convenient in patients responding poorly to chlorpropamide to try the addition of phenformin before recourse to insulin.

Diabetes is a progressive disease, though the rate of progression varies greatly. It is not surprising that some patients at first controlled by the sulphonylureas slowly began to relapse, and this was equally true of patients controlled on combined therapy. In some patients the introduction of combined therapy has meant no more than a delay before insulin was introduced. Nevertheless in other patients treatment by combined therapy has been prolonged, and has been particularly welcomed by elderly patients who would otherwise have required insulin.

Whereas it seems clear that oral therapy as at present described is capable of maintaining normoglycaemia, it remains open to question whether this is sufficient to prevent the degenerative complications so commonly seen in diabetics poorly controlled on insulin, since these complications could possibly be due to factors other than hyperglycaemia. However, quite apart from ultimate complications, hyperglycaemia leads to troublesome symptoms and predisposes to infection. In the present state of our knowledge, these seem valid reasons to justify the use of oral therapy in responsive patients.

Summary

Of 1,450 diabetic patients attending a clinic, 587 (40.4%) were controlled on simple dietary restriction, 608 (42%) required insulin, and the remaining 255 (17.6%) took oral hypoglycaemic agents.

Diabetics deemed suitable for oral therapy who failed to respond to chlorpropamide were given phenformin in small doses as an alternative or as adjuvant therapy. Of 23 such patients, 9 responded to phenformin alone but 14 responded only when the phenformin and chlorpropamide were given together.

Phenformin when administered in a single daily 100-mg. slow-disintegration capsule appeared to offer as effective clinical control as when given in divided doses as tablets.

Our thanks are due to Dr. K. Boheimer, of Bayer Products, for the supply of phenformin capsules ("dibotin" sustained release capsules).

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Among the 3,334 visitors to Coventry who were treated by local doctors last year were an Ethiopian, a Kuwaitian, a Libyan, a Venezuelan, a Norwegian, three Yugoslavians, and four Sudanese. These figures are given in the annual report of the Coventry Executive Council of the Health Service. On January 1 this year 308,359 persons were on Coventry doctors' lists. On April 1 there were 133 doctors in the city and 84 surgeries. It was stated that five people lost dentures while swimming, one lost them "overboard," six threw them in the fire, and two had them destroyed by dogs. (*Birmingham Post*, May 1.)

BARIUM STUDIES IN THE AGED

BY

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As the possibilities of treatment in the field of geriatrics increase, more and more elderly patients will be submitted to radiological examinations. Some examinations can be carried out almost as easily in the old as in the young. Others, such as the investigation of the alimentary tract by means of barium meals and enemas, may be difficult because of the patient's physical frailty or disability or because his mental state prevents his effective co-operation. Moreover, the barium examinations and the preparation entailed may be distressing for the patient. Barium studies in a series of aged patients have therefore been reviewed in order to determine in how many the results were of practical value and in how many of merely academic interest.

The patients investigated had been treated in the geriatric unit during the past five years and were 70 or more years old. The oldest was 93, and the average age was nearly 80. 148 barium studies (102 meals and 46 enemas) were undertaken on 129 patients (40 men and 89 women). Thirteen patients had both a barium meal and an enema. Five patients had two barium meals and one had two barium enemas. In six cases a meal was attempted but was unsatisfactory because the patient was either not able to co-operate or proved unfit for the examination.

Barium Meals

The findings in the patients examined by barium meal are shown in Table I.

*Clinical Diagnosis of Peptic Ulcer (20 Patients).—*This diagnosis was confirmed in 11 patients (7 gastric ulcers, 4 duodenal ulcers). An additional 16 cases of

TABLE I.—Radiological Findings in 97 Patients (102 Barium-meal Examinations) Grouped According to Diagnosis or the Indication for Investigation.

