Hypovolemic Shock

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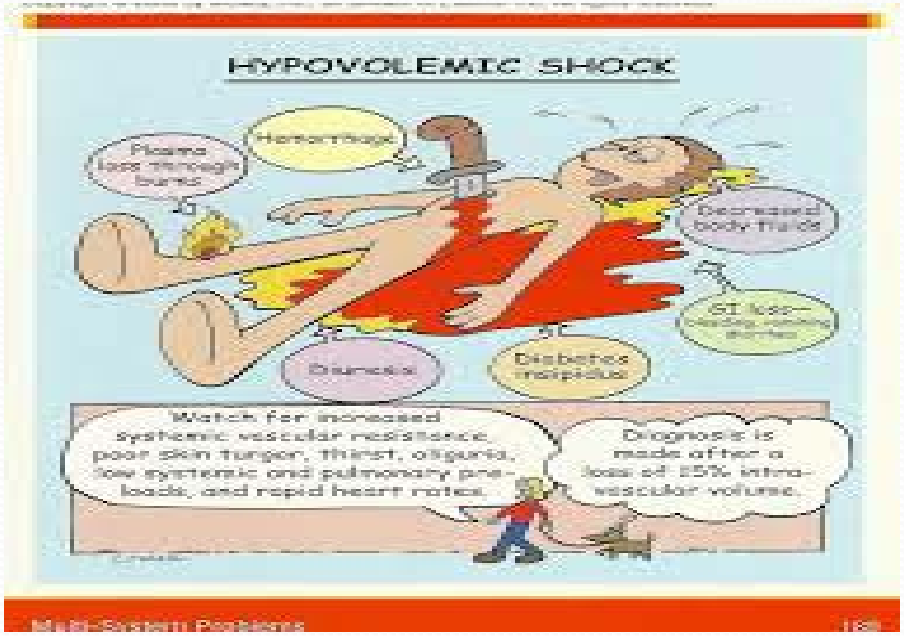
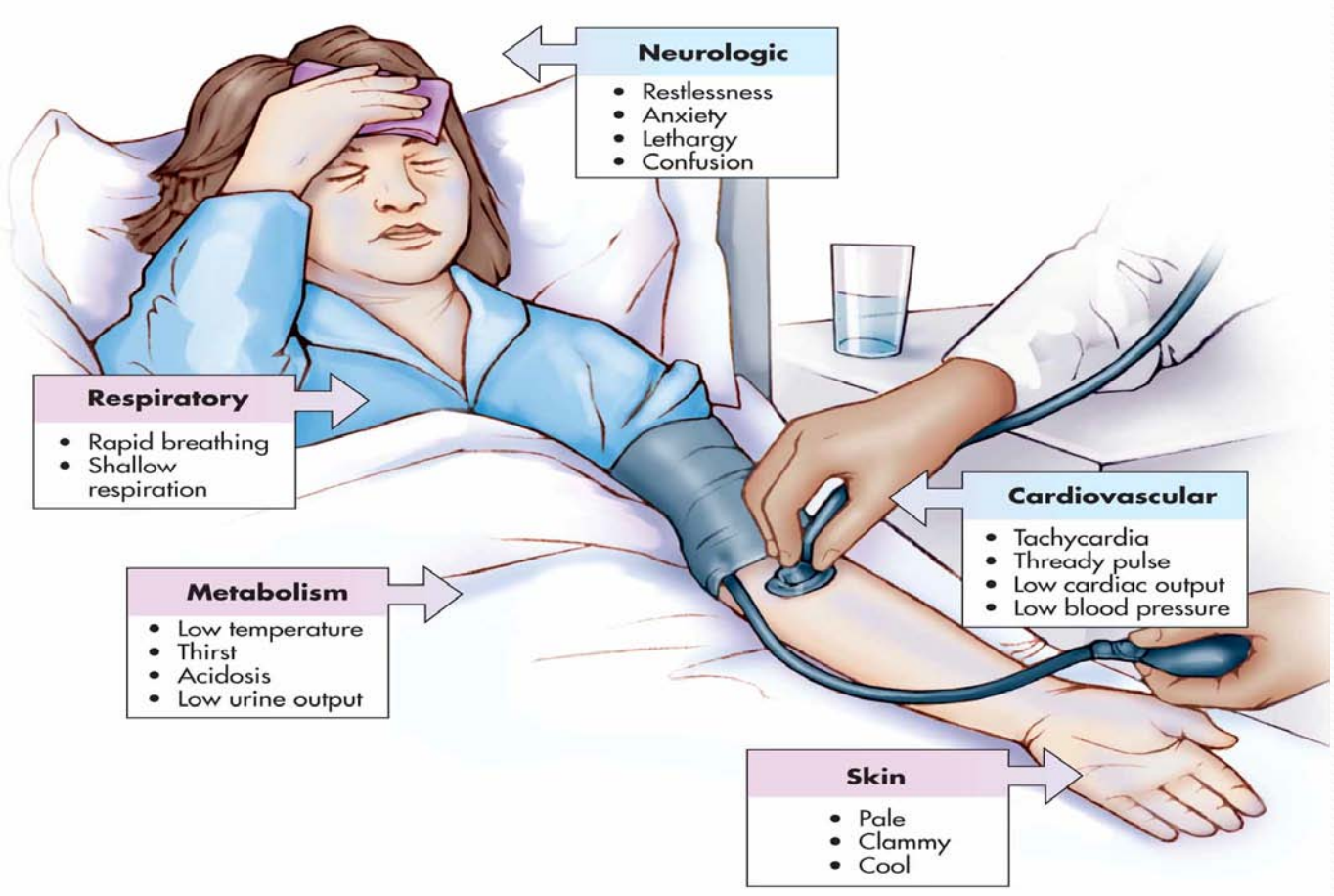

