

Jaundice - Newborn

Pediatric After-Hours Version

- DEFINITION -

* Yellow color of the skin and whites of the eyes

- INITIAL ASSESSMENT QUESTIONS -

1. COLOR: "What color is the jaundice?" "How deep is the color?" "Is your baby a lot more yellow than when last seen?"
2. SEVERITY and LOCATION: "What part of the body is jaundiced?" "Does it involve the legs?"
 - MILD jaundice: Face or sclera only
 - MODERATE jaundice: Trunk involved (chest and/or abdomen)
 - SEVERE jaundice: Legs involved or entire body surface
3. ONSET: "On what day of life did you first notice your newborn was jaundiced?" (Days)
4. BILIRUBIN LEVEL: "Did the hospital or office tell you your baby's bilirubin level?" If so, "What was it?" (Note: includes either serum or transcutaneous measurements)
5. SYMPTOMS: "Does your baby have any other symptoms?" If so, ask: "What are they?"
6. OUTPUT: "How many poops has your baby passed in the last 24 hours?" (Normal: 3 or more per day) "How many wet diapers have there been in the last 24 hours?"
7. FEEDING: "How is feeding going?" "How strong a feeder is your baby?"
8. BABY'S APPEARANCE: "How is your baby acting?"

- BACKGROUND INFORMATION -

RECOGNIZING THE PRESENCE OF JAUNDICE BY PARENT

Sometimes callers aren't certain if the newborn's skin is jaundiced. Have them look at the sclera. If the sclera is white, the child is NOT jaundiced. The sclera always turns yellow at a lower bilirubin level than the skin. The color of the sclera is essential in assessing whether jaundice is present in babies with darkly pigmented skin or those who normally have a yellowish skin tone (some Hispanics). Parents of darkly pigmented newborns can be taught to observe the hands and feet for yellowing.

ESTIMATION OF BILIRUBIN LEVEL BY PARENT

- * If the parent can be taught to report what part of the body is jaundiced, this information can be helpful. (See Care Advice 10: Judging Jaundice)
- * Parents are not qualified however, to judge the depth of jaundice. Even physicians and nurses are not consistently reliable.
- * Therefore, if the caller thinks the jaundice is deep yellow or orange, the patient is seen now.
- * If the caller thinks the jaundice is light yellow, but they are concerned, the baby is seen within 24 hours.
- * Trying to get the parent to be more specific about the degree of jaundice is unfair and potentially dangerous.

BILIRUBIN LEVEL SEVERITY BY PARENT'S REPORT OF LOCATION

- * The following rating scale is used for phone assessment in this guideline:
- * MILD jaundice: Face or sclera only
- * MODERATE jaundice: Trunk involved (chest and/or abdomen)
- * SEVERE jaundice: Legs involved or entire body surface
- * Newborns with SEVERE jaundice all need to be referred in for a bilirubin level NOW.
- * Source: Dr. Elizabeth Thilo, Neonatologist

ESTIMATES OF BILIRUBIN LEVELS USING ZONES OF DERMAL ICTERUS (ORIGINAL STUDY)

Jaundice begins on the face of newborns and proceeds to the trunk, the extremities, and finally the palms and soles. The most distal zone of dermal icterus in this cephalopedal progression correlates with the level of serum bilirubin (Kramer, 1969). Once, the bilirubin stops rising, the progression of dermal icterus also stops. When the serum bilirubin falls, gradual fading of jaundice occurs on all skin surfaces simultaneously. The following correlations between the most distal body part that is jaundiced and the predicted level of bilirubin can be helpful, but they do not substitute for an actual serum bilirubin. These observations were made by nurses, not parents.

