NEONATAL JAUNDICE- A Review

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ABSTRACT

Neonatal jaundice is yellowish discoloration of the skin, conjunctiva, and sclera due to elevated serum or plasma bilirubin in the newborn period. Neonatal jaundice is typically a mild and transient event. However, it is imperative to identify newborns with jaundice that present with more severe jaundice or whose jaundice does not resolve in a typical manner. This activity reviews the pathophysiology, evaluation, and management of neonatal jaundice and the role of the interprofessional team in the care of affected patients.

KEY WORDS- jaundice- discolouration- treatement- management

INTRODUCTION

Neonatal jaundice is yellowish discoloration of the skin, conjunctiva, and the sclera from elevated serum or plasma bilirubin in the newborn period. The term jaundice is from the French word "jaune," which means yellow. Neonatal jaundice in most newborns is a mild and transient event. It is, however imperative to identify newborns with jaundice that do not follow this pattern as failure to do so may lead to long-term sequelae. In most of cases there is no specific underlying disorder (physiologic).In other cases it results from red blood cell breakdown, liver disease, infection, hypothyroidism, or metabolic disorders (pathologic).A bilirubin level more than 34 μmol/l (2 mg/dL) may be visible.Concerns, in otherwise healthy babies, occur when levels are greater than 308 μmol/L (18 mg/dL), jaundice is noticed in the first day of life, there is a rapid rise in levels, jaundice lasts more than two weeks, or the baby appears unwell. In those with concerning findings further investigations to determine the underlying cause are recommended.[2]

SIGNS AND SYMPTOMS

The primary symptom is yellowish discolouration of the white part of the eyes and skin in a newborn baby.[1] Other symptoms may include excess sleepiness or poor feeding.[1]

A bilirubin level more than 34 μmol/l (2 mg/dL) may be visible.[1] For the feet to be affected level generally must be over 255 μmol/l (15 mg/dL).[1]

To check for infant jaundice, press gently on your baby's forehead or nose. If the skin looks yellow where you pressed, it's likely your baby has mild jaundice. If your baby doesn't have jaundice, the skin colour should simply look slightly lighter than its normal colour for a moment.

Examine the baby in good lighting conditions, preferably in natural daylight.[3]

CAUSES

Excess bilirubin (hyperbilirubinemia) is the main cause of jaundice. Bilirubin, which is responsible for the yellow color of jaundice, is a normal part of the pigment released from the breakdown of "used" red blood cells.

Newborns produce more bilirubin than adults do because of greater production and faster breakdown of red blood cells in the first few days of life. Normally, the liver filters bilirubin from the bloodstream and releases it into the intestinal tract.[4] A newborn's immature liver often can't remove bilirubin quickly enough, causing an excess of bilirubin. Jaundice due to these normal newborn conditions is called physiologic jaundice, and it typically appears on the second or third day of life.[5]

Other causes

An underlying disorder may cause infant jaundice. In these cases, jaundice often appears much earlier or much later than does the more common form of infant jaundice. Diseases or conditions that can cause jaundice include:

1.Internal bleeding (hemorrhage)
2.An infection in your baby's blood (sepsis)
3.Other viral or bacterial infections
4.An incompatibility between the mother's blood and the baby's blood
5.A liver malfunction
6.Biliary atresia, a condition in which the baby's bile ducts are blocked or scarred
7.An enzyme deficiency
8.An abnormality of your baby's red blood cells that causes them to break down rapidly

RISK FACTORS

Major risk factors for jaundice, particularly severe jaundice that can cause complications, include:

Premature birth. A baby born before 38 weeks of gestation may not be able to process bilirubin as quickly as full-term babies do. Premature babies also may feed less and have fewer bowel movements, resulting in less bilirubin eliminated through stool.