HYPOVOLEMIC SHOCK
Plasma loss through burns
Hemorrhage
Decreased body fluids
Diabetes insipidus
Watch for increased systemic vascular resistance, poor skin turgor, thirst, oliguria, low systemic and pulmonary pre-loads, and rapid heart rates.
Diagnosis is made after a loss of 15% intra-vascular volume.

- Hypovolemic shock may be subdivided into four classes based on presenting signs and symptoms


Neurologic
Restlessness
Anxiety
Lethargy
Confusion
Respiratory
Rapid breathing
Shallow respiration
Cardiovascular
Tachycardia
Thready pulse
Low cardiac output
Low blood pressure
Metabolism
Low temperature
Thirst
Acidosis
Low urine output
Skin
Pale
Clammy
Cool

Class I hypovolemia

- Blood losses of less than 15% -<750 cc of the total blood volume
- no measurable changes in bloodpressure resting pulse, respiratory rates
- Urine output >30cc
- Mental status :Normal

class II hypovolemia

- Blood Loss 750-1500cc –(15-30 %)
- the most consistent clinical finding is tachycardia
- increase in heart rate >100
- BP : Normal (Tilt +)
- RR :20-30
- oliguria is a common manifestation of hypovolemic shock 20-30 cc
- Mental status : Anxious

class III hypovolemic shock

- blood loss equivalent to 30% to 40% (1500 -2000cc) of the plasma volume
- HR >120
- BP :Decreased
- RR :30-40
- Urinary out Put : 5-15 cc
- Mental status :confused

Class IV hypovolemia

- Blood Loss >2000 cc - >40 %
- HR >140
- BP :Decresed
- RR ; 35
- Urinary Out put :Anuric
- Mental Status :Lethargic

- losses of 20% to 30% of their blood volume may ultimately require RBC replacement for immediate resuscitation, crystalloid is usually adequate

- . Crystalloid replacement is guided by the 3:1 rule: 300 mL crystalloid per 100 mL of blood (plasma volume) loss

- In normal adults, approximately two thirds of the total body water is intracellular, and the remaining one third in the extracellular fluid compartment is disproportionately distributed between the interstitial and intravascular compartments in a 3:1 ratio

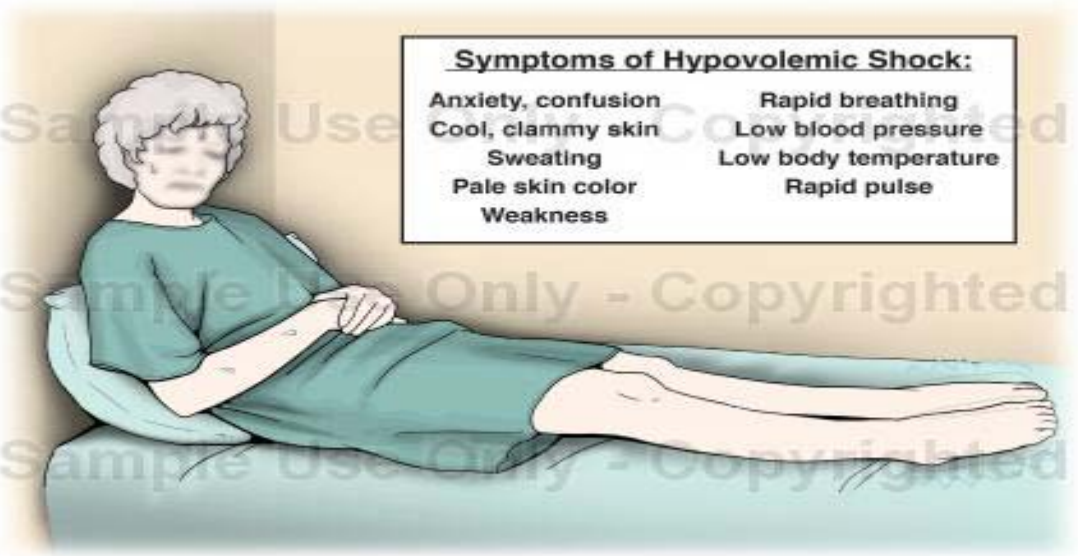
- Colloid oncotic pressure, the effective osmotic pressure between the intravascular and interstitial compartments, is dependent ontranscapillary hydrostatic and oncotic pressures, and the relative permeability of capillary membranes that divide these spaces

- Because of these forces, within 24 hours of intravenous crystalloid administration, approximately two thirds will disperse into the interstitial compartments.

