nothing in the patient's history to indicate the presence of a hernia until strangulation occurs. Polson records a case occurring twelve and a half years after the original accident, and only found at necropsy after death from acute strangulation.

Tixier, Patel, and Pollosson record a case diagnosed one month after a motor accident, confirmed by barium visualization of the stomach, and treated surgically three months later, the patient meantime suffering from dyspeptic symptoms whilst being kept under close observation, with numerous x-ray visualizations of the stomach to estimate the state of affairs. Boyce reports a successful case of operation for traumatic diaphragmatic hernia the day following the accident.

It is probable that traumatic diaphragmatic hernia is commoner than is generally realized, the chief causative factor being car accidents. It would appear that routine visualization of the stomach with barium is desirable in all cases of crushing injuries to the chest if the surgeon is to receive the case early, and not when some catastrophe such as acute strangulation has rendered his help imperative, but has vitiated the chance of a successful outcome to a difficult operation.

I wish to express my indebtedness to Dr. L. Lavine for permission to record this case, and to Mr. H. Upcott, who performed the operation.

BIBLIOGRAPHY

- Cope, Zachary: *The Early Diagnosis of the Acute Abdomen*.
Harrington: *Journ. Amer. Med. Assoc.*, September, 1933.
Polson: *Brit. Journ. Surg.*, July, 1930.
Tixier, Patel, and Pollosson: *Lyon Chir.*, November-December, 1932.
Boyce: *Amer. Journ. Surg.*, January, 1933.

ANTE-MORTEM DIGESTION OF THE OESOPHAGUS

BY

ALEXANDER LYALL, M.B., Ch.B.

ASSISTANT PATHOLOGIST, GLASGOW ROYAL INFIRMARY

(With Special Plate)

The following is a case of ante-mortem digestion of the oesophagus, a condition which appears to be but little recognized in this country, although described by Pringle and Teacher some time ago.

Case History

A married woman, aged 48, was admitted to the Glasgow Royal Infirmary on November 21st, 1933, as a case of perforated duodenal ulcer. Operation was performed seven hours after the onset of symptoms, and a perforation of a duodenal ulcer on the anterior aspect of the first part of the duodenum was sutured. The abdomen was closed without drainage. The case progressed favourably until November 24th, when the patient had a slight haematemesis. From then until her death two days later she was frequently sick and vomited up small amounts of coffee-ground material. Just before death she vomited about one pint of black material.

POST-MORTEM REPORT

The body was that of a well-nourished middle-aged woman. There was coffee-ground material around the mouth. The heart appeared normal except that it contained a lesser quantity of blood than is usual. The lungs were normal except for some venous congestion behind. Oesophagus: The lower 8 inches showed a black discoloration which ceased in a straight line at the cardiac sphincter of the stomach, but faded off gradually in an upward direction, where the colour became more of a brownish black. The discoloured area was ulcerated and typical of ante-mortem digestion of the organ, the blackness being due to the soaking of the necrotic tissue

with haemolysed blood. The stomach contained a small quantity of coffee-ground material. There were two ulcers in the first part of the duodenum, one on the anterior wall being 7 mm. in diameter and the other, on the posterior wall, being 1.3 cm. in diameter. That on the anterior wall had perforated about its centre, but had been efficiently sutured. That on the posterior wall had as its base peritoneum at one part and pancreatic tissue at another. The bases of both were firm and indurated, showing them to be very chronic in type. Careful examination of the base of each disclosed no bleeding vessel. The rest of the intestine contained a small quantity of altered blood. All the other abdominal organs were normal.

Sections of the ulcers and of the oesophagus were preserved for further examination. Sections of the ulcers showed the typical appearances of chronic peptic ulcer. No bleeding point was found.

Sections from the affected area of the oesophagus (see Special Plate) showed complete destruction of the mucous membrane, which was replaced by polymorphonuclear leucocytes closely packed together, many of which showed degenerative changes. Superficial to this, and corresponding to the dark colour of the affected area macroscopically, there was a thin layer of brown altered blood pigment. Deep to the leucocytic layer necrotic debris with an occasional thrombosed vessel was seen. The cellular infiltration extended to a lessening degree through the muscularis mucosae, the superficial part of which showed patchy necrosis. There was a slightly increased cellularity of the fibrous layer between the muscularis mucosae and the muscular coats. The muscular coats themselves appeared normal.

