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Disorders that cause non-conjunctiva hyperbilirubinemia

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Abstract

Bilirubin is a tetrapyrrole pigment resulting from the destruction of the heme of hemoglobin of old red blood cells. Each day, approximately 4 milligrams of this substance is produced per kilogram of body weight, with a large portion (80-85 percent) of hemoglobin, and the remainder of the destruction of arthritic cells that occurs more often than not in the bone marrow during ineffective erythropoiesis; it is, also, produced out of the destruction of various hemo-proteins, such as cytochrome p-450 and cytochrome c. The degeneration occurs in the monocular phagocytic cells of the spleen, liver and bone marrow.In preterm infants, who experience the non-development of liver function more severely, or in cases of hemolysis, such as erythroblastosis, hyperbilirubinemia is higher than non-conjugated hyperbilirubinemia.If the concentration of unconjugated bilirubin increases rapidly, or the amount is increased from 20 mg/dL, the baby is at increased risk of encephalopathy due to bilirubin kernicterus.In this case, bilirubin passes through the evolving blood-brain barrier, precipitates in the ganglin basal complexes and other areas of the brain. The results of kernicterus vary from severe mental damage to death. The main treatments for this condition are: light therapy that converts bilirubin into water-soluble light isomers that are easily eliminated without biliary conjugation and transfusion.At birth, the canalicular-muscle mechanisms of bilirubin secretion are also premature and sometimes the evolution of these mechanisms may be delayed further than the development of UGT1A1. This may be due, in particular, to hyperbilirubinemia in neonates with hemolysis.

Keywords: non-conjunctiva, hyperbilirubinemia, review

Introduction

Bilirubin and Metabolism

Bilirubin is a tetrapyrrole pigment resulting from the destruction of the heme of hemoglobin of old red blood cells. Each day, approximately 4 milligrams of this substance is produced per kilogram of body weight, with a large portion (80-85 percent) of hemoglobin, and the remainder of the destruction of arthritic cells that occurs more often than not in the bone marrow during ineffective erythropoiesis; it is, also, produced out of the destruction of various hemo-proteins, such as cytochrome p-450 and cytochrome c. The degeneration occurs in the monocular phagocytic cells of the spleen, liver and bone marrow.(1)

The first step in converting heme to bilirubin is to open the oxidation of the molecule in the carbon monoxide by the action of the heme oxygenase enzyme which, by itself, requires oxygen and NADPH itself.The final product of this reaction is biliverdine, carbon monoxide and iron.The second reaction is catalysed by a cytoplasmic enzyme called biliverdine reductase. In this reaction, the

methylene blue linkage is recovered and bilirubin is produced.The bilirubin produced in the reticuloenthocytal cells is almost insoluble in water (2). Tinprotoporphyrin, a synthetic metalloparphyrin, is a potent competitive inhibitor of oxygenation.The beneficial effect of this compound can be on reducing the production of bilirubin and preventing its toxic effects among neonates (3). Mummies change water-soluble, non-toxicbiliverdine into water-insoluble bilirubin; however, this is not the case in birds, reptiles and amphibians. This can be confirmed by the fact that biliverdine, unlike bilirubin, is unable to cross the pair (4). The chemical properties of bilirubin are composed of four peerlon loops connected by three carbon bridges.Non-conjugated bilirubin in physiologic PH is almost inaccurate in water because COOH and NH groups are involved in hydrogen bonds between strong molecules and thus not able to interact with the water (5).These transplants are broken down by conjugation of the COOH groups with glucuronic acid. The reaction takes place in the liver cells, thereby greatly increasing the solubility of the bilirubin molecule in water and altering its biological properties.Non-conjugated bilirubin is released almost all over the membrane, such as the blood-brain barrier, the placenta, the intestinal epithelium, and the gallbladder, and only very small amounts are excreted into the bile (6).Therefore, liver conjugation to bilirubin allows the body to be excreted and prevent damage to the central nervous system.When unconjugated bilirubin is exposed to light, polar light isomers and lumirubin, which are the result of intra-molecular cyclization, are formed. These compounds are eliminated by the liver without conjugation and therefore, it is very effective in lowering the concentration of bilirubin in hyperbilirubinemia of neonates and preventing its adverse effects (7).

