Code Blue Caesarean at midnight!

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.

CASE 1

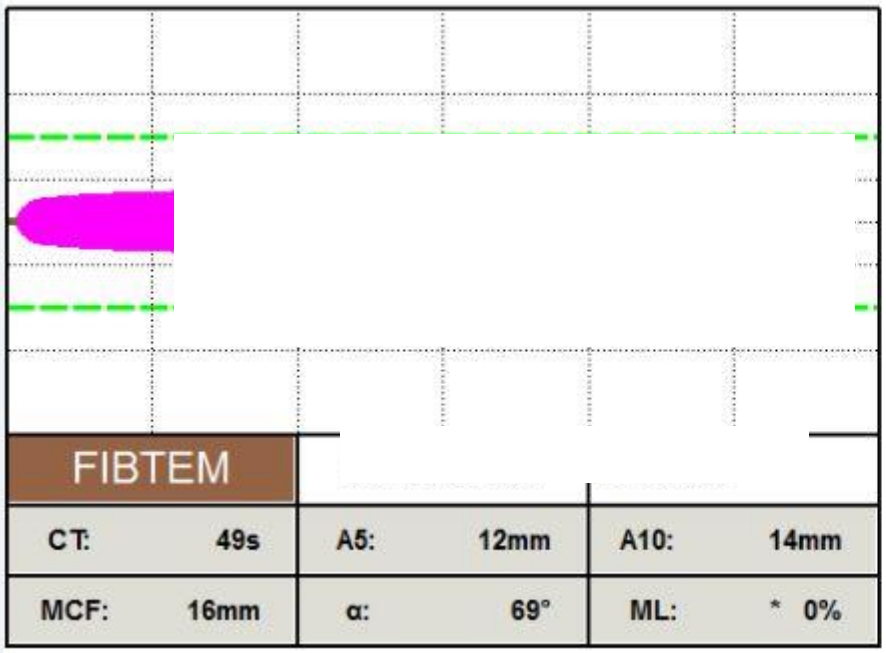
- Woman in labour at term, 4th pregnancy
- Previous caesarean
- Fetal bradycardia – code blue CS to theatre
- Systolic BP 50mmHg on arrival in theatre
- GA induced with ketamine
- C/Section performed and fetus delivered
- Intra-abdominal uterine rupture with massive blood loss noted.
- Internal manual aortic occlusion applied & maintained for a total duration approx 20-30min, whilst hysterectomy performed.
- TXA 1g and 2litres Hartmanns solution

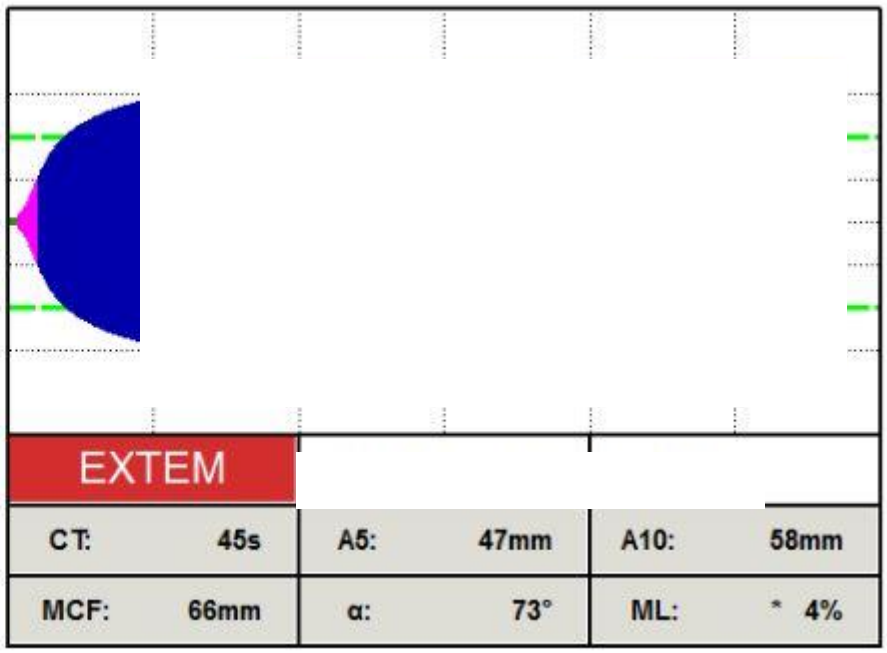
CASE 1

- Red cells 2 units given
- Arterial line inserted & bloods including ROTEM taken
- Fibrinogen concentrate 4g reconstituted and given empirically (before results of first ROTEM).
- Time to dissolve and administer all 4g – 10min

