MANAGING JAUNDICE IN THE BREASTFEEDING INFANT

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I have no conflicts of interest to declare

Except

I am a member of the Board of Directors of BABY FRIENDLY USA
KERNICTERUS: The reason we have to care about bilirubin

- AKA: Bilirubin Encephalopathy
- Definition: Brain damage resulting from the entrance of unconjugated bilirubin into certain centers in the brain and causing death of neurons.
- Manifestations:
  - Acute – opisthotonus, spasticity, seizures, death
  - Long Term – choreoathetoid CP, deafness, severe motor deficit
WE THOUGHT KERNICTERUS HAD DISAPPEARED!

- It has not!
- Why not?
- What types of infants are still having kernicterus?
  - All kinds of children – but one type has emerged recently as predominant
The New Kernicterus:

- **BREASTFED INFANTS**
  - 90% of all cases of kernicterus especially with weight loss in excess of 10%

- **ALSO**
  - **BIG PREMATURES**
    - 35 weeks and >2,500 grams poorer breastfeeders, greater weight loss

- **INTERNAL BLEEDING**
  - Cephalhematoma, Subgaleal hemorrhage, Unknown site

- **G6PD DEFICIENCY**
  - About 30% of cases of kernicterus
New Study from Brazil

Draque C M et al. Pediatrics
2011;128:e565-e571
Neonatal Jaundice: Mechanisms
Physiologic Jaundice of the Newborn

Synthesis

Load

Uptake  Conjugation  Excretion

Liver

Enterobacterial Circulation

Intestine

Bile Duct
Breastfeeding and Jaundice: Two Phenomena

- **BREASTMILK JAUNDICE**
  - Normal and Physiologic

- **STARVATION JAUNDICE**
  - aka: Breastfeeding Jaundice
  - aka: Breast-non-feeding Jaundice
  - Abnormal and dysfunctional
Neonatal Jaundice: Mechanisms In Breastfeeding Infants

- Synthesis
- Load
- Uptake
- Conjugation
- Excretion
- Enterohepatic Circulation
- Liver
- Bile Duct
- Intestine
More frequent breastfeeding results in lower bilirubin levels
More frequent feedings increases caloric intake
Greater caloric intake results in lower bilirubin levels

Recognizing risk:

- Large *prematures* are at particular risk of kernicterus
- **Risk factors** need to be recognized: cephalhematoma, prematurity, hemolysis,
- Jaundice needs to be closely monitored and *treated* promptly
- Poor breastfeeding is both a *symptom* of and *result* of hyperbilirubinemia
New References

- Highly Recommended

- American Academy of Pediatrics
  Clinical Practice Guideline
  
  Management of Hyperbilirubinemia in the Newborn Infant 35 or More Weeks of Gestation
  
  *Pediatrics* 2004;114:297-316

- Gartner, L.M.
  
  Hyperbilirubinemia and Breastfeeding (Chap 13)
  
  Pages 255-270
AAP - New Management Guidelines
Ten Key Elements

1. Promote & Support Successful Breastfeeding
2. Nursery protocols to identify & evaluate hyperbilirubinemia
3. TSB or TCB bilirubin on infants jaundiced in first 24 hrs.
4. Visual estimation of bilirubin is not reliable
5. Interpret bilirubin levels in relation to age in hours
6. Infants less than 38 weeks and breastfed infants at higher risk of developing hyperbilirubinemia – need closer surveillance
7. Assess all infants for risk of hyperbilirubinemia pre-discharge
8. Provide parents with written & verbal info about neonatal jaundice
9. Appropriate follow-up based on age at discharge and risk status
10. Treat newborns, when indicated, with phototherapy and/or exchange transfusion

Pediatrics 2004;114:297-316
Primary Prevention

- Recommendation #1
  - Clinicians should advise mothers to nurse their infants at least 8 to 12 times per day for the first several days.

- Recommendation #1.1
  - The AAP recommends against routine supplementation of non-dehydrated breastfed infants with water or dextrose water.
  - “Supplementation with water or glucose water will not prevent hyperbilirubinemia or decrease total serum bilirubin levels.”

  *Pediatrics* 2004;114:297-316
Prevention of Excessive Hyperbilirubinemia

1. Early initiation of breastfeeding
   - First 30 to 60 minutes of life with skin to skin

2. No feeds prior to initiation
   - No water, no glucose water, no formula

3. Optimize breastfeeding from the beginning
   - Position; latch; formal evaluation early

4. Teach and use early feeding cues

5. No supplementation
   - Differentiate between normal irregularity and true starvation.
Jaundice should be assessed whenever the infant’s vital signs are measured but no less than every 8 to 12 hours

- In daylight at window (preferred)
  - Or well lit room
- First seen in face; progresses caudally
- Uncertain reliability of clinical assessment
- Use transcutaneous bilirubin measurement
  - If elevated confirm with serum bilirubin
  - Standing orders should give nurse the right to order transcutaneous or serum bilirubin without specific physician order.

