THE RISKS OF GASTROSCOPY WITH THE FLEXIBLE GASTROSCOPE

BY

C. M. FLETCHER, M.D., M.R.C.P.

First Assistant, British Postgraduate Medical School

AND

F. AVERY JONES, M.D., M.R.C.P.

Senior Physician, Central Middlesex County Hospital

When Wolf and Schindler devised their flexible gastroscopie they called it an "entirely safe" instrument (Schindler, 1932). They claimed there was no risk of lower oesophageal perforation, which had been the chief disadvantage of the older rigid gastroscopes. This claim appears to have been justified by later experience, and, to our knowledge, no instance of lower oesophageal injury with the flexible gastroscopie has been reported. Other accidents, however, have occasionally occurred. Schindler (1940) published the results of a survey of 22,351 gastroscopies performed by many gastroscopists of varying experience in America. In this large series only one death had occurred after gastroscopy. This was due to hypopharyngeal perforation of the oesophagus. There were also eight instances of gastric and one of jejunal perforation without fatality. Later Schiff and Shapiro (1941) reported a further non-fatal case of gastric perforation. These perforations were attributed to the use of the sponge-rubber tip to the instrument, and no further cases of gastric perforation have been reported since the rubber finger-tip and plain metal end to the instrument have come into general use.

Since this large series was published three further cases of hypopharyngeal perforation with the flexible gastroscopie have been reported—Paul and Page (1943), Touroff (1941), and White (1941). One of these was fatal. So far as we are aware these are the only cases of a dangerous sequel to the passage of the flexible gastroscopie that have been published.

Personal Experience with the Gastroscopie

In a combined experience of 2,800 gastroscopies, about half of which were done with the Hermon Taylor gastroscopie, we have had two fatalities attributable to gastroscopy and four cases that gave rise to some anxiety. We consider it right to publish details of these cases.

Case 1 (Central Middlesex County Hospital).—A woman aged 59. Admitted with diagnosis of scurvy. Considerable improvement after six weeks' treatment with full diet and ascorbic acid, and all cutaneous haemorrhages had disappeared. Gastroscopy was carried out to exclude malignant disease of the stomach. The Hermon Taylor gastroscopie was used with a rubber finger-tip. The instrument was introduced as far as the cardia without any difficulty, but the patient had a slight kyphosis and the instrument was held up here. It was then passed on with slight difficulty by active flexion of the end of the instrument. An atrophic gastric mucosa was seen. The patient did not complain of unusual discomfort at the time, but was rather drowsy as a result of premedication with morphine gr. 1/6 and hyoscine gr. 1/150. She remained drowsy and unwell, and that evening surgical emphysema of the neck was noticed and the pulse rose to 130. She was treated with rectal fluids and sulphapyridine by mouth. Her general condition remained poor and swallowing was difficult and painful. An empyema developed on the right side and she died on the sixth day after gastroscopy. At necropsy a longitudinal tear, 1/2 in. long, was found in the posterior wall of the oesophagus, 2 in. from its upper end.

Case 2 (at a South London Hospital).—A woman aged 59. Admitted with diagnosis of gastric ulcer. The patient had been gastroscopied uneventfully three weeks previously by another gastroscopist, using the Wolf-Schindler instrument with a rubber finger-tip. On the present occasion the Hermon Taylor gastroscopie with a plain metal end was used. The instrument was passed easily as far as the hypopharynx, where it was held up and did not slip on into the oesophagus when the patient swallowed. Slight pressure was applied, and the instrument passed on about 1 in. The patient then complained of pain localized to the upper thoracic spine. On looking through the gastroscopie after one bulbful of air had been injected, a mass of froth was seen instead of oesophageal mucosa. The instrument was immediately withdrawn. Skiagrams of the neck showed surgical emphysema, which became obvious clinically shortly afterwards. The patient was treated with intravenous fluids and sulphathiazole. She remained very ill, with fever and dyspnoea, but without pain after the first 12 hours. She developed a right-sided

empyema and died 12 days later. At necropsy a longitudinal perforation of the posterior wall of the oesophagus was found at the level of the cricoid cartilage, with suppurative mediastinitis and extension of the infection to the right pleural space. In the stomach there was a carcinomatous ulcer with secondary lymphatic deposits.

