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### Pathological Jaundice

Dianna Contosta

Otterbein University, [dianna.contosta@otterbein.edu](mailto:dianna.contosta@otterbein.edu)

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# Pathological Jaundice

Dianna Contosta, RN  
Otterbein University, Westerville, Ohio

## Introduction

Neonatal jaundice is a common condition present in infants after birth. It is caused by elevated bilirubin in the blood. It can affect up to 84% of term infants and is one of the most common cause for hospital readmission for the neonatal department (Muchowski, 2014). It typically appears within 24 hours of life and is normally present in otherwise healthy newborns. Physiologic jaundice, also known as unconjugated bilirubin, is a normal process that happens in neonates because the hepatic system is not matured yet (Kirk, 2008). Majority of the time physiologic jaundice resolves on its own. Pathological jaundice, also known as conjugated bilirubin, in newborns is due to other reasons other than the normal pathologic process the newborn hepatic system goes through. It may be a result of endocrine or genetic disorders, which are considered to be rare (Kirk, 2008). A more common cause is due to ABO incompatibility. For the purpose of this poster the focus is going to be on pathologic elevated bilirubin specifically related to ABO incompatibility between mother and baby.

## Case Study

A mother who was O blood type and had a term baby with A+ blood type and was admitted to the NICU for elevated bilirubin levels of 10mg/dl. The mother was wanting to understand why her baby had yellowed skin color. It was explained to the mother that she makes antibodies against blood type A and blood type B and the antibodies are able to cross the placenta destroying the baby's RBC's. When RBC's are destructed there is a rise in the bilirubin levels manifesting by causing a yellowish tint to the infants skin color (Rubarth, 2011). In this particular study knowing the mother was O blood type that meant there were three blood type possibilities for the father. The below table shows the three genotype possibilities for the father that would result in the infant have an A+ blood type.

Table 1. Three possible genotypes for the father in the case study (Rubarth, 2011)

Genotypes of Parents	Mother's Blood Type (O)	Mother's Blood Type (O)
Father's Blood Type (A)	O	O
A	AO	AO
A	AO	AO

Genotypes of Parents	Mother's Blood Type (O)	Mother's Blood Type (O)
Father's Blood Type (A)	O	O
A	AO	AO
O	OO	OO

Genotypes of Parents	Mother's Blood Type (O)	Mother's Blood Type (O)
Father's Blood Type (AB)	O	O
A	AO	AO
B	BO	BO

## Signs & Symptoms

Visual inspection may be the first noticeable sign that an infant maybe has pathologic jaundice but is not the most accurate method to determine elevated bilirubin levels. Trying to estimate serum bilirubin by using clinical examination is not reliable and therefore not recommended (Dennerly, Seidman, Stevenson, 2001). Jaundice is defined as the yellow-orange discoloration found in the sclera, skin, and other tissues of infants (Schwartz, Haberman, & Ruddy, 2011). Jaundice is hard to observe in dark skin babies. Even though jaundice may indicate an imbalance of production and elimination of bilirubin it does not imply any specific cause (Cohen, Wong, & Stevenson, 2010). It is recommended that babies that appear to look jaundice or have risk factors should be evaluated using total serum bilirubin (TSB) or transcutaneous bilirubin (TcB). Performing both the universal TSB/TcB screening along with using the risk factor scoring system seems to be the most reliable method for identifying infants at high risk for hyperbilirubinemia. Detection of those infants that are at high risk for increased bilirubin levels allows for earlier treatment options leading to improved clinical outcomes (Muchowski, 2014).

## Pathophysiology

ABO incompatibility can happen between a mother and baby primarily when the mother has blood type O and the developing fetus has blood type A, B, or AB. This happens because mothers with type O blood have anti-A and anti-B antibodies because the baby has A, B, or AB blood type. These antibodies cross the placenta and go into the fetal circulation. The antibodies then attach to the infant's red blood cells (RBC's) causing hemolysis of the RBC's. The attaching and attacking by the antibodies starts while the baby is still in utero. Hemolysis of RBC's cause an increase in bilirubin levels. In order for hemolysis to occur the antibodies have to attach to the RBC's (Rubarth, 2011).



