include adequate treating of the accompanying empyema. In a late case, with fully established empyema, to attempt to free the oesophagus and perform suture would be undoubted folly. In an early case, however, possibly up to 48 hours after perforation, the right attitude should be to explore and if possible suture the rent.

In this third case—with a long rent—there was a late leak. By performing a gastrostomy as an oesophageal bypass, and thus restricting swallowing purely to saliva, local pleural drainage together with gastrostomy ultimately gave sound closure.

Summary and Conclusions

Spontaneous perforation of the oesophagus is an acute emergency which must always be kept in mind and which may simulate many lesions. It can masquerade as coronary thrombosis, or acute abdominal catastrophes, especially perforated gastric ulcer, acute pancreatitis, and acute cholecystitis. Frequently the patient is too distressed to give a rational history.

As the oesophagus may perforate into the mediastinum alone, into the right or left pleural cavities, or into both, there is a diversity of signs and symptoms. Convincing chest clinical signs are often hard to elicit. Not all cases have cervical emphysema, but, if present, it is diagnostic. Chest radiographs, including, if necessary, the swallowing of radiopaque oil, confirm the diagnosis.

Pre-operative management embodies prompt relief of any tension pneumothorax, restriction of all food by mouth, intravenous fluids, passage of a Ryle tube to the stomach, and antibiotics.

Thoracotomy is then required, and wherever possible the rent should be sutured. In early cases, healing is sound and convalescence greatly shortened.

A plea is made to include a chest radiograph when faced with a difficult diagnosis of the acute abdomen.

I gratefully acknowledge help and co-operation with these patients from Professor J. E. Caughey, Mr. Alan Wardale, Mr. C. L. Tucker, Dr. R. L. Coulter, Dr. T. O'Donnell, and my resident staff in the Dunedin Hospital. I also wish to thank Dr. James Thomson, acting medical superintendent of the Dunedin Hospital, for permission to publish these records.

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An observing station for measuring the smoke and sulphur dioxide pollution in the London atmosphere has been established in the Science Museum by co-operation with the Fuel Research Station of the Department of Scientific and Industrial Research. The station is one of a number that are being established to permit a more detailed examination of atmospheric pollution in London and elsewhere. The sampling equipment is displayed as a working exhibit in the Meteorology gallery. The smoke particles are captured on filter paper through which air is drawn from just above museum roof level by means of a small electric pump. As a result a grey stain appears on the filter paper, the intensity of which is a measure of the degree of smoke pollution. The same air is bubbled through a weak solution of hydrogen peroxide, where the atmospheric sulphur dioxide is dissolved to form an acid solution, the strength of which is measured by standard chemical methods. Observations of smoke and sulphur dioxide pollution are made daily by a member of the museums staff and reported to the Fuel Research Station, who are in charge of the investigation.

SPONTANEOUS RUPTURE OF OESOPHAGUS

BY

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The following case of spontaneous rupture of the oesophagus is placed on record, even though treatment was unsuccessful, as this condition is still thought to be rather rare. The records of this hospital for the past six years, covering 28,725 admissions, show only one comparable case—that of an eclamptic patient who died thirty-two hours after admission—in which two perforations involving the lower end of the oesophagus were found; unfortunately the data about this case are too scanty for an accurate diagnosis to be made.

Increasing awareness of the condition seems to be bringing more cases to light. Mallam, Whitelocke, and Robb-Smith (1940) stated that the total number of published cases was 40. Barrett (1946), in a comprehensive review of the subject, put the figure at about 50 cases. Mauro (1952) discussed 103 cases in the literature. Barrett (1947) was the first to describe recovery following correct diagnosis and deliberate operation to repair the rupture. Frink (1947) published details of a successfully treated case of 1941, and Samson (1951) recorded two such cases mentioned by Graham in 1944. Nanson and Milnes Walker (1953) added the twenty-third recovery to the literature.

It would be wrong to publish only the successes in the treatment of this condition if a correct record of mortality rate is the aim. The mortality rate may be even higher and the disease commoner than the records would suggest, as up to 1949 only 16 cases had been diagnosed in life and the remainder at necropsy (Russell, 1953), and it may be possible to miss a ruptured oesophagus at necropsy unless one is looking especially for the condition (Barrett, 1946). Many cases of death in a period of hours to a few days after the onset of retrosternal pain, collapse, and perhaps vomiting must have been certified as being due to coronary thrombosis without necropsy confirmation, and these might well include a number of cases of spontaneous rupture of the oesophagus.

Summary of Case Notes

A 73-year-old widow, about to begin her tea, complained of severe upper abdominal pain which rapidly spread to both sides of the lower chest and back. After 30 minutes she vomited a little blood-stained fluid and then collapsed with pain. She was admitted to the medical wards, and after several hours was transferred to the surgical side. A long history of dyspepsia which she relieved by making herself vomit was obtained.

Examination.—Grossly obese, very shocked, and in great pain. Respirations 24, pulse 80, temperature taken rectally 99.8° F. (37.7° C.); blood pressure 150/90 mm. Hg. Tongue stained with altered blood. Marked surgical emphysema of front of neck. Equal aeration of both lungs and no detectable effusion or pneumothorax. Abdomen very fat, with large irreducible umbilical hernia; tender in right epigastrium but no guarding. A Ryle tube was passed and 90 ml. of thick bloody material was aspirated.