Both these fatalities may be said to be due to an error of judgment. In the first case gastroscopy was probably contraindicated, since the patient's tissues might have been expected to be in a fragile state as a result of her recent scurvy. No difficulty was experienced in getting the instrument past the site of the oesophageal tear. It is possible that the tear was the result of stretching the oesophagus by the rigid part of the instrument, since the patient had a slight kyphosis. In the second case extra pressure was exerted when the tip of the instrument was lying in the hypopharynx. When the patient swallows, the instrument should always slip on easily into the oesophagus, and it is clearly dangerous to apply any pressure if it does not do so.

Case 3 (at a North-East London Hospital).—A woman aged 62. Diagnosis: rheumatoid arthritis; dyspepsia with achlorhydria, but without radiological abnormality in stomach or duodenum. Gastroscopy was carried out to exclude malignant disease of the stomach, and was unusually easy. The Hermon Taylor gastroscopie was introduced without any difficulty, and afterwards the patient sat up and commented on the complete absence of any discomfort. The gastric mucosa was atrophic, with erosions and the scar of a healed ulcer. The patient remained well for the next 12 hours, when she developed a slight sore throat and a little fever. This soreness increased, and 24 hours after gastroscopy she had severe substernal pain with dysphagia. Very slight surgical emphysema was detected in the neck and confirmed by skiagrams. She was treated with rectal fluids and intravenous sulphathiazole, and after a febrile course of one week made an uninterrupted recovery. We thought that she might have had an oesophagitis due to an allergic sensitivity either to the rubber sheath of the gastroscopie (as in respirator dermatitis) or to the anethaine which had been used as a local analgesic, but skin tests with both these substances gave negative results. In view of the surgical emphysema it must be concluded that the patient had had a small oesophageal abrasion with a subsequent oesophagitis, but it is remarkable that such an abrasion could have been inflicted without any difficulty, pain, or even discomfort at the time of instrumentation.

We have had 3 other cases in which severe retrosternal pain and fever followed gastroscopy, without the development of surgical emphysema. These resolved uneventfully after 7 to 10 days' conservative treatment.

In addition to these cases of our own we have heard of five other fatal and two non-fatal cases of hypopharyngeal perforation of the oesophagus by the flexible gastroscopie during the past two years. The Hermon Taylor gastroscopie was used in five of the seven fatal cases.

Comment

Gastroscopy with the flexible gastroscopie is proving to be an indispensable means of diagnosis of diseases of the stomach, and is rapidly becoming a routine procedure in almost every large hospital in the country. It is inevitable that many gastroscopies should be performed by inexperienced gastroscopists. We believe that some beginners have a false sense of security in their use of the instrument, based on the rarity of reported accidents. Both of our fatal cases were the result of overconfidence in the safety of the flexible gastroscopie, which led, in Case 1, to the gastroscopy of an unsuitable subject, and in Case 2 to slight pressure being used to overcome resistance during the passage of the instrument. With our present realization of the risks of gastroscopy both these fatalities would probably have been avoided.

It is important that all users of the flexible gastroscopie should realize that there is a slight but definite risk associated with the passage of the instrument, and that in this, as in all endoscopic methods, the greatest circumspection is needed. The main risk appears to be that of perforation of the upper part of the oesophagus and the hypopharynx. Both of our fatal cases, and three of our four cases of severe oesophagitis, occurred in elderly women, which might suggest that such patients carry a special risk; but Touroff's case was in a man aged 40, White's case was in a man aged 58, and two of the unreported cases were in young men. Schindler (1943) has criticized the Hermon Taylor gastroscopie, which was used in both of our fatal cases, because of its long rigid portion, which might lead to dangerous stretching of the lower end of the oesophagus as it turns to the left just above the cardia. No accident of this kind has come to

our knowledge. The flexible part of the Hermon Taylor gastro-scope is 2 mm. wider (i.e., 14 mm. wide) and is appreciably stiffer than the corresponding part of the original Wolf-Schindler instrument. It is possible that extra care is necessary for its passage into the oesophagus. The Hermon Taylor model gives a much better view of the stomach than can be obtained with the Wolf-Schindler instrument, and we consider it is the gastro-scope of choice provided it is passed with care.

Summary

Two cases of fatal hypopharyngeal perforation of the oesophagus with the flexible gastro-scope are reported.

