Newborn Jaundice

Jaundice (or icterus) is the yellow discoloration of the skin and other organs caused by accumulation of bilirubin. It is caused primarily by unconjugated bilirubin, a by-product of hemoglobin after it is released from the red blood cells.

Babies are born with an increased amount of hemoglobin. After birth, extra hemoglobin is broken down and eliminated within the first few days of life. Before birth bilirubin metabolism takes place in the placenta. After birth, it is metabolized in the liver. The maturity and health of the newborn liver determines how quickly and efficiently bilirubin will be processes and excreted. Frequently, liver enzymes are not fully functioning until an infant is one to two weeks old, resulting in a backup of unconjugated bilirubin.

Newborn jaundice begins in the head and progresses downward. How far the jaundice progresses is an indicator of how high the bilirubin levels in the blood are. The blanch test assists in differentiating cutaneous jaundice from skin color. The test is performed by applying pressure with the thumb over a bony are for several seconds. If jaundice is present, the blanched area will look yellow before the color returns. It is better to assess for jaundice in daylight because artificial lighting can distort colors. On dark-skinned babies the inner cheek or lip, whites of the eye, tongue, gums and the palms and soles of the feet are checked.

Approximate level of hyperbilirubinemia by cephalocaudal distribution:

Nose: 3 mg/100 mL

Face: 5 mg/100 mL

Chest: 7 mg/100 mL

Abdomen: 10 mg/100 mL

Legs: 12 mg/100 mL

Palms and soles 20 mg/100 mL

An Icterometer is a clear plastic gauge that can also be used to assess bilirubin levels. Various yellow patches are matched to the infants skin to determine approximated levels.

Blood tests can be done to assess the bilirubin levels:

- Direct Bilirubin level reflects whether the bilirubin is bound to other substances by the liver so that it can be excreted.
- Indirect Bilirubin level is bilirubin that is circulating in the blood.
- Red Blood Cell (RBC).
- Blood type and Rh incompatibility testing (Coomb's test)

Physiologic jaundice or Neonatal hyperbilirubinemia

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Physiologic jaundice is normal and occurs in over 50% of all full-term and 80% of preterm newborns. It usually appears within the first 3 days of life. Normal newborn jaundice is differentiated from pathologic by the following criteria:

* The baby does not appear to be sick in other ways. Changes in feeding patterns, sleeping patterns, pallor, dark color of stools or urine are things to watch for.

* Jaundice appears after the baby is 24 hours old. It subsides after the seventh day in Caucasian and African-American infants, and after the tenth day in Oriental infants. (In pre-term infants jaundice appears after the baby is 48 hours old and subsides by the tenth day.)

* Serum unconjugated bilirubin concentration does not exceed 12mg/100 mL.

* Conjugated biliubin does not exceed 1.5 mg/100 mL.

* Bilirubin concentration does not rise more than 5 mg/100 mL per day.

There are several influences that can affect the levels of physiologic jaundice. Early breast feeding helps to keep the serum bilirubin level low by stimulating intestinal activity and the passage of meconium. Meconium contains bilirubin and there can be considerable reabsorption of bilirubin from the baby's intestines. Studies have shown that the greater the number of feedings the first three days of life, the lower the bilirubin levels. Colostrum is a natural laxative that helps promote the passage of meconium. Early, frequent nursing will enhance meconium excretion and decrease bilirubin levels.

Cold stress of the newborn may result in acidosis and raise the level of free fatty acids. This weakens the bond between albumin and bilirubin and bilirubin is freed, thus raising bilirubin levels in the blood. Newborns must be kept warm and dry.

Pathologic Hyperbilirubinemia

Pathologic hyperbilirubinemia refers to that level of serum bilirubin which, if left untreated, can result in damage to brain tissue, the kidneys, the intestines, and the pancreas.

Kernicterus refers to the bilirubin encephalopathy involving the deposit of unconjugated bilirubin in brain cells, resulting in death or impaired intellectual, perceptive, or motor function. The deposits of bilirubin into brain cells leaves a characteristic yellow staining and may cause cellular necrosis. It appears to damage cells so they cannot carry out normal chemical activities.,

Pathologic jaundice is judged according the following criteria:

* Serum bilirubin concentration greater than 4 mg/100 mL

* Jaundice that is evident within the first 24 hours after birth.

