

Neonatal Jaundice Pathway- Infants \geq 35 Weeks Gestational Age

Purpose Statement

To standardize the care of patients who present to Arkansas Children's with Neonatal Jaundice.

Goal

To increase adherence to national guidelines, decrease unnecessary interventions and promote/protect breastfeeding for patients with neonatal jaundice.

Neonatal Jaundice Pathway- Infants ≥ 35 Weeks Gestational Age - Emergency Department

Inclusion Criteria
Previously healthy
Age ≤14 days
Born at ≥35 wks gestational age

Exclusion Criteria
Direct hyperbilirubinemia
Suspected sepsis or ill-appearing
Meets NICU direct admit criteria:
Total Serum Bilirubin (TSB) >5mg/dL above exchange transfusion threshold and/or signs of acute bilirubin encephalopathy

!
Contact NICU
Attending for direct admission for infants meeting exchange transfusion criteria

!
IV Fluids NOT routinely indicated

Initial Assessment

- Clinical History/Physical Exam
- Blood glucose only if symptomatic
- Total Serum Bilirubin with direct fraction
- Initiate ED Hyperbilirubinemia (Neonatal) orders
- Determine exchange transfusion threshold using AAP nomogram
- Determine phototherapy threshold using BiliTool™ or AAP nomogram

Place PIV if clinically indicated (if not placed with lab draw)

Automatic NICU Admission Criteria

- Signs of acute bilirubin encephalopathy
-TSB > 5mg/dL above exchange transfusion threshold
- Include NICU attending on calls for patients that meet NICU direct admit criteria.

NICU Consult Criteria

- TSB within 2mg/dL of exchange transfusion threshold
- Age < 24 hours
- High suspicion for or lab evidence of hemolysis (e.g. DAT positive)

Evaluate for Discharge

- TSB below phototherapy threshold
- Follow-up appointment arranged for next day
- Feeding adequately
- No concern for significant hemolysis

Inpatient Admission

TSB above phototherapy threshold but not within 2mg/dL of exchange transfusion threshold (e.g. at 72 hours of age, exchange transfusion threshold 24 and TSB 21)

Admit to NICU

NICU (off pathway)

Meets discharge criteria

Discharge

Admit for phototherapy

Inpatient Admission

ED Management

- Encourage feeding (direct breast feeding/formula feeding is okay)
- Consider maintenance IV fluids if not feeding well
- Use maternal EBM for supplemental feeds, when available
- Give 20mL/kg bolus then maintenance IV fluids for patients that meet NICU consult criteria
- Consider additional labs (type & screen, total and direct bili)
- If patient meets criteria, initiate phototherapy

