

CLINICAL VISTAS

Inflammation at a previous inoculation site: an unusual presentation of Kawasaki disease

A previously healthy 22-month-old girl of Asian heritage presented with a 10-day history of high fever and a 3-day history of nonpurulent conjunctivitis, erythema and swelling of her left upper arm and right side of her neck, and reddened, swollen palms. She had emigrated from South Korea 6 weeks before her admission to hospital. Her immunizations, including BCG (bacille Calmette–Guérin) vaccination given at 9 months of age, were up to date.

On physical examination, the girl was irritable, and her temperature was 39.8°C. She had conjunctivitis and reddened lips, and a tender lymph node 2.5 × 1.5 cm in size was felt on the right side of her neck. She had mild erythema of her palms and a faint maculopapular rash on her chest. She also had marked erythema, induration and small areas of vesiculation on her left upper arm (Fig. 1) that corresponded to the area of her BCG vaccine.

Laboratory investigations revealed an elevated leukocyte count (23.7 [normal 5–12] × 10⁹/L) with a left shift

(18.73 neutrophils, 0.47 bands), a low-normal hemoglobin concentration (111 [normal 110–140] g/L) and an elevated platelet count (430 [normal 150–400] × 10⁹/L). The erythrocyte sedimentation rate was elevated (111 [normal 1–10] mm/h).

Kawasaki disease was diagnosed, and intravenous gamma globulin therapy (2 g/kg) and high-dose ASA therapy (100 mg/kg daily) were started. The patient became afebrile during the gamma globulin infusion, and her clinical signs resolved over the next 24 hours. An echocardiogram showed ectasia of the right coronary artery. She was discharged home with a prescription of 40 mg of ASA daily; a follow-up echocardiogram done 4 weeks after discharge appeared normal.

Kawasaki disease is an acute systemic vasculitis that predominantly affects preschool-aged children. The disease has an incidence as high as 1 per 1000 children less than 5 years of age, it affects boys somewhat more often than girls, and it exhibits seasonal peaks in

Box 1: Diagnostic criteria for Kawasaki disease

5 days of fever (usually high, spiking and unresponsive to antipyretics)

At least 4 of the following:*

- Polymorphous rash
- Bilateral conjunctivitis (non-exudative)
- Oral changes (dry, cracked lips, strawberry tongue)
- Extremity changes (erythema and edema of palms and soles)
- Cervical lymphadenopathy (> 1.5 cm, usually firm and tender)

*Atypical Kawasaki disease, especially in young infants, may be diagnosed in patients with fewer than 4 criteria if coronary artery changes are present on echocardiography.

winter and spring.¹ The cause is unknown, but epidemiologic features suggest that the mechanism involves an immune response to a precipitating infection in genetically predisposed people. The diagnostic criteria for Kawasaki disease are listed in Box 1.

BCG vaccine is a live vaccine prepared from strains of *Mycobacterium bovis* and administered as a single intracutaneous injection. Although not protective against infection with *Mycobacterium tuberculosis*, the vaccine is relatively effective in preventing meningeal and miliary tuberculosis (TB) in children. The World Health Organization recommends BCG vaccination soon after birth in infants living in TB-endemic areas; the vaccine is currently used in more than 100 countries. In Canada, BCG vaccine is given selectively only to people at high risk of TB infection (infants living in First Nations or other communities that have a high incidence of TB, health care workers repeatedly exposed to patients with untreated or drug-resistant TB, and travellers planning extended stays in highly endemic areas).

In children who have received BCG vaccine, reactions of erythema, induration and ulcerations may occur at the site of inoculation with the development of Kawasaki disease. Reactions can also occur at the site of *M. tuberculosis* antigen skin tests. In the case described here, although only



Fig. 1: Marked erythema, induration and small areas of vesiculation (arrows) on left upper arm of girl with Kawasaki disease.

BCG vaccination was recalled and documented to have been given at the site of vesiculation, the pattern of vesiculation suggests possible reaction to a prior multiple-puncture skin test for *M. tuberculosis*. In Japan, where Kawasaki disease and BCG vaccination are both more common than in North America, 121 (43%) of 281 children who had Kawasaki disease within 3 years after BCG vaccination had cutaneous reactions at the inoculation site.² This observation led to this clinical feature being incorporated into the diagnostic guidelines suggested by the Japan Research Committee on Kawasaki Disease. Because BCG vaccination is uncommon in North America, clinicians are relatively unfamiliar with this clinical finding. The explanation for the reactions to BCG vaccine and tuberculin skin tests in children with Kawasaki

disease is unclear, but studies support the hypothesis that there is molecular mimicry between specific mycobacterial and human proteins and that the activated immune system in cases of Kawasaki disease may be propagated by these antigens.³

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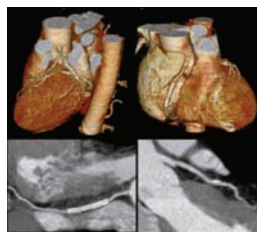
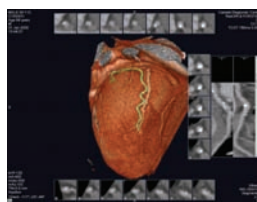
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