**Maryland Next Gen NCLEX Test Bank Project**

**January 25, 2023**

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| **Case Study Topic**  (& Stand- alone bow-tie) | Neonatal jaundice | **Author** | Laura Sessions PhD, MScN, RN, CNE  Townson University |

**Case Summary**

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| A term newborn with Rh incompatibility develops jaundice on the first day of life. |

**Objectives**

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| 1. Recognize signs and symptoms of hyperbilirubinemia 2. Identify risk factors for hyperbilirubinemia 3. Monitor results of diagnostic tests and intervene 4. Implement and monitor phototherapy 5. Educate client (parent) about jaundice |

|  |  |
| --- | --- |
| **Case Study Link** | **Case Study QR Code** |
| <https://umaryland.az1.qualtrics.com/jfe/form/SV_4N2ZNXQa8zerYHA> |  |
| **Bow-tie QR Code** | **Bow-tie Link** |
|  | <https://umaryland.az1.qualtrics.com/jfe/form/SV_3awxOCd9z8sBhNI> |

**Case References**

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| Ansong-Assoku B., Shah S. D., Adnan M. & Ankola, P. A. (2022). Neonatal jaundice. *StatPearls.* Retrieved June 10, 2022 from https://www.ncbi.nlm.nih.gov/books/NBK532930/  Rh Incompatibility (2022, June, 6). *Medscape*. <https://emedicine.medscape.com/article/797150-overview>  Wagle, S. (2017). Hemolytic disease of the newborn. *Medscape*. Retrieved June 6, 2022 from <https://emedicine.medscape.com/article/974349-overview> |

**Case Study Question 1 of 6**

The nurse cares for a term newborn on the first day of life on the postpartum unit.

|  |  |  |
| --- | --- | --- |
| **Phase Sheet** | | |
| Name | Wang | | | | Gender | F |
| Gestation | 39.5 weeks | Weight | | 6 lb. 9 oz/ 2.98 Kg | Blood type | 0+ |
| **Nurse’s Notes** | | |
| 0900. 18-hour old newborn born by spontaneous vaginal delivery to a 23-year-old gravida 2, para 1, blood type O-negative mother. Uncomplicated pregnancy. Rupture of membranes 7 hours prior to delivery with clear fluid. APGARs 7 and 9. Mom states that breast feedings are a struggle, baby has poor latch and is easily frustrated. Mom has sore nipples. | | | | | | |
| **History & Physical** | | |
| **General** | | | Slightly lethargic, crying with exam, flexed posture, visible jaundice | | | |
| **Vital signs** | | | T 37.3C/ 99.1F, HR 144, RR 48 | | | |
| **HEENT** | | | Normocephalic, fontanelle slightly depressed, eyes and ears normal set/shape, sclera yellow, palate intact, tongue with Epstein pearls, dry mucous membranes | | | |
| **Cardio/respiratory** | | | No murmur, pulses +2 bilaterally, breath sounds clear, | | | |
| **Gastrointestinal/**  **genitourinary** | | | Soft, non-distended, liver palpable, umbilical stump intact/clamped; passed 1 meconium stool, voided 1 time since birth | | | |
| **Musculoskeletal** | | | Hips stable bilaterally, all WNL | | | |

* Drag the 5 findings that need immediate follow-up to the box on the right.

|  |  |
| --- | --- |
| Client Findings | Top 5 Findings |
| Activity level\* |  |
| Color\* |  |
| Epstein pearls |  |
| Fontanelle\* |  |
| Mucous membranes\* |  |
| Stool output |  |
| Sclera\* |  |
| Urine output |  |
| Umbilical stump |  |
| Vital signs |  |

**Scoring Rule: 0/1**

**Rationale**: Bilirubin is produced by the breakdown of hemoglobin. A build-up of bilirubin in the body causes a yellow skin color called jaundice. Jaundice and yellow sclera are signs of hyperbilirubinemia. This is urgent as high bilirubin can cause brain damage and death. This combined with the dry mucous membranes, and slightly depressed fontanelle may indicate the newborn is developing hypovolemia. Both hypovolemia and hyperbilirubinemia can cause lethargy. Epstein pearls are very small keratin cysts that appear in the mouths of more than 50% of newborns. Epstein pearls are benign and disappear after a few weeks. A clamped umbilicus is normal. Passing 1 stool and voiding once on day 1 are typical findings/ The vital signs are within normal limits for a newborn.

