Emergency Department Guideline

Major Haemorrhage- CODE RED

NHS
Birmingham Women's and Children's
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What is a major haemorrhage? How to activate the MAJOR HAEMORRHAGE PROTOCOL

Major haemorrhage can be medical, surgical or traumatic. It is important to consider **CODE RED** activation in **ANY** clinical situation where there is suspected or known unexpected, uncontrolled blood loss that will require resuscitation with blood products to restore and maintain circulating blood volume.

CODE RED DEFINITION

Consider if ACTIVE HAEMORRHAGE SUSPECTED AND
>20MLS/KG Red Cells given in 1 hour
>40mls/kg fluid given in 3 hours
>2mls/kg/ min blood loss

If in doubt **CALL IT OUT.**
To contact Blood Bank technician directly e.g. (Trauma call pre-alerted and you want to alert blood bank technician that you would like to put blood bank on 'standby' for activation of MHP.

Blood Bank: Ext 9874 (M-F 0900-1700)
Bleep 55034 (all other times)

CODE RED ACTIVATION-

Important information

2222 via switchboard- **CODE RED/ ACTIVATION OF MAJOR HAEMORRHAGE PROTOCOL**
Location
Trauma or Non- trauma (if trauma has a trauma call gone out?)
Male or female patient
Estimated/ working weight

This will alert blood bank who will be able to begin getting blood products ready. Switchboard will additionally fast bleep: Blood bank Technician, Haematology Consultant, Anaesthetist on call, Theatre coordinator for ANY **CODE RED**

O negative blood is stored in fridges in Blood Bank/ ED/ PICU, F-block and main theatres.

What products do I get when I activate the MHP?

When the MHP is activated, you will get something called a **'SHOCK pack'.** This will contain Packed RBC (PRBC's), Fresh frozen plasma (FFP Brand name that we use at BWC Octoplas) and Platelets. The volume you get in the shock pack will depend on the weight of the patient.

PRBC: Red blood cells. Plasma and most of leucocytes have been removed.
Aim for Hb >100g/L.
Give 5- 10mls/kg (MAXIMUM 250mls) at a time.
After 20mls/kg or (500mls) need calcium
After 40mls/kg PRBC need FFP/ Platelets and Cryo.

FFP: Made from plasma contains ALL clotting factors. Takes 30 mins to thaw. 'Octoplas' is a brand of FFP (virus inactivated FFP)
Aim for INR/ APTT < or equal to 1.5 of the normal range
Give 10mls/kg (MAXIMUM 250mls)
When available should be 1:1 ratio with PRBC

Platelets: In severe bleeding there are lots of factors that affect platelets.
Aim for platelets >75 x10^9/L
Give 5-10mls/kg (maximum 250mls)
After 40mls/kg PRBC need platelets
Platelets should **NOT** go through Belmont rapid infuser

Cryoprecipitate: From plasma. Higher Fibrinogen content (with less overall clotting factors than FFP) Contains Factor 8, VWF and Fibrinogen.
Aim for Fibrinogen >1.5g/litre
Give 5mls/kg (max 125mls)
Does NOT come automatically as part of SHOCK PACK
After 40mls/kg PRBC need cryoprecipitate
Cryoprecipitate should **NOT** go through Belmont rapid infuser

Authors: Dr Victoria Currie PEM Consultant, Dr James Bennett Consultant in Anaesthetics, Richard Cole Blood Transfusion Manager, Transfusion Committee, Dr Hari Krishnan PICU Consultant, Rhian Isaac Pharmacist, Dr Ralph Jepson Anaesthetic Consultant, Dr Rae Lancashire Haematology Consultant
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Shock pack

SHOCK PACKS			
	<10KG 1year	10-20kg 1-5 years	>20kg >5 years
PRBC	1 unit (275mls*)	2 units (275mls/unit*)	4 units (275mls/unit*)
FFP	1 unit (275mls*)	2 units (275mls/unit*)	4 units (275mls/unit*)
Platelets	One paed unit (60mls*)	Two paed units (60mls/unit*)	One adult unit (275mls/unit*)

Evidence has shown us that **balanced transfusions** ideally with a ratio of 1:1 PRBC: FFP improves outcomes. Therefore, when FFP (Octoplas) is available use in a balanced ratio with PRBC.

