BCG vaccination prevents pneumonia in immobile elderly patients

Sir—Delayed-type hypersensitivity (DTH) responses to tuberculin, as described by Gillian Black and colleagues[1] in Malawi and the UK, is an important marker of T-helper-1- mediated acquired immunity.[2] Since depressed DTH response is associated with increased susceptibility to pneumonia and mortality in older people,[3,4] we investigated whether BCG vaccination lowers the rate of pneumonia in immobile elderly patients in Japan.

We prospectively assessed the rate of pneumonia in elderly people with a negative tuberculin response and no vaccination, in those with a positively converted tuberculin response by BCG vaccination, and in those with a naturally positive tuberculin response. Patients were selected from three long-term care facilities; those eligible were immobile and had a history of stroke. We excluded patients if they were immunocompromised—eg, patients who had active malignant disease, renal dialysis, corticosteroids treatment, or HIV-1 infection. All participants had a history of a positive DTH response to tuberculin according to their medical records, but were free from active lesions of tuberculosis during the study. They had received influenza vaccination every year, but none had received pneumococcal vaccination.

Before the study, all participants underwent physical examination, chest radiography, and tuberculin skin test.[2] We enrolled 164 patients in April, 1999, and investigated all patients for 2 years. Pneumonia was diagnosed by two radiologists who were not involved in the studies.

Nine patients were excluded from the analysis because they died from causes other than pneumonia during follow-up. Of the remaining 155 patients, 67 had positive DTH responses to tuberculin. The other 88 patients were randomly assigned by random numbers table BCG inoculation (44) or no inoculation (44). 4 weeks after vaccination, the negative tuberculin responses converted to positive in 41 (93%) of 44 patients inoculated with BCG. There were no significant differences in the mean age and mean scores for activities of daily living[5] between groups.

During follow-up, new pneumonia was diagnosed in 19 (43%) of the 44 non-inoculated patients, six (15%) of the 41 inoculated patients who became tuberculin positive, and nine (13%) of the 67 patients with positive DTH responses to tuberculin. According to Cox's regression model, the relative risk of developing pneumonia in the non-inoculated group

compared with the inoculated tuberculin-converted patients was 3·22 (95% CI 1·03–9·96, p=0·03). The risk of developing pneumonia did not differ between the tuberculin-converted group and the positive DTH response group.

Our findings suggest that BCG inoculation could reactivate the depressed T-helper-1-mediated cellular immunity and prevent pneumonia in immobile elderly patients with previous strokes. BCG inoculation may, therefore, have beneficial effects on the prevention of pneumonia in these patients.

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