**Case Study Question 2 of 6**

The nurse cases for a term newborn on the first day of life on the postpartum unit.

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| --- | --- | --- |
| **Phase Sheet** | | |
| Name | Wang | | | | Gender | F |
| Gestation | 39.5 weeks | Weight | | 6 lb. 9 oz/ 2.98 Kg | Blood type | 0+ |
| **Nurse’s Notes** | | |
| 0900. 18-hour old newborn born by spontaneous vaginal delivery to a 23-year-old gravida 2, para 1, blood type O-negative mother. Uncomplicated pregnancy. Rupture of membranes 7 hours prior to delivery with clear fluid. APGARs 7 and 9. Mom states that breast feedings are a struggle, baby has poor latch and is easily frustrated. Mom has sore nipples. | | | | | | |
| **History & Physical** | | |
| **General** | | | Slightly lethargic, crying with exam, flexed posture, visible jaundice | | | |
| **Vital signs** | | | T 37.3C/ 99.1F, HR 144, RR 48 | | | |
| **HEENT** | | | Normocephalic, fontanelle slightly depressed, eyes and ears normal set/shape, sclera yellow, palate intact, tongue with Epstein pearls, dry mucous membranes | | | |
| **Cardio/respiratory** | | | No murmur, pulses +2 bilaterally, breath sounds clear, | | | |
| **Gastrointestinal/**  **Genitourinary** | | | Soft, non-distended, liver palpable, umbilical stump intact/clamped; passed 1 meconium stool, voided 1 time since birth | | | |
| **Musculoskeletal** | | | Hips stable bilaterally, all WNL | | | |

* For each client finding click to indicate it is a risk factor or not a risk factor for jaundice.

|  |  |  |
| --- | --- | --- |
| Factor | Risk factor | Not a risk factor |
| Breastfeeding problems | \* |  |
| Current hydration status | \* |  |
| Maternal blood type | \* |  |
| Length of rupture of membranes |  | \* |
| Second pregnancy | \* |  |
| Current stooling pattern |  | \* |

**Scoring Rule: 0/1**

**Rationale.** Hyperbilirubinemia can come from increased bilirubin production and or delayed excretion. The majority of bilirubin is produced from the breakdown of hemoglobin into unconjugated bilirubin. Unconjugated bilirubin binds to albumin in the blood for transport to the liver, where it is taken up by hepatocytes and conjugated to make it water-soluble so it can be excreted in stool and urine. Breastfeeding problems that lead to inadequate intake, and poor hydration, evidenced by the dry mucous membranes and depressed fontanelles, can result in decreased excretion of bilirubin. Rh incompatibility occurs when a mother who is type Rh - gives birth to an infant who is Rh+ and develops anti-Rh antibodies in her serum. The antibodies attack the infant’s blood cells, causing the cells to lyse and producing a hemolytic anemia. The development of antibodies typically happens during the birthing process, so antibodies are present in subsequent pregnancies. Passing 1 stool in the first day of life is an expected finding and would not be considered a risk factor. The length of rupture of membranes was typical and would not be considered a risk factor.