- * Head and neck 4-8
- * Upper trunk (chest) 5-12
- * Lower trunk (abdomen) and thighs 8-16
- * Arms and lower legs 11-18
- * Palms and soles > 15
- * Entire body 15-30

LOCATION OF JAUNDICE: SURVEY OF 10 DENVER PCPS

- * The following results came from a survey of 10 Pediatric Groups in Denver (May 2008)
- * Premise: Assume you have a phone call about a jaundiced newborn
- * Survey question: Do you use the parent's report of the level of jaundice on the baby's body surface to help you decide if a bilirubin is needed? If yes, what location prompts you to order a bilirubin?
- * Abdomen: 20%
- * Legs: 20%
- * More jaundiced than when last seen: 40%
- * Don't use because parent's observation not reliable: 20%

TYPES OF JAUNDICE

Physiological jaundice (50% of newborns)

- * Onset 2 to 3 days of age
- * Peaks day 4 to 5 (Reason for recheck visits on these days)
- * Disappears 1 to 2 weeks of age

Breastfeeding or malnutrition jaundice (5 to 10% of newborns)

- * Due to inadequate intake of breastmilk
- * Pattern similar to physiological type
- * Also causes poor weight gain

Breast-milk jaundice (1% of newborns)

- * Due to conjugation inhibitor in breastmilk that blocks destruction of bilirubin
- * Onset 4 to 7 days of age
- * Lasts 3 to 10 weeks
- * Not harmful

Rh and ABO blood group incompatibility

- * Onset during first 24 hours of life
- * Can reach harmful levels

Liver Disease (rare)

- * White or pale stools suggest biliary atresia or other obstructive liver disease as the cause of the jaundice.

RISK FACTORS FOR SEVERE JAUNDICE

- * Onset within first 24 hours of life

- * Blood type incompatibility (Mother is Type O or Rh negative)
- * Gestational age 36 weeks or earlier (Preterms are 5 times more likely to have bilirubin levels over 12 than 40 week newborns)
- * Sibling required phototherapy
- * Bruising from birth trauma (e.g., cephalohematoma)
- * Breastfeeding, especially if firstborn and feeding not going well
- * Asian race (Bilirubin levels over 12 occur in 23% of Asian babies, 12% of whites and 4% of African-Americans.)

KERNICTERUS PREVENTION

- * Kernicterus (bilirubin encephalopathy) is the most serious complication of high bilirubin levels
- * Early symptoms are lethargy, hypotonia, poor suck and high-pitched cry
- * The US kernicterus registry reported 61 cases in term and near-term healthy newborns in 8 years (Johnson 2002). Currently over 120 cases (2007).
- * Bilirubin levels 22-48; 31% idiopathic, 31% G6PD, 10% hematomas
- * Breastfed: 59 of 61 (increased risk for dehydration and malnutrition) (97%)
- * Sequelae > 90% at 18 mo (cerebral palsy, developmental delays, hearing loss)
- * Lapses in follow-up care: Only 28% were given an early follow-up appointment within 2-3 days of discharge. (AAP Practice Parameter 1994 and 2004 recommends any newborn discharged before 48 hours needs a check-up within 2-3 days of discharge for jaundice, feeding behavior, weight, hydration, etc.)
- * Errors in telephone care: Mothers who phoned their doctor's office for jaundice, drowsiness, poor feeding, etc. received repeated reassurance rather than being seen

SUNLIGHT THERAPY FOR JAUNDICE

- * Sunlight that comes through a window can lower bilirubin levels, but the actual benefits have not been researched.
- * This guideline does not recommend sunlight therapy because of the lack of proven benefits and the following potential harmful effects: [1] exposing the baby's uncovered back to sunlight gives a risk of rolling prone and suffocation AND [2] exposure to outdoor direct light could cause sunburn.
- * Maisels (NEJM 2008) warns us: "Sunlight will lower the serum bilirubin level, but the practical difficulties involved in safely exposing a naked newborn to the sun either inside or outside (and avoiding sunburn) preclude the use of sunlight as a reliable therapeutic tool".

