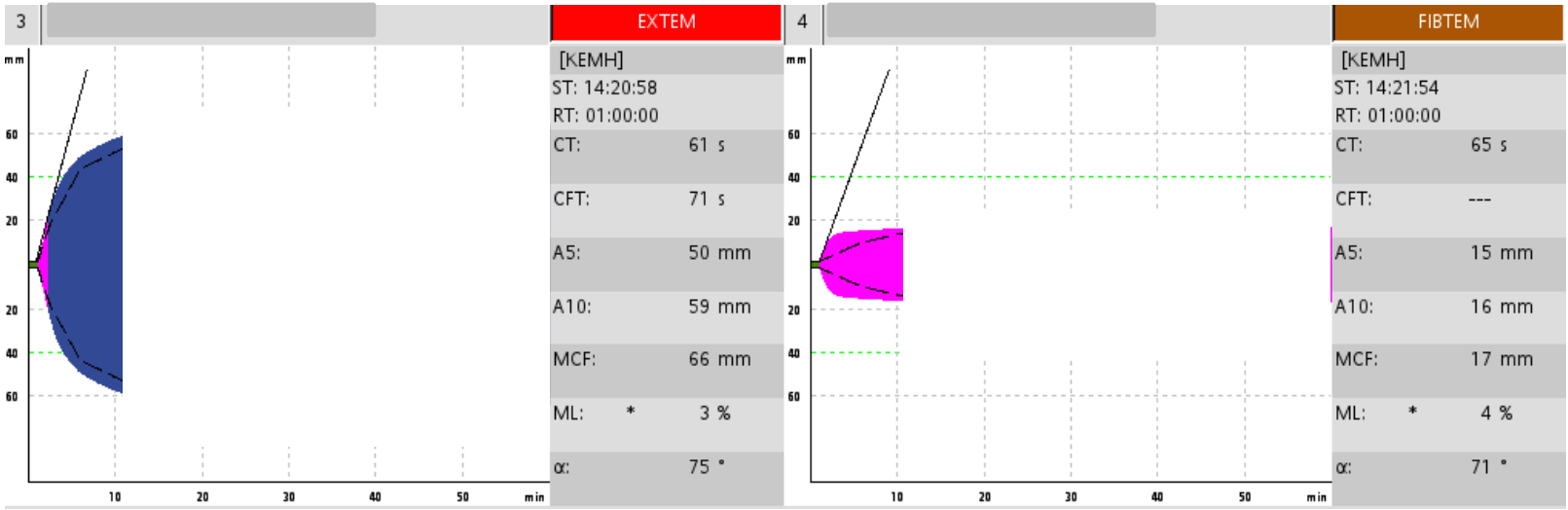
CASE 1

- A woman in her 60s undergoes laparotomy for an extensive pelvic cancer.
- Unexpected bleeding occurs and after 1.5litres of blood loss a ROTEM is performed and this is what it looks like at 10min.



- 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.

CASE 1 Answers

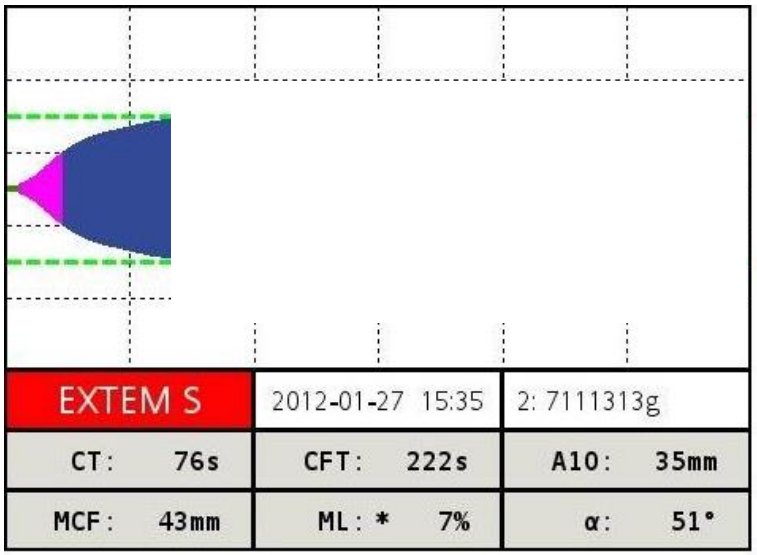


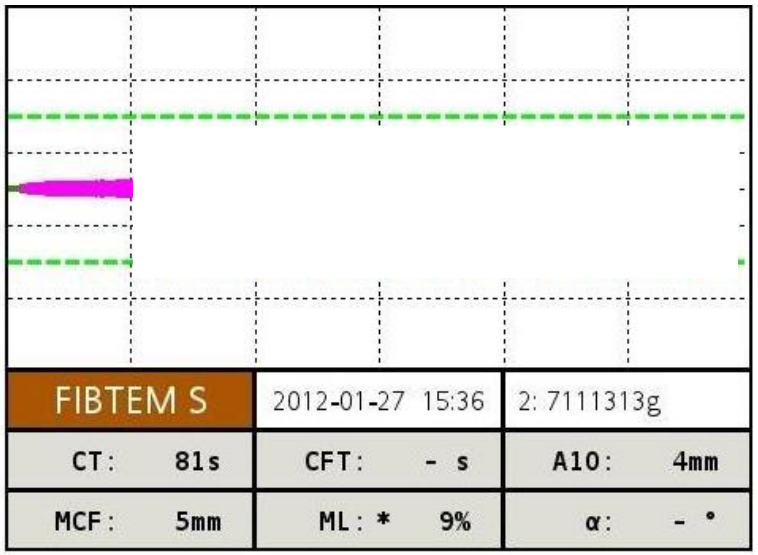
Typical ROTEM with no abnormalities, (cancer is often a prothrombotic state and thus patients often have very good haemostatic reserve)