** Blood bank work on the following volumes. This is a rough estimate and may vary slightly.*

Other considerations

Co-Ordinator of MHP: Consider nominating a member of the team to be the sole point of contact with Blood Bank and team leader.

Delivery of Blood products: Do you have the right access to be able to deliver this blood? Do you need the Belmont rapid infuser (theatre)? Can you prepare the ranger in advance to warm the PRBC/FFP?

Additional personnel: Can you assign a runner with a communication device to go to and from Blood Bank (ideally who is trained on Bloodhound to get blood out of the fridge?

Scribe: Can you assign someone to stand next to the team leader and use the **CODE RED** transfusion worksheet? To keep track of what products have been given and when other products are needed?

Calcium: Maintain **ionised calcium levels >1.0mmol/litre**. Give calcium after every (20mls/kg) or 500mls of PRBC or if the ionised calcium <1.0mmoL/Litre.

Administer: 0.2mls/kg calcium gluconate 10% (over 10 minutes) ideally via central access. Or will require dilution if peripheral (see calcium gluconate monograph on trust intranet).

Tourniquet and Damage Control Surgery: Consider if tourniquet is appropriate and if could be used to reduced bleeding- document time and location of application. Are the surgical team involved? Do they need to be? If ongoing suspected intrabdominal/ pelvic/ thoracic bleeding is suspected, do you need to think about damage control surgery?

Tranexamic acid: 15mg/kg bolus (max 1g) followed by continuous infusion: 2mg/kg/hour over 8 hours (max 125mg/hr). Give if MHP has been activated.

Cell Salvage: should be considered in any life -threatening haemorrhage if the surgeon, anaesthetist and theatre staff are trained and competent with its use and contraindications.

Send products with patient to theatre: If patient is going to theatre. Move 'SHOCK PACK' with patient

Stand down blood bank if no longer required.

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APLS: P-TRAUMATIC

T	**Tranexamic acid**	• If not administered already 15 mg/kg bolus (max 1 g), followed by • 2 mg/kg/hr over 8 hours (max 125 mg/h)
R	**Resuscitation**	• Activate MHP and consider: • Rapid infuser • Cell salvage • Normotensive resuscitation (unless post pubertal) • Pelvic binder/splint fractures/tourniquet • Limit crystalloid and colloid use
A	**Avoid hypothermia**	• Target temperature over 36 degrees Celsius • Remove wet clothing and sheets • Warm fluids • Warming blanket/mattress/external warmer
U	**Unstable? Damage control surgery**	• If unstable, coagulopathic, hypothermic or acidotic, consider damage control surgery • Aim surgery time less than 90 minutes • Haemorrhage control, decompression, decontamination and splintage
M	**Metabolic**	• Avoid acidosis • Base excess guides resuscitation • If lactate more than 5 mmol/litre or rising, consider stopping surgery, splint and transfer to PCCU • Monitor blood glucose
A	**Avoid vasoconstrictors**	• Inappropriate use of vasoconstrictors doubles mortality • However, use may be required in cases of spinal cord or traumatic brain injury
T	**Test clotting**	• Consider TEG® (thromboelastographic)/ROTEM® • Check clotting every 15 ml PRBC/kg body weight • Aim platelets over 75 x 10/litre • Aim INR & aPTTR less than or equal to 1.5 • Aim fibrinogen more than 1.5 g/litre

I	**Imaging**	• Consider:
		  • Local guidelines for paediatric trauma
		  • Does this child need imaging at all?
		  • If imaging is required which anatomical area(s) need to be covered?

C	**Calcium gluconate**	• Maintain ionised calcium more than 1.0 mmol/litre • Administer 0.2 ml/kg 10% calcium gluconate over 10 minutes as required • Give calcium routinely after MHP pack one

References:
Smith S. Advanced Paediatric Life Support. 7th Edition. John Wiley & Sons; 2023.

Emergency Department Guideline

Major Haemorrhage- CODE RED flow sheet

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CODE RED DEFINITION

Consider if ACTIVE HAEMORRHAGE SUSPECTED AND
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>2mls/kg/ min blood loss

IF YES: CODE RED ACTIVATION/ ACTIVATION OF MAJOR HAEMORRHAGE PROTOCOL 2222 via switch

State location/ Trauma/ Non- trauma/ Male or female patient/ Estimated weight.

