

Adult Massive Transfusion Protocol

Version 5.0 July 2019

Trauma

Emergency Department

Non-trauma

Other locations

Suspected critical bleeding

Should I activate Code Red?

Major trauma and 2 or more of the following:

- Penetrating injury
- FAST scan positive for intra abdominal fluid
- HR > 120/min
- SBP < 90 mmHg

or Major trauma and

- Senior clinician's suspicion of ongoing bleeding and circulatory failure despite volume resuscitation

- Bleeding > 150 ml/min
- Blood loss > 1500ml
- Loss of half the circulating blood volume in less than 2 hours
- Rapid blood loss leading to circulatory failure despite volume resuscitation

Activate **CODE RED 2222**

1. Request Pack A

Stop the cause of bleeding

Stop bleeding - apply physical methods.

Damage Control Resuscitation. Identify occult source of bleeding.

Send bloods for baseline tests and ROTEM.

Transfuse Red Cells and up to 6 g Fibrinogen concentrate: Aim for Hb 100g/L and FIBTEM A5 ≥ 10 mm

Drugs

Tranexamic acid 1g if within 3h of injury. Reverse **warfarin** (give Octaplex). DOACs - seek Haematology advice.

2. Request Pack B if ongoing bleeding

Repeat ROTEM.

Ensure Hb 100g/L and FIBTEM A5 ≥ 10 mm

Give additional products according to ROTEM

3. Request Pack C if ongoing bleeding after 6 units of Red cells

Ensure Hb 100g/L; FIBTEM A5 ≥ 10 mm and EXTEM A5 > 35 mm

Give additional products according to ROTEM

4. Request Pack D if patient still bleeding or ROTEM unavailable

Targets

Bloods

Hb 90-100 g/L,
FIBTEM A5 > 10 mm
EXTEM A5 > 35 mm; CT <85s
Platelets > 50 x 10⁹/L
Fibrinogen > 2.0 g/L

Metabolic

Temp > 34 deg C
pH > 7.2
iCa > 0.9 mmol/L

Haemodynamics

Systolic BP 80-100mmHg.
If Traumatic Brain Injury - Mean BP ≥ 80 mmHg
Ensure cardiac output is adequate (CI > 2.5)

Excessive transfusion = worse outcomes

Hb 90-100 g/L is enough - Re-check Hb and ROTEM to guide ongoing resuscitation.

Packs

Pack A

4 units Red Cells
6g Fibrinogen concentrate

Pack B

4 units Red cells
4 units FFP

Pack C

4 units Red cells
4 units Cryoprecipitate
1 pool Platelets

Pack D

4 units Red cells
4 units FFP
1 pool Platelets
6g Fibrinogen concentrate



Priority tasks	Personnel <ul style="list-style-type: none"> Call for senior clinician and assistance Appoint a Transfusion Coordinator Identify dedicated blood porter Inform Theatres if appropriate 	Patient care <ul style="list-style-type: none"> Immediate physical methods to stop bleeding Give Tranexamic acid Warm patient; warm fluids; warm room Monitor blood pressure directly 	Investigate <ul style="list-style-type: none"> FAST scan if trauma Look for occult source of bleeding Monitor cardiac function by ECHO or ODM
Other tasks	Send blood for these tests <ul style="list-style-type: none"> FBC ROTEM Clotting Fibrinogen 	Monitor <ul style="list-style-type: none"> Arterial blood gas: Hb, Lactate, Base deficit Repeat ABG and ROTEM every 30 mins until patient stable iCa if available 	Hypocalcemia Consider treating hypocalcemia if ionised [Ca] < 0.9 mmol/L
Ring Transfusion	Give patient information <ol style="list-style-type: none"> Name Gender Age Date of Birth Weight - estimate Hospital number 	Communication <ul style="list-style-type: none"> Agree telephone extensions to call Deviate from MTP advisory packs if ROTEM suggests alternative treatment required 	Warfarin + major bleeding <ul style="list-style-type: none"> Request Octaplex if INR > 1.5 Give 30-50 IU per Kg Maximum dose is 3000 IU

A5 - amplitude (mm) at 5 min for FIBTEM and EXTEM	FIBTEM < 10mm	Give 4-6g Fibrinogen concentrate or 4 packs of CRYO
	FIBTEM ≥ 10mm	Check EXTEM
	EXTEM < 35mm	If FIBTEM A5 <10mm - give 4-6g Fibrinogen concentrate or 4 packs of CRYO If FIBTEM A5 ≥10mm - give PLATELETS
	EXTEM ≥ 35mm	No further blood products if FIBTEM A5 ≥10mm and EXTEM CT < 85s
CT - clotting time (s) for EXTEM	EXTEM CT < 85s	No further blood products if FIBTEM A5 ≥10mm and EXTEM A5 ≥ 35mm
	Extem CT ≥ 85s	If FIBTEM A5 <10mm - give 4-6g Fibrinogen concentrate or 4 packs of CRYO If FIBTEM A5 ≥10mm - give PLATELETS (EXT A5 <35 mm) or FFP (EXT A5 ≥35mm)

Revised 10.01.2018

1. Check FIBTEM A₅ first v. A₅

If active or suspected bleeding: correct low FIBTEM (low fibrinogen) first

2. Look at EXTEM CT and A₅ Repeat FIBTEM and EXTEM after blood product transfusion or every 30 mins if actively bleeding

STOP the cause of bleeding!

- Physical
- Surgical

Tranexamic acid Targets

- Hb 90-100 g/L if bleeding
- Platelets > 50 x10⁹/L
- Systolic BP 80-100 mmHg
- Mean BP ≥ 80 if brain injury
- Temperature 35 - 37* C
- pH > 7.2

Doses

Cryoprecipitate (5u/bag)

- 4 bags ~ 6g Fibrinogen
- 3 bags ~ 4.5g
- 2 bags ~ 3g

Fibrinogen 25-50 mg/kg

FFP 20 ml/kg

Platelets - 1 pool

Tranexamic acid 2g (10-30 mg/kg)

Dual anti-platelet drugs or DOAC - ask specialist help

ROTEM® - guided intervention in critical bleeding

Brighton and Sussex University Hospitals NHS Trust

