PROTOCOL BASED MANAGEMENT IN MASSIVE BLOOD LOSS

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DEFINITIONS OF MASSIVE BLOOD TRANSFUSION

- Replacement of one or more blood volume(s) within 24 hrs.
- Replacement of >50% of the blood volume in 3 hrs
- Blood loss >150ml/min with hemodynamic instability with need of blood transfusion

INDICATIONS

Acute profuse bleeding

PRINCIPLES OF MANAGEMENT IN MASSIVE BLOOD LOSS

- Restoration of blood volume
- Maintain oxygen carrying capacity
- Treatment of surgical source of bleeding
- Correction of coagulopathy
- Prevention of hypothermia
- Haematological monitoring

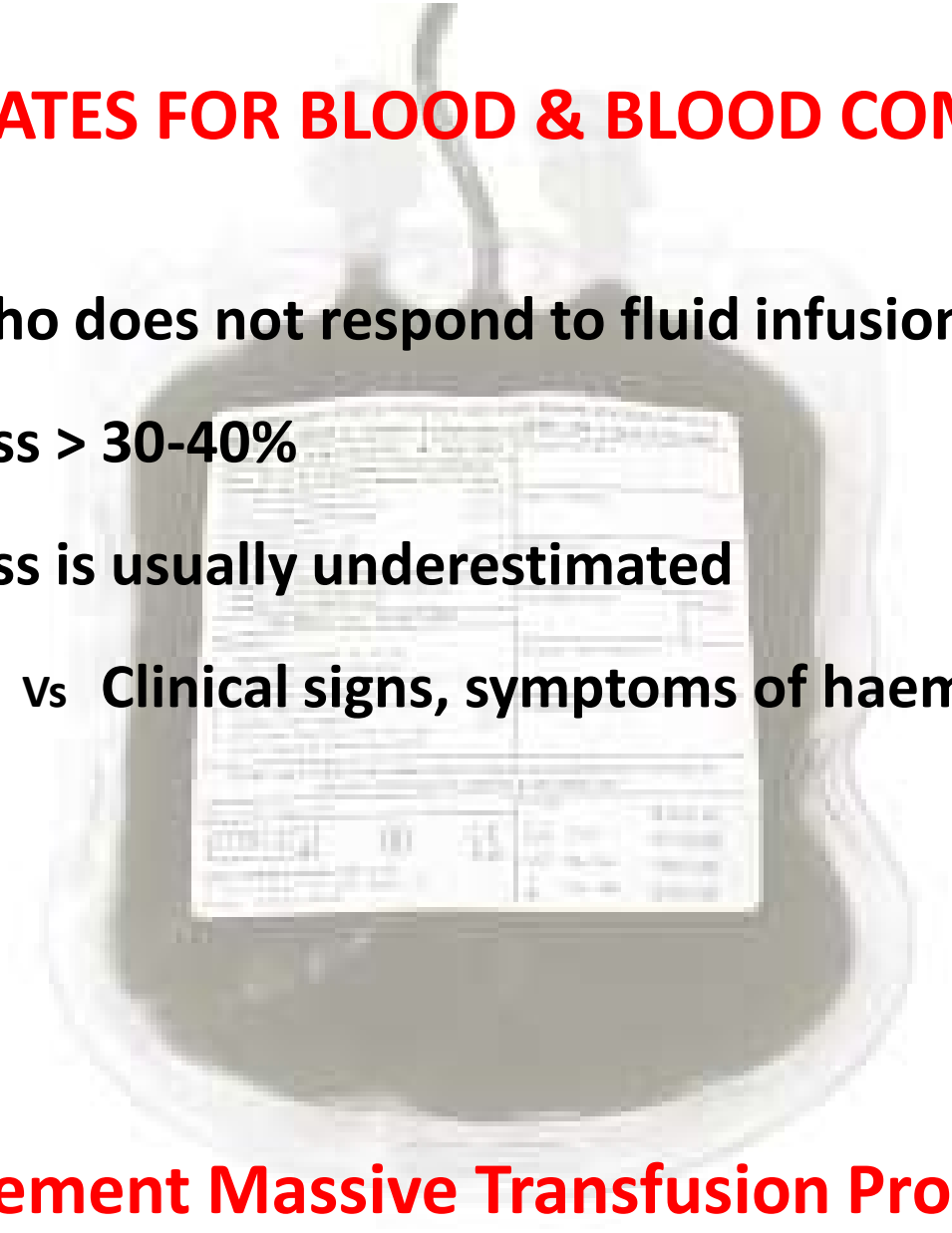
RESTORATION OF CIRCULATING VOLUME

- Rapid infusion of crystalloids or colloids
- Ringer Lactate is preferable
- Ratio of crystalloids is 3:1 to blood lost
- Monitoring
  - Haemodynamic response
  - Tissue perfusion

Response to 2000ml of crystalloids ?

