Emergency and Massive Transfusion

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Nov 2021

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- Define Massive Transfusion

  -List the type of shock

- Estimated blood loss and fluid resuscitation

- Indication for red cell, platelets and plasma in massive transfusion

Definition

- **Replacement total volume in 24 hrs**
- **50% in 3 hrs**
- **At least 10 unit in 24 hrs**

Massive Transfusion clinical setting

-Trauma

-Surgery (liver , cardiovascular, etc.)

- GI bleeding
- Obstetrics

Types of shock

- **Cardiogenic – MI cardiomyopathy**
- **Obstructive – Tamponade**
- **Distributive – Sepsis, Anaphylaxis**
- **Hypovolemic - Hemorrhage**

Hemorrhagic shock

Class I

<750 ml blood loss, 10 – 15 %

Pulse < 100 BP normal

Pulse pressure normal or increased

Respiratory Rate 14 – 20

Urine Output > 30 ml/hr

CNS : Slightly Anoxia

Fluid Replacement – Crystalloid

Class II

750-1500 ml 15%-30% Blood Loss

Pulse > 100 BP Normal

Pulse pressure Decreased

Respiratory Rate 20 – 30

Urine Output 20 -30 ml/hr

CNS: Mildly Anxious

Fluid Replacement Crystalloid

Class III

- **1500 -2000 ml 30% - 40% Blood Loss**
- **Pulse >120 BP Decreased**
- **Pulse Pressure Decreased**
- **Resp Rate 30 – 40**
- **Urine Output 5 – 15ml /hr**
- **CNS: Anxious and Confused**
- **Fluid Replacement : Crystalloid & Blood**

Class IV

- **>2000 ml 40% or more Blood Loss**
- **Pulse > 140 BP Decreased**
- **Pulse Pressure Decreased**
- **Res Rate > 35**
- **Urine Output Negligible**
- **CNS : Confused & lethargic**
- **Fluid replacement: crystalloid and Blood**

Laboratory Value to Monitor in Trauma

- **Hgb/Hct**
- **INR/PTT**
- **Fibrinogen**
- **Platelet Count**
- **Blood Gases**
- **Electrolytes**

Blood Products

- **RBC**
- **Plasma（ FFP ）**
- **Platelets**
- **Cryoprecipitate**

Blood Orders

- **Patient Blood sample Available**

  Type & Screen

  Type & crossmatch

Patient Blood sample Not Available

Emergency (universal Donor)

Type & screen

- **Initial sample gets ABO , Rh type and antibody screen**

  40 min

- **When blood is needed an immediate spin crossmatch is done**

  10 – 15 min

Type & Crossmatch

- **- Initial sample gets ABO Rh type, Antibody screen and crossmatch**

  60 min

- When blood is needed it has already been fully tested

5 min

Platelets & Massive Blood Loss

- **Massive Transfusion patient resuscitated with RBC , crystalloid and FFP**
- **After 20 unit 75% showed Plt count <50000**
- **More platelets became physiologically available**
- **Possible splenic reservoir**
- **Delusional thrombocytopenia**

- 1.5% of trauma patient require platelets
- 1.43% of blunt injury patient
- 2.3% of penetrating injury patient

- FFP if INR > 1.5 or PT> 1.5 X Normal
- Platelet if count < 50000 – 100000
- Cryoprecipitate if Fibrinogen < 100mg /dl
- (Each unit contain ~ 250 mg)

Massive Exsanguination
"Triad of Death"

- **Acidosis**
- **Hypothermia**
- **coagulopathy**

Massive Transfusion Protocol

- **Mortality in massive transfusion is high up to 57%**

  patient transfused >50 RBC unit

Coagulopathy is present early

-A resent retrospective review shown an increase in survival with

a 1:1:1 ratio of plasma : platelets : RBC

- New trend to give RBC ,FFP and Plt simulate whole blood

  -6 units RBC adult (250 ml/unit)

- 6 units FFP (~ 250ml/unit)

- 6 units platelet concentrate (50 ml/ unit)

Potential Adverse Effects of M.T

- **Metabolic Disturbances**
- **Transfusion Reaction**
- **Infectious Disease Risks**
- **Citrate toxicity**
- **Hyperkalemia**
- **Decreased oxygen delivery**
- **Hypothermia**