Denouement and Discussion

Severe Skin Ulceration After Tuberculin Skin Test

The patient’s primary diagnosis was lymphadenitis caused by Mycobacterium tuberculosis. The skin necrosis was related to tuberculin skin testing. A bulla (22 mm in diameter) developed 4 days after a PPD injection (Figure, A and B). The erythema extended, covering almost all the volar forearm, from the elbow down to the wrist (black mark in Figure, A). The full thickness of the skin covering the bulla dislodged 2 days later, with granulation tissue and some yellowish eschar left (Figure, C on day 7 postinjection). Vancomycin hydrochloride was administered empirically for 2 days to treat presumed cellulitis. Cultures of blood and swab tests from the base of the bulla were negative for microorganisms. A biopsy specimen of the right cervical lesions revealed granulomatous inflammation, caseous necrosis, multinuclear giant cells, and acid-fast bacilli suggestive of mycobacterial infection. The patient was treated with isoniazid, rifampin, ethambutol hydrochloride, and pyrazinamide for 2 months followed by isoniazid and rifampin for an additional 4 months. Several tiny cervical lymph nodes remained palpable.

The erythema subsided spontaneously and gradually in the following days, resolving totally in 1 week. The skin defect remained and was cared for with daily cleansing with normal saline, disinfectant with an iodine solution (povidone-iodine), and covered with a hydrocolloid dressing (DuoDerm; Convatec, Princeton, NJ). Regrowth of the defect skin was noted 3 weeks later. At 30 days after inoculation, new skin had reepithelialized the entire skin defect (Figure, D). The red discoloration of the neoskin faded away at 90 days (Figure, E).

The tuberculin skin test is used for aiding in the diagnosis of active or latent M tuberculosis infection. In subjects exposed to M tuberculosis, T cells sensitized by the organism are recruited to the tuberculin skin injection site. Lymphokines are then released, resulting in induration and erythema. This phenomenon is classic for type IV delayed hypersensitivity reactions characterized by delayed course and marked induration. The test is carried out by injecting intradermally into the forearm a PPD, which represents a mixture of the material produced by M tuberculosis as it is growing (Mantoux method).1,2 The result is read between 48 and 72 hours after injection, measuring the induration diameter transversely to the long axis of the forearm in millimeters. Based on the sensitivity and specificity of the PPD tuberculin skin test and the prevalence of tuberculosis in different groups, 3 cutoff points have been recommended for defining a positive tuberculin reaction: greater than 5 mm, greater than 10 mm, and greater than 15 mm of indurations.1,3 The higher the risk a person has for developing active tuberculosis, the smaller the diameter criterion used for defining positivity in a tuberculin skin test result.

Complications of the tuberculin skin test are usually mild: pain or irritation at the injection site immediately after injection. Individuals who have been exposed to M tuberculosis may occasionally experience sizeable reactions, which may cause arm swelling and discomfort. There are few reports of acute allergic reactions to PPD.4,5 Our observation extends the potential range of the tuberculin skin test results to include severe bulla formation and full-thickness necrosis of the overlying skin.

Overall, the patient was in good condition before the episode. She had undergone BCG vaccination, which is routine for all newborns in Taiwan. The BCG vaccination might result in false-positive results in tuberculin tests. However, the accentuating effect of BCG on the tuberculin test wanes after vaccination1 and is extremely unlikely to be responsible for severe bulla formation 10 years later. Repeat tuberculin tests have been reported to accentuate the response in persons with active or latent tuberculosis infection.6 However, the patient presented in this case had never received a previous tuberculin skin test. Finally, the PPD used for this patient was commercially available and routinely used in the hospital. The dose and procedures of administration of PPD were also standard.

Tuberculosis remains a serious disease globally. The diagnosis of tuberculosis, especially extrapulmonary tuberculosis in children, poses a challenge for pediatricians because of the protean ways in which the disease presents.7,8 Severe, undesired complications of tuberculin skin tests are rare.4 Spontaneous full recovery is expected even in a patient with severe bulla formation and skin necrosis such as that manifested in our patient. The tuberculin skin test remains a useful diagnostic tool. To avoid severe skin necrosis, a tuberculin skin test should be avoided in patients with a history of severe reaction, as in the patient in this case.

Accepted for Publication: June 13, 2006.
Correspondence: Li-Min Huang, MD, PhD, Department of Pediatrics, National Taiwan University Hospital, 7 Chung-Shan South Rd, Taipei, Taiwan (lmhuang@ha.mc.ntu.edu.tw).

Author Contributions: Acquisition of data: Lu, Lee, Chang, Chen, and Huang. Drafting of the manuscript: Lu. Critical revision of the manuscript for important intellectual content: Lee, Chang, Chen, and Huang.

Financial Disclosure: None reported.

REFERENCES


©2007 American Medical Association. All rights reserved.