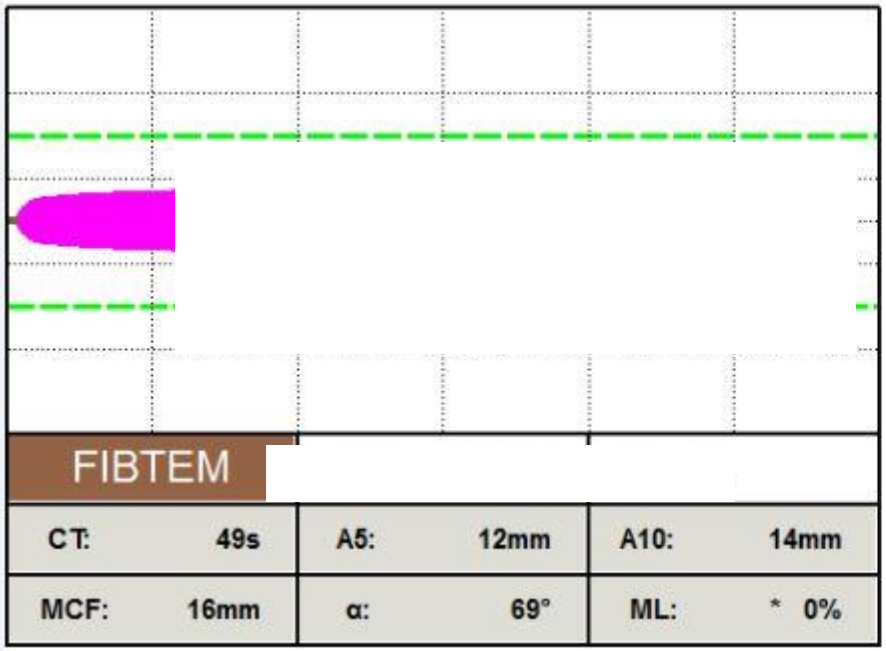
CASE 1

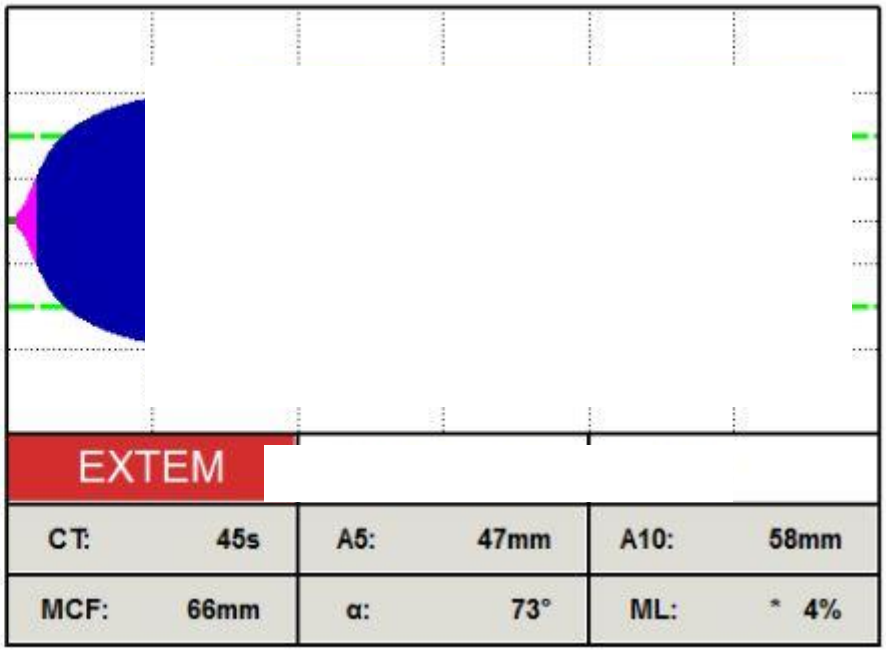
- Following this the first ROTEM results (taken before Fib conc) become available





- Apply the KEMH ROTEM algorithm – even better use your hospitals if it has one.
- What blood products would you give (ignore the fact that she has alreadyreceived Fib conc).?
- Don’t cheat & look at the next slide until you have written down what you think you should give.

