

# Hemorrhage

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## Introduction

- Hemorrhage = Bleeding
- Treated by arresting bleeding
- Types:
  - *Arterial*: bright red, spurting as jet
  - *Venous*: dark red, steady & copious flow
  - *Capillary*: bright red, oozing

## Types

- **Primary**: occurring at the time of injury or operation.
- **Reactionary**: occurring within 24 hours of surgery, due to slipping of ligature, dislodgement of clots, cessation of reflex vasospasm
- **Secondary**: usually occurs after 6-7 days due to infection and sloughing of part of the wall of an artery.

*Predisposing factors*: pressure of drainage tube, bone fragment, ligature at infected area, cancer

## Types.....

- **External**: visible, revealed
- **Internal**: invisible, concealed; eg; liver/ spleen injury, femur/ pelvic bone #.

## Measurement of blood loss

- Blood volume: infants: 80-85 ml/Kg  
adults: 65-75 ml/ Kg  
~ 5 litres
- Blood clots of clenched fist = 500ml
- Swelling In closed #: tibia- 500-1500 ml  
femur: 500- 2000 ml
- Swab weighing: wet wt. – dry wt.  
1 gm = 1 ml
- Hemoglobin is poor indicator of degree of blood loss

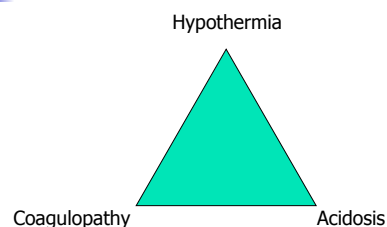
## Degree of hemorrhage

<b>Traditional classification of hemorrhagic shock</b>	
<i>Class of hemorrhagic shock</i>	<i>Blood volume lost as % of total blood</i>
Class I	< 15%
Class II	15 -30 %
Class III	30 – 40%
Class IV	>40%

## Pathophysiology

- Bleeding → hypovolemia → anaerobic metabolism & lactic acidosis → coagulopathy.
- Reduced perfusion to gut & muscle bed → less heat generation by muscle → hypothermia → coagulopathy
- Final result → further hemorrhage → vicious cycle
- Thus, treat bleeding by arresting it but not just supplementing fluids

## Lethal Triad



## Treatment

### Principles:

1. Resuscitation/ Restore blood volume
2. Stop further bleeding
  - Pressure & packing
  - Position & rest
  - Operative procedures

## Resuscitation

- ABC
- Large bore needle
- Intravenous fluids: colloid, crystalloid
- Blood transfusion

## Pressure & packing

- Gauze, tetra packing,
- Bandaging,
- Pinching of nose,
- Sengstaken tube in esophageal varices

## Position & rest

### Use of gravity to reduce bleeding

- Leg elevation in varicose vein surgery
- Trendelenburg position in prostate surgery
- Reverse Trendelenburg position in thyroid surgery
- Total bed rest in liver/ spleen injury



## Operative procedure

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- Suturing,
- Vessel ligation, transfixation,
- Vessel repair,
- Coagulation,
- Gelatin, fibrin glue,
- Adrenaline soaked gauze,
- Splenectomy, partial excision of organ.