Commentary

This interesting case is one of ante-mortem digestion of the oesophagus, which appeared to be almost unknown in British literature until described by Pringle and Teacher in 1919 and later in 1921. Before that a very complete account of the condition was given in Kaufmann's *Spezielle Pathologische Anatomie*. Teacher and Pringle in 1921 described a series of sixteen cases which they had observed over a period of seven years. Modern post-mortem experience suggests that the condition is now much less common than this.

During life the affection is characterized by the frequent vomiting of small quantities of dark brown sanguineous material, and in a small number of cases pain between the shoulders or behind the sternum is recorded, and is said to be very characteristic when present.

Post mortem the lower end of the oesophagus shows varying degrees of dark discoloration and necrosis, and in certain extreme cases described there has been perforation into a pleural sac. A characteristic feature is the contrast between the affected area of the oesophagus and the cardia of the stomach; for, whereas the former shows the varying degrees of necrosis and dark discoloration, the stomach itself has the normal post-mortem appearances, the ulceration ceasing abruptly at the cardiac sphincter. This was a notable feature of our own case and is a point of differentiation from post-mortem digestion, which affects the oesophagus and stomach alike and, of course, shows no vital reaction. These appearances suggested a possible explanation of the condition. Post-operative vomiting of very acid fluid is fairly common, and patients often say that it burns their mouths and lips. It was suggested that the lower end of the oesophagus was in an atonic state, so that it failed to empty itself completely in vomiting and some of the highly acid material was retained in its lower third, helped by spasm of the cardiac sphincter. This fluid acted on the devitalized mucous membrane, digesting it and causing a general oozing of blood, which was changed to brown and black by the acid present. The presence of the acid and the oozing instead of a sudden flow from a punctured vessel of some size distinguishes the condition from other oesophageal haematemeses, which are bright red in colour.

Pringle and Teacher found evidence of healing in some of their cases. This led us to examine those oesophagi where the appearances were in the least suggestive of ante-mortem digestion. In very many of these cases evidence of vital reaction in the form of haemorrhage from small vessels and leucocytic infiltration was found, so that ante-mortem digestion in its lesser degrees is probably a much commoner condition than is imagined.

The well-marked forms of ante-mortem digestion of the oesophagus are specially common in severe toxic and infective conditions, especially following operations. The slighter degrees mentioned were found to occur most commonly in cases where there had been a debilitating illness of no special kind. Very many of these cases show evidence of healing, seen macroscopically by the rounding off of the islets of epithelium left in the damaged area. This fact suggests that if treated early the condition may not be so hopeless as it might often seem. The rational treatment would appear to be to neutralize the acid in the oesophagus by frequent small doses of alkali and the soothing of the inflamed surfaces by some emollient such as gum arabic, olive oil, or liquid paraffin.

My thanks are due to Mr. Patrick, who has given his permission to use the clinical history of the case, and to Professor J. Shaw Dunn for his kind help at all times.

BIBLIOGRAPHY

Pringle and Teacher: *Brit. Journ. Surg.*, April, 1919, No. 24.
Pringle, Stewart, and Teacher: *Journ. Path. and Bact.*, 1921, p. 396.

MASTOID RADIOLOGY*

BY

W. O. LODGE, F.R.C.S.Ed.

HONORARY SURGEON TO THE OPHTHALMIC AND AURAL DEPARTMENT
OF THE ROYAL HALIFAX INFIRMARY

(With Special Plate)

A reliable source of information upon this subject is Dr. Mittermaier's *Die Krankheiten der Nasenbenhöhlen und des Ohres im Röntgenbild*, published by Georg Thieme of Leipzig in 1934. This is an atlas with 144 pages and 213 illustrations. A leading article in the *Lancet* of June 2nd, 1934, referred to contributions by Frey, Cottentot, and Thienpont, and summarized Witmaack's theories. For examining a number of my patients suffering from mastoid disease, my thanks are due to Dr. Franklyn and his assistants.