Significant bruising during birth. Newborns who become bruised during delivery gets bruises from the delivery may have higher levels of bilirubin from the breakdown of more red blood cells.
Blood type. If the mother's blood type is different from her baby's, the baby may have received antibodies through the placenta that cause abnormally rapid breakdown of red blood cells.[5]

Breast-feeding. Breast-fed babies, particularly those who have difficulty nursing or getting enough nutrition from breast-feeding, are at higher risk of jaundice. [6]Dehydration or a low caloric intake may contribute to the onset of jaundice. However, because of the benefits of breast-feeding, experts still recommend it. It's important to make sure your baby gets enough to eat and is adequately hydrated[7]

Race. Studies show that babies of East Asian ancestry have an increased risk of developing jaundice.[8]

COMPLICATIONS

- Cerebral palsy
- Deafness
- Newborns who develop severe hyperbilirubinemia are at risk for bilirubin-induced neurologic dysfunction (BIND) when bilirubin crosses the blood-brain barrier. Bilirubin binds primarily to the globus pallidus but also the hippocampus, cerebellum, and sub-thalamic nuclear bodies, causing neurotoxicity[28] through apoptosis and necrosis.[9]
- Acutely, this manifests as acute bilirubin encephalopathy (ABE), characterised by lethargy, hypotonia, and decreased suck, and is reversible. [10]
- Kernicterus, which is permanent, may develop if ABE progresses. It manifests as cerebral palsy, seizures, arching, posturing, and sensorineural hearing loss.[11]

PREVENTION

To preveent acute bilirubin encephalopathy and kernicterus, severe hyperbilirubinemia is treated with phototherapy, IV immunoglobulin, or exchange transfusion. There are nomograms available to determine bilirubin levels at which phototherapy and exchange transfusion are indicated.

Phototherapy is started based on risk factors and the serum bilirubin level on the nomogram. Bilirubin absorbs light optimally in the blue-green range (460 to 490 nm)[12] and is either photoisomerized and excreted in the bile or converted into lumirubin and excreted in the urine. During phototherapy, the eyes of the newborn must be covered, and the maximum body surface area exposed to the light. It is important to maintain hydration and urine output as most bilirubin is excreted in the urine as lumirubin. The use of phototherapy is not indicated in conjugated hyperbilirubinemia[13] and may lead to the "bronze baby syndrome" with greyish-brown discolouration of the skin,[14] serum, and urine. After phototherapy is discontinued, there is an increase in the

total serum bilirubin level known as the" rebound bilirubin." The "rebound bilirubin" level is usually lower than the level at the initiation of phototherapy and does not require reinitiating of phototherapy.[15]

IV immunoglobulin is recommended for increasing bilirubin levels from iso-immune hemolysis despite phototherapy. IV immunoglobin is initiated when the bilirubin level is within 2 to 3 mg/dl of the exchange transfusion level.[16][17]

Exchange transfusion is indicated if there is a risk of neurologic dysfunction with or without an attempt at phototherapy. It is used to remove bilirubin from the circulation, and in iso-immune hemolysis, it removes circulating antibodies and sensitized red blood cells. Exchange transfusions should take place in the training of the neonatal or pediatric intensive care unit (NICU/ PICU) by trained personnel. A double volume exchange blood transfusion (160 to 180 ml/kg) is performed, replacing the neonate's blood in aliquots with crossed-matched blood. Complications that may arise from exchange transfusion are electrolyte abnormalities like hypocalcemia and hyperkalemia, cardiac arrhythmias, thrombocytopenia, blood-borne infections, portal vein thrombosis, graft versus host disease, and necrotizing enterocolitis (NEC).[18]

Phototherapy should resume after exchange transfusion until the bilirubin reaches a level where it can be safely discontinued.

OUTCOMES

Today there is the 2-color icterometer, which can help parents identify jaundice. Nurses should train mothers on how to examine the skin and eyes of neonates. In addition, a smartphone app can also help parents assess jaundice. The key is to ensure that the infant is seen in the clinic to rule out any sinister cause of jaundice. Only with an interprofessional team approach can the morbidity of jaundice in neonates be reduced. Neonatal and low-risk nursery nurses are often the first to detect jaundice. They monitor treatments, educate parents, and keep the team apprised as to changes in condition.

Although neonatal jaundice is, in most cases, a mild and transient phenomenon, every newborn must be assessed predischarge for factors associated with increased risk of severe hyperbilirubinemia as per the American Academy of Pediatrics to improve patient outcomes.

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