

How do you approach the following situations?

Answers can be found on the next page.

Case 1: A 13-month-old Canadian born, male infant is evaluated for a prolonged fever and cough following a three-week visit to his grandparents in Kenya. A Mantoux (5 tuberculin units) test produces 22 mm of induration at 72 h. A chest x-ray is reported probably normal, the radiologist notes poor inspiration and vessel crowding.

Case 2: A 6-year-old is referred because of a 22 mm Mantoux test and a possible tuberculosis (TB) contact. History is complicated by language difficulties, though a Burmese friend of the family helps with translation. The child has a normal physical examination and chest x-ray.

Case 3: An 18-month-old girl entered your practice having recently been adopted from Mainland China. An initial Mantoux test produces 18 mm of induration. She had Bacille Calmette-Guerin at birth, and the mother believes this is the likely cause of her positive test. She is hepatitis B surface antigen negative. Should she have treatment for latent TB infection?

Case 4: A 15-year-old girl presents with a nine-day history of productive cough and fever unresponsive to amoxicillin. A chest x-ray shows bilateral lower lobe infiltrates. She immigrated to Canada from the Indian subcontinent three years ago.

CONTINUING MEDICAL EDUCATION – QUIZ

Tuberculosis in children — Quiz

Answer the following questions by circling the letter of the correct answer(s). Answers can be found on the next page.

- The whole blood gamma interferon assay for tuberculosis (TB):
 - may be useful in the detection of TB disease.
 - is specific for *Mycobacterium tuberculosis*.
 - is a test for latent TB infection.
 - is useful in populations where TB is highly prevalent.
 - has been extensively evaluated in children.
- Complications of pyrazinamide include:
 - hepatotoxicity.
 - optic neuritis.
 - arthralgias.
 - pyridoxine-dependent peripheral neuropathy.
 - hyperuricemia.
- You are treating a child exposed to an adult with infectious TB with isoniazid. You should:
 - measure serum transaminases and bilirubin levels monthly.
 - review the patient monthly for clinical signs of toxicity.
 - always prescribe pyridoxine supplementation.
 - discontinue therapy if a Mantoux test three months after last contact produces 6 mm of induration.
 - confirm the susceptibilities of the source patient's isolate.
- Risk factors for progression of TB infection to disease include:
 - human immunodeficiency virus infection.
 - young age.
 - nonsteroidal anti-inflammatory therapy.
 - infliximab therapy.
 - origin from a country where TB is prevalent.
- The tuberculin skin test:
 - is not affected by live virus vaccines.
 - is negative in less than 3% of children with TB disease.
 - may be administered subcutaneously or intradermally.
 - should be read at 48 to 72 h.
 - should have results recorded in millimetres of erythema.

CLINICAL SCENARIOS IN PAEDIATRIC TUBERCULOSIS – CASE ANSWERS

Case 1

1. Rule out disease: Obtain specimens before starting therapy. This is a highly significant Mantoux reaction.

Three gastric aspirates were obtained, as an outpatient, on successive mornings. All were immediately placed in a buffered kit containing sodium carbonate. All were smear negative. Following the third test, treatment for tuberculosis (TB) disease was commenced using isoniazid (INH), rifampin, pyrazinamide and ethambutol (at a dose of 15 mg/kg/day). The third aspirate grew *Mycobacterium tuberculosis* after two weeks. A repeat chest x-ray at that time showed a left lower lobe infiltrate. Ethambutol was discontinued after the strain was reported to be sensitive to all first line agents. INH, rifampin and pyrazinamide were given for two months and INH and rifampin were continued for a further four months. The child's energy improved within a few days and he is clinically well and cured.

2. Identify the source: The patient's Grandmother in Kenya was identified as having active pulmonary TB.

Case 2

Principle: Make every effort to establish the contact strain. A history taken through a Burmese translator (obtained through a telephone translation service) revealed the identity of the TB contact, the child's caregiver. It was then established that the contact's strain of *M tuberculosis* was resistant to INH, rifampin, ethambutol and ethionamide and sensitive to pyrazinamide and second line agents. A computed tomography scan of the chest, obtained to help rule out TB disease conclusively, was normal.

This child is likely infected with a highly resistant strain. Like all latently infected children she is at risk for active disease. After consultation with several experts, directly observed preventive therapy with ciprofloxacin and pyrazinamide was commenced and was well tolerated:

we plan on 12 months of therapy. An alternative approach is to follow this child closely, reserving drugs for disease if it develops.

Case 3

Although the Bacille Calmette-Guerin is a possible cause of a false positive reaction, it is much more likely that the reaction is due to latent TB infection. The child comes from a country with a high prevalence of TB. Her birth circumstances were unknown and may have been in an especially high risk environment. If she is latently infected she has a 20% to 40% chance of developing TB disease. The highest risk is in the next few years, and up to 40% of this will be extrapulmonary, including TB meningitis.

Complications of INH at this age are rare, and can usually be predicted from side effects. The benefit to risk ratio in this situation is strongly in favour of treatment. Treatment with INH for nine months should be strongly advised. The child should be seen monthly to monitor side effects. If any anorexia, nausea or jaundice occurs, the INH should be withheld and liver function tests should be checked.

Case 4

Again, obtain specimens. Ideally this patient should be hospitalized and isolated until the diagnosis is clear. However, sputum should be submitted for direct smear, TB culture and a rapid test for TB as soon as possible. Her sputum was smear numerous and AMTD positive, immediately confirming the diagnosis of pulmonary TB. In similar cases, adolescents have received multiple courses of antibiotics before the diagnosis of pulmonary TB was established, and have infected several classmates. Although reactivation disease typically occurs in the upper lobes, any combination of airspace disease in the right epidemiological setting is potentially due to TB.

CONTINUING MEDICAL EDUCATION – QUIZ

Tuberculosis in children — Quiz

Correct answers for "Tuberculosis in children" quiz found on the previous page.

1. (c)
2. (a)
(c)
(e)
3. (b)
(e)
4. (a)
(b)
(d)
5. (d)