Medical Memoranda

A Case of Pulmonary Asbestosis

Asbestosis is a form of silicosis, the asbestos fibres consisting mainly of a fibrous magnesium and calcium silicate. These fibres are found in the fine dust present in factories engaged in the manufacture of heat-resisting materials, etc., from crude mineral asbestos.

The lesions produced in the lungs by the inhalation of asbestos fibres take the form of a diffuse pulmonary fibrosis affecting particularly the lower lobes of the lungs. The characteristic "asbestos bodies" may be found in the sputum, but it is only when they are present in clumps or masses that they indicate parenchymal involvement (Beattie and Dickson, 1943). Emphysema and bronchiectasis are commonly present; the pleura is thickened and may be adherent to the diaphragm. Pulmonary tuberculosis may be associated with asbestosis, although not so commonly as with silicosis.

The following case is of interest in view of the lapse of time between exposure to industrial hazard and the diagnosis of the disease, and because of the isolation of "asbestos bodies" in the sputum 20 years after exposure.

CASE REPORT

The patient, a man aged 45, was admitted to a sanatorium on April 4, 1949, with a diagnosis of pulmonary tuberculosis following a mass miniature radiography examination in September, 1948. He gave a history of chronic productive cough of at least ten years' duration accompanied by breathlessness on exertion for approximately the same period. The sputum was white and frothy and has never been blood-stained. Although spare in build his weight has remained stationary at about 8 st. 12 lb. (56.25 kg.). There have been no fresh symptoms during the last few years.

At the age of 12 he had a colectomy performed for rheumatoid arthritis, and has limited movement of the spine, hips, and elbow-joints. He has been in the habit of taking liquid paraffin daily for 35 years.

Occupational History.—From 1924 to 1929 the patient worked as an asbestos crusher. The crude dry mineral asbestos was crushed by mechanical hammers into its constituent fibres, which passed into hoppers and thence into sacks. During this process the air was continuously filled with dry asbestos which entered the workpeople's mouths and noses in spite of the simple precautions they took. Respirators were not provided, so the men were in the habit of tying their pocket-handkerchiefs over their mouths and noses while working. The patient worked in an atmosphere such as this for 48 hours weekly. He gave up this employment in 1929 and has not worked with asbestos since.

On examination he was seen to be of spare build and poorly nourished. His pulse, temperature, and respirations were within normal limits. The chest was emphysematous, with an expansion of only 1½ in. (4.4 cm.). Vital capacity was 2,300 c.cm. The percussion note was not impaired. A few moist sounds were present at both bases. There was no cyanosis or clubbing. Repeated examination of the sputum and stomach washings both by culture and by animal inoculation was negative for tubercle bacilli.

Asbestos bodies were found in the sputum on April 12. Oil droplets were never demonstrated. An x-ray film taken on April 7 showed a fine diffuse infiltration affecting mainly the mid-zone and lower zone of the right lung. There was some very fine scattered infiltration in the left mid-zone. The apices were clear, the bases emphysematous, and the right costophrenic and cardiophrenic angles were obliterated. There was considerable increase in the size and density of both hilar shadows. Screen examination showed little interference with the move-

ments of the diaphragm, although there was some peaking of the right cupola on inspiration.

The case was referred to the Pneumoconiosis Medical Panel as a matter of interest, but as the man had not worked in the asbestos industry for 20 years he was adjudged ineligible to recover compensation under any existing scheme.

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Effects of Nitrogen Mustard on the Intraocular Pressure

Nitrogen mustard is an unstable vesicant studied during the war as a possible successor to ordinary mustard gas. When dissolved in water it forms mainly a hydrochloride (S-hydrochloride), which is stable for long periods. It is this product that has been used in the present study. When applied to the eye of the rabbit (for example, two drops of a 1% solution) its most prominent effect is a breakdown of the barrier between the blood and aqueous humour, so that plasma proteins appear in the latter fluid (Davson and Quilliam, 1947); associated with this change there is a pronounced meiosis, a severe inflammatory conjunctivitis with chemosis, and corneal oedema. So far, no study of its effects on the intraocular pressure have been recorded. The results described below show that the effects may be very severe; they will be published in detail later, it being our purpose here mainly to emphasize the severe consequences that are likely to ensue should a little of this material accidentally reach the eye—a matter of some importance in view of the use of the substance in the treatment of Hodgkin's disease.

EXPERIMENT

A rabbit was anaesthetized with pentobarbitone sodium, and after cocainization of the right eye a needle was inserted into the anterior chamber, connected to a tambour-type manometer, and the intraocular pressure recorded. Slit-lamp observation of the aqueous humour was made at the same time. The changes in intraocular pressure with time are shown in the Graph. At A three drops of nitrogen mustard were placed in the conjunctival sac; it will be seen that the intraocular pressure rose from its original value of 16 mm. Hg. to one of 55 mm. Hg. within about 25 minutes—that is, the changes so far as intraocular pressure is concerned are akin to those occurring in an acute inflammatory attack of glaucoma. The constricted pupil, however, and the breakdown of the blood-aqueous barrier are reminiscent of an acute iridocyclitis.

In general, the constriction of the pupil runs parallel with changes in intraocular pressure, the maximum constrict-

tion occurring during the later stages of the rising phase. The appearance of a noticeable "aqueous flare"—that is, the presence of protein in the aqueous humour—seemed to take place after the pressure had begun to rise steeply. Thus at B the flare was first definitely identified; at C the current of cells in the aqueous humour ceased, indicating an increase in viscosity due to the presence of protein; at D the flare appeared to be maximal and clots of fibrin were observable.

