Unexpected accreta and panic!

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.

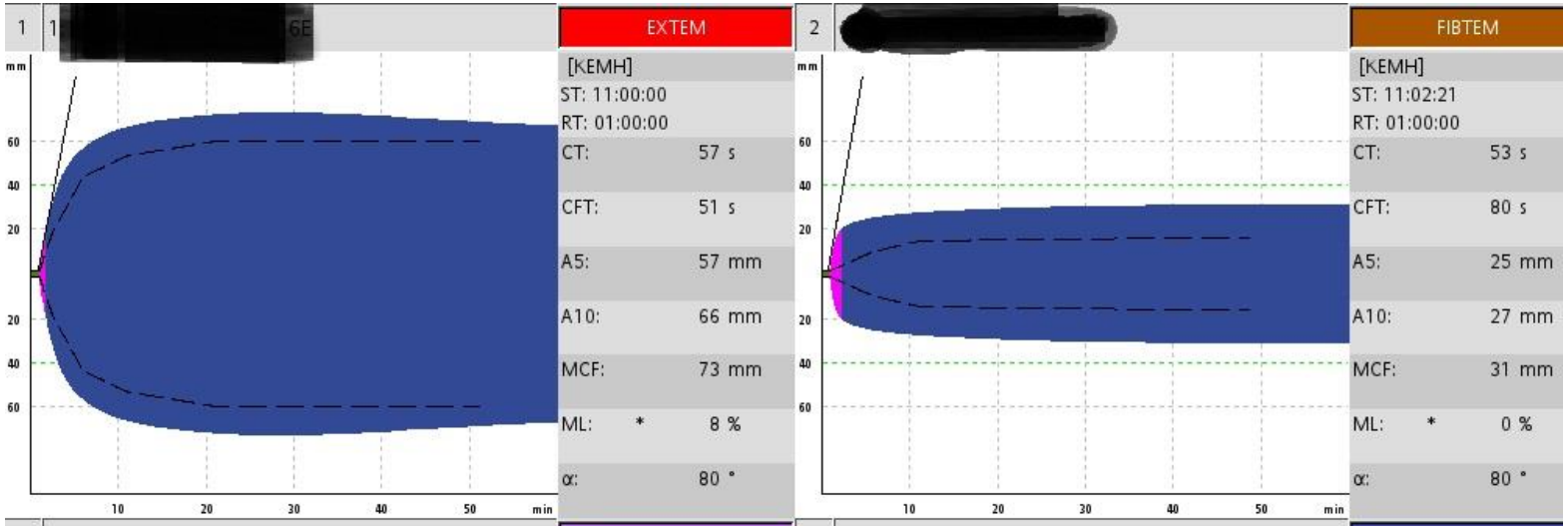
CASE 2 – an unexpected accreta

- 39 y.old at 21/40 gestation, approx 70-80kg
- Prev classical caesarean and history of fibroid surgery.
- An inpatient with chorioamnioitis and evolving maternal sepsis – after premature rupture of membranes a number of days earlier.
- Decision made to terminate pregnancy for maternal reasons because of evolving sepsis.

1000am

- Booked for suction termination under GA in theatre.
- Baseline ROTEM & bloods requested (see below) – 4 units crossmatched

Results
Hb 95
Plt 244
Fib 5.5
Aptt 28
INR 1.0



Comments on baseline ROTEM /bloods

- This ROTEM demonstrates the typical finding in pregnant women – a high fibrinogen.

Normal values:		Fibtem A5
- in 3rd trimester	4.4 – 5.8 g/L	11 – 27mm
- Non pregnant	3.1 - 3.6 g/L	6 – 22mm