**Case Study Question 3 of 6**

The nurse cases for a term newborn on the first day of life on the postpartum unit.

|  |  |  |  |
| --- | --- | --- | --- |
| **Phase Sheet** | | | |
| Name | Wang | | | | | | Gender | F |
| Gestation | 39.5 weeks | | Weight | | 6 lb. 9 oz/ 2.98 Kg | | Blood type | 0+ |
| **Nurse’s Notes** | | | |
| 0900. 18-hour old newborn born by spontaneous vaginal delivery to a 23-year-old gravida 2, para 1, blood type O-negative mother. Uncomplicated pregnancy. Rupture of membranes 7 hours prior to delivery with clear fluid. APGARs 7 and 9. Mom states that breast feedings are a struggle, baby has poor latch and is easily frustrated. Mom has sore nipples. | | | | | | | | |
| **History & Physical** | | | |
| **General** | | | | Slightly lethargic, crying with exam, flexed posture, visible jaundice | | | | |
| **Vital signs** | | | | T 37.3C/ 99.1F, HR 144, RR 48 | | | | |
| **HEENT** | | | | Normocephalic, fontanelle slightly depressed, eyes and ears normal set/shape, sclera yellow, palate intact, tongue with Epstein pearls, dry mucous membranes | | | | |
| **Cardio/respiratory** | | | | No murmur, pulses +2 bilaterally, breath sound clear, | | | | |
| **Gastrointestinal/**  **genitourinary** | | | | Soft, non-distended, liver palpable, umbilical stump intact/clamped; passed 1 meconium stool, voided 1 time since birth | | | | |
| **Musculoskeletal** | | | | Hips stable bilaterally, all WNL | | | | |
| **Laboratory Report** | | | |
| Lab | | Results | | | | Reference range | | |
| Total bilirubin | | 16 mg/dL | | | | <5.2 mg/dL within 24 hours of birth | | |
| Direct antiglobulin test | | Positive | | | | Negative | | |
| Hematocrit | | 39% | | | | Males: 42-52%; Females: 35-47% | | |
| Hemoglobin | | 13 g/L | | | | Males: 13-18 g/dL; Females:12-16 g/dL | | |

The nurse reviews the laboratory results.

* Complete the following sentence by choosing from the list of options.

|  |  |
| --- | --- |
| The client is most likely experiencing | breastfeeding jaundice |
| pathological jaundice\* |
| physiological jaundice |
| due to | poor intake |
| hemolysis\* |
| impaired excretion |

**Scoring Rule: Rationale**

**Rationale:** Visible jaundice on the first day of life and the high bilirubin level rising more than 5mg/dL a day indicate pathological jaundice. The direct antiglobulin test shows that there are maternal Rh antibodies adhering to the infant’s Rh+ red blood cells lysing the cells. Untreated, this will lead to a hemolytic anemia and possible kernicterus. Poor intake an excretion can complicate the problem but are not the underlying cause of the pathological jaundice.

**Case Study Question 4 of 6**

The nurse cases for a term newborn on the first day of life on the postpartum unit.

|  |  |  |  |
| --- | --- | --- | --- |
| **Phase Sheet** | | | |
| Name | Wang | | | | | | Gender | F |
| Gestation | 39.5 weeks | | Weight | | 6 lb. 9 oz/ 2.98 Kg | | Blood type | 0+ |
| **Nurse’s Notes** | | | |
| 0900. 18-hour old newborn born by spontaneous vaginal delivery to a 23-year-old gravida 2, para 1, blood type O-negative mother. Uncomplicated pregnancy. Rupture of membranes 7 hours prior to delivery with clear fluid. APGARs 7 and 9. Mom states that breast feedings are a struggle, baby has poor latch and is easily frustrated. Mom has sore nipples. | | | | | | | | |
| **History & Physical** | | | |
| **General** | | | | Slightly lethargic, crying with exam, flexed posture, visible jaundice | | | | |
| **Vital signs** | | | | T 37.3C/ 99.1F, HR 144, RR 48 | | | | |
| **HEENT** | | | | Normocephalic, fontanelle slightly depressed, eyes and ears normal set/shape, sclera yellow, palate intact, tongue with Epstein pearls, dry mucous membranes | | | | |
| **Cardio/respiratory** | | | | No murmur, pulses +2 bilaterally, breath sound clear, | | | | |
| **Gastrointestinal/**  **genitourinary** | | | | Soft, non-distended, liver palpable, umbilical stump intact/clamped; passed 1 meconium stool, voided 1 time since birth | | | | |
| **Musculoskeletal** | | | | Hips stable bilaterally, all WNL | | | | |
| **Laboratory Report** | | | |
| Lab | | Results | | | | Reference range | | |
| Total bilirubin | | 16 mg/dL | | | | <5.2 mg/dL within 24 hours of birth | | |
| Direct antiglobulin test | | Positive | | | | Negative | | |
| Hematocrit | | 39% | | | | Males: 42-52%; Females: 35-47% | | |
| Hemoglobin | | 13 g/L | | | | Males: 13-18 g/dL; Females:12-16 g/dL | | |

The nurse contacts the physician with the assessment and laboratory findings.