TSB rising or meeting NICU admission criteria

TSB stable or falling and otherwise clinically well

Neonatal Jaundice Pathway- Infants ≥ 35 Weeks Gestational Age - Inpatient

!
Supplemental IV Fluids NOT routinely indicated

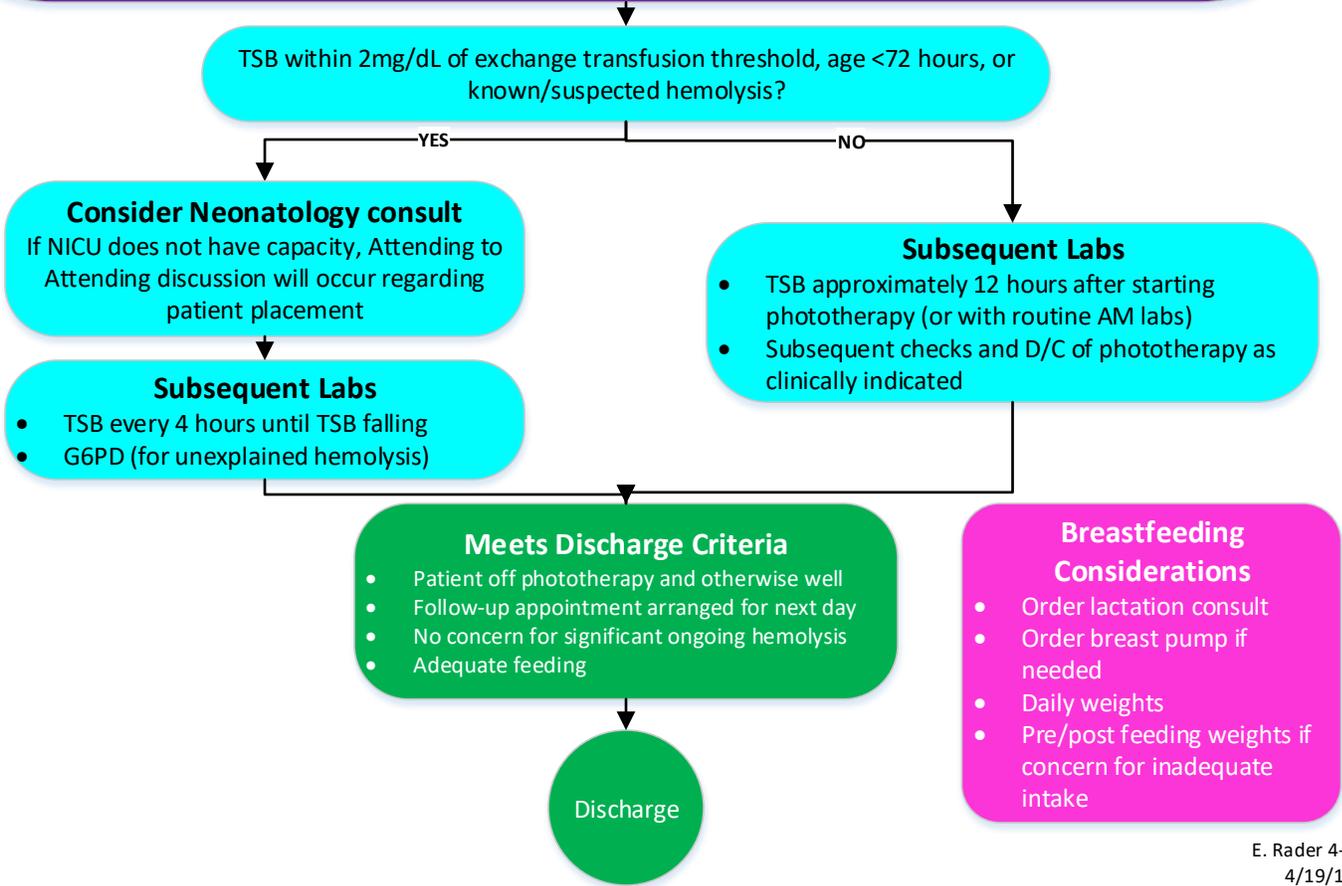
Inclusion Criteria
Previously healthy
Age ≤14 days
Born at ≥35 wks gestational age

Exclusion Criteria
Direct hyperbilirubinemia
Suspected sepsis or ill-appearing
Meets NICU direct admit criteria:
Total Serum Bilirubin (TSB) >5mg/dL above exchange transfusion threshold and/or signs of acute bilirubin encephalopathy

Considerations
Consider obtaining TSB at time off phototherapy and 4 hours after off phototherapy, especially if concern for rebound hyperbilirubinemia or ongoing hemolysis. Plot rate of rise, if > 0.15 mg/dL/h, concern for readmission. Consider continuing phototherapy and recheck TSB in 6-12 hours.

Inpatient Management

- Measure light therapy intensity using Bili meter and document level in Epic → Flowsheets → Phototherapy. Therapeutic level is 450 nanometers.
- Phototherapy: 60 microW/cm²
- Initiate Hyperbilirubinemia (Neonatal) Admit Orders
- If direct admit, obtain baseline total serum bilirubin (TSB)
- If not previously obtained or known, check direct bilirubin once
- Continue effective phototherapy until TSB at least 3mg/dL below phototherapy threshold
- Encourage continued home feeding (formula/breast milk) - Infant may be removed from phototherapy for up to 30 minutes at a time for breastfeeding
- Place patient in isolette.
- Consider additional labs for patients meeting NICU consult criteria
- Run maintenance IV fluids for patients within 2mg/dL of exchange transfusion threshold or with rapidly rising TSB. Stop IVF once TSB has fallen to at least 2mg/dL below exchange transfusion threshold and feeding well. (e.g. at 72 hours of age, exchange transfusion threshold 24 and TSB less than 22)



Definitions

For TSB $\leq 5\text{mg/dL}$, direct of 1mg/dL or greater—for TSB $>5\text{mg/dL}$, a direct bilirubin of more than 20% of the TSB is considered abnormal.