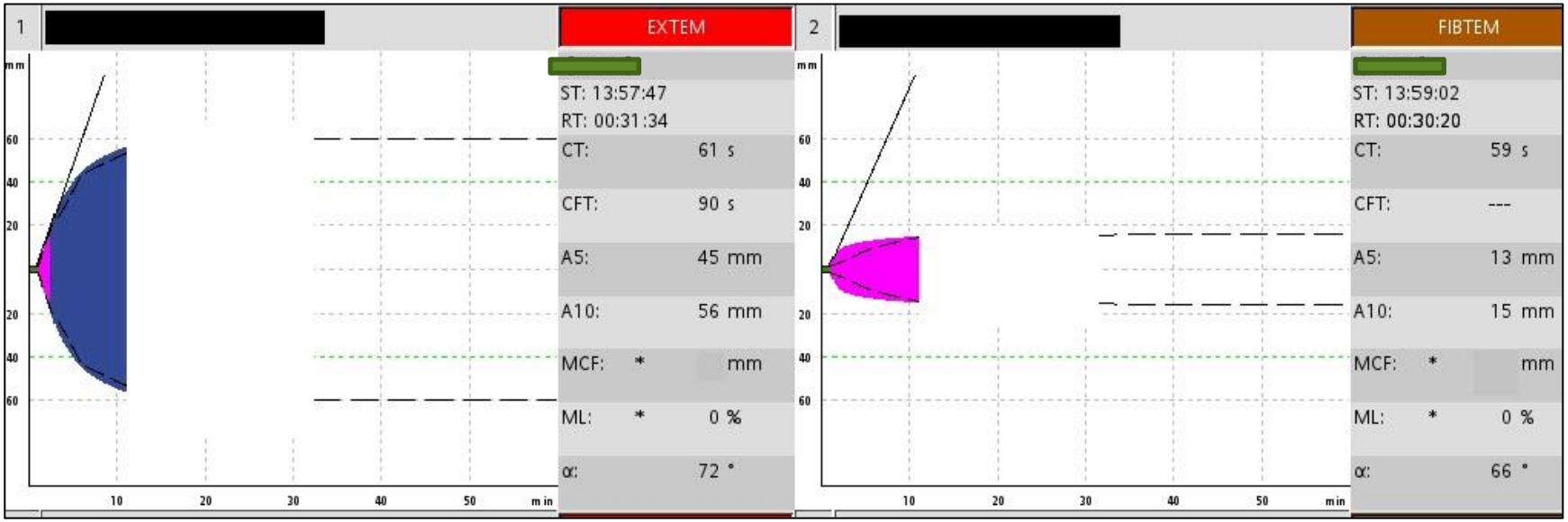
- Her ROTEM shows very robust haemostatic reserve.

Clinical Events - 1345

- GA/ETT + art line and x2 16g IV cannula – anaesthetist concerned as febrile and prev classical scar
- Straightforward dilatation and removal fetus
- Torrential blood loss after removal of placenta
- After 3-4min patient became pulseless & CPR commenced (3-5min chest compressions required)
- Manual external aortic compression applied to upper abdomen by obstetric registrar.
- Adrenaline (bolus and infusion) and crystalloids given
- Blood products requested (none in theatre complex)
- Laparotomy and supra – renal aortic clamp applied
- ROTEM taken 10min after arrest – see over

At about 15min this ROTEM is available

(Adjusted to look as it would in real-life at the time when decisions are made – i.e. only the first 12min of the trace)



If you were using the KEMH Obstetric ROTEM algorithm what blood products / treatments would you administer?

- In view of the clinical situation how would you adjust your management (from that suggested in the algorithm).

<u>FYI - Traditional Coag Results</u>

(Not available initially)

Hb 56

Plt 196

Fib 2.7

Aptt 35

INR 1.4

Comments

She obviously needs a lot of red cells and rapid volume resuscitation.

Re coagulation management using the ROTEM algorithm:

- If you follow it strictly nothing is required!

However in view of the clinical picture common sense should prevail – she is obviously likely to develop a severe coagulopathy (and probably already has in the 20-25 min since this blood sample was taken). You should anticipate & treat this without waiting for the next ROTEM / Coags:

- Give tranexamic acid 1g
- Give fibrinogen (the most likely abnormality to have developed), ideally fibrinogen concentrate 3-4g if available – if not request 15-20units cryo ASAP.

(*Platelets usually take a little longer to fall and are not immediately available in most centres but ask your blood bank to anticipate the need for this and to start getting some transferred across from the red cross).

