MASSIVE TRANSFUSION IN OBSTETRICS & GYNAECOLOGY (CODE PINK)

1. AIM
   - To ensure timely and adequate availability and replacement of blood and coagulation factors in a woman with massive blood loss

2. PATIENT
   - Massive transfusion (MT) should be considered when a woman is receiving or has received greater than 3000mls (40mls/kg) crystalloid/colloid and 4 units of blood and has ongoing resuscitation needs, or a woman has an estimated blood loss ≥2 litres and ongoing bleeding. MT should be activated at 6 units of blood.

3. CLINICAL PRACTICE
   The important feature is EARLY notification of major blood loss or likely major blood loss, as there will be a delay between activation of MTP and delivery of fresh frozen plasma (FFP) of approximately 30 minutes.

Activation of the Massive Transfusion Protocol (MTP) (see flow chart)
   - Perform aggressive fluid/blood resuscitation and use active warming measures (i.e. fluid warmer and forced air warming device) to try to avoid hypothermia and acidosis.
   - Notify Blood Bank directly on ext 29145/6, once patient is identified to be at risk of MT. Notification is to be performed by anaesthetic registrar/obstetric registrar
   - Notify consultant obstetrician and consultant anaesthetist to attend. Consultant Anaesthetist is to assume the role of team leader.
   - Notify Nurse Manager (pg 44020).
   - Consider PACE call Tier 2 (777) stating “Massive blood loss” and relevant location
   - Communicate early with Surgical Emergency Team specialist (SET), particularly where hysterectomy or internal iliac ligation is likely.
   - Measure coagulation factors regularly according to MTP, including fibrinogen, BUT do not wait for results before ordering coagulation factor replacement.
   - Ensure communication with porters regarding pick-up of products is a priority in an MTP. If porter is unavailable Nurse Manager (pg 44020) is to be notified to arrange alternative reliable collection and delivery of products. Please provide an “Authority to Issue Blood Products” (pink) form labelled MTP 1 or MTP 2 with identifying patient data when collecting products.
   - Administer blood component therapy according to MTP, after the initial 4 units of packed cells (these may have been administered elsewhere), provided the initial haematological and coagulation screens are within normal limits (when available). The order and rate of administration will depend on supply and clinical impression of need and is the responsibility of the Anaesthetic consultant in consultation with the Haematologist. Component therapy administration may be altered, particularly in the event of abnormal initial haematological and coagulation values.
   - Consider the need to take to operating theatre for early surgical haemostasis/ EUA/ hysterectomy. Stopping bleeding must be addressed as priority
   - Consider Tranexamic acid (1g Tranexamic acid IV undiluted over 10-20 minutes), followed by an additional 1g dose 30 minutes later.
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- Discuss with the duty haematologist as required.
- Consider the role of radiological intervention (embolisation)

Recombinant Factor VIIIa (available from POWH blood bank ext. 29145/29146. Before calling blood bank approval must have been sought from the oncall haematologist AND an ‘Authority to issue blood products form’ completed).
  a. Refer to RHW protocol for indications for use – given only with the agreement of the on-call haematology consultant
  b. Dose 90 micrograms per kilogram. Give intravenously every 2-4 hours (maximum 2 doses). Ensure temperature, serum calcium, platelets and fibrinogen have been optimised prior to administering dose of Factor VIIIa.
- Consider additional abnormalities which will impact coagulation, e.g. pre-existing liver disease, malnutrition, anticoagulant treatment (e.g. aspirin, warfarin, clopidogrel, NSAIDS, heparin, LMWH, dabigatran, other oral anticoagulants, herbal therapies).
- Notify blood bank directly when decision made by senior team member to cease the MTP

Consultant in Charge Role

- Activate MTP by direct communication with Blood Bank technician / scientist (ext 29145/6)
- Ensure haematological & biochemical monitoring of replacement therapy and resuscitative efforts occurs approximately every 60 minutes during resuscitation.
- Assume responsibility for the order, rate and recording of component therapy replacement, guided by clinical impression and resuscitative endpoints.
- Cease the MTP by direct communication with the on-duty Blood Bank technician.
- Administer PRBC:FFP in 1:1 ratio. No other resuscitative fluids are required

Blood Bank/Haematology Role

- Supply initial 4 units packed red blood cells (PRBCs), 4 units FFP, 6 units Cryoprecipitate
- Once supplied, immediately enquire of requesting Medical Officer as to the need for MTP activation. If MTP activated, record activating Medical Officer’s name and dispense blood components as per MTP pack or as requested.
- Ensure urgent grouping and crossmatch of recipient’s blood.
- Notify on-call Haematologist / registrar, if required for further advice.

Massive Transfusion Protocol Pack

MTP Pack 1: 4 units PRBCs, 4 units FFP, 6 units Cryoprecipitate

Alternating with
MTP Pack 2: 4 units PRBCs, 4 units FFP, 1 pooled platelets

Consider additional:
- Platelets – if platelets < 50 X 10⁹/l
- Cryoprecipitate – if fibrinogen < 2g/l
- FFP – if PT, APTT prolonged and provided fibrinogen >2g/l
- PRBCs – if Hb< 80g/l (may vary in different clinical scenarios)
- CaCl – if Calcium <2.0mmol/L

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Haematological/biochemical monitoring

- FBC, EUC, LFT, calcium, PT/APTT/fibrinogen, ABG, Group/Xmatch initially.
- Repeat FBC, UEC, INR, APTT, fibrinogen, A/VBG every 60mins during resuscitation.