THE SICK NEWBORN: SUBTLE SYMPTOMS

- * Newborn vulnerability: Newborns are a very high-risk age group, especially during the first 7 days of life. Over 90% of underreferrals that result in a serious adverse outcome involve newborns. Newborns with serious chronic diseases may look good at birth, but abruptly change during the first week of life. Examples are congenital heart disease and metabolic disease. Newborns are at special risk for sepsis and can deteriorate very rapidly.
- * The symptoms of serious illness in newborns can be very subtle. That is why the statement '[1] Newborn (< 1 month old) AND [2] starts to look or act abnormal in any way' is found in the 'See Immediately' category of at least 20 guidelines.
- * Keep in mind that when a parent denies that their newborn is acting 'sick', they may simply mean that the newborn doesn't have a cough, runny nose, or diarrhea. Always ask them, 'What's normal for your baby?, What's different (or abnormal)? and What is your baby doing right now?'
- * Feeding behavior is the one universal and reliable measure of a newborn's well being. Newborns should be vigorous eating-machines. (EXCEPTION: never a vigorous feeder, but takes adequate amounts and nothing has changed).

SYMPTOMS OF ILLNESS in a newborn includes the following:

- * Poor feeding behavior or a sudden change in feeding behavior (has to be repeatedly awakened to feed or can't stay awake for feedings)
- * Poor suck or inability to sustain sucking

- * Sweating during feedings
- * Sleeping excessively (EXCEPTION: normally parent has to awaken for feeds, but is easy to arouse, alert for feedings and nothing has changed)
- * Change in muscle tone (decreased or limp)
- * Decreased activity or movement
- * Change in color (i.e., pallor, cyanosis or gray extremities)
- * Fever or low temperature
- * Unusual crying, moaning, grunting
- * Tachypnea
- * Parent who calls back about the same concerns

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FIRST AID

N/A

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SEARCH WORDS

BILIRUBIN
 BREASTFEEDING JAUNDICE
 BREAST-MILK JAUNDICE
 JAUNDICE
 JAUNDICED NEWBORN
 LIVER DISEASE
 NEWBORN JAUNDICE
 ORANGE SKIN
 PHYSIOLOGICAL JAUNDICE
 YELLOW
 YELLOW EYES
 YELLOW OR ORANGE COLORED SKIN
 YELLOW SCLERA
 YELLOW SKIN
 YELLOWING OF EYES

- TRIAGE -

Call EMS 911 Now

Difficult to awaken or to keep awake
 (EXCEPTION: child needs normal sleep)

CA: 50, 7

Shock suspected (very weak, limp, not moving, too weak to stand, pale cool skin)

FIRST AID: have child lie down with feet elevated

CA: 50, 7

Sounds like a life-threatening emergency to the triager

CA: 50, 7

Go to ED Now

[1] Age < 12 weeks AND [2] fever > 100.4 F (38.0 C) rectally

R/O: sepsis, UTI

CA: 51, 8, 7

Go to ED Now (or PCP triage)

[1] Newborn (< 1 month old) AND [2] starts to look or act abnormal in any way (e.g., decrease in activity or feeding)

R/O: sepsis

CA: 52, 7

Feeding poorly (e.g., little interest, poor suck, doesn't finish)

CA: 52, 7

Dehydration suspected (no urine > 8 hours, sunken soft spot, very dry mouth, etc.)

CA: 52, 7

[1] Purple (or blood-colored) spots or dots on skin AND [2] unexplained

R/O: congenital infection

CA: 52, 7

[1] Low temperature < 96.8 F (36.0 C) rectally AND [2] doesn't respond to rewarming

R/O: sepsis

CA: 52, 7

See Physician within 4 Hours (or PCP triage)

Began during the first 24 hours of life

R/O: hemolytic jaundice

CA: 53, 11, 7

SEVERE jaundice (skin looks deep yellow or orange; legs are jaundiced)

R/O: high bilirubin level

CA: 53, 11, 7

HIGH-RISK baby for severe jaundice (preterm OR ABO or Rh problem OR cephalohematoma OR sib needed bili-lights OR Asian race, etc)

CA: 53, 11, 7

Call PCP Now

Triager uncertain if baby needs urgent bilirubin test (e.g, more yellow than when last seen)
(EXCEPTION: MILD jaundice of face or sclera only)

