Bilirubin

Hemoglobinogenic pigments. Causes and forms of jaundice.

Questions

- Histochemical caracteristics of the different pigments. Exogenous pigments.
- **Hemoglobinogenic pigments. Causes and forms of jaundice.**
- Hemoglobinogenic pigments. Pathological forms of iron storage.
- Endogenous non-hemoglobinogenic pigments: lipofuscin, melanin, homogentizic acid.

Bilirubin

- The non-iron-containing, yellow-orange pigment that results from breakdown of porphyrin rings (mostly hemoglobin).
- Bilirubin by itself is insoluble in water and is carried on albumin to the liver, where hepatocytes conjugate it with glucuronic acid and pour it into the bile.
- Elevated levels of bilirubin in the blood mean jaundice.
- You may see bile plugs (bile in distended canaliculi; big ones that ruptured are "bile lakes") or intracellular bilirubin in the liver in obstructive jaundice.

Jaundice

Bilirubin is the end product of heme degradation.

Elevated levels of bilirubin in the blood mean jaundice.

Jaundice results from the retention of bile.

Bile formation is a complex process and is readily disrupted **by a variety of hepatic insults**. Thus, *jaundice,* a yellow discoloration of skin and sclerae (*icterus*).

Cholestasis is defined as systemic retention of not only bilirubin but also other solutes eliminated in bile (particularly bile salts and cholesterol).

Processing of bilirubin

- Uptake at the sinusoidal membrane
- Conjugation with glucuronic acid
- Excretion of the water-soluble, nontoxic bilirubin glucuronides into bile
- Most bilirubin glucuronides are deconjugated in the gut by bacteria and degraded to colorless urobilinogens
- The urobilinogens and the residue of intact pigment are excreted in feces and urine .

Etiology

Jaundice occurs when the equilibrium between bilirubin production and clearance is disrupted.

Most common causes of icterus:

- Hemolytic anaemia
- Hepatitis (liver inflammation)
- Blockage of bile flow

Neonatal icterus: transient, enzymes are not ready yet.

Gilbert syndrome: benign „non disease”, harmless hyperbilirubinemia

Dubin-Johnson syndrome results from an autosomal recessive defect in a hepatic transport protein. Hepatomegaly and hyperbilirubinemia, benign.

Clinical consequences

- Cholestasis, which results from impaired bile flow due to hepatocellular dysfunction or intrahepatic or extrahepatic biliary obstruction, also may manifest as jaundice. However, sometimes pruritus is the first presenting symptom.
- Skin xanthomas (focal accumulations of cholesterol) also may appear in cholestasis.
- Extrahepatic biliary obstruction frequently is amenable to surgical correction.
- Intrahepatic cholestasis cannot be treated surgically (maybe transplantation), and the patient's condition may be worsened by an operative procedure.
- Thus, there is always urgency in identifying the cause of jaundice and cholestasis.