

Papers and Originals

Gastrosocopy with Biopsy and Cytological Sampling under Direct Vision

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[WITH COLOUR PLATE BETWEEN PAGES 536 AND 537]

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Gastrosocopy has improved with the introduction of fibre-optics. The flexible fibrescope allows inspection of the stomach with much less discomfort to the patient than earlier gastrosocopes, which are flexible only through part of their length. The value of gastrosocopy is greatly enhanced if lesions can be biopsied while being inspected. This has been achieved in the past for semi-rigid gastrosocopes by several workers (Kenamore, 1940; Benedict, 1948; Debray and Housset, 1959), but has only recently been developed for the fibrescope. This model is the Olympus G.F.B. combined fibrescope and gastrosocamera, which incorporates a method of obtaining histological and cytological specimens under direct vision.

This paper reports our initial experiences with this instrument. The first three authors carried out the gastrosocopic examinations and the other two were responsible for the histological and cytological studies respectively. It has been the usual practice for at least two of the gastrosocopists to examine the stomach in every patient; this has helped to diminish observer error.

The Instrument

The fibrescope used was an Olympus model G.F.B. made in Tokyo. The stomach is viewed through a flexible bundle of quartz fibres at a magnification of $\times 12$, after air inflation down the side channel. Illumination is by a special cold bulb at the distal end of the instrument, and there is a separate bulb in the same holder producing flashes for photography. The tip of the instrument can be angled from the control unit forwards 70 degrees and backwards 50 degrees. The angle of view is 55 degrees, at right angles to the long axis of the instrument. Photographs are taken on ordinary 35-mm. film, with an Olympus-pen camera, which slots on to the end of the control unit. Lesions are then viewed through the camera and photographed as they are viewed. The picture size is 10 mm. square.

The most important new feature of this fibrescope is the side channel incorporated in the instrument. Biopsy forceps, cytology brushes, or water-jet tubes can be passed down while the fibrescope is in the stomach and directed on to an area under vision, an elevating mechanism with a knob on the control unit being used. Not only does this allow biopsy and cytological specimens to be obtained accurately, but in addition any mucus or debris obscuring a lesion can be washed off with a jet of water aimed from a polyethylene tube.

Method of Examination

Most of the patients examined were outpatients and all had had a recent barium meal. Apart from the fact that a barium meal is an essential diagnostic procedure in gastroenterology, it must be performed before gastrosocopy to exclude cardio-oesophageal abnormalities which might make introduction of the gastrosocope unduly dangerous.

Preparation has been as follows: (1) Starvation for six hours before examination, though a drink is allowed three hours before. Preliminary gastric washout has been necessary on only one occasion. (2) Premedication: sodium amytal in a variable dose by mouth and atropine 0.6 mg. by intramuscular injection 45 minutes before examination; one 10-mg. benzocaine lozenge to suck 15 minutes before examination; and amethocaine 2% gargle immediately before examination.

All patients have been examined in the left lateral position, with the head in normal position or slightly extended. The instrument is guided over the tongue to the back of the pharynx, and, after a slight resistance at the cricopharyngeal region has been overcome, is gently pushed down into the stomach.

A methodical survey of the stomach is made, and photographs are taken of any lesions seen. The cytology brush is used to obtain cells for smears, which are made immediately, and then several biopsy specimens are taken.

After the examination the patient rests for about an hour, and a check is made for symptoms and signs of perforation, and for return of normal swallowing.

Complications

Complications have been few and minor in this series.

Perforation.—The greatest risk is perforation of the oesophagus. This has not occurred in our experience with this flexible fibrescope.

Haematemesis.—One patient had a haematemesis of approximately 50 ml. directly after the examination. However, the bleeding stopped and no treatment was required. This patient was later found to have a diffuse infiltrating carcinoma of the linitis plastica type.

Pain.—Most patients tolerated the examination well, and admitted to discomfort only. Two complained of pain, and in one this seemed to be largely psychological.