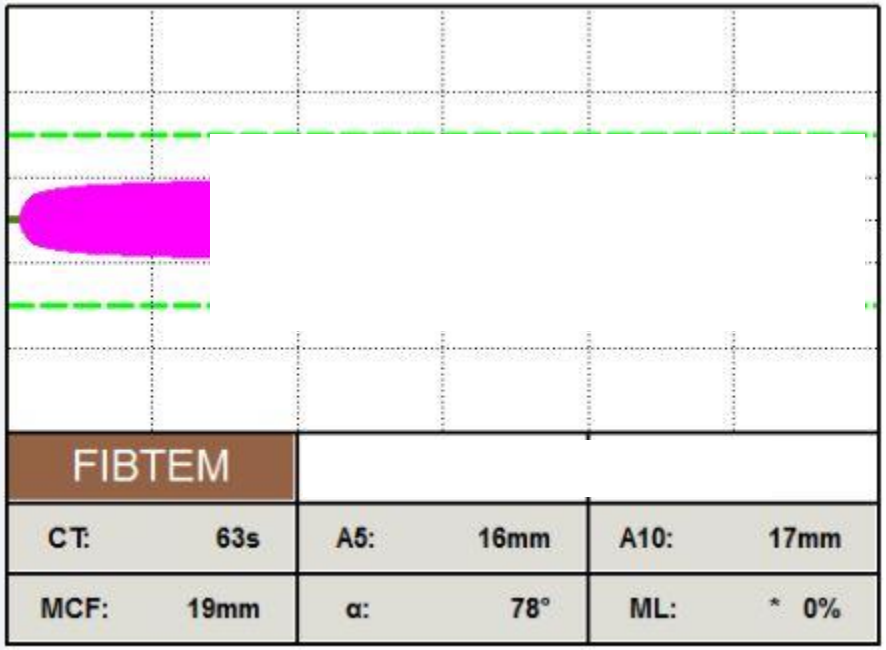




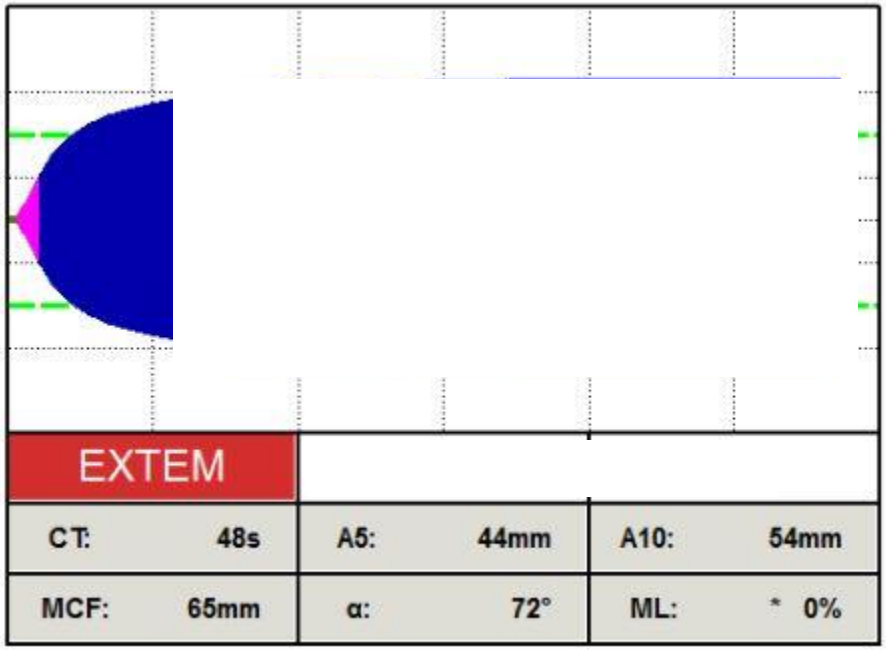
- Typical ROTEM for low normal fibrinogen
- Fibrinolysis: No evidence at this early stage but it occurs commonly in severe shock, she has already had TXA 1g (but as she was 115kg another 1g was given at this point)
- Fibrinogen: Fibtem A5 = 12, this is borderline low normal, in this situation of massive blood loss and cardiovascular collapse (she currently has aortic occlusion in situ) anticipate a rapid deterioration and consider pre-emptive fibrinogen replacement
- Platelets: Extem A5 = 47mm No need for platelets
- Factors: Extem CT = 45s Very good thrombin generation no need to augment this with FFP or prothrombinex

CASE 1

- After the fibrinogen concentrate 4g and release of aortic occlusion a further 2 units of red cells and 2 litres of crystalloid given.
- a repeat ROTEM is done:

