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FOREIGN BODIES IN THE BRONCHI AND OESOPHAGUS IN CHILDREN

BY

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Out of a number of cases of foreign bodies in the bronchi and oesophagus which have passed through my hands during the past five years it is thought that the following five are worth reporting as they illustrate various points which may materially affect the ease or difficulty with which these bodies may be removed.

Foreign bodies are less common in the bronchi than in the oesophagus. On account of the more rigid structure and small diameter of the bronchus, especially in children, removal is always more difficult in these cases. Removal is also complicated by the fact that, unless the foreign body is impacted, it tends to move up and down the lumen of the bronchus with respiration and cough, thus causing irritation of the mucous membrane and producing a varying amount of oedema, which may ultimately occlude any view of the offending article. The lumen of the oesophagus is considerably larger than that of the bronchus, even in a child, and the walls are lax and distensible, providing more space for manipulation, which considerably facilitates the removal of a foreign body.

Case I

A male child aged 5 was admitted to hospital on April 24, 1944, with a history of having inhaled two glass beads three days previously. One of these he had subsequently coughed up before admission, and it had been retrieved. Several severe attacks of coughing were accompanied by partial respiratory obstruction, alarming enough for the practitioner in charge of the case to send the child to hospital. On admission the patient appeared comfortable and continued so as long as he remained in one position. Any change, however, tended to bring on an attack of coughing, which at times was accompanied by signs of dyspnoea. This was explained, and subsequently demonstrated at the time of removal, by the bead being forced up into the trachea and impinging on the lower surface of the vocal cords. There were no signs of collapse of the lung, and x-ray examination revealed the bead situated in the left main bronchus.

Operation was performed under chloroform anaesthesia and the 25-mm. Irwin Moore bronchoscope passed down into the bronchus. The glass bead was easily visible in the bronchus, and was propelled up and down the lumen with each act of respiration. Attempts to seize the bead were found difficult for two reasons: (1) the extremely smooth surface of the bead, which allowed of no firm grip; and (2) although the bead was not impacted, there was hardly enough room to pass the forceps ends over it on either side in order to grip it. After several unsuccessful attempts the patient began to come round and the tube was withdrawn. While this was being done he coughed, and the bead was seen to be propelled into the trachea up against the lower surface of the cords, but before the forceps could be reintroduced it had been sucked back again into its original position. Under deeper anaesthesia the tube was reintroduced and a cotton-wool swab soaked in adrenaline held against the mucous membrane around the bead for a few seconds. This resulted in shrinkage of the tissues, and after one or two more attempts it was possible to secure a firm grasp of the bead and withdraw it into the lumen of the bronchoscope, and then to withdraw the whole. Further examination showed no damage to the bronchial mucous membrane. Beyond a slight laryngitis for a few days, the child suffered no ill effects, and was discharged about a week later.

Case II

A boy aged 3 was admitted to hospital on Jan. 9, 1945, at 3.30 p.m., having swallowed an open safety-pin at midday. Immediate x-ray examination showed the pin, open end downwards, lodged in the oesophagus just below the post-cricoid region (Fig. 1).

The interest in this case lies in the fact that the safety-pin had passed into the oesophagus point downwards—a very unusual occurrence, but one which considerably facilitates the removal. It is interesting to compare this case with the one reported by Mr. Ritchie Paterson in the *Journal* of Feb. 17, 1945, in which the pin entered the oesophagus point upwards. Mr. Ritchie Paterson described the dangers associated with the removal of a pin in this position and the dexterity required to effect this without perforating the oesophageal walls, with the possible consequence of mediastinitis.

FIG. 1

In the present case, on introduction of the oesophagoscope under general anaesthesia, the pin was seen lightly poised on the posterior wall of the oesophagus. The point had presumably been caught between two folds of the mucous membrane without actually perforating the tissues. It was an easy matter to seize the rounded end with the forceps and withdraw the pin into the lumen of the tube and then to remove the oesophagoscope and its contents in one act. There was no damage to the tissues, and the whole operation, including demonstrating to the nursing staff, took at the most five minutes. The patient was sent home next day, none the worse.

Case III

On Jan. 9, 1943, a girl aged 14 was admitted complaining of cough and pyrexia for two weeks before admission. Clinical examination showed signs of collapse of the right lung. Skiagrams of the chest revealed a very large paper-clip, with a round head and two prongs, lodged head downwards at the bifurcation of the right main bronchus (Fig. 2). Each prong of the clip was later found to be 3/4 in. long. A preliminary bronchoscopic examination was done under chloroform anaesthesia, as it was thought that a good deal of pus and oedema might be present and preventing a view of the clip, thus interfering with its removal by direct vision. This surmise proved correct, and even with gentle pressure with a long wool-carrier the foreign body could not be felt. It was therefore decided to defer any further attempt at removal until this could be done under the x-ray screen. Owing to the disproportion in size between the diameter of the bronchus and the length of the prongs, it was obviously impossible to manipulate the clip so as to remove it with the points dangling and thus avoid damage to the mucous membrane. The only hope was to attempt to seize the prongs about half-way down their length, close them as much as possible and draw them into the lumen of the bronchoscope.