Figure 1. Infant with pathologic jaundice

## Significance of Pathophysiology

The primary reason that healthcare workers assess for hyperbilirubinemia is because of the chance of neurotoxic effects (Dennerly, et al., 2001). This can happen by the bilirubin crossing the blood-brain barrier and entering the brain tissue (Lauer & Spector, 2011). When this happens it poses a risk of developing neurological dysfunction (Stevenson, Vreman, & Wong, 2011). Kernicterus is the term used to describe the permanent development of bilirubin toxicity (Schwartz, et al., 2011). Bilirubin can only enter the brain if it is not bound to albumin or is unconjugated (Dennerly, et al., 2001). If the babies serum albumin level is low this causes the binding of bilirubin to be compromise leading to an increase chance of kernicterus (Dennerly, et al., 2001). Even though kernicterus is not seen very much anymore it is still important to continue to prevent it by being meticulous in assessing and treating elevated levels of bilirubin (Dennerly, et al., 2001).

## Implications to Nursing

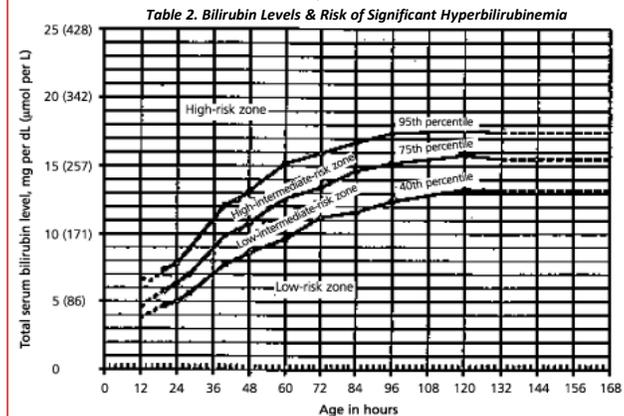
Nurses are the front line to caring for mothers and infants that might have conjugated elevated bilirubin. Nurses play an important role in promoting follow-up, assessing infants for risk factors, assessing jaundice level using the TSB or TcB (Wells, Ahmed, & Musser, 2013). Many hospitals do not allow nurses to independently check bilirubin levels without a physician order. Therefore this can create a barrier to diagnosing hyperbilirubinemia. If there was a system in place to allow the nurses to check the bilirubin levels of infants based on certain risk factors or clinical suspicion might help diagnose hyperbilirubinemia before it becomes life-threatening. Follow-up is important because infants are being discharged sooner making them not available to healthcare workers when the bilirubin levels peak. Having a protocol in place for when infants are discharged may help to ensure follow-up bilirubin testing. The parents must understand the potential risk with hyperbilirubinemia and that is where the nurse can play a strong role (Bhutani, Schwoebel, & Gennaro, 2006). It is important that nurses stay up to date on completing ongoing education and passing required competencies in order to provide the best possible care to the patients. Nurses should be well educated about conjugated hyperbilirubinemia in order to properly educate the parents of the babies diagnosed with elevated bilirubin and answer any questions they might have.

## Conclusion

Even though jaundice can be a normal physiological process that newborns go through it is important to determine whether it has a pathologic component to it in order to properly monitor and treat it. If not properly diagnosed and treated than the risk of developing long term neurological damage is increased. It is important to be able to know what to look for and know the risks associated with hyperbilirubinemia no matter if working in an inpatient or outpatient setting. Early evaluation of infants is important to help determine diagnosis of pathologic hyperbilirubinemia before the baby is discharged home. Once discharge it is important to have a follow-up appointment scheduled within two to three days after discharge so the infant can be professionally examined for jaundice (Dennerly, et al., 2001).

## Additional Sources

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