A provisional diagnosis of spontaneous rupture of the oesophagus was made and the patient was transferred to the x-ray department. Films of the chest were taken and then three mouthfuls of barium mixture were given to her to swallow before repeating the pictures. The following

information was obtained from these. The Ryle tube was folded on itself in the oesophagus. There was marked widening of the mediastinum and much free gas was present in it. There was slight collapse of the medial lung substance at both bases and a very little free pleural effusion on each side, but no pneumothorax. Barium was found to have passed into the posterior mediastinum to the left at the level

Radiograph showing barium in posterior mediastinum.

of the lower part of the body of the seventh thoracic vertebra (see Fig.).

Operation.—In view of the certainty of a fatal outcome if untreated, operation was undertaken in spite of the patient's age and poor physical state. Through a right thoracotomy, the intact mediastinum was widely opened, releasing air under pressure, blood, and pieces of chicken meat (partaken of four hours before the onset of the condition). The tear was not located,

but the left side of the lower oesophagus could not be seen satisfactorily from this approach. The search was not prolonged, and a wide-bore stomach tube was passed without revealing the tear. The chest was closed after inflating the right lung, and two intercostal drainage tubes, leading from the mediastinum and the pleural cavity to underwater seals, were inserted.

After 36 hours her condition deteriorated and she died 48 hours after operation.

Post-mortem Examination.—The right lung was fully aerated and adhering to the parietal pleura; the mediastinum was dry and relatively clean. The left pleural cavity contained 2 pints (1,140 ml.) of clear brownish inflammatory exudate, but the mediastinal pleura was intact. The oesophagus had a vertical tear 2 in. (5 cm.) long on its left posterior aspect, the lowest part of the tear being 1½ in. (3 cm.) from the oesophago-cardial junction. The myocardium was pale and fatty and the right side of the heart was dilated; other organs showed evidence of congestive failure. Microscopical examination of many sections of oesophagus about the tear showed no evidence of pre-existing disease and the appearances were consistent with spontaneous rupture.

Discussion

Mackler (1952) distinguishes between rupture and perforation of the oesophagus, the term "rupture" applying when it occurs in a previously normal oesophagus and is not caused by direct trauma. Spontaneous rupture is usually associated with vomiting, but occasionally with other causes of increased intra-abdominal pressure. Mackler experimented with 65 oesophagi from fresh cadavers, by inflating them with air, and in all but three cases rupture took place as a longitudinal tear at the lower end of the oesophagus in its left lateral wall. McKenzie (1884) had also demonstrated this.

In the present case the tear was typical, as were the symptoms. The pleural cavity was not directly involved, as it often is (usually on the left side). No history of vomiting prior to the rupture could be obtained, though there was a long history of habitual voluntary vomiting.

Recent writers mention the value of radiography in the diagnosis. Dorsey (1951) states that the patient should be

given radiopaque material to swallow, and if none escapes from the oesophageal lumen no harm will follow; if it does escape, operation is indicated. Nanson and Milnes Walker (1953) used a barium compound, screening their patient; provided surgery follows if indicated, there can be no danger in using barium mixture. Priviteri and Gay (1951) prefer lipiodol to demonstrate the fistula, its site and extent.

In the above case barium mixture was used. It escaped only from the uppermost part of the tear, giving the impression that the tear was perhaps smaller and higher than it was eventually found to be.

Most writers are agreed that early diagnosis and immediate operation are necessary if there is to be recovery. Operation and drainage of the mediastinum, with the rupture of the oesophagus being adequately by-passed for some time, has been successful in a number of cases, and Jelliffe and Ferguson (1953) suggest that it may be sufficient. But most authors appear to feel that repair of the oesophageal defect increases the patient's chances of recovery. Mackler (1952) assesses the percentage of recoveries after drainage alone at 33%, and after definitive repair of the oesophagus at 69%.

Operation should preferably be performed at a centre with experience of operating in this field, but, as in the above case, the patient may not be fit to be transported any distance.

Summary

A case of spontaneous rupture of the oesophagus is briefly described.

The value of radiography and the use of radiopaque media as a swallow, to establish or confirm the diagnosis, is affirmed.

I should like to express my appreciation to Mr. L. Wynn Houghton for his advice and assistance with this case, and his permission to publish it.

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A new British-American hospital, established to serve the constantly growing needs of the English-speaking community, has been opened in Madrid by Sir Ivo Mallet, the British Ambassador. The opening ceremony, attended by representatives of the Spanish Government and British and American residents, marked the end of three years' work to provide more adequate accommodation than that available in the 5-bed British-American nursing-home opened in 1923. Built on rising ground in the faculty of medicine area of Madrid's University City, the new 21-bed hospital stands on land leased free of charge for 50 years by the university authorities. A long, low, red-brick building on three floors, so constructed that three more floors can be added to meet future needs, it has a large garden and a wide view across the University City to the snow-capped peaks of the Guadarrama mountains north of Madrid. Several American firms gave medical and surgical equipment or sold it at cost, and an iron lung, said to be the only one in Spain for civilian use, was given by the U.S. Public Health Service. Equipment bought in England was shipped free of charge by a British mining company operating in Spain. The idea of building a new hospital for the British-American colony was proposed in June, 1951, by Sir John Balfour, then British Ambassador, in collaboration with Mr. Stanton Griffis, an American businessman, who at that time was U.S. Ambassador to Spain.