* Select the nursing action(s) from each of the categories the nurse should anticipate including in the plan of care. Each category may have one or more nursing action(s).

|  |  |
| --- | --- |
| Therapy | Nursing Action |
| Phototherapy | * Eye shield\* |
| * Monitor temperature hourly\* |
| * Kangaroo care |
| * Monitor phototherapy light level\* |
| Nursing | * Lactation consultant\* |
| * Encourage breast feeding every hour |
| * Supplement feedings with infant formula |
| * Weigh diapers\* |

**Scoring Rule: +/-**

**Rationale**: Phototherapy lights can cause retinal damage, hyperthermia, and bronzed baby syndrome. The nurse must plan interventions to decrease the risk of these adverse effects of therapy. Dehydration is another potential complication of phototherapy. Phototherapy increases insensible water losses. To maximize time under the lights, it is recommended that the baby not be removed from under the phototherapy lights for more than 20 minutes every 3-4 hours. This can interfere with feeding. A lactation consultant can help the breastfeeding parent maximize the efficiency of the time breastfeeding. The nurse should monitor the neonate’s hydration status by weighing the diapers. Although this neonate is struggling to breastfeed, supplementing feedings with formula are not the first choice as they may interfere with establishing breastfeeding.

**Case Study Question 5 of 6**

The nurse cases for a term newborn on the first day of life on the postpartum unit.

|  |  |  |  |
| --- | --- | --- | --- |
| **Phase Sheet** | | | |
| Name | Wang | | | | | | Gender | F |
| Gestation | 39.5 weeks | | Weight | | 6 lb. 9 oz/ 2.98 Kg | | Blood type | 0+ |
| **Nurse’s Notes** | | | |
| 0900. 18-hour old newborn born by spontaneous vaginal delivery to a 23-year-old gravida 2, para 1, blood type O-negative mother. Uncomplicated pregnancy. Rupture of membranes 7 hours prior to delivery with clear fluid. APGARs 7 and 9. Mom states that breast feedings are a struggle, baby has poor latch and is easily frustrated. Mom has sore nipples. | | | | | | | | |
| **History & Physical** | | | |
| **General** | | | | Slightly lethargic, crying with exam, flexed posture, visible jaundice | | | | |
| **Vital signs** | | | | T 37.3C/ 99.1F, HR 144, RR 48 | | | | |
| **HEENT** | | | | Normocephalic, fontanelle slightly depressed, eyes and ears normal set/shape, sclera yellow, palate intact, tongue with Epstein pearls, dry mucous membranes | | | | |
| **Cardio/respiratory** | | | | No murmur, pulses +2 bilaterally, breath sound clear, | | | | |
| **Gastrointestinal/**  **genitourinary** | | | | Soft, non-distended, liver palpable, umbilical stump intact/clamped; passed 1 meconium stool, voided 1 time since birth | | | | |
| **Musculoskeletal** | | | | Hips stable bilaterally, all WNL | | | | |
| **Laboratory Report** | | | |
| Lab | | Results | | | | Reference range | | |
| Total bilirubin | | 16 mg/dL | | | | <5.2 mg/dL within 24 hours of birth | | |
| Direct antiglobulin test | | Positive | | | | Negative | | |
| Hematocrit | | 39% | | | | Males: 42-52%; Females: 35-47% | | |
| Hemoglobin | | 13 g/L | | | | Males: 13-18 g/dL; Females:12-16 g/dL | | |
| **Orders** | | | |
| * Start phototherapy – 3 banks of lights per protocol * Obtain transcutaneous bilirubin level every 2 hours on covered skin * Obtain serum bilirubin every 6 hours * Lactation consultant * Strict I&O * V/S Q 1H X 2 hours then Q 2H | | | | | | | | |

The nurse has received orders and updates the plan of care.