In conclusion, we must emphasize that nitrogen mustard is a dangerous substance; there is reason to believe that the human eye is some five times more sensitive to its effects than the rabbit's eye, so that just a fraction of a milligram of nitrogen mustard in the conjunctival sac may be enough to cause symptoms as acute as those described here. There is no known antidote for the substance, so that the first measure to be taken is thorough and immediate irrigation of the eye with water or saline solution.

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Congenital Atresia of the Oesophagus

In 1944 Haight, in America, reported the first case of congenital atresia of the oesophagus successfully treated by anastomosis. Franklin (1947) described the first two successful cases treated in this country, and since then there have been several, as yet unpublished, successes. In reporting another successful case it is my purpose to describe certain variations in operative technique and post-operative management which are considered of value.

CASE REPORT

A full-term female child weighing 8½ lb. (3.85 kg.) was admitted to the Alder Hey Children's Hospital on May 5, 1949, when 5 days old, with a history of regurgitation of all feeds since birth, associated with coughing, choking, and cyanosis. In spite of the length of history the child's general condition was satisfactory on admission apart from moderate dehydration. A small rubber catheter was passed into the oesophagus and 1 ml. of iodized oil was injected through this tube. Radiographs showed a dilated blind pouch ending at the level of the third thoracic vertebra. There was air in the stomach.

The child was nursed in an oxygen tent and the pharynx aspirated at frequent intervals. Penicillin, 250,000 units, was given intramuscularly and an intravenous glucose-saline infusion was started.

Operation.—Endotracheal oxygen and ether was supplemented by curare (Dr. G. J. Rees). The child was placed on her left side with a small sandbag underneath the lower ribs and her right arm raised above her head. An incision was made along the fourth intercostal space from the lateral border of the sacrospinalis to the anterior axillary line. The intercostal muscles were divided down to the parietal pleura and the pleura was gradually dissected off the chest wall. The ribs were slowly spread with the aid of a mastoid retractor, while the pleura was separated in an upwards and backwards direction. At the apex of the lungs some difficulty was experienced in dissecting the pleura of the chest wall and a large hole was torn into the pleural cavity. This gave rise to some temporary respiratory distress, which was, however, quickly overcome by occluding the hole with a moist piece of lint and by controlled respiration. The blind oesophageal pouch was easily identified by manipulating a catheter in it. After dividing the vena azygos the lower oesophageal segment was discovered. It was found to be attached to the back of the trachea just above its bifurcation, and the distal segment was divided. The upper and lower segments were clamped and tied with strong chromic catgut sutures could be brought together without tension. The blind oesophageal pouch was opened. The two segments were now

anastomosed by means of a single layer of about a dozen interrupted silk sutures, on atraumatic needles, around a thin rubber catheter which had been passed down into the stomach and up into the mouth. The wound was dusted with penicillin powder and closed in layers around a small drainage-tube lying in the extrapleural space. The operation was completed in 85 minutes.

Post-operative Management.—The child was returned to an oxygen tent, intravenous fluids were continued, and penicillin was given orally and by intramuscular injection. Her position was often changed and the pharynx was aspirated at half-hourly intervals. The tube draining the extrapleural space was connected to a Woulfe's bottle.

On May 6 her condition was excellent. Small feeds of ½ oz. (14 ml.) glucose-saline were given through the stomach catheter. In the afternoon the infant vomited up the catheter and it was not reinserted. Next day the drip stopped early in the morning and was taken down. Oral feeding was instituted. At first a feed of ½ oz. of saline coloured with gentian violet was given. There was no discharge from the drainage-tube. Then ½ oz. of breast milk was given at two-hourly intervals and the volume of the feeds was gradually increased.

On May 8 the child was taking 2½ oz. (71 ml.) of breast milk at three-hourly intervals without difficulty. No vomiting occurred and there was no discharge from the drainage-tube. On May 10 penicillin was discontinued and the drainage-tube removed. On May 13 the sutures were removed and the wound had healed.

The child made an uninterrupted recovery and was discharged on the 40th post-operative day. At the time of writing she is 11 weeks old and weighs 12 lb. (5.4 kg.).

COMMENT

The operative approach differs from that of Haight (1944), Ladd and Swenson (1947), Franklin (1947), Swenson (1947) and others, and is the one used by Mr. Denis Browne. It provides an excellent exposure of the upper mediastinum and avoids time-consuming rib-resection. It involves, however, a more extensive separation of the parietal pleura from the chest wall and there is some danger of post-operative pulmonary collapse of the upper lobe. A rent of the parietal pleura may occur and give rise to temporary respiratory embarrassment, but this can be checked by controlled respiration anaesthesia and it seems unnecessary and time-consuming to repair it.

It had been our intention to give feeds by stomach-tube for at least five days, but the tube was regurgitated on the day after operation and it was thought inadvisable to reinsert it. Feeding by mouth was started 36 hours after operation, at first using coloured saline to detect any leak from the anastomosis, and then breast milk. We consider that the early commencement of oral feeding was one of the main reasons for the child's speedy recovery. Detection of a leaky anastomosis by instillation of iodized oil into the child's oesophagus and observing it under x ray was not undertaken because it was thought that this method would not reveal a small leak and that a coloured aqueous solution would prove more satisfactory and less irritant.

I wish to thank Miss Isabella Forshall for her most helpful advice during both the operation and the post-operative treatment, and Dr. R. McL. Todd and Dr. A. C. Kirby, whose skilled co-operation during the post-operative period has been invaluable. The rapidity and smoothness of the child's recovery were largely due to Dr. W. J. Gourley's and Sister Owen's constant and faithful attention.

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