The patient was laid on the x-ray table and chloroform anaesthesia induced. A further examination through the bronchoscope proved the clip still invisible by direct vision. Under the screen, however, it was clearly seen, with the head firmly lodged down the right main bronchus. A pair of forceps was then passed down the tube to the clip and several attempts were made to secure a hold of both prongs together, but these were not successful. It was felt that the clip must be removed at all costs, even at the risk of damage to the surrounding tissues. A firm grip of one of the prongs was therefore

obtained and gentle traction applied. This was accomplished only after turning the child on her right side. Watching all the time through the screen, the clip was pulled up for about an inch. It then stuck, and it was seen that one prong had caught in the tissues. Further gentle traction showed that this prong was acting as a fulcrum round which the head was rotating. Traction was therefore continued, and the prong, with its point embedded, was seen to be gradually bending at its centre. Traction was continued till the

FIG. 2

prong was bent double and no further progress was being made. Then, still with a firm grip on the first prong, a slight downward push was made in an attempt to dislodge the point. This was successful, and by a stroke of luck the now-doubled prong entered the lumen of the bronchoscope when further traction was applied. Thereafter it was a comparatively easy matter to draw the whole clip into the tube and withdraw the latter and its contents in one movement. The proceedings were viewed the entire time through the x-ray screen, and it would have been impossible to remove the foreign body without the vision thus afforded.

The patient subsequently developed, not surprisingly, a complete collapse of the right lower lobe and a swinging temperature for a while, but with the help of sulphapyridine and breathing exercises she made a satisfactory recovery, and was discharged from hospital on March 25, 1943, to attend the chest clinic as an out-patient.

Case IV

A boy aged 12 was admitted on April 30, 1945, with a history of having swallowed or inhaled a bent pin which he had been holding between his teeth in an effort to straighten it. The patient was not distressed in any way and there were no abnormal physical signs. X-ray examination showed an apparently straight pin lodged in the commencement of the right main bronchus. An ordinary white steel pin similar to that involved was seen to have some ornamentation of an orange-coloured composition material around the head.

The child was placed on the operating table and chloroform anaesthesia induced. On introducing an Irwin Moore bronchoscope into the right bronchus one-half of the pin could be easily seen. With a little manipulation the ornamented head end came into view on the right, and it was seen that the pin was in fact bent into a "V," as stated by the child, though this was not apparent on the films. Having ascertained the shape and position of the pin, forceps were introduced and a firm grip obtained as near the point as possible, which was then drawn into the lumen of the tube. The

decorated head of the pin impinged on the rounded end of the bronchoscope. This was then gently withdrawn without any difficulty till the subglottic region was encountered, when there was a slight hitch; but a little manipulation sufficed to withdraw the pin past the vocal cords, after which there was no further difficulty.

Other than a moderately severe laryngitis for a few days after the operation there were no ill effects, and the child was discharged fit on May 7.

Case V

A baby aged 18 months was admitted at 10 p.m. on May 19, 1945. The mother said she thought the baby had swallowed a piece of bone or button—"there were plenty of bits on the floor." Immediate x-ray examination revealed a shadow about the post-cricoid level, but it was difficult to be sure whether it was in the air or the food passage. From an oesophagoscopy performed under general anaesthesia it was evident that there was no foreign body in the oesophagus. Bronchoscopy was then attempted, but, owing to a misunderstanding as to the age of the child in the first place, the smallest-sized bronchoscope was not available, and the next size was too large to pass through the glottis without undue force, which would have damaged the cords. A brief glimpse was obtained, however, of the upper part of the trachea, but no foreign body could be seen. The child was breathing comfortably and was in no way distressed, so it was decided to postpone further examination till another skiagram could be taken the next day. This was done, and a lateral view showed a small pointed body at the level of the sixth cervical vertebra, but it was still not clear whether it was in the bronchus or the oesophagus. A barium meal was therefore given, and it immediately became clear that the offending article was in front of the oesophagus in the left bronchus, possibly exerting slight pressure on the oesophagus.

The baby was taken to the theatre and chloroform anaesthesia induced. The smallest-size Negus bronchoscope was then introduced through the larynx with the aid of a Mackintosh electrical laryngoscope. Owing to the small lumen of the tube the view was very restricted, but by keeping well to the left side of the trachea the bronchoscope passed easily into the left main bronchus. After sucking away some mucus there appeared to be a small dark hair-line across the lumen of the bronchus, which could not be sucked away and was presumed to be the foreign body, although no adequate view could be obtained. A very fine pair of forceps was introduced down to the site and gentle palpation performed, when something hard could be defined. The forceps were opened and manipulated till it was felt that a grip on the hard body had been obtained; traction was then exerted until the forceps ends and their contents were within the lumen of the bronchoscope. The latter and its contents were then withdrawn in one movement. On examination the foreign body was seen to be an irregular piece of button of some composite material, approximately half an inch long and a quarter-inch in diameter.

Beyond slight pyrexia for a few days the baby suffered no ill effects, and was discharged from hospital on May 25.

I am indebted to Dr. W. E. Crosbie, medical superintendent of Alder Hey Hospital, for permission to publish the above cases, and to Dr. Bennett-Jones for the anaesthetic in Case III and Dr. Derham in the four remaining cases. I have also to thank the radiographer, Mr. Lucas, for the x-ray films and prints and his valuable assistance in screening the patient in Case III.

AN UNUSUAL CASE OF ERYTHROBLASTOSIS FOETALIS

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The possibility that erythroblastosis foetalis may sometimes be due to a heterospecific pregnancy (i.e., to maternal anti-A or anti-B iso-agglutinins) has been considered by Wiener (1943); and Boorman, Dodd, and Mollison (1942, 1944) have reported three cases in which this seemed to have happened. A fourth and rather striking case has been investigated by us, with the following findings.

Clinical History

Mrs. A., a primigravida aged 24, attended the antenatal clinic at the City Hospital, Nottingham, on Jan. 28, 1944, and was seen by one of us (J. B. C.). Her L.M.P. was Sept. 29, 1943, and her fundal height at 14-16 weeks corresponded with the period of amenorrhoea. She was found to have an intermediate degree of