*Pediatrics* 2004;114:297-316
Clinical Observations

Variable
- Depends on person, experience, lighting

In hospital
- Formal assessment of jaundice every shift
- Use transcutaneous bilirubin if available
- Use serum bilirubin if infant appears jaundiced even if think it is mild unless reliability of transcutaneous method has been established.
- Repeat serum bilirubin before discharge or use transcutaneous technique.

At home
- Don’t rely on parents
- Parents are even less reliable observers
- If in higher risk categories by Bhutani curve, schedule for early visit with serum bilirubin determination.
Monitor daily weights in hospital

Use of cephalocaudal progression
  - Be cautious

Use TOTAL serum bilirubin
  - Do not subtract the direct fraction
  - Measure direct fraction if jaundice continues for more than 3 weeks

Measure Glucose-6-Phosphate Dehydrogenase (G-6-PD) activity in otherwise unexplained jaundice in infants of Mediterranean, Arabic, Asian and African origin – and others

Perform formal risk assessment before discharge (risk factors and Bhutani curve)
If jaundice appears in the **first 24 hours**, no matter how mild:

- Perform transcutaneous or serum bilirubin determination immediately
- Repeat to determine rate of rise
- Perform diagnostic studies
  - Assume hemolysis or internal bleeding until proven otherwise.

If total bilirubin exceeds 12 mg/dl at any age, perform diagnostic studies to determine cause.
Laboratory Evaluation

**Required**
- Blood Type and Rh
  - Mother; Baby
- Coombs Test (DAT) – Baby
- Hemoglobin/Hematocrit
- Red cell smear for morphology

**Optional**
- G6PD
- Serum electrolytes
- Reticulocyte count
Recommendation 5.1:
Risk Assessment before Discharge

Before discharge assess risk for severe hyperbilirubinemia

- Every nursery should have formal protocol
- Essential for infants discharged before 72 hrs
- Best method: measure serum or transcutaneous bilirubin in every infant before discharge and plot on Bhutani curve
  - Perform at same time as metabolic blood sampling

*Pediatrics* 2004;114:297-316
Breastfeeding Management

What to do:
- Correct breastfeeding difficulties before child leaves hospital
- Assess breastfeeding at follow-up visit and correct all problems on site or refer to lactation expert
- DON’T LEAVE A STARVING CHILD STARVING!
  - If necessary, feed expressed breastmilk, banked human milk or formula
- Optimize breastfeeding management to achieve return to exclusive breastfeeding
- Recognize that parents will associate jaundice with breastfeeding and will have increased anxiety regarding breastfeeding
Recommendation 6.1

Hospital Policies and Procedures

- All hospitals should provide written and verbal information for parents at the time of discharge to include:
  - Explanation of jaundice
  - Need to monitor infants for jaundice
  - Advice on how monitoring should be done
    - Early visit (3 to 5 days of age)
    - Repeat visit if indicated
    - Can not rely on parents’ observations of jaundice to determine severity
**Recommendation 6.1.2**

**Follow-up Visit**

- **Timing**
  - If discharged before 24 hours, see by age **72 hrs**
  - If discharged 24 to 47.9 hrs, see by age **96 hrs**
  - If discharged 48 to 72 hrs, see by age **120 hrs**

- **Second follow-up visit**
  - If discharged before 48 hrs, may need second early visit if first visit is before 72 hrs.
  - With risk factors – use judgment

- **Examiner:** Qualified (licensed) health care professional
Follow-up Visit (cont.)

- Content of follow-up visit
  - Infant weight and percent change from birth
  - Assessment of intake by caretaker history
  - Voiding and stooling frequency
  - Observe feeding
    - Breast or bottle
  - Assessment of clinical jaundice
  - Serum bilirubin if clinical jaundice is more than minimal.
    - If uncertain get the serum bilirubin.
Specific Management

If jaundice **NOT** related to breastfeeding:
- Continue breastfeeding
- Formula supplement may help reduce bilirubin but has risks
  - Use of elemental formulas

If **Breastmilk** Jaundice and **low** risk with bilirubin 20 to 25 mg/dl:
- Phototherapy & continue breastfeeding
  - Home vs. hospital
- Interrupt breastfeeding for 24 hours & feed elemental formula
- Supplement breastfeeding with elemental formula
- Combined treatment is most effective but often unnecessary

**Post Therapy:** **Monitor bilirubin for rebound**
Specific Management

If Starvation Jaundice:

Feed the baby

- Mother’s milk if available by whatever route
- Human milk bank milk if available
- Infant formula

If bilirubin reaches critical phototherapy level (graph)

Institute same measures as previously shown

Always consider that another factor may be causing excessive hyperbilirubinemia in addition to starvation.

If bilirubin is at or above exchange transfusion level, perform exchange transfusion without delay.
Guidelines for Phototherapy

– 35 or more weeks of gestation
The End