* Click to specify if the nurse should implement the orders immediately, before the end of the shift, or by discharge.

|  |  |  |  |
| --- | --- | --- | --- |
| Order | Immediately | Before the end of the shift | By discharge |
| Start phototherapy | * \* |  |  |
| Lactation consultant |  | * \* |  |
| Parent education on use of phototherapy |  | * \* |  |
| Parent education on follow-up labs |  |  | * \* |
| Parent education Rh incompatibility |  | * \* |  |
| Obtain bilirubin |  | * \* |  |

**Scoring Rule: 0/1**

**Rationale:** Immediately – Based on the total serum bilirubin level phototherapy should be initiated.

Before end of shift –A lactation consultation is needed to improve breast feeding to help prevent dehydration and increase stooling to help excrete bilirubin. Parents will need to know how to interact with their infant while they are receiving phototherapy. Parents will need to understand the disease process as a rationale for the therapy needed and adherence to recommendations for time spent under phototherapy.

By discharge – Once the baby is discharged, follow-up total serum bilirubin levels may be needed to assess for rebound hyperbilirubinemia.

**Case Study Question 6 of 6**

The nurse cases for a term newborn on the first day of life on the postpartum unit.

|  |  |  |  |
| --- | --- | --- | --- |
| **Phase Sheet** | | | |
| Name | Wang | | | | | | Gender | F |
| Gestation | 39.5 weeks | | Weight | | 6 lb. 9 oz/ 2.98 Kg | | Blood type | 0+ |
| **Nurse’s Notes** | | | |
| 0900. 18-hour old newborn born by spontaneous vaginal delivery to a 23-year-old gravida 2, para 1, blood type O-negative mother. Uncomplicated pregnancy. Rupture of membranes 7 hours prior to delivery with clear fluid. APGARs 7 and 9. Mom states that breast feedings are a struggle, baby has poor latch and is easily frustrated. Mom has sore nipples.  0930. Phototherapy started.  1030. T 37.2C/ 99.F, HR 140, RR 42  11:30. T 37C/ 98.6.F, HR 144, RR 40. Lactation consultant worked with mom. Latched and breastfeed 10 minutes. Voided 10 mL and passed a meconium stool. Transcutaneous bilirubin 18 mg/dL. Sclera yellow. Backward arching noted. | | | | | | | | |
| **History & Physical** | | | |
| **General** | | | | Slightly lethargic, crying with exam, flexed posture, visible jaundice | | | | |
| **Vital signs** | | | | T 37.3C/ 99.1F, HR 144, RR 48 | | | | |
| **HEENT** | | | | Normocephalic, fontanelle slightly depressed, eyes and ears normal set/shape, sclera yellow, palate intact, tongue with Epstein pearls, dry mucous membranes | | | | |
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| Hemoglobin | | 13 g/L | | | | Males: 13-18 g/dL; Females:12-16 g/dL | | |
| **Orders** | | | |
| * Start phototherapy – 3 banks of lights per protocol * Obtain transcutaneous bilirubin level every 2 hours on covered skin * Obtain serum bilirubin every 6 hours * Lactation consultant * Strict I&O * V/S Q 1H X 2 hours then Q 2H | | | | | | | | |

The nurse reassesses the client 2 hours after starting phototherapy and implementing the treatment plan.

