Update on Tuberculosis Skin Testing of Children

Committee on Infectious Diseases

In January 1994, the Committee on Infectious Diseases published detailed guidelines on tuberculin skin testing of infants, children, and adolescents for the detection of tuberculous infections. This supplement to the 1994 statement is written to update and clarify several issues regarding the frequency of skin testing for children at increased risk of acquiring tuberculosis. In this document, children will refer to infants, children, and adolescents. The recommendations regarding the preferred use of the Mantoux skin test and the interpretation of skin test results remain unchanged and will not be repeated here. The interpretation guidelines for indurations of 5, 10, and 15 mm in diameter basically remain unchanged (Table 1).

The overall emphasis to control tuberculosis in the United States should be placed on access to health care, a thorough history taking of infectious persons, timely and effective contact investigations, proper interpretation of Mantoux skin tests, and appropriate use of therapy, including directly observed therapy. Variations in the epidemiology of tuberculosis in different locations reinforce the importance of communication with local public health officials and/or experts on tuberculosis. Existing publications can assist in assessing the local risk of acquiring tuberculosis. The recommendations should be considered regardless of previous BCG vaccine administration.

The American Academy of Pediatrics continues to encourage focusing tuberculin skin testing on children who are at increased risk of acquiring tuberculosis. Routine tuberculin testing, including school-based programs that include populations at low risk, has either a low yield of positive results or a large number of false-positive results and represents an inefficient use of limited health care resources. Therefore, children without risk factors who reside in low-prevalence regions do not need to have routine tuberculin skin testing. Table 2 is a clarification of the guidelines for investigating children who are at increased risk of having tuberculosis. The original recommendation for skin testing at 1 year of age was based on the theoretical concept that the administration of measles vaccine might reactivate dormant Mycobacterium tuberculosis. This theory has not been supported by data, and, given the low rates of tuberculous infection, even in high-risk 1-year-old children, routine skin testing at this age is not warranted. Current policy, therefore, does not include the recommendation of routine tuberculin skin testing of children at 1 year of age.

The Canadian Pediatric Society has published a statement on tuberculin skin testing that emphasizes contact investigation after identification of a case of tuberculosis. The Canadian Pediatric Society does not recommend routine tuberculin skin testing in low-risk children but encourages “regular assessment,” including Mantoux skin testing every 1 to 2 years, for children at increased risk. Follow-up reading of tuberculin skin tests has remained a controversial issue based on the lack of reliability in their interpretations by non-health care professionals, inconvenience, and potential loss of income for parents who need to take time off from work. The American Academy of Pediatrics recommends that Mantoux skin test results be read by health care professionals. When a primary care physician is unavailable to read the test, it can be read by the specifically trained staff of an after-hours clinic or local public health clinic, school-based nurses, home health care staff, or emergency department personnel who communicate with the primary-care physician. Published studies have failed to confirm the ability of parents to read tuberculin skin test results accurately.

RECOMMENDATIONS

The most reliable tuberculosis control program is based on aggressive, expedient contact investigations rather than routine skin test screening of large populations.

1. All children need routine health care evaluations that include assessment of their risk of exposure to tuberculosis. Only children deemed to have increased risk of exposure to persons with tuberculosis should be considered for tuberculin (Mantoux) skin testing. The frequency of such skin testing should be according to the degree of risk of acquiring tuberculous infection as detailed in Table 2.

2. Routine tuberculin skin testing of children with no risk factors residing in low-prevalence communities is not indicated.

3. Children who have no risk factors but who reside in high-prevalence regions and children whose histories for risk factors are incomplete or unreliable...
TABLE 1.  Definition of a Positive Mantoux Skin Test (5 Tuberculin Units of Purified Protein Derivative) in Children*  

**Reaction ≥15 mm**
- Children in close contact with known or suspected infectious cases of tuberculosis
- Households with active or previously active cases if treatment cannot be verified as adequate before exposure, treatment was initiated after the child’s contact, or reactivation is suspected
- Children suspected to have tuberculous disease
- Chest roentgenogram consistent with active or previously active tuberculosis
- Clinical evidence of tuberculosis†
- Children receiving immunosuppressive therapy‡ or with immunosuppressive conditions, including HIV infection

