

# Haemorrhage (Bleeding)

أ.م.د. مقداد فؤاد

أختصاص جراحة عامة

# Haemorrhage can be classified as following:

## 1. According to the type of vessel bleeding into:

- Arterial
- Venous
- Capillary

## 2. According to the timing of bleeding into:

- Primary
- Reactionary
- Secondary

## 3. According to the site of bleeding into:

- External bleeding
- Internal bleeding

## Arterial haemorrhage

- ✓ Bright red blood,
- ✓ Spurting as a jet
- ✓ Rises and falls in time with the pulse.
- ✓ In protracted bleeding, and when large quantities of intravenous fluids other than blood are given, it can become watery in appearance.

# Venous haemorrhage

- ✓ darker red,
- ✓ steady and copious flow.
- ✓ The colour darkens still further from excessive oxygen desaturation when blood loss is severe, or in respiratory depression or obstruction.
- ✓ Blood loss is rapid when large veins are opened, e.g. common femoral or jugular.
- ✓ Venous bleeding can be under increased pressure as in ruptured varicose veins.
- ✓ Portal vein pressure is high enough to cause rapid blood loss, especially in portal hypertension with oesophageal varices.

## Remember

**Pulmonary artery** haemorrhage is dark red (venous blood) , whereas bleeding from the **pulmonary veins** is bright red (oxygenated).

# Capillary haemorrhage

- Capillary haemorrhage is bright red, often rapid ooze.
- If continuing for many hours, blood loss can become serious, as in haemophilia.

# Primary haemorrhage

Primary haemorrhage occurs at the time of injury or operation.

# Reactionary haemorrhage

Reactionary haemorrhage may follow primary haemorrhage within 24 hours (usually **4—6 hours**) and is mainly due to:-

- 1) Rolling ('slipping') of a ligature,
- 2) Dislodgement of a clot
- 3) Cessation of reflex vasospasm.

## **The precipitating circumstances are:**

- 1) Increase blood pressure and the refilling of the venous system on recovery from shock state
- 2) restlessness, coughing and vomiting which raise the venous pressure (e.g. reactionary venous haemorrhage within a few hours of thyroidectomy).

## **Secondary haemorrhage**

Secondary haemorrhage occurs after **7—14** days, and is due to infection and sloughing of part of the wall of an artery.

### **Predisposing factors are :-**

1. pressure of a drainage tube,
2. fragment of bone,
3. ligature in an infected area or cancer.
4. complication of arterial surgery and amputations.

It is heralded by 'warning' haemorrhages, which are bright red stains on the dressing, followed by a sudden severe haemorrhage which may be fatal.

# External haemorrhage

External haemorrhage is visible, revealed haemorrhage.

# Internal haemorrhage

- Internal haemorrhage is invisible, concealed haemorrhage.
- Internal bleeding may remain concealed as in ruptured spleen or liver, fractured femur, ruptured ectopic gestation or in cerebral haemorrhage.
- Concealed haemorrhage may become revealed as in haematemesis or melaena from a bleeding peptic ulcer, as in haematuria from a ruptured kidney, or via the vagina in accidental uterine haemorrhage of pregnancy.

## Measurement of acute blood loss

Assessment and management of blood loss must be related to the pre-existing circulating blood volume, which can be derived from the patient's weight:

- Infant 80—85 ml/kg;
- Adult 65—75 ml/kg.

## Methods of measuring blood loss

- ***Blood clot:*** The size of a clenched fist is roughly equal to 500 ml.
- ***Swelling in closed fractures:*** Moderate swelling in closed fracture of the tibia equals 500—1500 ml blood loss. Moderate swelling in a fractured shaft of femur equals 500—2000 ml blood loss.

- **Swab weighing.** In the operating theatre, blood loss can be measured by weighing the swabs after use and subtracting the dry weight. The resulting total obtained ( $1\text{ g} = 1\text{ ml}$ ) is added to the volume of blood collected in the suction or drainage bottles.
- In extensive wounds and operations, the blood loss is grossly underestimated, due to evaporation of water from the swabs before weighing each batch

- Blood, plasma and water are also lost from the vascular system because of evaporation from open large wounds, sweating and expired water via the lungs.
- Indeed, for operations such as radical mastectomy or partial gastrectomy it may be necessary to multiply the swab weighing total by a factor of **1.5**.
- For prolonged surgery via larger wounds, as in abdominothoracic or abdominoperineal operations, the total measured may need to be multiplied by **2**.

## *Haemoglobin level*

- This is estimated in g/100 ml (g/dl), normal values being 12—16 g/100 ml (12—16 g/dl).
- There is no immediate change in haemorrhage, but after some hours the level falls by influx of interstitial fluid into the vascular compartment in order to restore the blood volume.

## ***Measurement of central venous pressure***

- Through inserting a catheter into the superior vena cava via the internal jugular or subclavian vein.
- Normal central venous pressure is up to 5 cm water

	<b>CLASS 1</b>	<b>CLASS 2</b>	<b>CLASS 3</b>	<b>CLASS 4</b>
<b>Blood loss(ml)</b>	<b>Up to 750</b>	<b>750-1500</b>	<b>1500-2000</b>	<b>&gt;2000</b>
<b>Blood loss(%)</b>	<b>Up to 15%</b>	<b>15%-30%</b>	<b>30%-40%</b>	<b>&gt;40%</b>
<b>Pulse rate</b>	<b>&lt;100</b>	<b>100-120</b>	<b>120-140</b>	<b>&gt;140</b>
<b>Blood pressure</b>	<b>Normal</b>	<b>Normal</b>	<b>Decreased</b>	<b>Decreased</b>
<b>Pulse pressure (mmHg)</b>	<b>Normal or increased</b>	<b>Decreased</b>	<b>Decreased</b>	<b>Decreased</b>
<b>Respiratory rate</b>	<b>14-20</b>	<b>20-30</b>	<b>30-40</b>	<b>&gt;35</b>
<b>Urine output (ml/hr)</b>	<b>&gt;30</b>	<b>20-30</b>	<b>5-15</b>	<b>Negligible</b>
<b>CNS/mental status</b>	<b>Slightly anxious</b>	<b>Mildly anxious</b>	<b>Anxious, confused</b>	<b>Confused, lethargic</b>
<b>Fluid replacement</b>	<b>Crystalloid</b>	<b>Crystalloid</b>	<b>Crystalloid and blood</b>	<b>Crystalloid and blood</b>

**Finito**