- Fibrinolysis: Severe Fibrinolysis unlikely (EX A5 > 35mm and FIBTEM CT <600s)
- Fibrinogen: Fibtem A5 = 15mm, no fibrinogen needed
- Platelets: Extem A5 = 50mm, no platelets needed
- Factors: Extem CT = 61s, thrombin generation normal, no need for FFP / PTX

CASE 2

- Unexpected bleeding following a termination of pregnancy at 9 weeks.
- Blood loss of greater than 2-3litres
- First ROTEM at 10min





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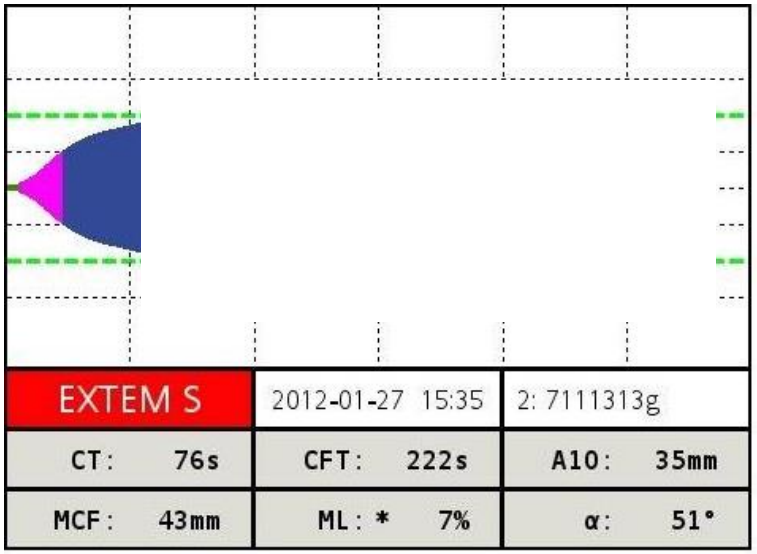
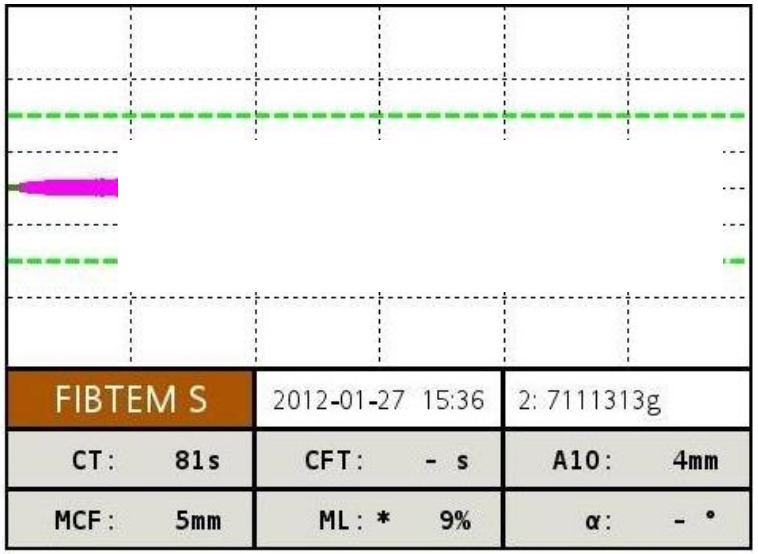
CASE 2



EXTEM S	2012-01-27 15:35	2: 7111313g
CT: 76s	CFT: 222s	A10: 35mm
MCF: 43mm	ML: * 7%	α: 51°



FIBTEM S	2012-01-27 15:36	2: 7111313g
CT: 81s	CFT: - s	A10: 4mm
MCF: 5mm	ML: * 9%	α: - °

Typical ROTEM with low fibrinogen

- Fibrinolysis: Severe Fibrinolysis possible (EX A5 approx 30mm (A10 = 35) Give TXA 1g
- Fibrinogen: Fibtem A5 approx 2-3mm (A10 = 4mm). Give cryo 25 units or fibrinogen concentrate 5g
- ➢ Platelets: Extem A5 approx 30mm (A10 = 35mm), no platelets needed – low because of the low fibrinogen
- ➢ Factors: Extem CT = 76s, thrombin generation normal, no need for FFP / PTX

Take Home Points

1. Patients with cancer often have very good haemostatic reserve (& can be prothrombotic). Check a ROTEM before empirically giving blood products that may not ne needed.
2. Severe fibrinogen deficiency needs large doses of fibrinogen (either cryo or fib conc).