

Management of Major Haemorrhage (MH) in Trauma - Adults

Site	Number to activate the MH pathway at this site	For further details, please refer to Trust MH policy/guidelines
Recognise Major Haemorrhage	<p>Estimated Blood Loss:</p> <ul style="list-style-type: none"> Blood loss of 150ml/min^B <p>Haemodynamic Parameters:</p> <ul style="list-style-type: none"> Bleeding with a heart rate of >110 beats/min and/or systolic blood pressure <90mmHg^B or Confirmed (or suspected) traumatic blood loss in the context of haemodynamic instability^B 	
Activate the MH Pathway Call for senior help	<p>Activate the Major Haemorrhage Pathway and order Major Haemorrhage Pack 1</p> <ul style="list-style-type: none"> Provide laboratory with patient information and a direct contact telephone number Note down the dedicated telephone number the laboratory will provide for ongoing communication <p>Assign team roles including communication lead Involve consultant for ED, contact surgeons, anaesthetists and other relevant specialities</p>	
Secure IV access Send baseline bloods	<p>Take bloods urgently and send to the laboratory^{A, B}:</p> <ul style="list-style-type: none"> Pre-transfusion crossmatch sample Full blood count (FBC) Coagulation screen*: PT, APTT, Clauss fibrinogen (plus PT/APTT ratios if available) Biochemistry including renal (U+Es), liver and bone profiles Send a second pre-transfusion transfusion sample when able to do so if no historical group <p>Near patient testing if available:</p> <ul style="list-style-type: none"> TEG / ROTEM Arterial blood gas (for pH, lactate, base excess, potassium and ionised calcium) 	
TXA Anticoagulant reversal	<ul style="list-style-type: none"> Confirm tranexamic acid (TXA) bolus administered by paramedic If not, give TXA 1g IV over 10 minutes immediately (must be within 3 hours of injury) Follow the TXA bolus by a 1g infusion over 8 hours <p>If patient on warfarin, give prothrombin complex concentrate (PCC) and 5mg IV vitamin K Urgently contact haematologist if on other anticoagulants e.g. DOACs (direct oral anticoagulants)</p>	
Transfuse and Monitor Aim for Hb >80g/L Keep the patient warm and use blood warmer Location of emergency O negative blood:	<p>Use emergency O negative blood in nearest fridge if blood is required immediately</p> <p>Transfuse Major Haemorrhage Pack 1 (Minimum of 4 red cell units and 4 FFP units) Aim to maintain a packed red cell: plasma transfusion ratio of 1:1 for traumatic haemorrhage^B Use pre-thawed FFP in MH Pack 1 where available Laboratories may provide group O positive red cells for males over 18 and women of non-child bearing potential (over 50 years) where suitable, change to group specific when able to do so^C If ongoing haemorrhage, order MH Pack 2 (do not wait until the end of Pack 1 to order)</p> <p>Re-check FBC, coagulation screen*, U+Es, Ca²⁺ and TEG/ROTEM between each pack or at least hourly Tailor component transfusion when blood results become available, see 'Aims for Therapy' below</p> <p>Transfuse Major Haemorrhage Pack 2 (Minimum of 4 red cell units, 4 FFP units and 1 dose of platelets) Consider cryoprecipitate to maintain fibrinogen >1.5g/L* or as guided by TEG/ROTEM</p> <p>Until bleeding ceases, continue regular blood monitoring, repeat and tailor MH Pack 2 (aims below)</p>	
Stand down	Contact the laboratory to confirm stand down when reached, document and debrief	
Limit Blood Loss	<p>Consider, <i>where appropriate</i>:</p> <ul style="list-style-type: none"> Direct pressure/ tourniquet use^A Topical haemostatic agents^A Pelvic binder if suspected fracture^A Early surgical intervention Cell salvage 1 unit of red cells = c.250mls of salvaged blood 	Aims for Therapy
		<p>Haemoglobin 80-100g/L If haemoglobin falling - give red cells</p> <p>Platelets >75x10⁹/L If <75x10⁹/L - give 1 adult dose (order if <100x10⁹/L) <i>Maintain platelets >100x10⁹/L if a traumatic brain injury (TBI) and consider increasing platelet threshold to >100x10⁹/L for ongoing haemorrhage^A</i></p> <p>PT/APTT ratio <1.5 If >1.5 - give FFP (15-20mls/kg)</p> <p>Fibrinogen >1.5g/L* If <1.5g/L* - give cryoprecipitate (2 pools) <i>*Maintain a fibrinogen >2.0g/L in pregnancy</i></p>

ED: Emergency department, Hb: Haemoglobin, FFP: Fresh frozen plasma, PT: Prothrombin time, APTT: Activated partial thromboplastin time, TEG: Thromboelastography, ROTEM: Rotational thromboelastometry

^A Spahn et al. The European guideline on management of major bleeding and coagulopathy following major bleeding and coagulopathy following trauma: fifth edition. Critical Care (2019) 23:98

^B Hunt et al. A practical guideline for the haematological management of major haemorrhage. British Journal of Haematology (2015) 170, 788-803

^C National Blood Transfusion Committee (2019) The appropriate use of O negative red cells. <https://www.transfusionguidelines.org/document-library/documents/nbtcc-appropriate-use-of-group-o-d-negative-red-cells-final-pdf> (last accessed: 17th Jan 2020)