Radiological Findings	Provisional Clinical Diagnosis or Indication for Investigation					Total
	Peptic Ulcer	Carcinoma of Stomach	Gastro-intestinal Haemorrhage	Dysphagia	Hiatus Hernia	
No abnormality discovered ..	8	15	15	6	2	46
Gastric ulcer ..	7	2	10		1†	20
Duodenal ..	4		3			7
Hiatus hernia ..		1	6	3	5	15
Carcinoma of stomach ..		3				3
Carcinoma of oesophagus ..				2	1†	3
Duodenal diverticulum ..			2*			2
Oesophageal diverticulum ..	1				1	2
Neurological disorder ..				1		1
Achalasia of cardia ..				1		1
Pressure on oesophagus by dilated aorta ..		1				1
Situs inversus ..			1*			1
	20	22	37	13	10	102

* Included among the 15 cases assumed to have no abnormality.
 † Associated with hiatus hernia.

peptic ulcer (13 gastric, 3 duodenal) were found in patients with other clinical diagnoses. Thus 27 peptic ulcers (20 gastric, 7 duodenal) were found in the whole series. Five of the 20 gastric ulcers were "giant" ulcers (Strange, 1959). 14 of these patients were discharged well after medical treatment. Two were discharged well after surgical treatment: one had an elective partial gastrectomy; the other, who had had haematemesis and a negative barium-meal examination, had a further haematemesis, for which an emergency partial gastrectomy was performed when the gastric ulcer was found. Four patients died; one after sudden general deterioration in hospital; one from unrelated conditions; one after continued melaena—this patient was unfit for operation; and one who deteriorated while having medical treatment, and in whom it was found at necropsy that the ulcer was malignant. The seven patients with duodenal ulcer were all discharged well.

Clinical Diagnosis of Carcinoma of Stomach (22 cases).—In only three cases was this diagnosis confirmed by barium-meal examination. No cases of gastric carcinoma were found at barium-meal examinations performed in patients with other clinical diagnoses, although one radiologically benign ulcer was found at necropsy to be malignant. Of the three cases thought at barium-meal examination to have gastric carcinoma, one was found at operation to have a non-resectable carcinoma of the pancreas invading the pyloric antrum, another refused operation, and in the third, with clinically obvious metastases in the liver, operation was not advised. The final diagnosis in two patients with anorexia, loss of weight, and abdominal pain was pernicious anaemia.

Clinical Diagnosis of Gastro-intestinal Haemorrhage (? Cause) (34 Cases).—Nine patients presented with haematemesis or melaena. Three found to have a gastric ulcer and one found to have a duodenal ulcer were discharged well after medical treatment. One patient with a gastric ulcer had recurrent haemorrhage, was never fit for operation, and died in hospital. Of four patients in whom no abnormality was found at radiological examination, three were discharged well after medical treatment. The fourth, already mentioned, had a further haematemesis, and at emergency partial gastrectomy a gastric ulcer was found which had not been seen at the barium-meal examination. Twenty-five patients had anaemia with occult blood in the stools. Six found to have peptic ulcers (four gastric, two duodenal) were discharged well after medical treatment. One patient with a gastric ulcer died in hospital from unrelated conditions. A woman aged 93, who could not be persuaded to drink the barium, died in hospital and was found at necropsy to have a giant gastric ulcer. Of six patients shown to have hiatus hernia, which may or may not have been the cause of the haemorrhage, four were discharged well after medical treatment, one is still alive and well in hospital, and one died from an unrelated condition. The 11 patients in whom no abnormality was present included one in whom a satisfactory examination was impossible on account of Parkinsonism, who died in hospital, and in whom at necropsy no gastro-intestinal abnormality was found. The other 10 were discharged well after medical treatment.