CA: 59, 11, 7

See Physician within 24 Hours

Good-sized yellow, seedy BMs per day are < 3

(EXCEPTION: If breastfed, not expected while milk is coming in during 1-4 days of life)

R/O: poor milk intake

CA: 54, 2, 3, 4, 10, 9, 7

[1] Breastfed AND [2] day 2 to 4 of life AND [3] no BM in over 24 hours

R/O: poor milk intake

CA: 54, 3, 4, 10, 9, 7

[1] Breastfed AND [2] mother concerned the baby is not getting enough milk

R/O: elevated bilirubin due to poor milk intake

CA: 54, 3, 4, 10, 9, 7

Wet diapers per day are < 6

(EXCEPTION: If breastfed, 3 wet diapers/day can be normal while milk is coming in during 1-4 days of life)

R/O: poor milk intake

CA: 54, 2, 3, 4, 10, 9, 7

[1] Discharged before 48 hours of life AND [2] 4 or more days old AND [3] hasn't been examined since discharge

Reason: AAP recommends re-check

CA: 54, 2, 3, 4, 10, 9, 7

Call PCP within 24 Hours

Caller is concerned about the degree of jaundice, but sounds MILD (Exception: sclera only)

CA: 60, 2, 3, 4, 10, 9, 7

[1] Had previous bilirubin level AND [2] jaundice worse, but sounds MILD

Reason: PCP may decide to recheck bilirubin level

CA: 60, 2, 3, 4, 10, 9, 7

See PCP When Office is Open (within 3 days)

[1] > 7 days of age AND [2] the color becomes deeper

Reason: not physiological jaundice

CA: 55, 2, 3, 4, 10, 9, 7

[1] > 14 days of age AND [2] the jaundice is not gone

R/O: breastmilk jaundice, liver disease, UTI

CA: 55, 2, 3, 10, 9, 7

Jaundice began or reappears after 7 days of age

R/O: liver disease

CA: 55, 2, 3, 10, 9, 7

Stools (BMs) are white, pale yellow or light gray

R/O: neonatal hepatitis, biliary atresia

CA: 55, 2, 3, 10, 9, 7

Home Care

Mild jaundice of newborn (all triage questions negative)

CA: 58, 1, 2, 3, 4, 10, 5, 6, 7

- CARE ADVICE (CA) -

1. REASSURANCE:
 - Some jaundice is present in 50% of newborns.
 - It is usually temporary and harmless.
 - The first place for jaundice to appear is in the whites of the eyes (sclera).
 - Jaundice that only involves the face and eyes is always harmless.
2. BOTTLEFED: If bottlefed, increase the frequency of feedings. Try for an interval of every 2 to 3 hours during the day.
3. BREASTFED:
 - If breastfed, increase the frequency of feedings.
 - Nurse your baby every 1-1/2 to 2-1/2 hours during the day.
 - Don't let your baby sleep more than 4 hours at night without a feeding.
 - Reason: increased stools carry more bilirubin out of the body.
4. INCREASE STOOLS:
 - If your baby is 5 days or older AND has less than 3 stools/day, carefully insert a lubricated thermometer 1/2 inch (12 mm) into the anus and gently move it from side to side a few times to stimulate the release of a stool
 - Reason: Stools carry bilirubin out of the body.
 - Do this once or twice per day until jaundice improves or stool frequency becomes normal.
5. EXPECTED COURSE: Physiological jaundice peaks on day 4 or 5 and then gradually disappears over 1-2 weeks.
6. CALL BACK IF:
 - Jaundice becomes worse
 - Legs becomes yellow
 - Feeding poorly or weak suck
 - Baby starts to act sick or abnormal
 - Jaundice not gone by day 14
7. CARE ADVICE given per Jaundice - Newborn (Pediatric) guideline.
8. FEVER UNDER 3 MONTHS OLD: Don't give any acetaminophen before being seen. Need accurate documentation of temperature in medical setting to decide if fever is really present. (Reason: may require septic work-up)
9. CALL BACK IF
 - Jaundice becomes worse
 - Legs becomes yellow
 - Feeding poorly or weak suck
 - Your baby starts to act sick or abnormal

