Neonatal Icter

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Criteria for Home Phototherapy in Newborns

- ≥ 38 weeks' gestational age
- ≥ 48 hours of age
- Newborn is clinically well with appropriate weight loss (no more than 10% of birth weight) and output (number of voids and stools in 24 hours equivalent to age of newborn in days)
- No known neurotoxicity risk factors
- No previous phototherapy
- Total serum bilirubin no more than 1 mg per dL greater than the phototherapy threshold for age in hours*
- LED-based phototherapy device is available to bring home the same day
- Ability to check total serum bilirubin daily after starting phototherapy

Initiation of phototherapy

- Initiation of phototherapy is clinically determined when a specific range of TSB threshold values based on a newborn infant's gestational age (in weeks), postnatal age (in hours), and the presence or absence of risk factors associated with bilirubin neurotoxicity is reached.

TSB thresholds

- The TSB thresholds should provide a sufficient margin of safety and take into account interlaboratory variations in TSB measurements, the biologic vulnerability of an individual infant, the rapidity of an infant's response to phototherapy, and the balance between risks of over- and undertreatment.

The effectiveness of phototherapy

- The effectiveness of phototherapy depends on the efficacy of the device used and the net gradient between an infant's rates of bilirubin production and elimination. Phototherapy needs to be delivered in measurable doses (irradiance), which makes it conceptually similar to pharmacotherapy

Application of phototherapy

- The efficacy of phototherapy devices varies widely because of nonstandardized use of light sources and configurations and irradiance meters.

Efficacy of a device

- Factors to consider in prescribing and implementing phototherapy using a particular device include:
- (1) the emission wavelength range of the light source;
- 2) the light intensity (dose, irradiance) delivered;
- (3) the percent exposed BSA of the infant (ventral, dorsal, or both) that can be illuminated;
- and (4) commercially availability.
- Efficacy is measured by the rate of reduction in TSB concentrations but may be impacted by variations in infant skin thickness and maturation and hematocrit.

Duration of Light Exposure

- Phototherapy can be administered continuously or intermittently (ie, cycled).
- The benefits of either strategy have not been demonstrated consistently in the literature.
- In view of potential adverse effects of excessive photon exposure, it is prudent to limit the total duration of light exposure or “irradiance dose.”
- Small trials in term or near-term infants have reported that brief light exposure to 15 minutes per hour resulted in equivalent reduction of TSB concentrations as compared with continuous phototherapy.

Discontinuing phototherapy

- It is an option to discontinue phototherapy when the TSB has declined by 2 to 4 mg/dL below the hour-specific threshold at the initiation of phototherapy.
- The decision to discontinue phototherapy should be individualized to consider the TSB level at which phototherapy was initiated, the cause of the hyperbilirubinemia, the difference between the TSB level and the phototherapy threshold, and the risk of rebound hyperbilirubinemia.

- Prolonged phototherapy has been associated with increased oxidant stress and lipid peroxidation and riboflavin deficiency.

Discontinuing phototherapy

- Discontinuing phototherapy as soon as it is safe reduces unnecessary exposure to phototherapy while minimizing the risk of rebound hyperbilirubinemia.

Considerations

- Positioning, sleep posture, and medically-safe locations and environment
- Adjustments for infant's gestational
- Age Assessment for hemolysis and ensuing unpredictable response
- Availability of daily monitoring of patient and bilirubin level (either TcB or able to obtain TSB results in a timely manner)
- Appropriate supervision and a secure process for escalation of care if necessary