* For each finding, click to specify if the finding indicates that the client’s status has improved, declined, or is unchanged.

|  |  |  |  |
| --- | --- | --- | --- |
| Finding | Improved | Declined | Unchanged |
| Bilirubin |  | * \* |  |
| Breastfeeding | * \* |  |  |
| Yellow sclera |  |  | * \* |
| Posturing |  | * \* |  |

**Scoring Rule: 0/1**

**Rationale:** Breastfeeding has improved because the baby is able to latch now and has voided and stooled. The increased bilirubin levels after phototherapy shows a decline. The development of backward arching may indicate opisthotonos which develops as increased levels of unconjugated bilirubin cross the blood brain barrier and the bilirubin adheres to the neural cells in the brain. Opisthotonos is a sign of severe neurological damage. The sclera was yellow prior to beginning phototherapy and remains unchanged.

**Bowtie**

The nurse cases for a term newborn on the first day of life on the postpartum unit.

|  |  |  |  |
| --- | --- | --- | --- |
| **Phase Sheet** | | | |
| Name | Wang | | | | | | Gender | F |
| Gestation | 39.5 weeks | | Weight | | 6 lb. 9 oz/ 2.98 Kg | | Blood type | 0+ |
| **Nurse’s Notes** | | | |
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| **History & Physical** | | | |
| **General** | | | | Slightly lethargic, crying with exam, flexed posture, visible jaundice | | | | |
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| **HEENT** | | | | Normocephalic, fontanelle slightly depressed, eyes and ears normal set/shape, sclera yellow, palate intact, tongue with Epstein pearls, dry mucous membranes | | | | |
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| **Gastrointestinal/**  **genitourinary** | | | | Soft, non-distended, liver palpable, umbilical stump intact/clamped; passed 1 meconium stool, voided 1 time since birth | | | | |
| **Musculoskeletal** | | | | Hips stable bilaterally, all WNL | | | | |
| **Laboratory Report** | | | |
| Lab | | Results | | | | Reference range | | |
| Total bilirubin | | 16 mg/dL | | | | <5.2 mg/dL within 24 hours of birth | | |
| Direct antiglobulin test | | Positive | | | | Negative | | |
| Hematocrit | | 39% | | | | Males: 42-52%; Females: 35-47% | | |
| Hemoglobin | | 13 g/L | | | | Males: 13-18 g/dL; Females:12-16 g/dL | | |
| **Orders** | | | |
| * Start phototherapy – 3 banks of lights per protocol * Obtain transcutaneous bilirubin level every 2 hours on covered skin * Obtain serum bilirubin every 6 hours * Lactation consultant * Strict I&O * V/S Q 1H X 2 hours then Q 2H | | | | | | | | |

* Complete the diagram by dragging from the choices below to specify what condition the client is most likely experiencing, 2 actions the nurse should take to address that condition, and 2 parameters the nurse should monitor to assess the client’s progress.

|  |  |  |
| --- | --- | --- |
| Action to take |  | Parameter to monitor |
|  | Condition most likely experiencing |  |
| Action to take |  | Parameter to monitor |
|  |  |  |
| **Actions to take** | **Potential conditions** | **Parameters to monitor** |
| Initiate bottle feeding | Bilirubin encephalopathy\* | Reflexes\* |
| Exchange transfusion\* | Neonatal abstinence syndrome | APGAR score |
| Administer IV dexamethasone | Neonatal sepsis | Pain scale |
| Intensive phototherapy\* | Perinatal asphyxia | Neonatal abstinence score |
| Consult with neonatal cardiologist |  | Total serum bilirubin\* |

**Scoring Rule: 0/1**

**Rationale:** Bilirubin encephalopathy is caused by an extreme buildup of bilirubin in the brain. It is a medical emergency, and if treatment to bring down bilirubin levels is not initiated quickly, it can cause permanent brain damage. High values of indirect free bilirubin in the blood which couldn’t bind to albumin can transfer from the blood-brain barrier and precipitate in the brain cells and disturb the normal central nervous system function**.** Nurses must monitor the TSB level every 4-6 hours until levels start to decrease and notify the health care provided if therapeutic interventions are not effective. Diminished reflex responses in the neonate indicate a worsening neurologic outcome. Intensive phototherapy (two lights and a bili-blanket, should be initiated first. If levels do not respond in a few hours, or TSB are over the recommended levels, an exchange transfusion should be initiated.