10. JUDGING JAUNDICE:
 - Jaundice starts on the face and moves downward. Try to determine where it stops.
 - View your baby unclothed in natural light near a window.
 - Press on the yellow skin with a finger to remove the normal skin tone.
 - Then try to assess if the skin is yellow before the pink color returns.
 - Move down the body, doing the same. Try to assess where the yellow color stops.
 - Jaundice that only involves the face and eyes is always harmless.
 - As it involves the chest, the level is going up.
 - If it involves the abdomen, arms or legs, the bilirubin level needs to be checked.
11. CALL BACK IF:
 - Your baby starts to act sick or abnormal
50. CALL EMS 911 NOW: Your child needs immediate medical attention. You need to hang up and call 911 (or an ambulance). (Triager Discretion: I'll call you back in a few minutes to be sure you were able to reach them.)
51. GO TO ED NOW: Your child needs to be seen in the Emergency Department immediately. Go to the ER at _____ Hospital. Leave now. Drive carefully.
52. GO TO ED NOW (or PCP triage)
 - IF NO PCP TRIAGE: Your child needs to be seen within the next hour. Go to the ER/UCC at _____ Hospital. Leave as soon as you can.
 - IF PCP TRIAGE REQUIRED: Your child may need to be seen. Your doctor will want to talk with you to decide what's best. I'll page him now. If you haven't heard from the on-call doctor within 30 minutes, or your child becomes worse, go directly to the ER/UCC) at _____ Hospital.
53. SEE PHYSICIAN WITHIN 4 HOURS (or PCP triage)
 - IF NO PCP TRIAGE: Your child needs to be seen. Go to _____ (ED/UCC or office if it will be open) within the next 3 or 4 hours. Go sooner if your child becomes worse.
 - IF PCP TRIAGE REQUIRED: Your child may need to be seen. Your doctor will want to talk with you to decide what's best. I'll page him now. If you haven't heard from the on-call doctor within 30 minutes, call again. (Note: If PCP can't be reached, send to ED/UCC or office.)
54. SEE PHYSICIAN WITHIN 24 HOURS
 - IF OFFICE WILL BE OPEN: Your child needs to be examined within the next 24 hours. Call your child's doctor when the office opens, and make an appointment.
 - IF OFFICE WILL BE CLOSED AND NO PCP TRIAGE: Your child needs to be examined within the next 24 hours. Go to _____ at your convenience.
 - IF OFFICE WILL BE CLOSED AND PCP TRIAGE REQUIRED: Your child may need to be seen within the next 24 hours. Your doctor will want to talk with you to decide what's best. I'll page him now. (EXCEPTION: from 10 pm to 7 am. Since this isn't serious, we'll hold the page until morning.)
55. SEE PCP WITHIN 3 DAYS: Your child needs to be examined within 2 or 3 days. Call your child's doctor during regular office hours and make an appointment. (Note: if office will be open tomorrow, tell caller to call then, not in 3 days)

56. SEE PCP WITHIN 2 WEEKS: Your child needs an evaluation for this ongoing problem within the next 2 weeks. Call your child's doctor during regular office hours and make an appointment.
57. FOLLOW-UP: Discuss _____ with your child's doctor at the next regular office visit (Call sooner if you become more concerned.)
58. HOME CARE: You should be able to treat this at home.
59. CALL PCP NOW: You need to discuss this with your child's doctor. I'll page him now. If you haven't heard from the on-call doctor within 30 minutes, call again.
60. CALL PCP WITHIN 24 HOURS: You need to discuss this with your child's doctor within the next 24 hours.
IF OFFICE WILL BE OPEN: Call the office when it opens tomorrow morning.
IF OFFICE WILL BE CLOSED: I'll page him now. (EXCEPTION: from 9 pm to 9 am. Since this isn't urgent, we'll hold the page until morning.)
61. CALL PCP WHEN OFFICE IS OPEN: You need to discuss this with your child's doctor within the next few days. Call him/her during regular office hours.

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