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Memorandum

To: UMHS Physicians, Nurse Practitioners and Physicians Assistants

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Subject: **UMHS Clinical Care Guideline: Management of Indirect Neonatal Hyperbilirubinemia**

What's New!



These new guidelines have been developed to assure consistent management of patients with indirect neonatal hyperbilirubinemia. Guideline covers prevention, diagnosis and treatment of best practice recommendations.

Key Aspects of Care

Diagnosis. The approach to diagnosing hyperbilirubinemia will differ depending on whether it is detected via screening during the birth hospitalization (see Figure 1) or later in follow-up (see Figure 2).

Bilirubin Measurement. A total bilirubin (TSB or TcB) level should be measured on all newborns prior to discharge. Choose appropriate test for bilirubin levels (Table 5)

If TSB is indicated, the first level should be fractionated to rule out direct hyperbilirubinemia. Subsequent measurements can be total bilirubin alone.

The first measurement should be obtained at 16-24 hours of life.

Discharge prior to 16 hours of life is strongly discouraged. If extenuating circumstances result in the discharge of a neonate prior to 16 hours of life, appropriate follow-up for evaluation of hyperbilirubinemia should be arranged.

Total bilirubin levels should be plotted on the hour-specific nomogram to direct follow up (Figures 4 & 5). If POC bilirubin is obtained in the outpatient setting, consider that serum measurements can be 10% higher when interpreting the results.

Further investigation into underlying etiology. Investigation into rarer causes of hyperbilirubinemia is recommended in certain circumstances (Table 4).

Risk Stratification. Use risk stratification (lower, medium, or higher risk (Table 3) to determine phototherapy and exchange-transfusion thresholds. To risk stratify, combine gestational age (GA) with presence of neurotoxicity risk factors (Table 1). [I-D]

Treatment. For overview, see Figure 3.

Decision to admit to the hospital and treat should be based on TSB. [I-D]

Intensive phototherapy can be expected to decrease bilirubin levels by 30-40% in 24 hours, with most being in the first 4-6 hours. Intensive phototherapy should be initiated in the following circumstances:

when total bilirubin is at or above the phototherapy treatment threshold based on hour-specific nomograms (Figure 4) and when TSB rate of rise >0.2 mg/dL/hour and TSB is predicted to cross treatment threshold prior to next evaluation

There is lack of evidence to support the routine use of home phototherapy when the bilirubin level is at, near, or above the treatment threshold. However, home phototherapy can be considered when bilirubin is 0-2 mg/dL below the treatment threshold at discharge from the birth hospitalization or in the outpatient setting in the following circumstances:

Neonates who feed well, appear well, and have close follow up arranged.

Neonates with **no** neurotoxicity risk factors (low risk or medium risk based on gestational age alone) [III-C]

Neonates without prior history of intensive phototherapy treatment

When bilirubin values are at or near exchange transfusion values:

Maximize surface area exposed to phototherapy by removing unnecessary clothing (minimal/no diaper)

Use highly reflective materials to surround the neonate to increase surface area exposed and irradiance

Use multiple light sources (measure irradiance at various sites)

Consider adjunctive therapies, including Intravenous immunoglobulin (IVIG) and IV hydration

Notably, turning baby from prone to supine in an alternating fashion has **not** been shown to be efficacious

For most neonates, routine **IV supplementation** is **not** warranted. However, for neonates with **severe** hyperbilirubinemia, IV fluid administration may be useful and is recommended.

Use of **IVIG** may be useful in Rh or ABO disease.

Use should be restricted to select neonates in the NICU with high bilirubin values or rapid rate of rise (at high risk for exchange transfusion).

Neonates should be monitored closely.

Dose 0.5g/kg over 2 hours, repeat as clinically indicated.

An **exchange transfusion** should be considered when a serum bilirubin value surpasses the applicable AAP recommended threshold value (Figure 5).

Monitoring. Following the initiation of phototherapy, only serum bilirubin (TSB) levels are recommended.

Stop phototherapy once serum bilirubin has fallen to a level at least 3 mg/dL below the phototherapy threshold.

Rebound levels at 6 hours are not predictive of subsequent repeat phototherapy.

If treated prior to initial hospitalization discharge (post-delivery), consider repeat TSB 24 hours after discontinuation of phototherapy. This can be done as an outpatient.

If preterm, DAT+, or treated after readmission and serum bilirubin is **greater** than 14, recheck TSB 12-24 hours after discontinuation of phototherapy. This can be done as an outpatient. (If bilirubin \leq 14, routine repeat TSB is not indicated in all neonates.)

When treating with exchange transfusion, recheck bilirubin q 4-6 hours, depending on the rate of decline.

A neonate being treated with home phototherapy (fiber optic blanket, Bili Blanket) should have a TSB checked:

- every 24-48 hours if the neonate is low risk
- every 24 hours if the neonate is medium risk and has no neurotoxicity risk factors

Discharge should not be delayed to obtain a rebound bilirubin level. Rebound levels can be checked as an outpatient when indicated.

Follow-up. Timing and frequency of follow up after birth hospitalization should be influenced by risk of development of severe hyperbilirubinemia. This can be determined by risk factors for development of severe hyperbilirubinemia (Table 2) as well as plotting TcB or TSB on the Bhutani nomogram (Appendix 1)

- For those at higher risk, follow up should occur 1 day following birth hospitalization discharge

After hospital discharge from phototherapy, PCP follow-up should be arranged within 24 hours, or 48 hours when no serum bilirubin recheck is required (i.e. discharge bilirubin <14).

Phototherapy Techniques. Fiberoptic Phototherapy Blanket: The fiber optic blanket should be applied next to the neonate's skin. The neonate may wear a diaper. The parents should swaddle the neonate with the fiber optic blanket next to the skin to avoid hypothermia. Feeding can continue with the blanket next to the neonate's skin. If necessary, to optimize feeding, the neonate may be removed from the blanket for up to 30 minutes every 2-3 hours.

Inpatient Phototherapy:

Babies receiving inpatient phototherapy should receive "intensive" phototherapy. [I-C]

For the majority of term neonates, phototherapy using a single overhead LED light source will provide intensive phototherapy and will be sufficient.

Phototherapy using a single overhead LED light source and fiberoptic blanket may be indicated when the serum bilirubin value is:

- rising more than 0.5mg/dl/hour
- within 3mg/dl below the exchange transfusion threshold
- fails to respond to initial phototherapy

Use of 2 angled overhead lights, a fiberoptic blanket, and white sheets as a reflective surface may be indicated when bilirubin is at or above the exchange transfusion threshold. This is done in the NICU.

- body surface area exposed and continuity of therapy (i.e. minimizing interruptions) will influence efficacy.
- irradiance should be measured regularly.
- there is a lack of evidence to support the use of fiberoptic blanket alone.

when neonates are not considered high risk for exchange transfusion, phototherapy can be temporarily halted to allow for bonding and breastfeeding.

All UMHS Inpatient Clinical Care Guidelines can be found at: <http://www.uofmhealth.org/provider/clinical-care-guidelines>