Neonatal Hyperbilirubinemia, OP/ED, Inpatient, Pathway

Updated: February 3, 2023

Clinical Pathway Summary

CLINICAL PATHWAY NAME: Neonatal Hyperbilirubinemia, OP/ED, Inpatient

PATIENT POPULATION AND DIAGNOSIS: Neonates (0-28 days old) born at 35 weeks gestation or more, diagnosed with indirect hyperbilirubinemia

APPLICABLE TO: Helen DeVos Children’s Hospital and SH regional sites treating patient population

BRIEF DESCRIPTION: The goal of this clinical practice guideline (CPG) is to provide an evidence-based approach to the diagnosis and management of indirect hyperbilirubinemia in neonates born at 35 weeks gestation or more. This CPG is intended for pediatricians, family medicine physicians, emergency medicine physicians, pediatric hospitalists, neonatologists, resident physicians, nurse practitioners and physician assistants who care for these children in the clinic, emergency department, inpatient and neonatal intensive care unit settings. This CPG does not apply to premature infants born prior to 35 weeks gestational age or those with direct hyperbilirubinemia, although some initial direction is provided in the latter case.

Indirect hyperbilirubinemia leading to jaundice will affect more than 80% of newborn infants. Careful monitoring of all newborn infants and application of appropriate treatments are essential because high bilirubin concentrations can cause acute bilirubin encephalopathy and kernicterus. Risk factors for significant hyperbilirubinemia, when to initiate phototherapy or escalate care and guidance on testing, including in follow-up, are included in this CPG.

IMPLEMENTATION DATE: May 1, 2023

LAST REVISED: February 3, 2023

Pathway Information

OWNERS: Heather Gladfelter, MD; Allison Long, MD

CONTRIBUTORS: Lana Gagin, MD; Mitch DeJonge, MD

EXPERT IMPROVEMENT TEAM (EIT): Pediatric EIT

CLINICAL PRACTICE COUNCIL (CPC): Children's Acute Care

CPC APPROVAL DATE: May 1, 2023

OTHER TEAM(S) IMPACTED: Nursing, lactation consultants, registered dietitians

References

HDVCH Outpatient/ED Management and Admission Criteria for Neonatal Hyperbilirubinemia

TcB Transcutaneous bilirubin
TSB Total serum bilirubin
PTX Phototherapy
DAT Direct antiglobulin test
G6PD Glucose-6-phosphate dehydrogenase deficiency

Infant 24hr – 14d > 35w GA

Does the infant have any neurotoxicity risk factors as outlined in Table 1?

No

Is TcB within 3 mg/dL of threshold for phototherapy or above 15mg/dL?

Yes

Obtain TcB and plot on Phototherapy (PTX) Nomogram or BiliTool for infants without neurotoxic risk factors
Option to skip to TSB

Obtain TcB and plot on Phototherapy (PTX) Nomogram or BiliTool for infants with neurotoxic risk factors
Option to skip to TSB

Assess for risk of developing severe hyperbilirubinemia based on Table 2 and use provider discretion to determine timing of follow up

Confirm with TSB (Fractionate if not done previously)

TSB > 2mg/dL below PTX threshold

TSB 0-2 mg/dL below PTX threshold

Between PTX threshold and exchange transfusion based on neurotoxic risk factors*

Within 2 mg/dL of exchange transfusion based on neurotoxic risk factors

Ensure follow up with PCP in 24-48 hours.

Ensure follow up with TSB and/or POP in 24 hours.

Call HDVCH Hospitalists for direct admission

Admit directly to NICU and follow “Escalation of Care” protocol

Proceed to treatment protocol on next page

*Exchange Threshold for infants without neurotoxicity risk factors
*Exchange Threshold for infants with neurotoxic risk factors

Yes

No

Table 1
Neurotoxicity Risk Factors
1. Iso-immune hemolytic disease (+DAT), G6PD
2. Sepsis
3. Significant clinical instability in the previous 24 hours
4. Albumin < 3.0g/dL