Patients Examined

One hundred patients were referred for gastrosocopy, but the examination failed in five. The reasons for the failures were

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cervical spondylosis in two, carcinoma of larynx in one, and fear in two.

For analysis of the results the 95 patients examined successfully are divided into groups according to the reason for referral. These groups are: (1) haematemesis and melaena in 20, (2) suspected carcinoma in 24, (3) examination of ulcer shown on x-ray film in 20, (4) suspected ulcer in 21, and (5) miscellaneous in 10.

Results

Haematemesis and Melaena

Twenty patients were referred for examination. Fifteen had a normal barium meal, and in 14 of these a lesion was found on gastroscopy, the other case being normal. The lesions were: acute gastric ulcer in four, acute erosions in five, and superficial gastritis in five.

Cytological and histological examination confirmed the visual diagnosis in those cases in which they were performed.

Five patients had an abnormal barium meal but only one had an abnormality in which gastroscopy would be expected to contribute useful information. This was a radiologically irregular antrum in which no abnormality could be seen on gastroscopy. The other four had radiological lesions which could explain their haemorrhage, but gastroscopy was employed to exclude another, gastric source. These lesions were a hiatus hernia in three cases and a deformed duodenal cap, presumably ulcerated, in one. Gastroscopy in these four patients showed no abnormality other than gastric mucosal atrophy in two patients, in whom it had been noted radiologically. As mentioned below, this instrument is not suitable for observing a hiatus hernia.

Comment.—Gastroscopy in this group increased the diagnostic rate considerably.

Suspected Carcinoma

Twenty-four cases were examined and the following gastroscopic diagnoses made: malignancy in five, benign tumour in two, benign ulcer in five, hypertrophic rugae in six, superficial gastritis in two, atrophy in two, stomal oedema in one, and normal in one.

In one of the five cases of gastroscopic malignancy it was not possible, for technical reasons, to obtain a biopsy specimen. The smear showed changes suggestive of malignancy, and carcinoma was found at laparotomy. In three of the remaining four cases both cytological and histological examination showed malignant changes (Case 2 of Colour Plate). In the fourth case only gastritic changes were found.

At operation, and on subsequent histology, the three with malignant changes were proved to have carcinoma. The fourth case had a tumour locally excised, and histological examination of this showed an unusual benign structure. There was atrophic gastritis within the surface mucosa, and within the thickened submucosa there were two cystic inclusions, lined by normal fundic mucosal tissue. The inclusions were thought to be of post-traumatic origin, following the previous operation.

In the cases with macroscopically benign lesions in which cytological and histological examinations were performed no malignant changes were found. However, one case was later proved to be a reticulum-cell sarcoma of the stomach. This patient was a man of 72 who four years previously had had a vagotomy and pyloroplasty for antral gastritis (proved histologically at the time). He recently presented with symptoms and signs of pyloric stenosis, and a barium meal suggested neoplastic change in the distal stomach.

At gastroscopy many large mucosal folds radiated from a constricted pylorus, and there were several small shallow ulcers in

the prepyloric region. Both cytological and histological examination showed inflammatory changes with no evidence of malignancy. Surgical resection was advised. At operation there was gross antral gastritis with considerable hypertrophy of the stomach. A Polya gastrectomy was performed. Histological examination of the operative specimen showed superficial ulceration of the mucosa and invasion of parts of the muscle wall with malignant cells thought to be those of a reticulum-cell sarcoma. Some areas of mucosa were free of malignant cells, indicating that the failure to make the correct diagnosis from the biopsy was due to a sampling error.

Comment.—In this important clinical problem of suspected gastric carcinoma the new instrument is of great value, since in positive cases confirmation of the diagnosis can be obtained simply, and in negative cases the information provided can help considerably in the management of the patient.

Examination of Ulcer Shown on X-ray Film

Twenty cases of benign gastric ulcer were examined. Barium meal had demonstrated the ulcer in all cases, and there was no suspicion from the x-ray picture, or clinically, that the ulcer was malignant.