**Reaction ≥10 mm**
- Children at increased risk of dissemination
  - Young age (<4 y)
  - Other medical risk factors, including diabetes mellitus, chronic renal failure, or malnutrition
- Children with increased environmental exposure
  - Born, or whose parents were born, in high-prevalence regions of the world
  - Frequently exposed to adults who are HIV infected, homeless, users of illicit drugs, medically indigent city dwellers, residents of nursing homes, incarcerated or institutionalized persons, and migrant farm workers
  - Travel and exposure to high-prevalence regions of the world

**Reaction ≥5 mm**
- Children 4 y of age without any risk factors

* The recommendations should be considered regardless of previous BCG administration.
† Evidence on physical examination or laboratory assessment that would include tuberculosis in the working diagnosis (ie, meningitis).
‡ Including immunosuppressive doses of corticosteroids.

TABLE 2.  Revised Tuberculin Skin Test Recommendations*  

**Children for whom immediate skin testing is indicated**  
- Contacts of persons with confirmed or suspected infectious tuberculosis (contact investigation); this includes children identified as contacts of family members or associates in jail or prison in the last 5 y
- Children with radiographic or clinical findings suggesting tuberculosis
- Children immigrating from endemic countries (eg, Asia, Middle East, Africa, Latin America)
- Children with travel histories to endemic countries and/or significant contact with indigenous persons from such countries
- Children who should be tested annually for tuberculosis*  
  - Children infected with HIV
  - Incarcerated adolescents
- Children who should be tested every 2-3 y†
  - Children exposed to the following individuals: HIV infected, homeless, residents of nursing homes, institutionalized adolescents or adults, users of illicit drugs, incarcerated adolescents or adults and migrant farm workers; this would include foster children with exposure to adults in the above high-risk groups
- Children who should be considered for tuberculosis skin testing at ages 4-6 and 11-16 y
- Children whose parents immigrated (with unknown tuberculin skin test status) from regions of the world with high prevalence of tuberculosis; continued potential exposure by travel to the endemic areas and/or household contact with persons from the endemic areas (with unknown tuberculin skin test status) should be an indication for repeat tuberculin skin testing
- Children without specific risk factors who reside in high-prevalence areas; in general, a high-risk neighborhood or community does not mean an entire city is at high risk; it is recognized that rates in any area of the city may vary by neighborhood, or even from block to block; physicians should be aware of these patterns in determining the likelihood of exposure; public health officials or local tuberculosis experts should help clinicians identify areas that have appreciable tuberculosis rates

**Risk for progression to disease**
- Children with other medical risk factors, including diabetes mellitus, chronic renal failure, malnutrition, and congenital or acquired immunodeficiencies deserve special consideration; without recent exposure, these persons are not at increased risk of acquiring tuberculosis infection; underlying immune deficiencies associated with these conditions theoretically would enhance the possibility for progression to severe disease; initial histories of potential exposure to tuberculosis should be included on all of these patients; if these histories or local epidemiologic factors suggest a possibility of exposure, immediate and periodic tuberculin skin testing should be considered in these patients; an initial Mantoux tuberculin skin test should be performed before initiation of immunosuppressive therapy in any child with an underlying condition that necessitates immunosuppressive therapy

* BCG immunization is not a contraindication to tuberculin skin testing.
† Initial tuberculin skin testing initiated at the time of diagnosis or circumstance.

should be considered for tuberculin (Mantoux) skin testing at 4 to 6 and 11 to 16 years of age. The decision to test should be based on the local epidemiology of tuberculosis in conjunction with advice from regional tuberculosis control officials.

4. Family investigation is indicated whenever a tuberculin skin test result of a parent converts from negative to positive (indicating recent infection). Children of health care workers are not at increased risk of acquiring tuberculosis infection unless the workers’ tuberculin skin test results convert to positive or the workers have diagnoses of tuberculous disease.

5. Children with human immunodeficiency virus (HIV) infection or disease should receive annual tuberculin skin testing (5 tuberculin units, Mantoux).

6. The skin test interpretation guidelines for indurations of 5, 10, and 15 mm in diameter (Table 1) remain appropriate for decisions regarding contact investigations, tuberculosis control measures, and preventive therapy.
REFERENCES


Update on Tuberculosis Skin Testing of Children

Pediatrics 1996;97;282

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