Table 2
Risk Factors for Developing Severe Hyperbilirubinemia
1. Lower gestational age
2. Jaundice in the first 24 hours of life
3. Predischarge TcB or TSB close to PTX threshold
4. Hemolysis from any cause (known or suspected)
5. PTX before discharge from birth admission
6. Parent or sibling requiring phototherapy or exchange transfusion
7. Family history of inherited RBC disorders (i.e., G6PD, hereditary spherocytosis)
8. Exclusive breastfeeding w/ suboptimal intake
9. Scalp hemATOMA or significant bruising
10. Down Syndrome
11. Macrosomic infant of diabetic mother

Table 3
Eligibility Criteria for using BiliBlanket:
1. GA ≥ 38w
2. Age ≥ 48 hours
3. Clinically well with adequate feeding
4. No neurotoxicity risk factors (Table 1)
5. No previous phototherapy
6. TSB no more than 1 mg/dL above treatment threshold
7. Blanket is available without delay
8. TSB can be measured daily

If TSB on daily labs is ≥ 1 mg/dL above threshold OR the difference between TSB and threshold narrowed from previous check, the infant should be direct admitted to the hospital.
**HDVCH Inpatient Management of Neonatal Indirect Hyperbilirubinemia**

### Table 2

**Hyperbilirubinemia Admission “Order Set”**

1. Admit to general pediatrics floors under ‘hyperbilirubinemia requiring phototherapy’
2. Double PTX (1 light and blanket)
3. Baseline TSB (consider fractionation if not already done*)
4. ABO/Rh and DAT (if no cord blood available)
5. Consider CBC w/ reticulocyte count
6. Strict IOs
7. Daily weights
8. Consider Lactation/ RD consult
9. Vitamin D supplementation
10. Schedule repeat TSB within 12 hours
11. Consider cultures to evaluate for sepsis if there are clinical signs/symptoms

### Table 1

**Neurotoxicity Risk Factors**

1. Iso-immune hemolytic disease (+DAT), G6PD
2. Sepsis
3. Significant clinical instability in the previous 24 hours
4. Albumin < 3.0g/dL

---

**Infant 24h-14d > 35w GA**

- with TSB between phototherapy threshold and exchange transfusion threshold based on neurotoxic risk factors (Table 1) using BiliTool or the AAP CPG

#### 1. Direct Admit to general floors following orders outlined in Table 2

- 2. Begin double PTX

<table>
<thead>
<tr>
<th>TSB</th>
<th>Recheck</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;25 mg/dL</td>
<td>2-3 hr</td>
</tr>
<tr>
<td>20-25 mg/dL</td>
<td>3-4 hr</td>
</tr>
<tr>
<td>15-20 mg/dL</td>
<td>6-12 hr</td>
</tr>
<tr>
<td>&lt;15 mg/dL</td>
<td>12-24 hr</td>
</tr>
</tbody>
</table>

#### Is TSB 2mg/dL or more below the PTX threshold used at time of initiation of phototherapy?

- Yes: Stop phototherapy and determine follow up below

#### Is repeat bilirubin level decreasing or stable?

- Yes: Continue to recheck TSB q6 hours

#### Is TSB within 2mg/dL of exchange transfusion based on neurotoxicity risk?

- Yes: Consider additional laboratory workup (fractionated bilirubin*, CBC and reticulocyte count, G6PD)

#### Risk Factors

- Known hemolytic disease
- Received PTX during birth admission and readmitted for PTX
- Did not receive PTX during birth admission

#### Follow Up

- Repeat TSB in 6-12 hr and day after discontinuation
- Repeat TSB the day after discontinuation
- See PCP 1-2d after discontinuation, Need for TSB based on risk factors (GA < 38w, feeding/weight gain)

---

**Continually assess hydration status:**

1. Does the infant have adequate suck/latch?
2. Assess % weight loss from birth weight
3. Having at least 4 wet diapers a day and transitioned stools
4. Assess duration and frequency of feeds
   *Limit time infant is removed from lights to under 30 minutes during feeds/care*

---

**Initiate transfer to NICU Escalation of Care Protocol in the NICU**

1. STAT CBC, fractionated bilirubin, CMP, type and match
2. Notify blood bank
3. TSB q4 hours
4. Obtain IV (evaluate for umbilical access) and start IVF
5. Continue PTX
6. Consider IVIG

**Return to standard PTX pathway**

- TSB >2 mg/dL from exchange

**Continue checking TSB q4 hours**

- TSB <2 mg/dL from exchange

**Perform exchange transfusion**

- TSB above exchange threshold