In one case where the ulcer was radiologically on the lesser curve no ulcer was seen. In the remaining 19 the results were as follows:

Sixteen appeared gastroscopically to have benign ulcers. In those patients in whom specimens were taken for microscopical examination the diagnosis of benign ulcer was confirmed (Case 1 of Colour Plate). Follow-up of these patients has not given rise to suspicion of malignant disease.

Two cases had the appearances of malignant ulcers. In one case cytological and histological examination confirmed the presence of a malignant lesion. A carcinoma was found at operation. In the other the biopsy specimen and the smear showed inflammatory changes, but operation was performed and a carcinoma found.

One patient aged 45 had an ulcer of uncertain type. He was known to have Wegener's granuloma in the upper respiratory tract, and presented with a haematemesis. Barium meal showed a gastric ulcer. On gastroscopy he was seen to have several areas of extensive ulceration. The biopsy specimen showed malignant cells and the smear showed highly atypical cells (Case 3 of Colour Plate). One week later gastric perforation occurred and a biopsy specimen taken at laparotomy proved the lesion to be a reticulum-cell sarcoma. This was confirmed a few weeks later at post-mortem examination. An association between Wegener's granuloma and reticulum-cell sarcoma of the stomach has recently been suggested (Thompson *et al.*, 1967).

Comment.—Gastroscopy and biopsy showed that 3 out of 20 cases with a clinically and radiologically benign ulcer were malignant, and led to two of the three receiving radical treatment which they would otherwise not have received until later.

Suspected Ulcer

These patients were referred with symptoms suggesting the presence of a peptic ulcer and with negative or inconclusive barium meals. Twenty-one cases were examined; five of these were in a special category in that they were being examined after taking part in a therapeutic trial. They are not considered further, as they were not primarily referred for diagnostic purposes.

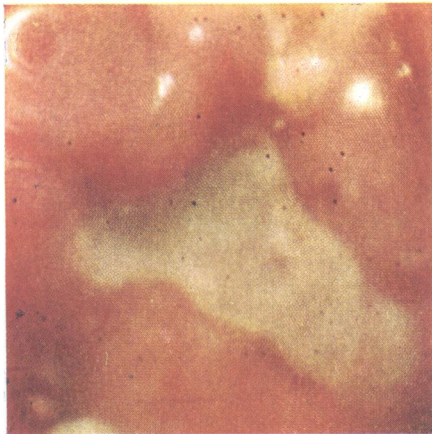
Of the remaining 16 three had ulcers, two erosions, five superficial gastritis; six were normal. We diagnosed superficial gastritis on one or both of the following criteria:

Hyperaemic Mucosa.—The normal gastric mucosa appears as a pale orange-pink or red. A gastroscopic diagnosis of superficial gastritis was suggested by a mucosa which was definitely a darker red, either diffusely or patchily.

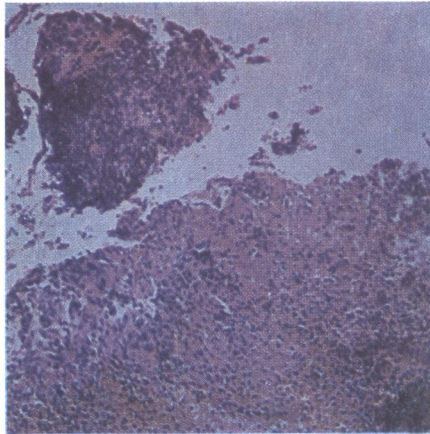
Excessive Contact Bleeding.—On use of the cytology brush the normal gastric mucosa does not bleed. Ready bleeding, suggesting

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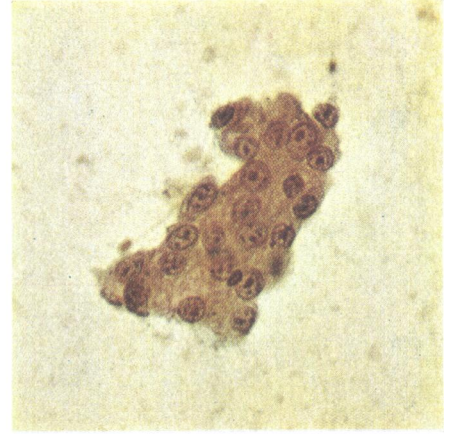
GASTROSCOPIC VIEW



