CLINICAL REPORTS

Polyneuritis following BCG re-vaccination

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Summary

A 12-year-old healthy, tuberculin negative boy was re-vaccinated with BCG. Nine days later symmetrical polyneuritis developed in all extremities. The tuberculin test was now strongly positive. It is suggested that the polyneuritis was due to a hypersensitivity reaction resulting from the BCG re-vaccination.

Introduction

BCG vaccination is generally considered to be a safe procedure (Aquinas 1957; Medical Research Council, 1956). Little information is available on the effects of repeated vaccination. The development of acute polyneuritis in a healthy 12-year-old boy soon after BCG re-vaccination suggests a causal effect.

Case report

A healthy 12-year-old boy had, at the appropriate ages, received the usual immunizations: vaccinia twice, poliomyelitis (Sabin) four times, diphtheria, pertussis, tetanus 6 times, and BCG once at birth. Twelve days before admission, a routine school-health tuberculin test (Mantoux, purified protein derivative (PPD), 5 units) was negative. Three days later he was re-vaccinated with BCG (GLAXO-7AC253). During this period and for the past year the boy had been perfectly well.

On the morning of admission he complained of pain and weakness in his hands and feet, difficulty in walking and in the use of his hands and fingers. On admission he did not look ill; temperature and pulse were normal. Physical examination was within normal limits except for symmetrical weakness of the distal muscles of his extremities. The achilles, biceps

and triceps deep tendon reflexes were absent. There was mild symmetrical hypoaesthesia in hands and feet. Babinski was negative bilaterally. Coordination was intact, fundus normal. On his left shoulder (the area of BCG, re-vaccination) was an infiltration of 0.5 × 0.5 cm. Routine laboratory examinations of blood and urine were negative as was X-ray of the chest. The long bones did not show 'lead-lines.'

Tuberculin test (Mantoux, PPD-5 units) gave a strongly positive reaction—an infiltration of 2.0 × 2.5 cm.

Ophthalmoscopy and fields of vision were normal. Lumbar puncture yielded normal fluid and pressure. Nerve conduction velocity in the ulnar nerve was 14 m/sec (normal—60 m/sec) with distal latency 8 msec (normal—up to 4 msec). The peroneal nerve could not be tested because motor unit potentials were extremely low. Electromyography of the tibialis anterior muscle at rest showed much spontaneous activity with fasciculations and fibrillations. On stimulation of the muscle, occasional rare motor unit potentials appeared. Their significance is difficult to interpret. These electrodiagnostic tests were compatible with a neuropathy.

Blood serology was negative for typhoid, brucellosis, rickettsia, leptospirosis, and syphilis. Blood immunoglobulins, complement and choline-esterase were within normal limits as were muscle enzymes. Urine was negative for lead, mercury, and thallium. The hair of his head was negative for thallium and arsenic. Blood serology for a spectrum of viruses showed the following low titres—West Nile 1:15, mumps 1:10, herpes simplex 1:30, adenovirus 1:15, influenza B 1:20—with no subsequent rise in titre.

He was given prednisone, 60 mg a day for 8 days, and then in decreasing doses for another 3 weeks. There was insignificant improvement and the boy

was transferred to the Rehabilitation Department. Six months later he was better but still had weakness in the muscle of his hands and feet.

Discussion

The neurological and electro-neurological findings with the normal cerebrospinal fluid establish generalized polyneuritis as the diagnosis. The child's previous good health as well as the absence of accompanying disease implies that the polyneuritis may have been related to the recent BCG re-vaccination.

Whereas experience in many countries and over many decades testifies to the safety of primary BCG vaccination (Aquinas, 1957; Medical Research Council, 1956) there appears to be less or perhaps no such documentation for BCG re-vaccination. However, rare side effects have been reported after primary vaccination. Two cases out of 14,100 vaccinated developed erythema nodosum (Medical Research Council, 1956). A few cases of generalized BCG disease were reported in immuno-deficient children (Passwell *et al.*, 1976). Other complications include regional adenitis (Aquinas, 1957; Medical Research Council, 1956) lupus vulgaris, multiple bone lesions (Imerslund and Torbjarg, 1954) and phlyctenular conjunctivitis (Damato, 1951). One report of rash, with pains in muscles, joints and abdomen, suggested a hypersensitivity reaction to BCG as the cause (Machtey, Bandmann and Palant, 1968).

The case described in this report was negative to tuberculin before re-vaccination with BCG. Re-testing with tuberculin only 9 days later produced a markedly positive reaction, suggesting a newly-acquired hypersensitivity. Such early conversion only 9 days after BCG vaccination is unusual; it normally takes about 6 weeks (Sinfotes 1972). This accelerated conversion suggests that the patient might have been already partially sensitive to tuberculin. Such prior sensitivity may explain both the hastened conversion and severity of the second tuberculin test following the BCG vaccination. Children after primary BCG vaccination may lose their skin sensitivity to tubercu-

lin, yet evidence of retained tuberculin sensitivity may still be provided by more sensitive methods (Spirer *et al.*, 1977). It is reasonable to ascribe this hastened reactivity to the influence of the BCG re-vaccination, and by implication the synchronous appearance of polyneuritis may well have been due to the same cause.

The fact that BCG vaccination has led to phlyctenular conjunctivitis (Damato, 1951) and erythema nodosum (Medical Research Council, 1956), both conditions considered to be due to a state of hypersensitivity, lends support to the contention that the polyneuritis here may have been the result of the same mechanism. Perhaps the fact that the BCG was not an initial but repeat vaccination is pertinent.

It may be appropriate for those practising BCG re-vaccination to reconsider established policy not only because of the somewhat possible greater risk of untoward reactions, for reasons as stated above, but particularly in the light of the evidence of persistent 'subclinical' reactivity to tuberculin that would suggest that re-vaccination may be unnecessary (Spirer *et al.*, 1977).

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