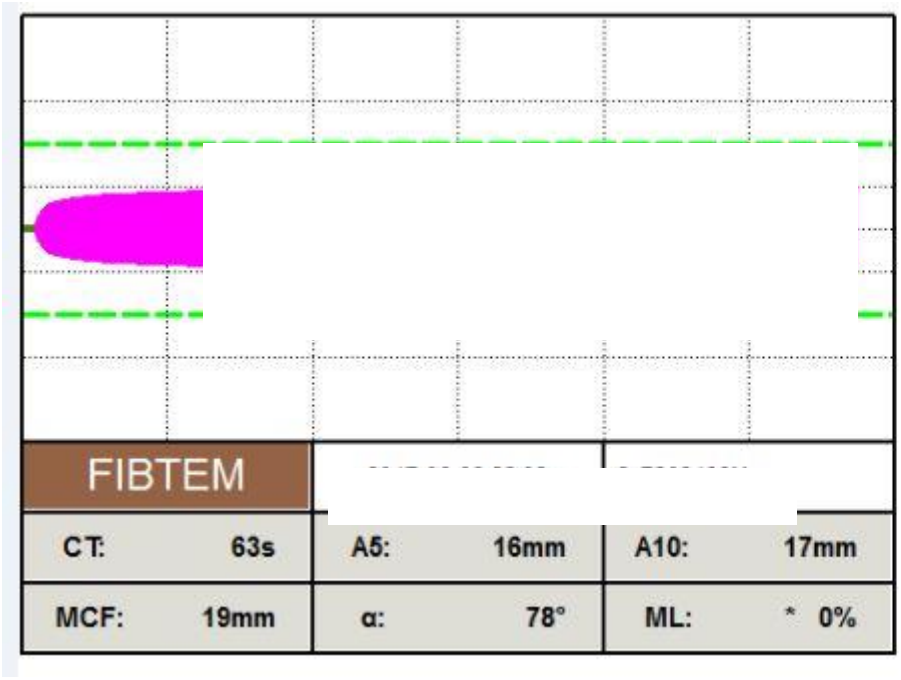


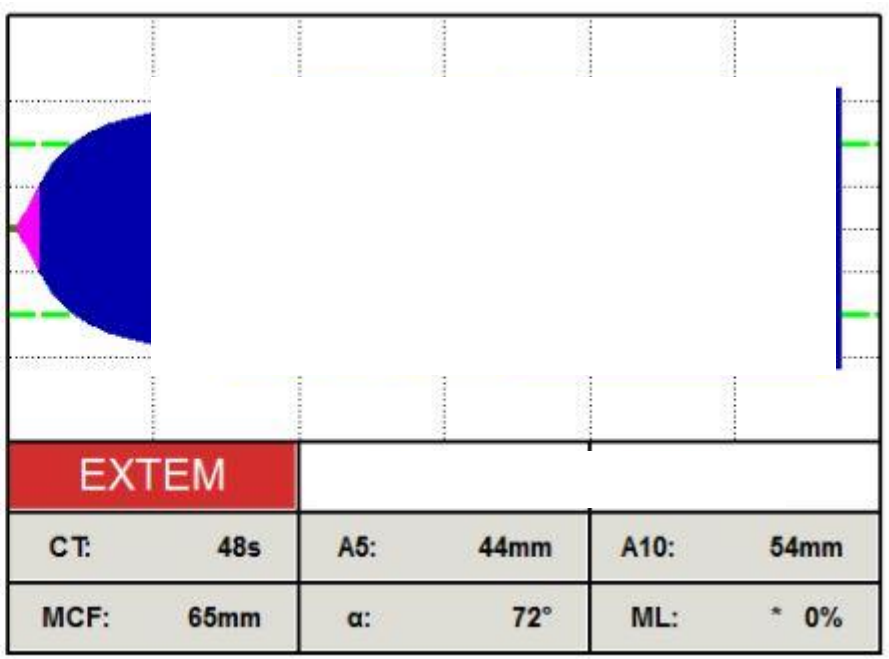
FIBTEM					
CT:	63s	A5:	16mm	A10:	17mm
MCF:	19mm	α:	78°	ML:	* 0%



EXTEM					
CT:	48s	A5:	44mm	A10:	54mm
MCF:	65mm	α:	72°	ML:	* 0%

- 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.





- Normal ROTEM
- Fibrinolysis: No evidence at this early stage . Has already had TXA 2g
- Fibrinogen: Fibtem A5 = 16mm, this is now normal, the bleeding has settled and no further treatment required at present
- Platelets: Extem A5 = 44mm No need for platelets
- Factors: Extem CT = 48s Very good thrombin generation no need to augment this with FFP or prothrombinex

SUMMARY

- Total Blood Loss 5 litres

- Crystalloids 5 litres
- Red cells 4 units
- Tranexamic acid 2g
- Fibrinogen concentrate 4g

- She was extubated and taken to HDU - no vasopressors and no respiratory dysfunction postoperatively.
- She received another 2 units of red cells over the following 3 days for moderate anaemia.
- No renal or organ dysfunction and good recovery.

TAKE HOME POINTS

1 – In the setting of cardiovascular collapse the first priority should be to stop the bleeding (not giving iv fluids or blood products). Consider manual aortic compression in any major blood loss below the umbilicus (e.g. PPH, ruptured ectopic, pelvic fractures or lower extremity injuries).

2 – Fibrinogen concentrate can rapidly be prepared and administered at the point of care and maintain normal haemostasis even in the face of massive blood loss and haemodilution.

Manual Aortic Occlusion:

https://www.youtube.com/watch?v=rc9BYcIhamA