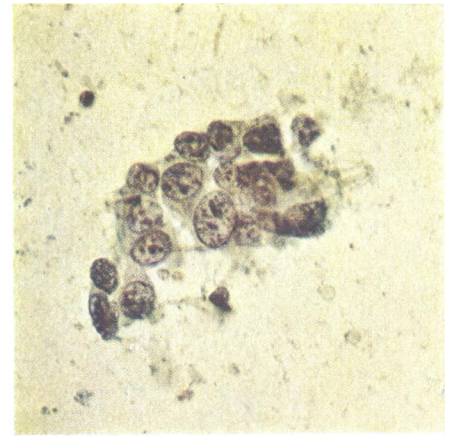
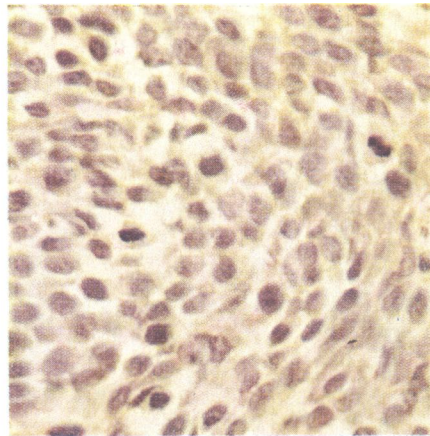
HISTOLOGICAL APPEARANCES



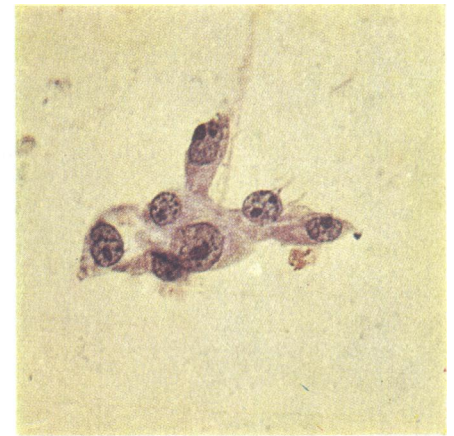
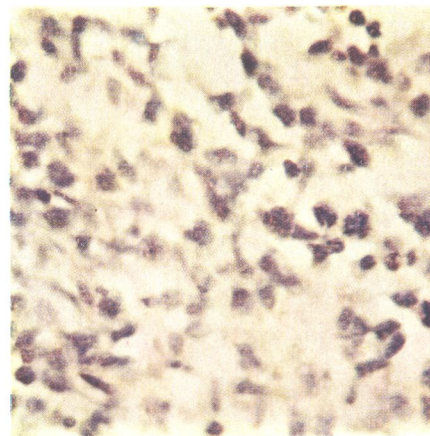
CYTOLOGICAL APPEARANCES



CASE 1.—Benign gastric ulcer. The gastroscopic view shows a typical benign gastric ulcer. A biopsy specimen taken from the floor of the ulcer shows granulation tissue. The cytological preparation shows a degree of abnormality commonly seen in gastritis.



CASE 2.—Carcinoma of stomach. The gastroscopic view shows a malignant prepyloric growth. A biopsy specimen shows tumour tissue with pronounced nuclear atypia and numerous mitoses. The cytological preparation shows malignant cells.



CASE 3.—Reticulum-cell sarcoma of stomach. The gastroscopic view shows an area of ulceration—one of many. The biopsy specimen shows malignant cells, many with mitotic figures, infiltrating the lamina propria. The cytological preparation shows highly atypical cells.

mucosal fragility, has been taken as important gastroscopic evidence of superficial gastritis.

Therefore in 10 of the 16 cases a diagnosis was made which would explain their symptoms. It is worth mentioning that of the 16 cases eight had normal appearances on barium-meal examination, and five of these were found to have an abnormality on gastroscopy.