- Yes – No BT
- No – Proceed towards BT

CANDIDATES FOR BLOOD & BLOOD COMPONENTS



- Those who does not respond to fluid infusion
- Blood loss > 30-40%
- Blood loss is usually underestimated
- Hb, HCT Vs Clinical signs, symptoms of haemorrhage

Recovery ?

Yes – Stop

No – Implement Massive Transfusion Protocol (MTP)

UPON IMPLEMENTATION OF MTP

Transfusing Unit :

1. Degree of urgency for transfusion immediately notified to Blood Bank Director / Head
2. Requisition form must mention time of requirement and should be labeled in bold as 'MTP'
3. Rapid transfusion via multiple access
4. Transfusion record

Blood Bank Director / Head :

1. Alternative notification from blood bank
2. Direct blood bank to issue necessary blood &
3. Cross match omission approval

Responsibilities of Blood Bank :

- **Immediate preparation of "first transfusion package"**
  - **6 units of PRBCs**
  - **6 units of FFPs**

- **Delivery of "first package" as per time mentioned or within 35 minutes of the initial order**

IF URGENT – ABO gr, Rh typing,
crossmatch by
rapid spin tube / LISS / gel method ….
followed by delivery

IF VERY URGENT – ABO gr, Rh typing,
delivery
followed by
crossmatch by
rapid spin tube / LISS / gel method ….

If extremely urgent –

Delivery of Uncrossmatched O gr PRBCs & AB gr FFP

- Males and postmenopausal females – Rh (D) Pos / Neg
- Pre-menopausal females – Rh (D) Neg

- Consent of the clinician
- **Un-crossmatched blood** on compatibility report and label of the blood bag
- Simultaneous work-up of patient's sample

- **"Second Transfusion Package"**

  - 6 units of PRBCs
  - 6 units of FFPs
  - 1 SDP or 6-8 units RDPs

- **"Third Transfusion Package"**

  - 6 units of PRBCs
  - 6 units of FFPs
  - 10 units of cryoprecipitate

- **"Packages" every 35 minutes until 'MTP' on**

  - All packages contain PRBCs & FFPs
  - Even number packages contain additional platelets (2,4,6,...)
  - Odd number packages contain additional cryoprecipitates except first (3,5,7, ...)

Haematological Monitoring:

Laboratory investigations	Target value
1. Haemoglobin (haematocrit)	10g/dl (0.33)
2. Platelet count	> 50,000/cmm
3. Prothrombin time (PT)	< 1.5 x control
4. APTT	< 1.5 x control
5. Fibrinogen	> 80mg/dl
6. Thromboelastography	

Some other laboratory tests

1. Potassium
2. Ionized Calcium
3. ABG for acid base status
4. Central venous oxygen saturation / lactate

TARGETED BLOOD COMPONENT THERAPY

- **Platelets concentrates:**

  - Pool of 4-6 RDPs / 1 SDP
  - 50,000/cmm when platelet function normal
  - 100,000/cmm in multitrauma /CNS injury
  - Platelet dysfunction in cardiac bypass surgery

- **Fresh Frozen Plasma:**

  - FFP in dose of 15ml/kg body weight
  - Coagulation abnormalities

- **Cryoprecipitate:**

  - Fibrinogen < 50mg/dl
  - Factor VIII

❖ **Fibrinolysis – Antifibrinolytic agent**

RAPID TRANSFUSION

1. Large internal bore of the cannula (14gauge)
2. Viscocity of blood reduced by warming
3. Venous spasm
4. Positive pressure


INFU-SURG
Pressure Infuser
LATEX FREE
1000 ml
MAINTAIN PRESSURE
Ethnox
International
10/10/2015


LEVEL 1
°C
HOTLINE
Fluid Warmer
10/10/2015

COMPLICATIONS OF MASSIVE TRANSFUSION

Immediate:

1. Inadequate Resuscitation
   - Lactic acidosis
   - SIRS
   - DIC
   - Multiorgan dysfunction

2. Overzealous Resuscitation
   - TACO
   - Interstitial oedema
   - Dilutional Coagulopathy

3. Hypothermia

- Core body temp <35 °C
- Coagulopathy and cardiac arrythmias

4. Acidosis

5. Coagulopathy

6. Citrate toxicity and hypocalcemia

- ↓ cardiac output, bradycardia and arrythmias

7. Hyperkalemia

Late Complications:

1. TRALI
2. SIRS
3. Sepsis
4. Thrombotic complications

Concluding Remarks

1. Implementation of Massive Transfusion Protocol (MTP) reduces judgmental errors and makes management more objective & specific , also creating smooth co-ordination between issuing unit & transfusing unit

2. Protocol based management of massive blood loss is a team effort and each hospital should formulate MTPs as per their need and resources

3. Despite the risks , application of early , aggressive transfusion support improves overall survival in this severely injured population that would otherwise have poor prognosis


THANK YOU !!!