Nominate coordinator
Request first **SHOCK PACK**
Send runner to Blood Bank
Start the **CODE RED WORKSHEET**
Use P TRAUMATIC ALGORITHIM ALONGSIDE

Continuous assessment of patient
Attempt to control Haemorrhage (splints, tourniquet, external pressure?)
Have you got enough IV/ IO access?
Start resuscitation with **O Negative PRBC (10mls/kg max 250mls)**
Warmed cells (Ranger)
Do you need Belmont rapid infuser (theatre)?

CODE RED ACTIVATED

O-Negative PRBC commenced if no cross matched cells available.
Has **Tranexamic acid** been given? 15mg/kg bolus (max 1g) over 10 minutes then infusion at 2mg/kg/hr (max 125mg/hr) over 8 hours.

(10mls/kg boluses of **warmed** PRBC max 250mls).
When shock pack available please change to type specific PRBC

When shock pack arrives **begin 1:1 ratio of warmed PRBC (10mls/kg max 250mls): warmed FFP (10mls/kg max 250mls**).

When you reach 20mls/kg or 500mls total PRBC **STOP- Think Calcium** (maintain ionised calcium>1.0mmol/L)
Administer: 0.2mls/kg calcium gluconate (over 10 minutes) ideally via central access. Or dilute in x5 volume of saline if peripheral.
EVERY 20mls/kg or 500mls of PRBC re-check ionised Calcium **

****At each 20mls/kg or 500mls PRBC- Think:** check and give calcium

At each 40mls/kg PRBC- Think: 1:1 ratio FFP
Platelets
Cryoprecipitate
Check bloods (FBC, INR, APTT, Fibrinogen)

At 40mls/ kg PRBC-** Think other products. Send repeat FBC and coagulation at this point to guide further blood products by test results.

Blood results not available and 40mls/kg PRBC given

1:1 ratio of FFP. (10mls/kg max 250mls)

Platelets (5-10mls/kg max 250mls at a time)

Cryoprecipitate (5mls/kg max 125mls)

Think about need for second shock pack if ongoing.
Follow guidance until bleeding stops or need for haemorrhage control surgery

Blood results available use them to guide resuscitation:
Aim for
Hb>100g/L
Plt >75 x 10^9/L
APTT/ INR < or equal to 1.5x normal ratio
Fibrinogen >1.5g/L

Bleeding stopped:
STAND DOWN **CODE RED**
Call Blood Bank 9874(M-F 0900-1700)
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Working weight:

Bolus size for this patient:
PRBC …….
(10mls/kg Max 250mls)

FFP……
(10mls/kg Max 250mls)

Bolus size for this patient:
Platelets……
(5-10mls/kg Max 250mls)

Cryoprecipitate……
(5mls/kg Max 125mls)

Patient ID:

PLACE STICKER HERE

Name

Date of birth:

Time	Bolus count	RBC	FFP 1:1 when available with PRBC	Plt	Cryo	Blood result	Think about	
:	1			x	x		?FFP arrived 1:1 ratio	?TXA given Loading
:	2			x	x		Call for Plt/ Cryo if not arrived	
:	3			x	x		Check and think calcium Keep iCa>1.0	Give Calcium (after 20mls/kg or 500mls PRBC)
:	4						Check FBC, Clotting, Fib	Give Plt, Cryo (after 40mls/kg PRBC or guided by results)
:	5			x	x			TXA infusion started?
:	6			x	x			
:	7			x	x		Check and think calcium Keep iCa>1.0	Give Calcium (after 20mls/kg or 500mls PRBC)
:	8						Check FBC, Clotting and Fib If ongoing continue in same cycle	Give Plt, Cryo (after 40mls/kg PRBC or guided by results)

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Bolus size for this patient:
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FFP……
(10mls/kg Max 250mls)

Bolus size for this patient:
Platelets……
(5-10mls/kg Max 250mls)

Cryoprecipitate……
(5mls/kg Max 125mls)

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:	7			x	x		Check and think calcium Keep iCa>1.0	Give Calcium (after 20mls/kg or 500mls PRBC)
:	8						Check FBC, Clotting and Fib If ongoing continue in same cycle	Give Plt, Cryo (after 40mls/kg PRBC or guided by results)