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Breastfeeding-Associated Neonatal Hyperbilirubinemia

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What is breastfeeding-associated hyperbilirubinemia?

Neonatal jaundice is one of the most common conditions in neonates, with 60-80% of infants experiencing some degree of increased serum bilirubin levels (Itoh, Okada, Kuboi, & Kusaka, 2017). Physiological jaundice is most commonly noted in the first week of life, with rising and peak levels occur between day of life three to five (Moncrieff, 2018). All infants experience a rise in serum bilirubin following birth due to their immature liver's inability to clear the byproduct of red blood cell breakdown, bilirubin, from the blood (Gardner, Carter, Hines, & Hernandez, 2016). Hyperbilirubinemia can be caused by a variety of factors including, but not limited to, infection, breast feeding, hemolytic disease of the newborn, maternal-fetal blood type incompatibility, drugs, gestational diabetes, birth trauma, prematurity, hypothyroidism, and galactosemia. The most commonly seen cause of hyperbilirubinemia in the outpatient settings is breastfeeding. (Gardner et al., 2016)

Why breastfeeding-associated hyperbilirubinemia?

- Commonly seen in outpatient setting
- Adequate identification necessary
- Timely treatment needed to prevent extreme hyperbilirubinemia leading to kernicterus (Moncrieff, 2018)



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Pathophysiology

- 70-90 day life span for newborn red blood cells (RBCs)
- RBCs destroyed by macrophages in spleen
 - Breakdown into globin protein and heme
- Heme turns to biliverdin by means of heme oxygenase.
- Biliverdin converts to unconjugated bilirubin by the enzyme, biliverdin reductase.
- Unconjugated bilirubin not water soluble, must bind to protein in blood (albumin).
- Bilirubin bound to albumin is carried to liver and disassociated from albumin prior to entering liver cell.
- In liver cell, unconjugated bilirubin becomes conjugated bilirubin by enzyme catabolism.
- Water soluble conjugated bilirubin which enables bilirubin to be secreted in bile.
- Bile secreted into intestinal tract for conjugated bilirubin to be excreted by urine and stool.

(Gardner et al., 2016)

What physiological process is altered breastfeeding-associated hyperbilirubinemia?

Breastfeeding failure has occurred

- Inadequate supply, inadequate latch, or inadequate frequency leading to:
 - Delayed stooling and decreased gastrointestinal motility
 - Dehydration
 - Poor caloric intake
 - Greater than 10% weight loss
- Increase in enterohepatic circulation and decreased bile removal occur.
- Serum bilirubin levels rise.
- Hyperbilirubinemia diagnosis when total serum bilirubin levels rise above the 95th percentile for age (Figure 1) (Ullah, Rahman, & Hedayati, 2016).
- Phototherapy with lights of the blue-green spectrum used.
- Phototherapy converts unconjugated bilirubin to conjugated bilirubin cutaneously enabling excretion via urine and stool.

(Itoh et al., 2017)



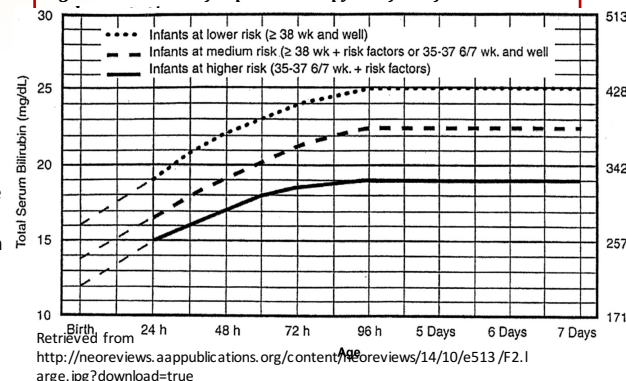
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Signs and symptoms

- Most notable signs and symptoms is jaundice, specifically of the skin and sclera (Stanford Children's Hospital, 2018).
- Lethargy
- Poor feeding
- High pitch cry
- Irritability
- Hypotonia
- Fever
- Apena
- Hypertonia
- Seizures

(Centers for Disease Control and Prevention [CDC], 2016)

Figure 1. Guideline for phototherapy use for infants born at >35



Implications for Nursing Care

- Initiate breastfeeding within 1 hour of delivery.
- Encourage at least 10 breastfeeds in 24-hour period.
- Teach effective breastfeeding practices to ensure proper nutrition and dehydration prevention. (Moncrieff, 2018)
- Delay discharge from hospital until effective breastfeeding is established.
- Educate caregivers on signs and symptoms of rising serum bilirubin levels. (Wells, Ahmed, & Musser, 2013)
- Infant should be observed by lactation-trained healthcare provider within first 48-72 hours post discharge from hospital (CDC, 2016).
- Encourage physicians to comply with protocols to identify hyperbilirubinemia in the early stages (Wells et al., 2016).
- Monitor patients on phototherapy.
- Once serum bilirubin levels fall below the hour-specific value, discontinue phototherapy and check for rebound hyperbilirubinemia within 24 hours. (Gardner et al., 2016)

Conclusion

Moncrieff (2018) states, "Although the yellow pigmentation changes may seem harmless, extreme hyperbilirubinemia can lead to kernicterus, an irreversible and devastating brain injury". Kernicterus is preventable with appropriate interventions and treatment (Wells et al., 2013). Families need to be educated and aware of signs and symptoms of increasing bilirubin levels and to follow up with clinicians appropriately. It is imperative that bilirubin levels are monitored appropriately and early intervention is implemented to prevent long neurological damage.

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