

REVIEW ARTICLES

INTERPRETATION OF TUBERCULIN SKIN TESTING IN CHILDREN VACCINATED WITH BCG

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Introduction

In countries highly endemic for Tuberculosis (TB), BCG vaccine is given at birth to most children. This BCG vaccine could subsequently interfere with tuberculin skin testing (TST) when administered to screen for TB. TST remains in widespread use due to its low cost, simplicity of administration and ease of interpretation. However, results of TST in BCG vaccinated children may have to be interpreted with caution to prevent over-diagnosis of TB and unnecessary treatment with ATT. The question remains unanswered as to how long can BCG interfere with the TST results? Also what reading of TST should be taken as positive in BCG vaccinated children to determine exposure to TB.

Duration of BCG effect on TST result

A recent study in Madrid Spain done in immigrants or adopted children from countries that give BCG at birth found that under 3 years of age, BCG does interfere with and may cause a false-positive TST result. (1) A meta-analysis by Farhat et al which included 24 studies involving 240,203 subjects who had received BCG-vaccination as infants, it was found that 20,406 (8.5%) had a TST of 10+ mm attributable to BCG, but only 56/5639 (1%) were TST-positive if tested > or =10 years after BCG. In 12 studies of 12,728 subjects vaccinated after their first birthday, 5314 (41.8%) had a false-positive TST of 10+ mm, and 191/898 (21.2%) after 10 years. This suggests that BCG may interfere with TST till 10 years of age. (2) In those countries where the vaccine is given exclusively at birth, the BCG effect disappears after 7 years (3) and even after 4 years according to a study conducted in Canada. (4) Thus, it seems that BCG does interfere with TST result upto 4 years of age and sometimes even longer and upto 10 years of age.

Boosting effect of repeated TST testing

Children often undergo multiple tuberculin skin tests in highly endemic countries having TB. Whether TST repeated may boost the reading of TST result seems unknown. The interpretation of serial TSTs in previously BCG-vaccinated children is complicated by our inability to differentiate among increases in the TST response resulting from improved immunologic response secondary to improved nutrition, conversion secondary to recent infection, and boosting resulting from previous BCG vaccination. (5) Conversion is defined as the development of new delayed type hypersensitivity to mycobacterial antigens after new infection with *M. tuberculosis*, nontuberculous mycobacteria, or BCG vaccination. Boosting is the phenomenon of an increase in TST induration upon retesting in the absence of new infection. It is believed to result from recall of waned cell-mediated immunity, akin to the anamnestic serologic response. (6) TST boosting is unlikely to occur if the interval between testing is >60 days. (7) A study in Houston, Texas postulated that in young children who have had recent BCG vaccination, the influence of boosting may be greater and longer lasting. (5). Since

TST once positive usually remains positive, repeated TST results are hard to interpret. (6) Thus, TST does not discriminate between recent and remote latent tuberculosis infection (LTBI). (8)

Positive TST reading with BCG -10mm or 15mm?

A TST result of more than 10 mm is usually taken as a positive result. (9) However studies have suggested that induration greater than or equal to 15 mm should only be considered as TB infection. (10-13) in BCG vaccinated children.

Conclusion

BCG vaccination can have a confounding effect on TST results especially in young children. TST boosting is unlikely to occur if the interval between testing is >60 days. Induration of 15mm or more may be considered as positive in BCG vaccinated children.

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