(* Consider a small dose of prothrombinex (preferable) or ask for 1-2 units of FFP to start being thawed)

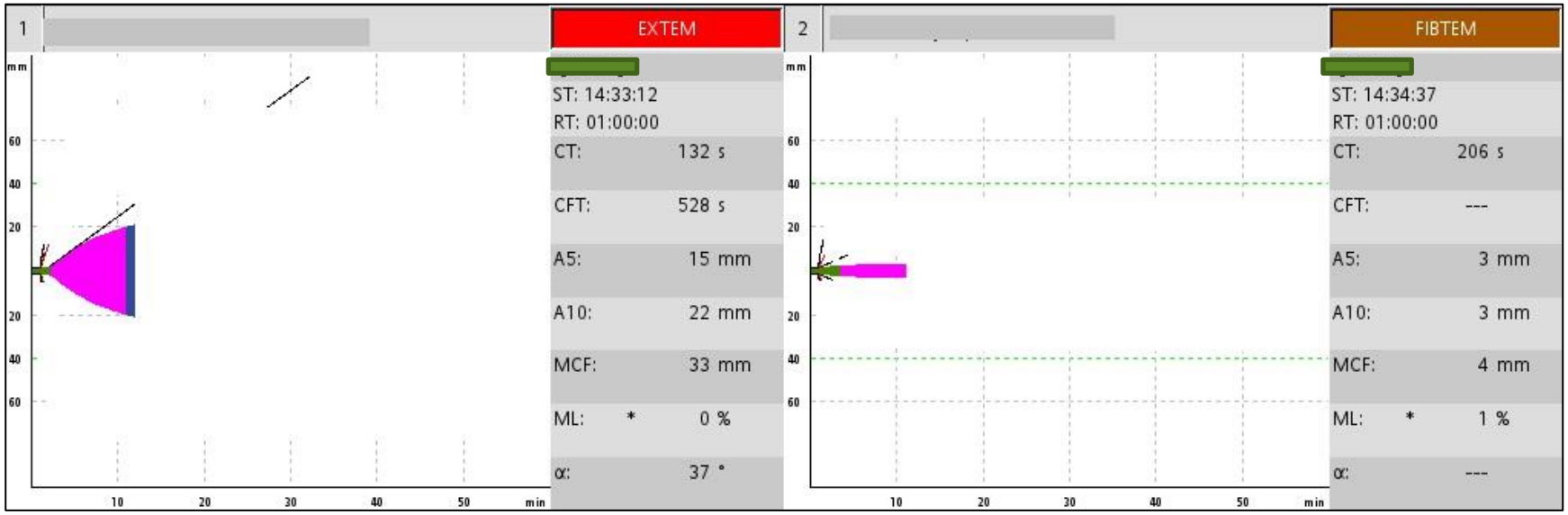
Further Clinical Events

Treatments administered:

- Tranexamic acid 1g
- Cryoprecipitate 8units (*fibrinogen concentrate was not available at at this time)
- Red cells 6 units
- Further crystalloids & Albumin 1litre
- Cross clamp still applied – Hysterectomy performed
- Adenaline & noradrenaline infusions through CVC.
- Another ROTEM was performed at 1425:

Approx 1425 this ROTEM is available

(Adjusted to look as it would in real-life at the time when decisions are made – i.e. only the first 12min of the trace)



1 - If you were using the ROTEM algorithm what blood products / treatments would you administer?

- In view of the clinical situation how would you adjust your management (from that suggested in the algorithm).

2 – What is the <u>main</u> cause of the prolonged INR & APTT in this patient ?

<u>FYI - Traditional Coag Results</u>

(Would take 30-40min in real life)