When to Suspect Ongoing Hemolysis

- If the total serum bilirubin does not fall or continues to rise despite intensive phototherapy
- Positive Coombs test indicates immune hemolytic anemia such as ABO- or Rh-incompatibility
- Abnormal peripheral blood smear

Indications for Supplementation

Infant indications

1. Asymptomatic hypoglycemia, documented by laboratory blood glucose measurement (not bedside screening methods) that is unresponsive to appropriate frequent breastfeeding. Note that 40% dextrose gel applied to the side of the infant's cheek is effective in increasing blood glucose levels in this scenario and improves the rate of exclusive breastfeeding after discharge with no evidence of adverse effects.⁷⁸ Symptomatic infants or infants with glucose <1.4 mmol/L (<25 mg/dL) in the first 4 hours or <2.0 mmol/L (<35 mg/dL) after 4 hours should be treated with intravenous glucose.¹⁵ Breastfeeding should continue during intravenous glucose therapy.
2. Signs or symptoms that may indicate inadequate milk intake:
 - a. Clinical or laboratory evidence of significant dehydration (e.g., high sodium, poor feeding, lethargy, etc.) that is not improved after skilled assessment and proper management of breastfeeding.⁷⁹
 - b. Weight loss of \pm 8–10% (day 5 [120 hours] or later), or weight loss greater than 75th percentile for age.
 - i. Although weight loss in the range of 8–10% may be within normal limits if all else is going well and the physical examination is normal, it is an indication for careful assessment and possible breastfeeding assistance. Weight loss in excess of this may be an indication of inadequate milk transfer or low milk production, but a thorough evaluation is required before automatically ordering supplementation.^{19,20,80}
 - ii. Weight loss nomograms for healthy newborns by hour of age can be found at: www.newbornweight.org^{20,80}
 - c. Delayed bowel movements, fewer than four stools on day 4 of life, or continued meconium stools on day 5 (120 hours).^{48,80}
 - i. Elimination patterns for newborns for urine and stool should be tracked at least through to the onset of secretory activation. Even though there is a wide variation between infants, the patterns may be useful in determining adequacy of breastfeeding.^{81,82} II-2. Newborns with more bowel movements during the first 5 days following birth have less initial weight loss, earlier the transition to yellow stools, and earlier return to birth weight.⁸³
2. Hyperbilirubinemia (see ABM Clinical Protocol #22: Guidelines for Management of Jaundice)
 - a. Suboptimal intake jaundice of the newborn associated with poor breast milk intake despite appropriate intervention. This characteristically begins at 2–5 days and is marked by ongoing weight loss, limited stooling and voiding with uric acid crystals.
 - b. Breast milk jaundice when levels reach 340–425 μ mol/L (20–25 mg/dL) in an otherwise thriving infant and where a diagnostic and/or therapeutic interruption of breastfeeding may be under consideration. First line diagnostic management should include laboratory evaluation, instead of interruption of breastfeeding.
3. Macronutrient supplementation is indicated, such as for the rare infant with inborn errors of metabolism.

Maternal indications

1. Delayed secretory activation (day 3–5 or later [72–120 hours] and inadequate intake by the infant).⁸⁰
2. Primary glandular insufficiency (less than 5% of women—primary lactation failure), as evidenced by abnormal breast shape, poor breast growth during pregnancy, or minimal indications of secretory activation.^{84,85}
3. Breast pathology or prior breast surgery resulting in poor milk production.⁸⁴
4. Temporary cessation of breastfeeding due to certain medications (e.g., chemotherapy) or temporary separation of mother and baby without expressed breast milk available.
5. Intolerable pain during feedings unrelieved by interventions.

Metrics

1. Increase breast feeding rates by 25% by June 30, 2020 (baseline data pending, subject to change).
2. Increase the use of the neonatal jaundice pathway by 50% by June 30, 2020.
3. Decrease the time to initiating phototherapy by 50% by June 30, 2020 (baseline data pending, subject to change).
4. Decrease length of stay for patients admitted with neonatal jaundice by 5% by June 30, 2020 (baseline data pending, subject to change).
5. Decrease readmission rate for patients admitted with neonatal jaundice by 5% by June 30, 2020 (baseline data pending, subject to change).

Contributing Members

Dr. Rebecca Cantu- Hospital Medicine

Dr. Jared Beavers- Neonatology

Sharon Tunstall, RN- 3K

Dr. Jeffery Montgomery- Emergency Medicine

Tiffany Squires, RN- ED

Belinda Edgar, RN- IT

Emily Rader, RN- Pathway Specialist

References

1. ABM Clinical Protocol #3: Hospital Guidelines for the Use of Supplementary Feedings in the Healthy Term Breastfed Neonate, Revised 2017. *Breastfeeding Medicine*. 2017;12(3):175-182.
2. ABM Clinical Protocol #22: Guidelines for Management of Jaundice in the Breastfeeding Infant 35 Weeks or More of Gestation – Revised 2017. *Breastfeeding Medicine*. 2017;12(5):250-257.
3. Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation. *Pediatrics*. 2004;114(1):297-316.
4. Maheshwari, A., & Carlo, W. A. (2016). Blood Disorders. In *Nelson Textbook of Pediatrics*(20th ed.). Elsevier.