Infant Born to a Mother with a Positive Tuberculin Skin Test Result

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BACKGROUND

Cause/Transmission
Tuberculosis (TB) is caused by Mycobacterium tuberculosis. It is transmitted when a person with active pulmonary TB coughs or sneezes and expels droplet nuclei into the air. Infants infected within the first year of life have a 43% chance of getting the disease. Infants have a very high mortality rate if their condition is not diagnosed and treated early. The presence of congenitally acquired TB in newborns is extremely rare; only 300 cases have been documented worldwide.

Terminology
- TB exposure - contact with an adult with active pulmonary TB.
- TB infection - a positive skin test result, normal chest radiograph result, and no clinical signs of disease. Persons with TB infection are not contagious.
- TB disease - positive skin test result, abnormal chest radiograph result, or physical or laboratory evidence of disease. Adults with active pulmonary disease are often contagious.

Determining Exposure
Infants exposed to adults with contagious TB require chemoprophylactic therapy to prevent infection or progression to disease. Exposure to TB should be suspected in an infant born to a mother with the following characteristics:
- Received the diagnosis of TB before delivery and has not received adequate therapy.
- Received the diagnosis of TB before delivery, is receiving adequate therapy, yet is still considered contagious at the time of delivery because of lack of compliance in taking medication, lack of laboratory evidence of response (improving chest x-ray and three consecutive negative
No treatment needed for infant (may breast feed & room in)

Refer mother for INH chemoprophylaxis; usually started 3 months after delivery

Screen household contacts for symptoms of TB

Asymptomatic

No treatment of household members necessary

Symptomatic

PPD Negative

< 10mm

No treatment necessary

Skin test each symptomatic contact before baby goes home

PPD Positive

> 10mm

Normal CXR: TB Infection (noncontagious)

Refer contact for chest X-ray

Abnormal CXR: TB Disease (contagious)

Will contact's presence in household continue when the infant goes home?

No

Yes

Infant needs INH prophylaxis

FIGURE 1 Positive Mantoux tuberculin skin test result (>10 mm). Normal chest x-ray (CXR) result, TB infection, no disease, mother is not contagious.
**FIGURE 2** Positive Mantoux tuberculin skin test result (≥10 mm). Abnormal chest x-ray (CXR) result.
acid fast bacilli smears and cultures), or lack of adequate time for therapy to be effective (usually 2 to 4 weeks).

- Has one or more of the clinical symptoms of TB (persistent cough, fever, weight loss, fatigue, hemoptysis) and a positive skin test result.

CLINICAL MANIFESTATIONS OF TB IN INFANTS

- Newborns with TB often have no symptoms
- Pneumonia that is not responsive to usual therapies
- Lymphadenopathy
- Fever of unknown cause
- Hepatomegaly, splenomegaly, or both
- Aseptic meningitis

MANAGEMENT

Mother with Positive Skin Test Result and Normal Chest X-ray

Result: See Figure 1

- Mother is not contagious, although isoniazid chemoprophylaxis may be indicated.
- Household contacts should be screened for symptoms of active tuberculosis. If a household contact with disease is identified, the infant should receive isoniazid chemoprophylaxis (Figure 2).

Mother with Positive Skin Test Result and Abnormal Chest X-ray

Result: See Figure 2

- An infant born to a mother with active TB is not contagious and does not require isolation.
- The mother may be contagious, and precautions to prevent infection of the newborn are needed. Complete separation of infant and mother should be enforced only if the mother is too ill to care for her baby, is not compliant with her therapy, or has a documented resistant strain of TB. The infant may breastfeed if the mother wears a mask to minimize transmission but should not share a room or spend long periods of time with the mother until she is no longer contagious (usually after 4 weeks of therapy and three consecutive negative acid-fast bacilli sputum smears).
- Skin testing is not recommended for newborns, because the incubation period from infection to the development of a positive skin test result requires 6 to 12 weeks.
- Isoniazid chemoprophylaxis (10 mg/kg/day) should be initiated once the mother is suspected or determined to be contagious. Many experts recommend not using isoniazid syrup, because it is frequently associated with gastrointestinal problems. Tablets may be crushed and dissolved in water. Directly observed preventive therapy is available through many local health departments and should be arranged if possible. Breastfed infants receiving isoniazid should be given a daily infant vitamin supplementation, because isoniazid may interfere with vitamin B6 absorption.

FOLLOW-UP

- The infant should be monitored every 4 to 6 weeks for signs and symptoms of disease, adherence to therapy, and toxicity to medication. Side effects of isoniazid, although very rare in children, include nausea, vomiting, loss of appetite, diarrhea, abdominal pain, and jaundice. Medication should be stopped if any side effects are noted. Serum liver enzyme analysis should be sent if hepatotoxicity is suspected.
- At 3 months of age the infant should have a tuberculin skin test to evaluate for infection. After contact with an infectious adult occurs, induration ≥5 mm is considered positive. A negative skin test result indicates that infection has been prevented, and if the mother is no longer contagious, chemoprophylaxis may be discontinued. A negative skin test result in children younger than 6 months of age may be unreliable because of an inadequate immune response. Therefore the skin test should be repeated at 6 and 12 months of age.

REFERENCES


NOTE: In Texas, nurse practitioners (NPs) practice from protocols mutually agreed upon by the NP and supervising physician. The protocols outline diagnostic and therapeutic procedures and categories of pharmacologic agents that may be ordered, administered, dispensed, and/or prescribed for patients with diagnoses identified. The protocols written for this manuscript have been reviewed by medical and NP faculty members in the Department of Pediatrics of the University of Texas Medical School at Houston. Any changes must be approved by this group. At the University of Texas Medical School, the protocol is approved/signed by the NP and the supervising physician.