In those cases in which biopsy specimens and smears were taken, these gave support for the diagnosis, as inflammatory changes were shown in all but one. This was a case of superficial gastritis in which the smear showed no abnormality. In addition, one case diagnosed as superficial gastritis was shortly afterwards found at laparotomy to have a linitis plastica. Gastroscopy in this patient was a very unsatisfactory examination, as the view was obscured by haemorrhage after about 20 seconds, and all that was seen in this brief period was a hyperaemic mucosa. A blind cytology specimen showed inflammatory changes only; a biopsy was not undertaken because of the technical difficulty.

Comment.—Despite this error the procedure provided a diagnosis in a large proportion of cases in which other investigations had been non-contributory or only suggestive.

Miscellaneous

There were 10 patients in this group. Four had anaemia with faecal occult blood and normal appearances on barium meal and barium enema examinations. In only one was a cause of haemorrhage seen. In this patient there were multiple erosions in the antrum, and biopsy and cytological examination showed inflammatory changes. The other three were normal.

Three patients presented with pain and vomiting, and one of them was examined twice by gastroscopy. All had been treated for duodenal ulcer by partial gastrectomy, and barium-meal examination showed no cause for pain. At gastroscopy one patient had a normal appearance; the others had superficial gastritis, confirmed by histological and cytological examination. One case of superficial gastritis also had a striking finding in the smear in that *Giardia lamblia* parasites were seen.

The ninth patient in this group had a large hiatus hernia and was examined to determine if the lesion could be seen well with this instrument. It could not; only a brief glimpse was obtained of the area.

One normal person was examined; he was one of our team.

Cytological Examination

Materials and Methods

The material consisted of smears from 65 patients. In each case the gastric mucosa was sampled with the brush, and six to eight slides were smeared and placed into fixative immediately. More than one area of mucosa or lesion was examined in some cases.

Smears were fixed in 70% industrial methylated spirit (Methcol) and stained by the Papanicolaou method. Slides were also stained by the periodic-acid-Schiff technique or Mayer's mucicarmine.

Results

Seven patients with subsequently proved malignant lesions of the stomach were encountered. In four of these cases the smears contained numerous epithelial cells that were clearly malignant. Their nuclei were large, irregular, and darkly staining, and contained one or more large and sometimes irregular nucleoli. The nuclear:cytoplasmic ratio was much increased. The grouping of these cells was abnormal and

showed crowding and lack of polarity. In two cases with diffuse anaplastic carcinoma and in one case of reticulosarcoma small numbers of abnormal cells were seen. The origin of these cells was uncertain; they could have been neoplastic or could have arisen from an associated inflamed gastric mucosa. The cytological findings here were similar to those of the malignant cases described above, but of lesser degree.

In patients with superficial gastritis and gastric ulcer epithelial cell abnormalities were noted in the smears, but in most cases these were clearly not malignant. The changes seen were similar to those observed in gastritis by other workers (Henning and Witte, 1957; Gibbs, 1960; Schade, 1960; Raskin *et al.*, 1961). The regular normal arrangement of epithelial cells in a "honeycomb" pattern was lost, and in these sheets of cells neutrophils were often present, both intracellularly and extracellularly. Nuclear prominence was a feature due to moderate and varying increase in size and staining of the nuclei and nucleoli. However, the nuclear membrane remained round to oval and regular, and the columnar shape of the cells was retained. In many cases evidence of intestinal metaplasia was seen, with groups of cells showing brush borders and goblet cells. In one patient *G. lamblia* was present in large numbers.

In four patients subsequently shown to have benign gastric ulcer considerable abnormality was seen in a few epithelial cell groups. Cells in these groups showed variation in nuclear size and shape, hyperchromatism, and prominent, sometimes irregular, nucleoli. These changes were of such a degree that the possibility of malignancy could not be excluded. However, these groups were scanty in number and their characteristics seemed to merge with those of less abnormal non-malignant cells which were also present.

