MASSIVE TRANSFUSION

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Massive transfusion:

- Is defined as replacement of the patient's total blood volume by stored blood in less than 24 hrs.
- Replacement of more than 50% of the patient's blood volume in 3 hrs.
- Replacement of blood loss more than 150 ml/min in an adult.
- In children, it is defined as transfusion of more than 40 ml/kg.
- Massive transfusion implies a single transfusion greater than 2500 ml/5000 ml transfused over a period of 24 hrs.
- Involves selection of appropriate amounts & types of blood components to be administered.
INDICATIONS OF MASSIVE TRANSFUSION

1. Traumatic
   - Haemorrhagic shock: acute blood loss of more than 20% blood volume in adults or 10-15% in children & pregnancy.
   - Severe Trauma.

2. Non traumatic
   - Exchange transfusion
   - Cardiopulmonary bypass
   - GIT bleeding
   - APH – Abruptio placenta, Placenta previa
   - PPH – Atonic uterus, Inversion of uterus.
   - Anemia
MASSIVE TRANSFUSION PROTOCOL

- It is the responsibility of all members of the resuscitation team.
  - Standardized lab monitoring for clinical crisis management.
- To provide optimal blood component therapy.
- Maintain intravascular volume.
- Infusion of RBC, Plasma & Platelets in ratio without waiting for lab results.
MASSIVE TRANSFUSION PROTOCOL

- Avoidance of hypothermia
- Normalization of acid base balance.
- Management of preexisting haematological or coagulative disorders.
- Maintain normal ionized Ca level.
- Assessment of ongoing blood loss.
When HB level is < 7g/l, HCT 21% with acute blood loss, transfusion is indicated.

In > 80 yrs old – PCV of 30-33% is the trigger.

The use of only Hb as a trigger for transfusion should be avoided.

Decision for RBC transfusion should be based on individual volume status, evidence of shock, duration & extent of anemia & cardiopulmonary physiologic parameters.
LOSS OF 1st HALF OF CBV

Circulating volume maintained by:

- Crystalloids, colloids, plasma proteins, Hydroxyethyl starch, Dextran
- Packed RBC
- Maintain CVP 5-10cm of H2O
LOSS OF SECOND HALF OF CBV

Dilutional coagulopathy sets in:

- Treatment with FFP
- Follow up PT, APPT
- Packed RBC
- Maintain P C V at 30%
LOSS OF COMPLETE CBV

- Treatment with FFP & PACKED RBC
- Maintain P C V at 30%

- Dilutional thrombocytopenia sets in. Treatment with Platelets.
The blood bank should be informed of the need for massive transfusion in a patient & the urgency of transfusion.

Within 5 mins of receipt of sample (extreme emergency) – O Rh (D) negative blood.

Rh (D) negative women of child bearing age, Rh(D) negative blood supplied.

Within 15 mins of receipt of sample (urgent cases) – ABO & Rh(D) Type specific cross matched blood.

Within 45 mins of receipt of sample – Type specific cross matched blood.
# Suggested ABO Group selection order for Transfusion of RBC’S

<table>
<thead>
<tr>
<th>Recipient</th>
<th>1st choice</th>
<th>2nd choice</th>
<th>3rd choice</th>
<th>4th choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABO Group</td>
<td></td>
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<td>AB</td>
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### STRATEGY FOR MASSIVE TRANSFUSION

<table>
<thead>
<tr>
<th>Condition</th>
<th>Treatment</th>
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<tbody>
<tr>
<td>Low blood vol.</td>
<td>Crystalloids or colloids</td>
</tr>
<tr>
<td>Low O₂-Carrying capacity</td>
<td>RBCs</td>
</tr>
</tbody>
</table>

Hemorrhage owing to:

- Thrombocytopenia
- Coagulopathy

Plat. Concentrates
FFP, cryoprecipitate.
(if Fib. Is low)

*If these occur simultaneously, whole blood may be indicated.
LABORATORY INVESTIGATIONS

<table>
<thead>
<tr>
<th>Investigations</th>
<th>Target value</th>
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<tbody>
<tr>
<td>Hb/ HCT</td>
<td>10g/dl, 32%</td>
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<tr>
<td>Platelet count</td>
<td>&gt;50 x 10^9/l</td>
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<tr>
<td>Prothrombin time</td>
<td>&lt; 15 secs</td>
</tr>
<tr>
<td>PTT</td>
<td>&lt; 1.5 sec</td>
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<tr>
<td>Fibrinogen</td>
<td>&gt; 0.8g/l</td>
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<tr>
<td>Blood gases</td>
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<tr>
<td>Thromboelastography</td>
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COMPLICATIONS OF MASSIVE TRANSFUSION

• “IT IS OFTEN THE UNDERLYING CAUSE AND CONSEQUENCES OF MAJOR HAEMORRHAGE, THAT RESULT IN COMPLICATIONS, RATHER THAN THE TRANSFUSION ITSELF”
1. **Acidosis**: result of inadequate treatment of hypovolemia than due to transfusion.

2. **Hyperkalemia**: stored blood results in a small increase in extracellular K+ concentration which will increase the longer it is stored.

3. **Citrate toxicity & hypocalcemia**: are rare, due to large volume transfusion of whole blood.
   
   Iv 10% calcium gluconate 10ml with every litre of transfused blood.

- Dilution of coagulation factors & platelets will occur following administration of large volume of replacement fluids
Management:
if PT is prolonged - ABO compatible FFP
If APTT prolonged, factor viii/ fibrinogen concentrate is recommended.

5. Depletion of platelets:
Platelet function is lost during storage of whole blood.
Management:
Give PC only when patient shows clinical signs of microvascular bleeding or platelet count falls below 50x10⁹/l
6. **Hypothermia:**
Rapid administration of large volumes of blood or replacement fluids directly from refrigerator can cause reduction in body temperature.

7. **DIC:** May develop during the course of massive blood transfusion. It can also be due to the underlying reason for transfusion such as:
   a. Hypovolemic shock
   b. Trauma
   c. Obstetric complications

**Management** - treatment of underlying cause.
8. Air embolism

9. TRALI (Transfusion induced lung injury)

10. GVHD (Graft versus host disease)

11. MICRO AGGREGATES
Save a life
Give Blood
Thank U