Illustrative Case

A man, aged 21, had had acute suppurative otitis for eight days, with copious muco-purulent discharge and slight mastoid tenderness. Temperature, 99° F.; pulse, 96. Fig. 1 (on Special Plate) is a skiagram of the healthy ear in Schüler's projection. The temporo-mandibular articulation, auditory meatus, and zygomatic and mastoid cells are visible. The sinus plate crosses the cells obliquely. Fig. 2 (on Special Plate) shows early Bezold's mastoiditis on the affected side. The cells are becoming disintegrated. The antral region is densely obscured. These changes are more apparent on comparing the two skiagrams as a whole than on minute examination of any one cell. Note, however, the triangular breach in the inner wall of the tip of the mastoid process.

At operation pus was found under pressure. Digastric muscle fibres were visible through the triangular erosion, and formed the inner wall of the abscess.

Schüler's method of projecting the temporal bone clear of overlying shadows is shown in Fig. 3. This diagram is a coronal section of the head with an arrow passing through the auditory meatus at an angle of 30 degrees, to indicate the axis of the central ray. For comparison, the other ear is projected at 150 degrees in the same plane.

* Read at a meeting of the Bradford Medico-Chirurgical Society on March 12th, 1935.

Stenver's projection is suitable for deep-seated affections. The central ray crosses a horizontal section of the head at 45 degrees, but the trajectory is elevated 10 degrees out of this plane to cast the shadow of the petrous temporal bone above that of the zygoma. A dozen anatomical points are recognizable in the skiagram.

Axial projections are informative in traumatic cases. The central ray crosses a sagittal section of the head as near 90 degrees as possible. In the skiagram the thickness of the mandibular shadow shows whether the projection was submento-vertical or vertico-submental.

Provided that obliquity of incidence is in the plane of the laminae of the Bucky diaphragm, x rays need not strike the film perpendicularly. A head clamp is not indispensable.

Sometimes, by having serial examinations, one is able to refrain from operation—for example, in pregnancy. When there are several mastoids on the operation list radiography conduces to speed, anatomical variations having been visualized beforehand.

FIG. 3.—Schüler's projection.

In well-pneumatized bones even the oedema of the overlying tissues due to a furuncle suffices to obscure the cells. In examples of arrested pneumatization, dating from otitis in infancy, the signs of inflammation are less distinctive.

Owing to a deposition of lime salts the mastoid cortex may appear as though its boundaries had been overlined with a J pen. This appearance suggests a previous attack of mastoiditis, which has subsided without operation. A contracted meatus implies chronicity. Such data are helpful, especially if the history is unreliable, in deciding whether a simple or a radical operation is indicated. If the semicircular canals show clearly in Schüler's projection cholesteatomata may be suspected. Cholesteatomatous cavities are best seen in stereoscopic skiagrams—they are smooth-walled.

If there is an erosion of the sinus plate Queckenstedt's test will show whether the sinus is thrombosed.

J. François (*Thèse de Paris*, 1935, No. 374) states that from the middle of the seventeenth century to the second part of the nineteenth severe epidemics of malaria, with a high fatality rate, occurred at Rochefort-sur-Mer. Since then there has been a progressive decline owing to draining of the marshes and other hygienic measures undertaken in the urban and suburban districts. The disease, however, is not entirely extinct but still persists, although it has undergone considerable attenuation. Benign tertian is the commonest form and larvate forms are frequent, especially in children, and are often overlooked. At the Naval Aviation Centre, between Rochefort and Soubise, four or five cases of indigenous malaria occur yearly in a military population of about 1,500 men. The persistence of the disease is partly due to the presence of swarms of anopheles and the large number of chronic cases of malaria and collections of stagnant water.

R. D. B. WRIGHT: STRANGULATION OF TRAUMATIC
DIAPHRAGMATIC HERNIA NINE MONTHS AFTER
ORIGINAL ACCIDENT

Post-mortem appearances. "A" points to tear in diaphragm, with coin in opening.

ALEXANDER LYALL: ANTE-MORTEM DIGESTION
OF THE OESOPHAGUS

Section of the oesophagus $\times 100$; (a) Layer of brown blood-stained necrotic material; (b) leucocytic infiltration.

W. O. LODGE: MASTOID RADIOLOGY

FIG. 1.—Normal mastoid region.

FIG. 2.—Bezold's mastoiditis.