in this instance, as we were able to control for many other factors that could be associated with crying (age, sex, social class, familiar location, presence of someone that they knew well, avoidance of 'contamination', skilled operator, and method). We are therefore satisfied that the difference in response to the two vaccines was the result of the difference between the two vaccines and not of some extraneous factor, and that the most probable cause for this was the acidity of the MMR II vaccine.

Although the difference is significant, one must keep in mind the clinical relevance of these findings. It could be argued that even those who did cry cried for no more than a minute and so the clinical relevance may not be obvious. However, this argument fails to take account of the fact that if one is given a free choice about whether to feel a 'little' pain or no pain at all, most would prefer to have no pain. In addition, those who give vaccines to children

will be well aware of the effects of a crying baby on the accompanying parent or minder, as well as on other children who may be waiting to undergo a similar experience. Hence we feel that the findings are of clinical relevance.

This study was primarily carried out among children who had defaulted from the vaccination programme. The mean age of those studied is higher than that of the population of children targeted for vaccination. One cannot necessarily extrapolate the findings of such a study to a younger age group, given that so little is known about pain in babies and toddlers and the difficulties of measuring it.

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Tuberculosis in a contact

Andrew Bush, J O Warner

Abstract

A 12 year old girl developed a large tuberculous pleural effusion. She was a contact of an adult with pulmonary tuberculosis who was positive on smear testing, and she had been managed in accordance with current British Thoracic Society recommendations.

The British Thoracic Society have recently published guidelines on the management of contacts of pulmonary tuberculosis.¹ We recently treated a child who developed tuberculosis from a known index case, despite being treated apparently in accord with these guidelines.

Case report

A 12 year old Asian girl was referred for investigation of a pleural effusion. She had been well until two days previously, when she became breathless during a physical education lesson, and was sent to the school doctor. A chest infection was diagnosed, but a chest radiograph showed a complete whiteout of the left hemithorax, and she was referred to hospital. On direct questioning she admitted to a two week history of a dry cough. She was an adopted child, and her adoptive mother (a doctor) was confident that she had had BCG vaccination at birth. Six months previously she had been seen in a chest clinic because the au pair girl, who had been with the family for two months, was found to have pulmonary tuberculosis that was positive on smear testing. Six weeks after the last contact with the index case

the Heaf test was grade two positive, with a normal chest radiograph, and therefore no action was taken and no follow up appointment given. On examination her temperature was 37.6°C and she looked unwell. The only other physical signs were those of a large left pleural effusion. There was no scar of a previous BCG vaccination visible.

Investigations showed her haemoglobin concentration to be 124 g/l, white cell count $5.7 \times 10^9/l$, platelet count $324 \times 10^9/l$, and erythrocyte sedimentation rate 38 mm in the first hour. She had normal urea and electrolyte, calcium, and phosphate concentrations and normal results on liver function tests. A Mantoux with 0.1 ml of 1 in 10 000 old tuberculin intradermally showed 15 mm of induration. A chest drain was inserted, and a total of 2.5 litres of straw coloured fluid was drained from the left chest. The pleural biopsy specimen showed necrotising granulomatous inflammation with Langerhans giant cells. Bronchoscopy was unremarkable. Pleural fluid and bronchial washings were culture negative for tuberculosis. She was started on pyrazinamide, rifampicin, and ethambutol because the organism in the index case was resistant to isoniazid, and she made a rapid recovery. Her mother subsequently rechecked the adoption papers, and found that the girl had not after all had a BCG vaccination.

Discussion

The development of a tuberculous pleural effusion in this child represents a failure of follow up. At the initial screening, there was a

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clear (but erroneous) history that BCG vaccination had been given. As the Heaf test was only grade two positive and the chest radiograph was normal, she was discharged, in accordance with the British Thoracic Society guidelines.¹ Had her true immune status been appreciated she would have had chemoprophylaxis. A single point in the history therefore made a considerable difference to her management.

In any case, BCG vaccination is known to afford incomplete protection (nil to 80% in different series²). It is possible that the development of a strongly positive Heaf test or chest radiographic changes would be delayed in patients only partially protected by BCG vaccine. Furthermore, the duration of protection after vaccination is unknown, and there is no good correlation between tuberculin hypersensitivity and immunity to tuberculosis.^{3,4} It therefore seems to us to be safer to repeat the Heaf test and the chest radiograph three months

as well as six weeks after the last known contact in all apparently negative children whether or not they have had BCG vaccination rather than to discharge them immediately from further follow up. The additional inconvenience is trivial, and, at least in this child, it seems likely that such a policy would have resulted in the earlier initiation of treatment.

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Indwelling cannula for insulin administration in diabetes mellitus

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Abstract

Experience with an indwelling subcutaneous Teflon cannula for insulin delivery to 10 children with diabetes mellitus is described. There were no significant complications during a one year trial period. The device may particularly benefit children during the early phase after diagnosis and for those with true needle phobia.

Multiple insulin injections may lead to distress and poor compliance in diabetic children particularly those of preschool age. We report the use of an indwelling, subcutaneous Teflon cannula (Insufon, Viggo*) to give insulin to newly diagnosed diabetics and children who require a brief period of frequent insulin injections to regain adequate metabolic control.

Patients and methods

METHODS

The 24 gauge Teflon cannula with an inner lumen diameter of 0.4 mm and an external diameter of 0.6 mm is similar in design to conventional cannulae used for intravenous treatment in neonatal units (figure A). The external end was sealed by a rubber membrane

which covers a conical injection port. The total dead space of injection port and cannula is 0.0075 ml; this is equivalent to 0.75 units of insulin (100 units/ml). A topical anaesthetic cream containing lignocaine and prilocaine (EMLA, Astra) was applied to the skin one hour before inserting the cannula. After cleansing with alcohol, a roll of skin on the abdomen was lifted to insert the cannula subcutaneously at an oblique angle using a 0.4 mm steel stylet which was then removed. The device was secured with an adhesive patch (figure B). The cannula patency was maintained by the residual volume of insulin in the dead space.

PATIENTS

Ten children aged 4 to 13 years were studied. Five children had newly presented with diabetes, of whom three had severe ketoacidosis and required intravenous fluids and insulin. The subcutaneous cannula was inserted later to give short acting insulin every six hours. The other two newly diagnosed diabetics were given multiple insulin injections for 48 hours via the cannula and then changed to twice daily injections.

Two newly diagnosed diabetics were referred because they had refused twice daily injections of insulin. A cannula was inserted in both children without difficulty and they quickly adjusted to having regular injections.

The cannula was used in a further three

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*The Insufon device is manufactured in the UK by Viggo-Spectramed and distributed by Medistron Limited, 6 Lawson-Hunt Industrial Park, Brodbridge Heath, Horsham, West Sussex, RH12 3JR.