* Serum bilirubin levels that rise more than 5 mg/100 mL per 24 hours.

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* In the full term infant serum bilirubin level greater than 15 mg/100 mL. In the preterm infant all visible jaundice should be carefully monitored.

Some infants are at a higher risk for pathologic jaundice. Chinese, Japanese, Korean, Eskimo, and Native American full-term newborns bilirubin levels tend to be much higher than those of Caucasian infants. African-American newborns bilirubin levels are even lower.

Women who are Rh negative are at risk for having Rh incompatibility if their baby is Rh positive. Soon after birth this newborn will become jaundiced. These infants can be severely ill very quickly.

Other factors include maternal infections such as syphilis, rubella, and toxoplasmosis. Maternal diabetes predisposes newborn to hyperbilirubinemia. Maternal ingestion of sulfonamides or salicylates close to birth affect the newborn's ability to remove bilirubin.

Infants that have had hypoxia, acidosis, hypothermia, hypoglycemia, bacterial infection, or certain medications are also at a higher risk because these conditions can interfere with the albumin-binding sites to the bilirubin.

Clinical manifestations of kernicterus appear in four phases, usually between 2 and 6 days after birth.

* Phase one: The newborn is hypotonic, lethargic, exhibits a poor sucking reflex, Moro's reflex is depressed or absent.

* Phase two: The newborn develops spasticity and hyperreflexia, often manifests opisthotonos(arching the back), has a high-pitched cry, may be hyperthermic, convulsions may occur.

* Phase three: At about 7 days of age the newborn's spasticity lessens and may disappear.

* Phase four: After the first month of life, sequelae develop. This may include spasticity, athetosis (involuntary snakelike twisting movements of the upper extremities), partial or complete deafness, or mental retardation.

Treatment

The best treatment is prevention. Feeding the newborn soon after birth will help prevent jaundice. Clamping the cord after it stops pulsing helps the babies blood levels to stabilize. Lack of light in the first few days after birth may be an important factor. Preventing hypothermia is also very important for preventing jaundice.

Sun bathing the baby is extremely effective in decreasing bilirubin levels. Place the undressed baby with eyes covered in direct sunlight for 5-10 minutes on each side, three times daily. You can do this inside by placing the baby in front of a window with sunlight coming in for 10 minutes on each side. Be sure to keep the baby warm.

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Phototherapy causes a change in the bilirubin in the skin. During phototherapy infants form a substance called lumirubin. Lumirubin is excreted easily by the infant.

Medical phototherapy involves the use of fluorescent bulbs. There are several kinds of bulbs: daylight, cool light, blue and special blue. Blue or special blue lights are considered to be more specific and effective. Blue lights can make the detection of cyanosis difficult.

One of the side effects of phototherapy is s bronze baby syndrome. The serum, urine, and skin turns bronze. Other complications associated with phototherapy include fever, diarrhea, irritability, hypothermia, rash, slower weight gain, a drop in luteinizing hormone in girls, and increased metabolic rates. The effects on vitamins is unclear, however riboflavin appears to be destroyed. Mutations in E.Coli bacteria and DNA modifications have been noted. Nursery personnel experience nausea and dizziness when exposed to blue lights.

The baby is placed 18 to 20 inches under a bank of lights for several hours or days until the serum bilirubin level drops to an acceptable range. Care must be taken to make sure the baby receives enough stimulation and contact. The infant's eyes must be protected to prevent over exposure to the light Eye shields are used but should be removed during feedings so appropriate eye contact can be made with the baby.

Fiberoptic blankets seem to have fewer risks and side effects. They eliminate the need for eye patches and isolation because the infant can be held.

If bilirubin levels cannot be controlled by phototherapy, blood transfusion may be necessary.

Breast Milk Jaundice

The cause of breast-milk jaundice is not known. It occurs in 0.5 %-2% of breast feed babies. It occurs after the milk has come in, usually about the fifth or sixth day of life in a thriving infant. The bilirubin levels subside by 5 to 10 mg if breast-feeding is discontinued for 12 to 24 hours. Mothers should maintain their milk supply during this test period. If the baby is doing well it can stay yellow until it clears on its own. The mother should continue to expose the baby to sunlight until the jaundice subsides. The baby may stay jaundiced for as long as 6 weeks

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