Hb 88

Plt 49

Fib 0.9

Aptt 104

INR 3.0

Comments

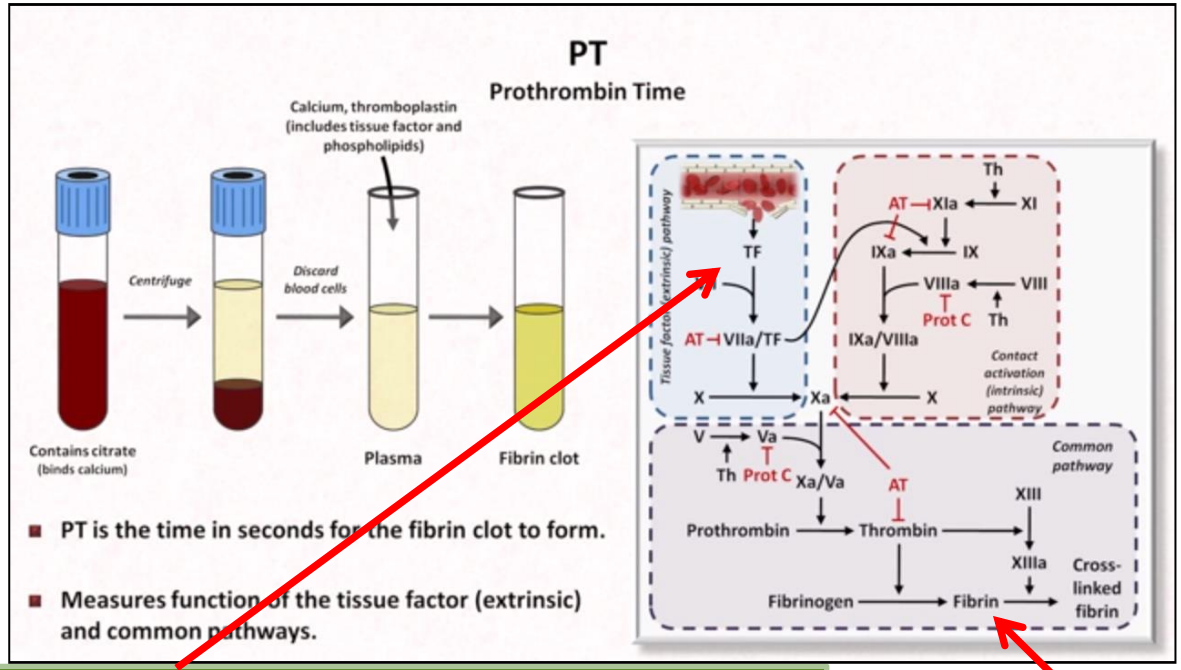
Question 1

Coagulation management using the ROTEM algorithm:

- Fibrinogen – a fibtem A5 = 3mm shows she is profoundly deficient despite the 8units of cryoprecipitate (once again demonstrating 8u of cryo is clinically insufficient in most situations). Using the table aiming for a fibtem A5 of 14mm – give fibrinogen concentrate 5g or cryo 25units
- Tranexamic acid – give 1g if not already given
- Platelets – Extem A5 = 15mm (<25mm when fib deficiency co-exists) – give her platelets 1 (or maybe 2) adult doses. *If these aren't immediately available consider increasing the dose of fibrinogen e.g. another fib conc 1-2g / cryo 5-10units.
- Factors – Extem CT = 132s, this may correct with fibrinogen alone but probably sensible in view of the clinical history to treat with either prothrombinex 1000units (12.5u/kg)(– probably the best option as at risk of volume overload / hypocalcaemia etc), or FFP 1-2units.

Question 2

A prolonged INR (&APTT) in patients with major haemorrhage and consumptive / dilutional coagulopathy (i.e. they are not on warfarin) is multifactorial but often mainly due to low fibrinogen and the best treatment is fibrinogen not large amounts of FFP



- The PT / INR measurement is prolonged if there is a deficiency in the "Extrinsic Pathway" (Tissue factor pathway)
- Factors 7 & 10

- **The INR (& APTT) are <u>also prolonged</u> if there is a deficiency in the "Common Pathway"**
- **Factor V, prothrombin, <u>fibrinogen</u> and 13**