This accident appears to be the most serious risk of gastroscopy with the flexible gastro-scope, and is not so infrequent as the rarity of reported cases suggests.

It is important that inexperienced gastroscopists should appreciate that caution is necessary in the passage of the flexible gastro-scope.

REFERENCES

- Paul, W. D., and Lage, R. H. (1943). *J. Amer. med. Ass.*, **122**, 596.
Schiff, L., and Shapiro, N. (1941). *Amer. J. digest. Dis.*, **8**, 260.
Schindler, R. (1932). *Münch. med. Wschr.*, **79**, 1268.
— (1940). *Amer. J. digest. Dis.*, **7**, 293.
— (1943). *Bull. Amer. Gastroscopic Club*, **1**, 7.
Touroff, A. S. W. (1941). *Ann. Surg.*, **114**, 369.
White, J. D. (1941). *Brit. J. Radiol.*, **14**, 364.

TREATMENT OF DENUDED EXTERNAL TABLE OF THE SKULL

BY

PATRICK CLARKSON, F.R.C.S.

Major, R.A.M.C.

AND

J. SCHORSTEIN, F.R.C.S.

Major, R.A.M.C.

(Surgical Specialists and O.C.s Army Maxillo-facial and Neuro-surgical Units)

This note describes a method of treatment of areas of bare external table exposed in deep burns and extensive injuries of the skull. It has been found satisfactory in the three cases in which it has been used. All these cases had complete loss of scalp and pericranium over the exposed bone, which was dry and eburnated.

The classic treatment for this condition is to make burr-holes through the exposed bone into diploe; to await the appearance of granulations from the burr-holes and their coalescence across the intervening outer table; and then, when the layer of granulations is complete, to cover it by a free graft. The particular disadvantage of this method is the delay

FIG. 1, Case 1.—(A) Contact burn destroying skin of face, nose, and forehead, and exposing 8 by 6 cm. of the external table of the frontal bone. (B) On the 24th day the external table was removed and the exposed diploe, together with face, forehead, and nose, was covered by thin patch grafts. Healing was complete six days later.

between the operation to expose patches of diploe and final healing. The granulations may be slow to appear and slower to coalesce completely; 6 to 12 weeks may elapse between the initial operation and final healing of the free graft. It is clear that if skin can be made to stick consistently on freshly exposed diploe much time can be saved.

During the Cassino battle a case of direct-contact burn was admitted with destruction of part of the scalp, the forehead, one cheek, and half the nose. After clearance of sloughs, 8 by 6 cm. of frontal outer table was exposed. On the 24th day primary re-surfacing by patches was undertaken. These were closely packed over the soft parts, and it was decided to cover the bare skull at the same operation. The exposed outer table was totally removed and thin split skin applied directly to the diploe. The grafts took completely, and the whole skull, together with forehead, cheek, and nose, was healed by the 30th day. This patient has been under observation for 8 months during the late repair of his nose and cheek. The skin over his diploe has remained stable; the depression in the skull caused by removal of the outer table is slight and not easily noticeable; palpation of the area suggests a thin deposit of subcutaneous tissue between graft and diploe.

Technical Points

Burr-holes are made through the exposed outer table into diploe and connected by a groove made by a gouge. Small areas of outer table are thus enclosed and taken off with an osteotome. Near the sagittal sinus arachnoidal granulations might be lacerated; if they were, the bleeding could be easily controlled with a small muscle graft. The intervening bone between the burr-holes and back to the margin of the granulations is completely removed. When there is comminution of the outer table near the margin these flakes are removed together with overlying granulations. Haemostasis is obtained by pressure with hot packs. Wax was used in one case without apparent prejudice to the graft.

The cover is provided by thin patch grafts, 1 cm. square, packed close and spread on grease-proof paper. A well-incised

FIG. 2, Case 1.—The appearance of the skull eight months later. There is a shallow depression where the external table was removed. The diploe is covered by skin, which has been stable during exposure to Mediterranean sun and to cold. (The nose has been repaired by a forehead rhinoplasty, and the patch grafts on cheek and forehead replaced by thick dermatome sheets from the abdomen.)

thin sheet stuck on with sano extracts or gum acacia would probably be almost as certain to take. The grafts are fixed by tulle gras, P.F. wool, wool, and crêpe. The dressings are taken down at the fourth day and repeated daily with a careful technique. Crêpe pressure is maintained until final healing.