Therefore, in addition to smears which can be grouped into normal, gastritic, and malignant categories, an inconclusive or overlap group is found. This group may contain cells from malignant tumours which are not sufficiently characteristic for a clear positive diagnosis and also cells arising from an ulcer edge or from active gastritis which show pronounced atypia. This point was emphasized by Richards and Spriggs (1961), who thought that in trying to diagnose carcinoma of the stomach from cytological evidence they were working, in some cases, "very near to the margin of what is humanly possible."

Smears made from gastric aspirates often contain only scanty numbers of gastric epithelial cells. The preservation of the cells is frequently imperfect. Often there is much contamination with cells and debris from the respiratory tract and from the mouth and oesophagus.

The advantages of the present method of examination are as follows: (1) numerous gastric epithelial cells are present in the smears; (2) the great majority of these gastric epithelial cells are well preserved owing to the speed of sampling and rapid fixation; (3) there is little contamination of smear preparations by cells from the respiratory and proximal alimentary tracts—this makes rapid examination possible; and (4) as smears are taken under direct vision cytological appearances can be correlated with the visible lesion and also with the histological condition when biopsy is performed.

Histological Examination

The specimens obtained for histology by this method are small, being 2–4 mm. in length. In spite of their small size they are usually adequate for histological diagnosis, provided multiple specimens are taken. Of the 33 patients from whom specimens were taken, in only six was there inadequate material for assessment; practice in the use of the biopsy forceps is already resulting in adequate specimens being obtained regularly. Full-thickness mucosal biopsy specimens, including muscularis mucosae, were obtained from only three patients, and two of these showed some degree of gastric atrophy. In the remaining cases varying depths of mucosa were obtained.

At least two biopsy specimens, and preferably more, were required to reduce sampling error as much as possible in such small biopsies. In two of the cases of malignancy, in which three and two biopsies respectively were taken, only one of the biopsy specimens from each case showed malignant changes.

Despite the fact that orientation of the tissue fragments is difficult, this has not proved a major obstacle to obtaining sections suitable for diagnosis, when the material was processed in the usual way and paraffin sections were cut at several levels.

Correlation of Gastroscopic Appearances with Results of Cytology and Histology

The degree of correlation between the macroscopic appearance of a lesion and the microscopical diagnosis is obviously important. To examine this aspect the 46 cases in which cytological or histological results are available are grouped according to the gastroscopic diagnosis.

Benign Ulcer.—The cytological and histological appearances confirmed the diagnosis in 18 out of 19 cases. The exception was the case of Wegener's granuloma and reticulum-cell sarcoma described above, in which the biopsy specimen showed malignancy and the smear highly atypical cells.

Carcinoma.—Seven cases appeared to have a carcinoma on gastroscopy. In four the cytological and histological appearances confirmed this diagnosis, and in another the smear showed changes suggestive of malignancy. Carcinoma was found at operation in these five. The other two cases yielded inflammatory tissue. At operation one of these was found to have a carcinoma. This case was examined on the first day we used the instrument, and our inexperience may have resulted in inadequate biopsy specimens and smears. The other case also came to operation, and, as described in the group of suspected carcinoma, a benign tumour was found. It is relevant here to comment on the cases of malignant disease that were not recognized gastroscopically. There were three in this series, and each has already been described. They are: (1) the patient with Wegener's granuloma in whom, however, the biopsy specimen taken at gastroscopy showed the lesion to be malignant; (2) the patient diagnosed after a brief and unsatisfactory examination as having superficial gastritis on visual and cytological evidence, who at operation had a linitis plastica; and (3) the patient with pyloric stenosis, large gastric folds, and multiple ulceration whose biopsy specimen and smears showed inflammatory changes but whose operative specimen contained a reticulum-cell sarcoma.

Acute Erosions.—There were nine cases, and all were found to have inflammatory changes.

Superficial Gastritis.—Eleven cases were diagnosed as having superficial gastritis, and nine were found to have inflammatory changes. Two had no abnormality, but in one of these only a biopsy specimen was taken, and in the other only a smear.

