

Location: A nursery in a community hospital.

CC: Infant with jaundice.

HPI:

You are called evaluate a 12-hour-old white male infant who appears to be jaundiced. The patient was born at 39 weeks gestation by vaginal delivery with vacuum assistance. Labor was slightly prolonged at 18 hours. The patient's Apgar scores were 8 and 10 at 1 and 5 minutes. Points were removed for acrocyanosis and irritability. The patient took to the breast within about three hours after delivery, had good suck reflex and transitioned well to room temperature environment after being in the warmer for about four hours. Initial evaluation of the patient by the on-call resident was unremarkable other than a cephalohematoma over the posterior parietal and occipital areas from the vacuum-assisted delivery.

Maternal history: Mother is a 28-year-old Group B Streptococci (GBS) positive G2, P2, now L2 white female of Mediterranean descent who received regular prenatal care and had intrapartum antibiotic prophylaxis for her GBS positive status. She has no previous history of sexually transmitted diseases, had no infections during her pregnancy and had laboratory work revealing that she was Rh positive, blood group O. Mother's other prenatal laboratories showed that she had positive rubella titers and positive IgG to toxoplasmosis. There is no history of smoking, IV drug use. Mother is not on any medications other than prenatal vitamins. **FH:** The patient has an 18-month-old sibling who had jaundice as an infant. Mother cannot recall how high her other child's bilirubin level reached; however, she does note that her first child required phototherapy for two days prior to discharge.

How to approach this case:

Jaundice in an infant less than 24-hour-old should always be presumed to be pathological. Therefore, you should look carefully for the etiology, including sepsis, hemolysis, polycythemia, and hemorrhages. You need to look at the infant to decide which etiology is highest on your differential and, in particular, to decide whether the child needs immediate antibiotics. You need to attend to details of the mother's medical history (Group B strep status, TORCH exposure) and the delivery (prolonged, traumatic, vaginal vs. c-section, fetal distress intrapartum).

Therefore, perform physical exam, including

Review of vital signs (check for temperature instability; voiding)
General appearance (lethargic? Arousable?)
HEENT (cephalohematomas, caput succedaneum, corneal opacity?)
Heart exam
Lung exam
Abdomen (hepatosplenomegaly?)
Genitourinary (patent rectum)
Neurological exam (tone, irritability, reflexes)
Skin (ecchymoses)
Check inputs/outputs

Results:

Vital signs are stable. Well-developed white male infant in no acute distress.
HEENT: There is mild scleral icterus and jaundice of the face. There is a 4 cm cephalohematoma over the posterior parietal occipital areas of the infant's head that is soft and slightly ecchymotic. Mucous membranes are moist. Pupils have bilateral red reflex. Oropharynx is clear. The patient has a good suck reflex. Neck is supple without any signs of meningismus. Anterior fontanel is open, flat and soft.
Cardiovascular and Lungs: normal.
Abdomen: soft, nondistended, nontender, no hepatosplenomegaly can be appreciated, no abdominal masses. Umbilicus: normal.
Extremities: normal. There is no acrocyanosis appreciated. Capillary refill is less than two

seconds.

Neurologic: Good suck reflex. Moro reflex symmetric. Good tone. Appropriate level of irritability and able to be consoled.

GU: normal. The anus is patent and appropriately positioned.

Review of nurse's notes reveals that the patient has passed several meconium stools and voided one wet diaper.

So far, this infant's physical exam is reassuring. Your initial physical exam did not reveal any signs of sepsis: the patient had no temperature instability, had been eating well, had passed a stool and urine of normal color, and did not appear to be lethargic. Therefore, you can do some work up before initiating antibiotics.

Order:

Blood typing of infant and mother (mother's is usually done already & on chart)

Direct Coomb's test, stat

CRP stat and q 12 hr

CBC with differential, stat

Total and indirect bilirubin

Inputs/outputs

Vital signs q 4 hrs

Discussion:

This is a full-term infant who presents with jaundice in the first day of life. Because of the early onset of jaundice, hemolysis and sepsis must be ruled out. Other items in the differential include polycythemia and hemorrhages. Workup of this patient should be the initial physical exam to observe for signs of sepsis including in an infant signs of lethargy, vomiting, poor feeding, fever or temperature lability with a low temperature, lack of stooling, or abnormal-colored urine. History taking should focus on any possible maternal infections which might be transmitted to the infant, particularly TORCH infections including CMV, toxoplasmosis and rubella infection, and maternal GBS (Group B streptococcal infection) status. Eliciting any family history of hyperbilirubinemia is also helpful because there is some familial tendency for neonatal jaundice. Laboratory workup should begin by blood typing and direct Coombs' testing on the infant. All infants who are born to mother's with Type O blood group should routinely have direct Coombs' testing to check for maternal fetal incompatibility and these children should be followed closely for evidence of jaundice from hemolysis. Laboratory work should also include C reactive protein for early assessment of infection, CBC, and initially a direct and total bilirubin.

