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Short reports

Diphtheria—the continuing hazard

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SUMMARY An unimmunised schoolchild with no history of foreign travel developed severe diphtheria. Epidemiological investigations led to the discovery of a child in the same class with cutaneous diphtheria who had just returned from Bangladesh; this highlights the importance of swabbing all skin lesions acquired in endemic areas during any outbreak investigation.

In the United Kingdom today diphtheria is a rare disease. Notifications for the last decade have ranged from 0 to 5 each year, yet despite this apparent success the case fatality rate has increased from 4·6% for the years between 1940 and 1955 to 7·7% between 1956 and 1982.[1] One of the factors that may account for this is unfamiliarity with the disease leading to late diagnosis or misdiagnosis, which may have disastrous consequences.[2 3] It is important to maintain a high level of clinical awareness of the disease. We describe the most recent case of diphtheria in Manchester and the steps taken to limit spread in the community.

Case report

In September 1985 a 6 year old unimmunised white boy presented to the paediatric department of a neighbouring hospital with a six day history of malaise, sore throat, and croupy cough. He had enlarged tonsils covered with white exudate and intermittent stridor. Streptoccal tonsillitis was diagnosed and treatment started with phenoxymethylpenicillin. The next day increasing stridor and spreading exudate led to a visit by one of us (BKM) and a diagnosis of diphtheria was made from the clinical signs. Emergency tracheostomy was performed on transfer to the Regional Infectious Diseases Unit (RIDU); this was followed by administration of 40 000 units of antitoxin and start of a 14 day course of erythromycin. Between the third and the 14th day after admission, frequent atrial and ventricular extrasystoles, non-specific S-T changes, and runs of supraventricular tachycardia lasting 3–4 seconds were recorded. No neurological sequelae were detected and the child was discharged well 26 days after admission.

Epidemiological and bacteriological measures

The medical officer for environmental health was immediately informed of the clinical diagnosis, and outbreak control measures were instituted through close cooperation between his department, the RIDU, and the Manchester Public Health Laboratory. Nose and throat swabs from the patient were put into a commercial charcoal-containing transport medium (Probact, Technical Service Consultants, Bury) and plated on to Hoyle's tellurite medium within a few hours. The isolate from the child was a typical gravis culture shown to be toxigenic by a modification of the Elek test.[4] The subsequent isolates from carriers were similarly identified.

The paediatric ward was immediately closed to admissions and discharges. Parents and staff were advised to stay at home until two sets of negative nose and throat swabs were obtained. No carriers were detected. In the patient's family, because of the father's distrust of vaccines, three other siblings were also unimmunised and they were given erythromycin prophylaxis and started on a primary immunising course for diphtheria and tetanus. No carriers or preclinical cases were detected.

Swabbing of the children at the infant school attended by the index case was started five days after presentation and was repeated twice at weekly intervals. Computer records showed that all the children had been adequately immunised against diphtheria. A search for any hidden case of cutaneous diphtheria in any child who had recently returned from the tropics led to the discovery of a 5 year old, fully immunised, British born Bangladeshi child in the same class as that of the index

case. This child had returned from Bangladesh three weeks earlier with multiple crusting lesions on his scalp from which a profuse growth of *Corynebacterium diphtheriae* var gravis, as well as *Staphylococcus aureus* and *Streptococcus pyogenes* was obtained. He was clinically regarded as a case of 'cutaneous diphtheria.' His scalp lesions healed rapidly on erythromycin.

Swabbing of the children at the infant school produced eight throat carriers among 132 pupils who shared common play areas and dining hall. Eight more throat carriers were discovered among contacts of these carriers. They were the mother, sister, and younger brother of the 'cutaneous diphtheria' case, two class mates of the sister who attended the local junior school, a younger preschool sibling of one of these two children, and two household contacts of one of the carriers from the infant school. The carriers were treated with a 14 day course of erythromycin at the RIDU and discharged after three sets of negative nose and throat swabs. Three further sets of swabs were obtained before they were allowed to restart school or work. There were no cases of bacteriological relapse. In all, 21 people were admitted—16 carriers, one laryngeal and one cutaneous diphtheria case, and three others whose swabs subsequently proved negative. Around 800 people were screened; this generated a little over 3000 specimens.

Discussion

The isolation of toxigenic *C diphtheriae* from a patient has important public health implications. The prevalence of such organisms in the United Kingdom is extremely low, so the spread in the community to and from a clinical case can be detected by swabbing of close contacts. Most toxigenic organisms are introduced from abroad and such sources should be looked for in every survey. Bangladeshi families have played an important part in the epidemiology of diphtheria in the United Kingdom in the last 10 years.[1 2 5] We consider the child with cutaneous diphtheria to be the source of the toxigenic organisms in this outbreak. Skin carriage of *C diphtheriae* can be very persistent and is common in the tropics where it probably contributes towards natural immunity. Swabs taken from skin lesions acquired in endemic areas should be cultured for corynebacteria in addition to the more usual pathogens. Skin carriers are also more infectious than either nose or throat carriers.[6] This outbreak also shows how toxigenic *C diphtheriae* can spread rapidly even in immune populations. In the 20 days between the beginning of term and the first swabbing exercise the organism had spread to nine children in three different classes, into another school, and into households involving three or more people. The unimmunised cannot therefore rely on herd immunity for protection and the risk to such people can only increase as air traffic between the United Kingdom and endemic areas grows.

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