Comment.—Of these 46 cases there was agreement between the gastroscopic and microscopical diagnosis in 41 (89%). When there was disagreement the histological or cytological appearances sometimes served to correct a mistaken gastroscopic diagnosis. We therefore conclude that this combination of methods provides a powerful diagnostic approach. The combined method is not infallible, and examples of diagnostic failure have been cited.

Discussion

Gastroscopy with the G.F.B. fibrescope has been safe, simple to perform, and convenient to use on an outpatient basis even when specimens have been taken for histological and cytological examination. Of the three of us who have performed the gastroscopies, only one was an experienced gastroscopist, but the other two have rapidly mastered the technique. However, the G.F.B. fibrescope is a large instrument and the actual

introducing tip is a rigid metal structure 6.5 cm. long and 1.3 cm. in diameter. We therefore consider that any novice endoscopist should have some supervision during his first experiences with the instrument.

The only part of the equipment that has proved unsatisfactory has been the biopsy forceps, which have repeatedly broken.

Excellent views of the pylorus, antrum, and mid-stomach are obtained, but the cardia is not seen well, and the fundus not at all. The instrument is not designed for visualizing the oesophagus or duodenum.

The actual procedure of taking biopsy specimens and smears requires a certain amount of skill, which is fairly easily acquired. Our initial inexperience, and the fact that for a period the biopsy forceps were broken, explain the lack of biopsies and smears in several cases. It is essential to carry spare biopsy forceps to guard against this eventuality.

We regard photography with this instrument as a subsidiary procedure, its main uses being for keeping a record of any important gastroscopic appearances and for teaching.

It can be seen from the results that much information has been gained which otherwise would not have been obtainable, and thus the accuracy and rate of diagnosis of gastric disorders has been increased. This is proved by the fact that 33 of the patients examined had a normal barium meal, and gastroscopy showed a lesion in 25 of these.

The facilities for taking specimens for cytology and histology greatly enhances the value of gastroscopy by providing confirmation of the diagnosis in many instances, and even in some situations by correcting a mistaken visual diagnosis. Even so, gastroscopy with this instrument, as with others, is complementary to radiology and does not replace it. Now that combined macroscopic and microscopical examination of the stomach can be done easily, this procedure and radiology together provide an opportunity for improved diagnosis, understanding, and management of gastric disease.

This model promises to be a useful research tool. Accurate correlation between macroscopic appearances and structural changes can be made. Gastric conditions as yet poorly understood, such as superficial gastritis and acute erosions, can be examined. By serial observation it ought to be possible to learn more of the natural history of these conditions than is known at present. The capacity to take cytological and biopsy specimens under direct vision opens up the opportunity of studying the lesions at cellular level.

Summary

This paper reports our initial experience with the Olympus G.F.B. fibrescope and gastro-camera, which incorporates the means for taking biopsy specimens and cytological samples under direct vision. The results of the first 100 examinations are presented.

Gastroscopy with this instrument has proved to be safe, simple to perform, and convenient for use on an outpatient basis, even when specimens have been taken for histological and cytological examination.

Among 15 patients referred because of haematemesis and in whom the barium-meal examination was negative, gastroscopy showed acute gastric ulcer, gastric erosions, or superficial gastritis in 14.

Among 24 patients referred with suspected carcinoma of the stomach five were judged gastroscopically to have a carcinoma. Four of these were proved at surgical operation to have malignant lesions which had already been confirmed by the gastroscopic biopsy specimens or cytological smears in three, and suggested by the smear in the fourth (in whom a biopsy specimen could not be taken). The fifth case proved to be one of

benign tumour, and it is relevant that both biopsy and cytological examination did not suggest malignancy. In the remaining 19 cases evidence of malignancy was not found, though one subsequently proved to have a reticulum-cell sarcoma.

Among 20 patients referred with a clinical and radiological diagnosis of benign gastric ulcer three were found to have malignant disease.