Results:

Mother is group O blood group. The patient is Group B. The direct Coombs' test was weakly positive. Initial CBC with differential is normal for age. CRP was normal. Total bilirubin was 5.6, direct bilirubin 0.3, indirect 5.2.

At this point the patient appears to have mild hemolysis secondary to ABO incompatibility with maternal blood with a weakly positive Coombs' test. The patient needs to have his hemoglobin and hematocrit followed as well as his total bilirubin to observe for evidence of a continued climb in the bilirubin level or a significant drop in his hemoglobin and hematocrit.

Therefore, Order:

Hemoglobin and hematocrit q 8 hr

Total bilirubin q 8 hr

Continue po feeding, breast milk

May supplement with formula

Vital signs q4 to watch for change in clinical status

Results:

2nd CRP is normal.

Hemoglobin and hematocrit remain stable.

Total bilirubin increases to 8.4 and then to 13.4mg/dl

Order:

Transfer to NICU (Neonatal ICU)

Phototherapy

Erythromycin ointment for eyes while receiving phototherapy

Start IV fluids at rate to ensure patient's total fluid intake (oral and IV) is 1 S maintenance rate. D5 1/4NS

Results:

Total bilirubin levels fall with phototherapy

Order review:

Phototherapy discontinued

D/C IV fluids

Follow up total bilirubin q daily until stable.

Discussion:

At 12 hours of age, the patient's total bilirubin is 5.6 which roughly corresponds to the rule of thumb for assessing clinical jaundice which corresponds to jaundice of the face with a bilirubin of approximately 5, jaundice of the midabdomen indicating a level of approximately 15 mg/dl and jaundice extending to the feet indicating a level of roughly 20 mg/dl. At this point, the patient does not meet criteria for phototherapy. One should consider phototherapy at levels of greater than 12 mg/dl for an infant 25-48 hours old. Definitely do phototherapy if the level is greater than or equal to 15 mg/dl and, if the patient has a level greater than 25 mg/dl, then exchange transfusion and intensive phototherapy is probably warranted. Q8H measurements of hemoglobin, hematocrit and total bilirubin would be appropriate. In addition, a second CRP level would be appropriate to monitor for signs of infection. Titers can be sent for CMV, toxoplasmosis and rubella as well, although usually this data is not available to the clinician in the first 24-48 hours of evaluation. If the patient's clinical status should change and he should become lethargic or have difficulty feeding and you suspect sepsis, then empiric antibiotic therapy should be begun but urine cultures and a spinal would be appropriate.

By history, this patient also has an increased risk for hyperbilirubinemia secondary to his positive family history of a sibling who had neonatal jaundice requiring phototherapy. An infant with a sibling who developed a bilirubin level of greater than 12 has approximately a three times greater risk of developing jaundice than an infant with a negative family history.

In addition, this infant obviously has an ABO incompatibility. One would suspect that the bilirubin level would continue to climb over the next 24 hours and this patient might indeed meet criteria for phototherapy. In the meantime, the patient should be continued to be monitored and the mother should be counseled to continue frequent breast-feeding to keep the baby well hydrated and to observe for any signs of infection.

The infant's other risk factor for elevated jaundice includes his cephalohematoma which can be an increased source of bilirubin production as the hemorrhage reabsorbs. The patient did not meet criteria for polycythemia but this is another cause of early jaundice. For instance with "physiologic jaundice" the bilirubin level does not rise more than 5 mg/dl per 24 hours and it usually peaks on day three with a level no greater than 13 mg/dl. These children usually do not present with jaundice within the first 24-hours of life. Likewise, breast-feeding jaundice which does present within the five days of life usually does not reach clinical levels within the first 24 hours. Breast milk jaundice is usually seen towards the end of the first week of life in an infant who is otherwise thriving. Jaundice which arises greater than one week from birth may indicate both breast milk jaundice but also other pathological mechanisms including liver disorder such as biliary atresia or metabolic disorder such as hypothyroidism, galactosemia or hereditary hemolytic disorder such as spherocytosis or G6PD deficiency which incidentally is an X-linked disease with variable phenotype. Jaundice that persists beyond the third week really should prompt one to investigate biliary causes as well as the metabolic and hereditary hemolytic diseases. Most forms of jaundice should resolve by two to three weeks of age and the vast majority of infants who do have jaundice have a physiologic or breast-feeding associated cause.

Primary Diagnosis

Jaundice

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