

Differential diagnostics of jaundice

Normal bilirubin values are 2.0–17.0 $\mu\text{mol/L}$. If serum bilirubin levels rise above approximately 20 $\mu\text{mol/L}$, we speak of hyperbilirubinemia. At higher levels, bilirubin starts to accumulate in the tissues, **subicterus** develops (yellow discoloration of the parts of the sclera covered by the lids, soft palate; serum bilirubin around **30–80 $\mu\text{mol/L}$**), and then **icterus** (jaundice). Pathologies from a low level of bilirubin are not described, physiologically the total bilirubin in the blood is mainly represented by unconjugated bilirubin. The terms "direct" and "indirect" bilirubin come from Van den Bergh, according to the method of determination. Approximately, direct = conjugated, indirect = non-conjugated. Only conjugated bilirubin can be found in urine, whereas only unconjugated can deposit in the CNS tissue when the blood-brain barrier is immature or damaged (in newborns kernicterus). According to the etiology, we distinguish the following types of hyperbilirubinemia and jaundice:

- **non-conjugated** – increased supply of bilirubin, the process of conjugation in the liver can't keep up,
- **conjugated** – impaired excretion into bile
- **mixed**.

Hyperbilirubinemia with predominantly non-conjugated bilirubin

Hyperbilirubinemia caused by increased bilirubin production

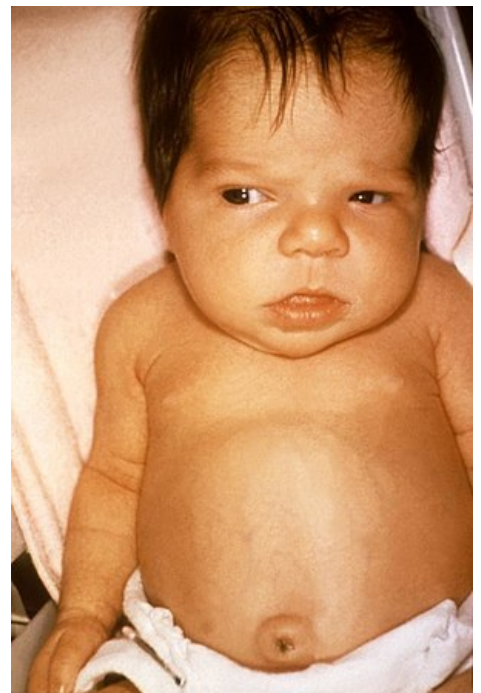
- Most often hemolysis, less often rhabdomyolysis, crush-syndrome, etc.;
- the liver capacity is large, hemolytic icterus occurs only with massive and/or prolonged hemolysis;
- in autoimmune hemolysis, in sickle cell anaemia, hereditary spherocytosis, toxicity or allergic reaction, in disorders of erythropoiesis (thalassemia...), hypersplenism.



Discoloration of sclera in jaundice patient

Icterus neonatorum (neonatal jaundice)

- In addition to hemolysis, the immaturity of conjugating enzymes in the liver also plays a role;
- in the first five days, it occurs in almost half of newborns (70–80 $\mu\text{mol/L}$);
- breast-fed newborns have higher levels (UGTA1 enzyme inhibitor in milk) – it is not usually associated with neurological damage
- other problems are, for example, with erythroblastosis fetalis, ABO incompatibility...;
- pathological jaundice – already within 24 hours after birth, above 220 $\mu\text{mol/L}$;
- phototherapy – breakdown of bilirubin in the skin with 425–475 nm light – photoisomers are polar (they are no longer dangerous for the CNS).



Neonatal jaundice

Hyperbilirubinemia with reduced conjugation

Gilbert syndrome

- Chronic, small elevation of bilirubin, usually no more than 50–70 $\mu\text{mol/L}$, subicterus only, decreased hepatic UGTA1 activity (TATA box disorder, decreased expression, AD, 10–12 % population);
- often diagnosed incidentally;
- bilirubin acts as a scavenger of free radicals, hyperbilirubinemia protects against oxidative stress.

Crigler-Najjar syndrome

- AR, complete (type I) or partial (type II) UGTA defect;
- in type I conjugated bilirubin is completely absent, unconjugated bilirubin levels are around 300–800 $\mu\text{mol/L}$;
- icterus appears shortly after birth, without phototherapy individuals soon die of CNS involvement;
- in type II – concentration of approx. 350 $\mu\text{mol/L}$.

Hyperbilirubinemia with predominantly conjugated bilirubin

Hyperbilirubinemia caused by impaired secretion

Dubin-Johnson syndrome

- Benign, AR, symptoms: only jaundice;
- for an unknown reason, coproporphyrin I is increased in the urine;
- a defect in the canalicular system by which bilirubin is secreted from hepatocytes.

Rotor syndrome

- Also rare, similar to the previous one.

Hyperbilirubinemia caused by bile outflow disorder

- Obstruction or inflammation, obstructive icterus - in cholecystitis, cholangitis, cholelithiasis, primary biliary cirrhózy, tumors of the head of the pancreas and bile ducts.

Intrahepatic cholestasis

- A number of drugs – estrogens, steroids, some ATB...;
- bile acids and liver enzymes are also increased in the blood.

Links

Related articles

- Jaundice • Hyperbilirubinemia in newborns • Juvenile hyperbilirubinemia
- Parameters of biliary tract obstruction

Source

- BENEŠ, Jiří. Studijní materiály [online]. [cit. 2009]. <<http://jirben.wz.cz>>.

Bibliography

- HAVLÍK, Jiří, et al. *Infektologie*. 2. edition. Praha : Avicenum, 1990. 293 pp. ISBN 80-201-0062-8.
- LOBOVSKÁ, Alena. *Infekční nemoci*. 1. edition. Praha : Karolinum, 2001. 263 pp. ISBN 80-246-0116-8.