- Although the principal determinant of oxygen delivery is hemoglobin, tissue oxygenation remains adequate as long as intravascular volume is adequate, and cardiac output appropriately increases despite major reductions in hemoglobin

- This is because oxygen delivery is not dependent on hemoglobin concentration alone

Hypovolemic Shock



Septic Shock

- Sepsis represents a continuum from the preshock phase or early hyperdynamic phase to the late shock phase. The early hyperdynamic phase is characterized by a normal or slight decrease in blood pressure and tachycardia. The slight decrease in systemic vascular resistance (SVR) is offset by a marked increase in cardiac output

- . In contrast, the classic features of late shock includes low SVR and low cardiac output, hypoperfusion, and lactic acidosis

MANAGEMENT OF SHOCK :

- ORDER

- O: Oxygenate (assure adequate airway, tidal volume, 6–8 L/min of oxygen by closed mask, nasal catheter, or endotracheal tube)
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- R: Restore circulatory volume (one or more intravenous lines, assess volume loss and replace with crystalloid; administer whole blood or packed red blood cells; with severe hemorrhage or disseminated intravascular coagulation, replace clotting factors as indicated; sterile packing until hemodynamic stability is restored; central venous monitoring; obtain cultures if indicated with intravenous access)

- D: Drug therapy
- pharmacologic support of blood pressure
- antibiotics
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- E: Evaluate response to therapy (identify etiology of shock; volume replacement based on right heart catheterization or central venous monitoring; reevaluate hemoglobin, coagulation profiles, serum chemistries [potassium, phosphate, acid–base, PaO_2, creatinine]; modify treatment plan/pharmacologic therapy; obtain culture results; radiographic studies—abdominal films, chest x-ray, CT scan, ventilation–perfusion scan, as indicated by suspected underlying condition

- R: Remedy the underlying cause (surgical control of bleeding using selective interventional embolization or surgery; antibiotic therapy based on culture results)

Whole Blood and Blood Components

- . Compatible whole blood is ideal for treatment of hypovolemia from catastrophic acute hemorrhage
- It has a shelf life of 40 days, and 70 percent of the transfused red cells function for at least 24 hours following transfusion.

- One unit raises the hematocrit by 3 to 4 volume percent. Whole blood replaces many coagulation factors, especially fibrinogen, and its plasma expands hypovolemia. Importantly, women with severe hemorrhage are resuscitated with fewer blood donor exposures than with packed red cells and components.

Packed Red Blood Cells

- Cells packed from a unit of whole blood have a hematocrit of 55 to 80 volumes percent, depending on the method used for preparation and storage. A unit of packed red blood cells contains the same volume of erythrocytes as whole blood and also raises the hematocrit by 3 to 4 volumes percent. Packed red blood cell and crystalloid infusion are the mainstays of transfusion therapy for most cases of obstetrical hemorrhage

Dilutional Coagulopathy

- When blood loss is massive, replacement with crystalloid solutions and packed red blood cells usually results in a relative depletion of platelets and soluble clotting factors. This leads to a dilutional coagulopathy that clinically is indistinguishable from disseminated intravascular coagulopathy

Platelets

- When needed, it is preferable to transfuse platelets obtained by apheresis from one donor. In this scheme, the equivalent of platelets from six individual donors is given as a one-unit onedonor transfusion. Such units generally cannot be stored more than 5 days.

- If single-donor platelets are not available, random donor platelet packs are used. These are prepared from individual units of whole blood by centrifugation, and then resuspended in 50 to 70 mL of plasma. One unit of random donor platelets contains about 5.5 1010 platelets, and 6 to 10 such units are generally transfused. Each unit transfused should raise the platelet count by 5000/L

Fresh-Frozen Plasma

- it is often used in the acute treatment of women with consumptive or dilutional coagulopathy as discussed previously. Fresh-frozen plasma is not appropriate for use as a volume expander in the absence of specific clotting factor deficiency. It should be considered in a bleeding woman with a fibrinogen level below 100 mg/dL or with abnormal prothrombin and partial thromboplastin times

Cryoprecipitate

- This component is prepared from fresh-frozen plasma. Cryoprecipitate is composed of factor VIII:C, factor VIII:von Willebrand factor, 200 mg of fibrinogen, factor XIII, and fibronectin, all combined in less than 15 mL of the plasma from which it was derived


THANK
YOU