Findings

Disorders that cause non-conjunctiva hyperbilirubinemia

(A) Increased production of bilirubin

1. Hemolysis: Increasing the destruction of red blood cells leads to increased bilirubin production and non-conjugated hyperbilirubinemia. When the liver function is normal, hyperbilirubinemia occurs at a mild degree. Therefore, low hemolysis alone cannot result in stable hyperbilirubinemia of more than 4 mg / dl. More bilirubin values indicate liver function impairment at the same time.The causes of hemolysis are numerous, including certain hemolytic disorders, mild hemolytic processes accompanied by a large number of systemic diseases (8). Long-term hemolysis may lead to the deposition of bilirubin salts in the bile duct and the formation of biliary stones. Instead of cholesterol, bilirubin is the main component during such constructions; this pigmentation might cause inflammation, acute or chronic gallbladder obstruction, or any other complication of gallstones (9).

Ineffective hematopoiesis

During the development of Erythropoiesis, the cell may lose a small amount of hemoglobin at the outlet of the nucleus. Also, the proportion of evolving erythroid cells in the bone marrow is destroyed. The rate of bilirubin production increases during ineffective hematopoiesis if the subjects is afflicted with various disorders, such as major thalassemia and megaloblastic anemiadue to lack of folic acid or vitamin B12, congenital erythropoietin porphyry, lead poisoning, and various types of congenital and acquired dysrhythmia anemia. This condition may produce mild degrees of non-conjugated hyperbilirubinemia (10).

Miscellaneous causes

Hemoglobin degradation in erythrocyte extravascular compartments, such as those seen in large or large hematomas, may temporarily cause non-conjunctional hyperbilirubinemia.

B. reduction of the consumption of bilirubin in the liver.

Mechanisms of bilirubin entry to liver cells are not well known, but it is likely to include facilitated transmission and release. It is believed that the decrease in bilirubin excretion in the

development of non-conjugated hyperbilirubinemia is contributing to the Gilbert syndrome, although the molecular basis of these findings is not known (11).

It has been reported that several drugs, including Flavispidic acid, Navobiocin and various types of cholecysteine, inhibit bilirubin intake of liver. Hyperbilirubinemia associated with the use of these drugs is discontinued if the subject stops taking this drugs (12).

Disorders in conjugation

A. Neonatal physiologic jaundice

Bilirubin produced by the fetus is removed by a pair, and is excreted by the mother's liver. As a result, the bilirubin concentration in the normal baby is low at birth.Immediately after birth, the baby's liver must take responsibility for removing bilirubin.However, many physiological aspects of the liver are low during the completely unexplained birth of UTG1A1, and the non-conjugated bilirubin is introduced into the intestine via a secondary pathway.Due to the fact that the natural flora of the intestine, which converts bilirubin into orbilinogen, also has not evolved, the liver-intestinal cycle of non-conjugated bilirubin occurs.As a result, most neonates have a mild non-conjugated hyperbilirubinemia between the second and the fifth day after birth.The typical maximum amount of bilirubin is less than 5 to 10 dl/mg, and with the development of bilirubin excretion mechanisms within 2 weeks, the normal concentration is reduced for adults (13). In preterm infants, who experience the non-development of liver function more severely, or in cases of hemolysis, such as erythroblastosis, hyperbilirubinemia is higher than non-conjugated hyperbilirubinemia.If the concentration of unconjugated bilirubin increases rapidly, or the amount is increased from 20 mg/dL, the baby is at increased risk of encephalopathy due to bilirubin kernicterus.In this case, bilirubin passes through the evolving blood-brain barrier, precipitates in the ganglin basal complexes and other areas of the brain. The results of kernicterus vary from severe mental damage to death. The main treatments for this condition are: light therapy that converts bilirubin into water-soluble light isomers that are easily eliminated without biliary conjugation and transfusion.At birth, the canalicular-muscle mechanisms of bilirubin secretion are also premature and sometimes the evolution of these mechanisms may be delayed further than the development of UGT1A1. This may be due, in particular, to hyperbilirubinemia in neonates with hemolysis (14).

B. Conjugation acquired deficiencies

Reduced bilirubin conjugation capacity may be mild in advanced hepatitis or cirrhosis; however, conjugation is better maintained than other aspects of bilirubin excretion, such as secretion into canalicles in these cases. Various drugs, including pargendel, noobiocin, chloramphenicol, and gentamasin, may cause non-conjugated hyperbilirubinemia.Finally, some progesterone and parenteral steroidal acids are found in mothers whose infants have been infected with severe neonatal hyperbilirubinemia (breast milk), which inhibits bilirubin conjugation (these substances do not exist in the serum of these mothers).It seems that breast-induced morbidity with hyperbilirubinemia is associated with a family history of transient Lucay-Driscall Syndrome, which involved the development of UGT1A1 inhibitor in the serum. (15)

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