Lesson of the Week

Expiratory chest x ray examination in the diagnosis of inhaled foreign bodies

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After the suspected inhalation of a foreign body most patients go either to their general practitioner or to the local casualty department. A chest x ray examination may well be asked for, but the routine inspiratory film may instil a false sense of security as it usually shows no abnormality. An expiratory chest x ray film gives much more information.

Case report

A 10 year old boy presented to the casualty department two and a half hours after inhaling a piece of plastic. He said that he had been chewing it when he was hit on the back, and he thought he had swallowed it. He coughed violently immediately afterwards, had an episode of retrosternal chest pain, and had subsequently sounded wheezy. He had had an episode of wheezy bronchitis as a baby but had not been thought to be asthmatic. On examination there were loud expiratory wheezes, much worse on the left than on the right. Appearances on an inspiratory chest x ray film and lateral neck x ray film were normal, and he was given 1 ml terbutaline in a nebuliser. He improved slightly and was allowed home. The next day his parents took him to their general practitioner, who sent him back to the casualty department

All patients thought to have inhaled a foreign body need an expiratory chest x ray examination to ensure the correct diagnosis

for review as the wheeze had not abated. On re-examination his signs were unchanged, and appearances on a further inspiratory chest x ray film were normal. An expiratory chest x ray film, however, clearly showed air trapping in the left lung, and a mediastinal shift to the right (figs 1 and 2). At bronchoscopy the conical tip of a ball point pen was removed from the left main bronchus. He made an uneventful recovery.

FIG 1—Inspiratory chest x ray film showing no abnormality.

FIG 2—Expiratory chest x ray film showing air trapping in left lung and mediastinal shift to right. Foreign body is not seen.

Discussion

Inhalation of a foreign body is always serious and sometimes fatal.¹ The degree of lung disease will be determined by the age and size of the child, the size and shape of the foreign body, the period since inhalation, and the area of lung affected. The character of the foreign body is important. Animal and vegetable bodies—for example, tooth, wool, peanut, grass seed heads—cause more symptoms and disease than mineral ones—for example, metal rings, or plastic.² In clinical practice 65% of foreign bodies are inhaled by children aged 1–3 years as children of this age place all objects in the mouth immediately; before this age their ability to reach and grasp an object is limited.³ Of those

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children with an inhaled foreign body, 80% have a good history of inhalation rather than swallowing, with 80% choking, and up to 20% becoming cyanosed.² On examination, the triad of cough, localised wheeze, and decreased air entry can be expected in 60% of patients.³

Radiographically, the commonest feature is obstructive over-inflation of one or more lobes of the lungs (68%).² This is about five times more common than collapse (14%). Pathophysiologically, a foreign body in a bronchus may not obstruct it on inspiration, when the bronchial diameter increases, but may occlude it totally or partially on expiration, when the bronchial diameter decreases.⁴ Thus an inspiratory chest x ray film will show air in both lungs, but an expiratory film will show that only the normal lung is deflating. Air trapping may be shown best by fluoroscopy (screening) during vigorous respiration or crying both in children aged from 1 to 3 years, in whom full expiratory films may be difficult because of poor cooperation, and in those cases with only minimal degrees of overinflation. Complete obstruction of a bronchus will lead to distal air absorption and collapse.

All inhaled foreign bodies need to be removed bronchoscopically. Various techniques and grasping forceps have been

developed which achieve this more easily. Modern ventilating bronchoscopes allow removal to be performed with safety, though there is always a need for close cooperation between the surgeon and the anaesthetist.

Although the role of the expiratory chest x ray film is well known in the diagnosis of pneumothorax, its place in the diagnosis of inhaled foreign body needs to be re-emphasised, as appearances on a routine inspiratory chest x ray film may be normal.

References

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Contemporary Themes

Differences in rate of uptake of immunisation among ethnic groups

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Abstract

In the Bradford health district ethnic origin is associated with appreciable differences in morbidity and mortality. In view of these differences a study was undertaken to determine whether there were differences among the ethnic groups in utilisation of the National Health Service, as reflected in the rate of uptake of immunisation, which is offered to all children. Significant differences were found between the British group and some other ethnic groups—notably Pakistani, Indian, and half Negro groups. The rate of uptake of immunisation was nearer the optimum in the Indian group than in the British group. The most unsatisfactory rate of uptake of immunisation overall was found in the half Negro group.

No clear explanation of the differences has been shown, they are likely to be due to various factors in the National Health Service and in the community.

Introduction

In the Bradford health district ethnic origin is associated with appreciable differences in both morbidity and mortality.¹ In 1980 the perinatal mortality was 29.2 per thousand in the Asian community in Bradford compared with 9.4 in the non-Asian community. This is important because 37.2% of the 1980 birth cohort in Bradford are of ethnic origins other than British (table I).

In view of the differences in morbidity and mortality we thought that it would be useful to know if there were also differences in the utilisation of the National Health Service in Bradford. We decided to examine rate of uptake of immunisation. The basic immunisations—diphtheria, pertussis, tetanus; poliomyelitis; and measles—are offered to all children known to be resident in the district. BCG is offered within the first six weeks of life to all children with ethnic origins in Asia because of the increased incidence of tuberculosis in these ethnic groups. As basic immunisations are offered to all children differences in the rate of uptake are likely to be due to differences in utilisation of the NHS.

The age at which a child is immunised is important and has been reviewed several times by the Joint Committee on Vaccina-

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