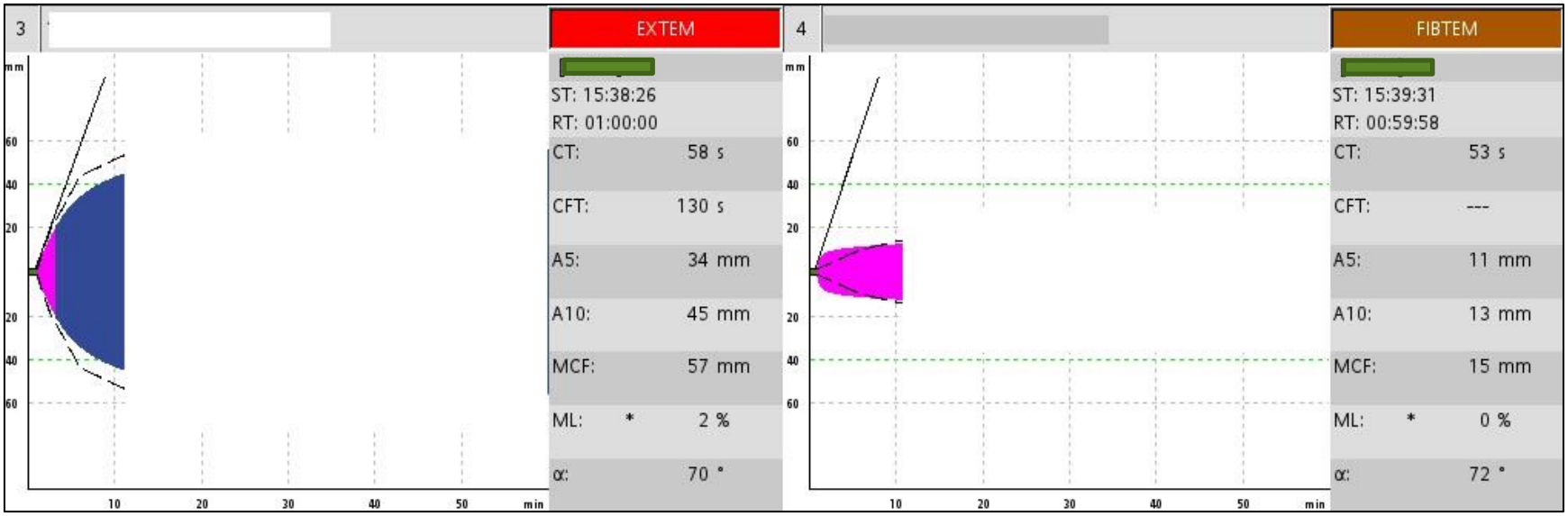
Further Clinical Events

Treatments:

- Cryoprecipitate 18units (2 discarded)
- Red cells 4 units
- FFP 2 units
- Platelets 1.75 adult doses (3 neonatal packs + 1 adult dose)
- Surgery completed and Aortic clamp now released
- Bleeding is now considered to be controlled
- At 1525 another ROTEM was performed:

Approx 1530 this ROTEM is available

(Adjusted to look as it would in real-life at the time when decisions are made – i.e. only the first 12min of the trace)



If you were using the ROTEM algorithm what blood products / treatments would you administer?

- In view of the clinical situation how would you adjust your management (from that suggested in the algorithm).

FYI - Traditional Coag Results

(Would take 30-40min in real life)

Hb 86

Plt 118

Fib 2.5

Aptt 39

INR 1.5

Comments

Overall: Haemostasis (as per ROTEM) has almost normalised with the treatments given. However she is still at risk of further bleeding and she is about to be transferred from theatre and across town in an ambulance. On balance it was decided to give some further fibrinogen to ensure her fibtem & extem A5 were at / above the targets (35mm/14mm).