Resuscitative End Points for Massive Haemorrhage:

- INR < 1.5; PT < 16 seconds; APTT < 42 seconds.
- Fibrinogen > 2g/l.
- Platelets > 50 X 10^9/l.
- pH 7.35 - 7.45
- Core Temperature > 35.5° degrees centigrade.
- Base Deficit < negative -3.0.
- Poor prognostic indicators: SBP < 70, Temp < 34°, Base Deficit > -6, ph < 7.1. lactate >4/L, ionised calcium <1.1mmols/L

4. EDUCATIONAL NOTES

Principles of Coagulopathy Management in Massive Transfusion

- Priority must be given to correcting the triad of HYPOTHERMIA, ACIDOSIS and COAGULOPATHY. Enzymatic processes within coagulation are pH and temperature dependent. Therefore aggressive normalisation of the first 2 components aids correction of the third.

- Coagulation factors are often at inadequate levels in patients suffering non compressible or microvascular bleeds, despite normal APTT and INR. Once APTT and INR are abnormal, there is probably close to only 30-40 % of coagulation factor present. It is therefore prudent to be aggressive with FFP early – rather than waiting for an abnormal result as a trigger to replace coagulation factors.

- The endpoint of the coagulation cascades is fibrinogen being converted to fibrin. Coagulopathy will not tend to correct, even with adequate factor replacement, unless fibrinogen is adequately present. Cryoprecipitate is the appropriate choice for hypofibrinogenaemia.

- Platelets tend to approach inadequate levels only after transfusion of 8 – 10 units PRBC. Despite adequate levels, platelet function is affected by hypothermia and acidosis. Damage control resuscitation minimizing hypothermia and acidosis is therefore critical to survival.

5. RELATED POLICIES / PROCEDURES / CLINICAL PRACTICE LOP

- Post Partum Haemorrhage – Prevention and Management
- Escalation Policy – Operating Theatre Suite escalation For Surgical Emergency Team (SET)
- Escalation for Birthing Services
- Patient With Acute Condition For Escalation (Pace): Management Of The Deteriorating Adult & Maternity Inpatient
- Massive Transfusion Protocol (Mtp) Prince Of Wales Hospital, Business Rule
- Factor VIIa (Novoseven)
- Blood component management and Administration
- Blood products refusal in pregnancy
MASSIVE TRANSFUSION IN OBSTETRICS & GYNAECOLOGY (CODE PINK) cont’d

6. RISK RATING
   • High

7. REFERENCES
   • Modified from POW ICU Massive Transfusion policy, February, 2006. 

REVISION & APPROVAL HISTORY
Reviewed and endorsed Therapeutic & Drug Utilisation Committee 13/12/16
Approved Quality & Patient Safety Committee 19/3/15
Minor amendment April 2016
Amended August 2015
Reviewed March 2015
Reviewed and endorsed Maternity Services LOPs 2/12/14
Approved Quality & Patient Safety Committee 15/7/10
Reviewed and endorsed Therapeutic & Drug Utilisation Committee June 2010
Approved Quality Council 19/6/06

FOR REVIEW: FEBRUARY 2019
Massive Transfusion Protocol (MTP) Flow Chart

1. Review bleeding patient early – assess for MTP
2. Massive transfusion should be activated when 4 units of blood is given or likely to be given or >=2000mL blood loss and ongoing bleeding
3. Control bleeding – call in relevant consultants: Obstetrician / Surgical Emergency Team specialist and Anaesthetist
4. Consultant Anaesthetist assumes role of Team Leader
5. Warm patient- use forced air warming device, warm fluids and warm room. Check temperature

DAMAGE CONTROL

TEAM ACTIONS

1. Contact Blood Bank on Ext. 29145/6 and state “Please activate MTP”
2. Call 777 to activate the PACE Tier 2 stating “Massive blood loss” in relevant location
3. Collect FBC, UEC, LFT, Ca++, PT, INR/APTT, Fibrinogen, ABG, G/XMatch
4. Nominate a runner to collect/deliver blood, with completed pink form. Page manager 44020 if problems
5. Repeat all bloods every 60 minutes

BLOOD BANK ACTIONS

1. Send Pack 1: 4 units RBC, 4 units FFP, 6 units Cryoprecipitate
2. Send Pack 2: 4 units RBC, 4 units FFP, 1 pool platelets
3. Ensure urgent group & Xmatch,
4. Notify Haematologist/reg as required

If still bleeding Consider Additional Products

1. Remember that all blood results are 30 to 60 minutes old
2. Team Leader to consider speaking personally to the Haematologist
3. Speak to Surgical Emergency team specialist personally, if not already present in Operating Theatre
4. Consider Tranexamic acid 1g IV over 10-20 minutes followed by an additional 1g 30 minutes later.

If bleeding continues, obtain Consultant Haematologist approval for NovoSeven®

1. Consider NovoSeven® after 10 units RBC90 microgram/kg bolus dose with second dose 2 hours later. Kept in Operating Theatre anaesthetic stockroom locked cupboard
2. Team to notify Blood Bank at cessation of MTP