Among 16 patients with symptoms suggestive of peptic ulcer but a negative or inconclusive barium meal, three were found to have a gastric ulcer, two to have erosions, and five to have superficial gastritis.

In 46 patients from whom biopsy and cytological specimens were taken there was agreement between the gastroscopic and the microscopical diagnosis in 41 (89%). In most instances the biopsy specimen and cytological preparation served to confirm the gastroscopic diagnosis, but occasionally they corrected a mistaken gastroscopic diagnosis.

This combined method of examination represents a powerful diagnostic approach to the diagnosis of gastric disease. It does not replace radiological examination, to which it is complementary.

We are indebted to the Nuffield Committee for making a grant to one of us (S. C. T.) for the purchase of the G.F.B. fibroscope. One of us (D. G. W.) was supported by a research grant from G. D. Searle, who also met some incidental expenses, for which we are grateful. It is a pleasure to acknowledge the help of Dr. A. I. Spriggs and Mr. M. M. Boddington with the cytological examinations. We wish to thank Mrs. Christine Ponsford for assistance at the gastroscopic examinations and Mrs. R. Lees for secretarial assistance.

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Psychological Aspects of the Management of Chronic Renal Failure*

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The treatment of chronic renal failure and the outlook for the patient have changed dramatically in recent years. Patients who would have died can now be maintained in reasonably good health by recurrent haemodialysis or by renal homotransplantation, either from living volunteer donors or from cadaveric sources. These new developments have thrown up new problems of management for the medical profession.

The early papers of Scribner *et al.* (1960), Barber *et al.* (1963), and Gutch *et al.* (1964) among others, referred to psychological factors briefly and in a relatively superficial way. Rather more extended and detailed accounts of psychological reactions to chronic dialysis were supplied by Brown *et al.* (1962), Shea *et al.* (1965), Wright *et al.* (1966), Sand *et al.* (1966), and Retan and Lewis (1966). Abstracts have been published by Pollock (1967) on the emotional adjustment of patients after transplantation, and by Norris (1967) on personality factors in the performance of dialysis patients. Norton (1967) makes the point that the novelty of the procedure is in a large part responsible for the anxiety felt by patients and staff and that these issues are clearly in the process of resolution.

Commentaries on the psychological problems of renal homotransplantation have been concerned mainly with living donor selection, as, for example, those by Woodruff (1964), Hamburger *et al.* (1964), and Monnerot-Dumaine (1965). Kempf (1966) drew attention to the unconscious resentment of donors to recipients, while Cramond (1967) described the development of a hostile dependency between recipients and donors.

Ethical and moral issues concerning this whole field of dialysis and transplantation have been dealt with, notably by

Lindholm *et al.* (1963), Scribner (1964), Leake (1964), and Schreiner and Maher (1965), while a Ciba Foundation Symposium was almost entirely preoccupied with these problems (Wolstenholme and O'Connor, 1966).

This paper deals with some of the psychological issues involved in the management of 47 patients in chronic renal failure and of the problems of the psychiatric screening of 28 potential kidney donors seen at the Queen Elizabeth Hospital, Adelaide, South Australia.

Methods

The renal unit, opened in early 1964, provides recurrent haemodialysis for the State with its population of slightly over one million. Initially, only four places were available on the artificial kidney. The number has since been increased to 10. The unit staff comprises a full-time director, two senior medical registrars, a senior house-physician, a junior house-physician, technicians, a trained sister, and trainee nurses. The unit is closely associated with the University of Adelaide's Department of Surgery, which organized the renal homotransplantation programme. Staff on this side of the work consists of a senior research fellow in experimental surgery with the status of reader and two honorary assistant surgeons, together with the usual theatre staff complement and two trained sisters. The psychiatrist, clinical psychologist, and social worker are closely identified with the work, and the psychiatric contribution to patient-care can be understood under the following headings: (1) the initial assessment interview of all patients being considered for inclusion into the renal unit programme; (2) the provision of specific therapy of a psychiatric nature as the need arises for patients in the programme; (3) the interpretation to

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