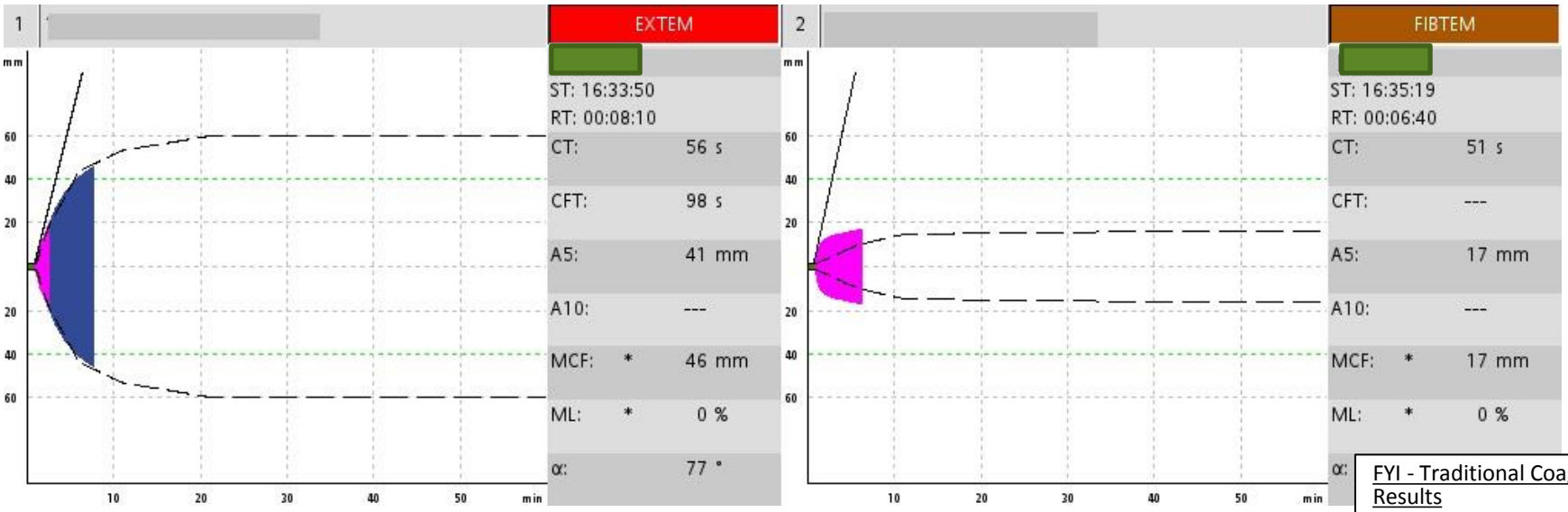
Coagulation management using the ROTEM algorithm suggests:

- Fibrinogen – a fibtem A5 = 11 mm shows she is still below the target of fibtem A5 = 14mm – give a small dose of fibrinogen concentrate 1-2 g or cryo 5-10units
- Tranexamic acid – not reqd (already given & no fibrinolysis)
- Platelets – Extem A5 = 34mm – this is just below the trigger of 35mm if she was still bleeding consider another dose. Adds support to ensuring fibtem target is higher.
- Factors – Extem CT = 58s, thrombin generation is good, no treatment required.

Further Clinical Events

Treatments:

- Cryoprecipitate 8units
- Transfer to ICU via ambulance organised
- Another ROTEM was performed at 1630 just prior to leaving:



If you were using the ROTEM algorithm what blood products / treatments would you administer?

FYI - Traditional Coag Results

(Would take 30-40min in real life)

Hb 85

Plt 126

Fib 3.6

Aptt 33

INR 1.3

Summary – some take home points

1 – Fibrinogen was the key – This case demonstrates the critical importance of ensuring adequate fibrinogen in major haemorrhage. Despite starting with a fibrinogen of 5.5, the first thing to fall to critical levels and the most important treatment required to restore normal haemostasis was fibrinogen.

2 – Cryoprecipitate versus Fibrinogen concentrate – although the team did a great job anticipating and ordering cryoprecipitate, as someone who was present during this case I can attest it took a significant amount of labour & time to request / transport / check and then administer 32 units of cryo. The time from arrest before finally reaching our target (fibtem A5 = 14mm) was 2.5 – 3 hours. Fibrinogen concentrate can be reconstituted in 3-4min and each ampoule given over 3-4min (or quicker in some German centres), thus making it feasible to correct this level of fibrinogen deficiency (FC 5-6g) in 30-45minutes or less. This would be especially true if both ROTEM and fibrinogen concentrate were available "point of care".

3 – FFP – The most important haemostatic problem she encountered was poor clot strength due to consumption and deficiency of fibrinogen and to a lesser extent platelets. FFP is not very good at correcting either of these problems and even with only 2 units of FFP, thrombin generation (as demonstrated by Extem CT) was perfectly adequate. Large volumes of FFP are not needed in resuscitation of these patients.

Total Blood Products administered:

- Red cells – 10 units
- Cryoprecipitate – 32 units
- Platelets – 1.75 adult doses
- FFP – 2 units
- Fluids: Albumin 1 litre, Crystalloids 3-4litres

Further Clinical Events - Postoperative Course in ICU

- Weaned from vasopressors and extubated within 5 hours
- No significant organ dysfunction
- Transferred back the following day