Clinical Diagnosis of Dysphagia (? Cause) (13 Patients).—One patient found to have cardiospasm was discharged well on medical treatment. Of two found to have carcinoma of the oesophagus, one died the day

after oesophagoscopy. The other was thought unfit for resection of the growth and was discharged with a view to readmission when the dysphagia became severe enough to justify intubation, but never returned. In one elderly woman dysphagia, starting after a cerebrovascular accident a few weeks before, improved as she recovered. Hiatus hernia was present in three of these patients. Two were discharged, one with less dysphagia and the other free from symptoms. In the third patient, whose dysphagia was of sudden onset, there was a complete hold-up of barium near the lower end of the oesophagus. A few days later swallowing was normal and there was no hold-up of barium. The dysphagia was assumed to be due to impaction of food above the herniated stomach. In six patients no definite abnormality of the oesophagus or stomach was found. In three, however, conditions were present which might well have been the cause of the dysphagia—motor neurone disease in one and heart failure in another (Keates and Magidson, 1955). The third was found later to be suffering from bronchial carcinoma, which was probably the cause of the dysphagia, though radiological evidence of this had not been detected. Of the other three, in one no cause for the dysphagia was found at necropsy and two were discharged still complaining of dysphagia.

Clinical Diagnosis of Hiatus Hernia (8 Patients).—The diagnosis was confirmed in five of these patients. In one there was an associated peptic stricture; in another there was a coincident carcinoma of the upper thoracic oesophagus, and in another a gastric ulcer. Six patients found radiologically to have hiatus hernia, in whom the indication for the examination was anaemia with occult blood in the stools, are considered with the cases of gastro-intestinal haemorrhage. Three cases are considered among those presenting with dysphagia. One patient with symptoms suggesting carcinoma of the stomach was found to have a sliding hiatus hernia, but the final diagnosis was pernicious anaemia; an atypical blood-picture had given rise to difficulty in diagnosis.

Barium Enemas

The findings in the patients examined by barium enema are shown in Table II. By "examination impossible" is meant that the patient was unable to retain the barium in spite of the use of an inflatable balloon in the rectum.

Clinical Diagnosis of Gastro-Intestinal Haemorrhage (? Cause) (7 Patients).—Two patients with anaemia and occult blood in the stools, who had had a negative

TABLE II.—Radiological Findings in 45 Patients (46 Barium Enemas) Grouped According to Diagnosis or the Indication for Investigation.

Radiological Findings	Provisional Clinical Diagnosis or Indication for Investigation			
	Carcinoma of Colon	Diverticulitis	Gastro-intestinal Haemorrhage	Total
No abnormality discovered ..	14	3	4	21
Diverticulitis ..	2	7	1	10
Diverticulosis ..	3	5	1	9
Carcinoma of colon	1*			1
Diaphragmatic hernia (colon in chest) ..	1*			1
Examination impossible ..	3		1	4
	24	15	7	46

* Also had diverticulitis of sigmoid.

barium-meal examination, also had a negative barium enema. One was discharged well and the other died of chronic myeloid leukaemia. Of two other patients examined on account of anaemia, one had a hiatus hernia and diverticulitis and the other had a duodenal ulcer but no abnormality in the colon. Of three patients who had not had a barium meal, one who had blood in the stools and a negative barium enema had piles and was discharged well; one who had melaena had a negative barium enema and died later of chronic myeloid leukaemia; and in one the examination was impossible and at necropsy a carcinoma of the caecum was found.

Clinical Diagnosis of Carcinoma of Colon (23 Patients).—This diagnosis was made radiologically only once; at operation the lesion was found to be an argentaffinoma of the caecum. In one patient with marked diverticulosis a carcinoma of the transverse colon, obvious in retrospect, was missed and was found later at operation for acute obstruction. In another patient, already mentioned, examination was impossible, and a carcinoma of the caecum was found at necropsy.

Clinical Diagnosis of Diverticulitis (15 Patients).—The clinical diagnosis of diverticulitis was confirmed radiologically in seven cases. A further three cases of diverticulitis were found in the whole series. All 10 patients were treated medically; nine were discharged home improved, and the condition of the last, who had a recto-vaginal fistula, remained unchanged.

Discussion

The results of hospital treatment in these 129 patients show that 91 (70.5%) were discharged from hospital either free from symptoms or improved. The other 38 were still in hospital at the time of the survey or had died. The fact that over 70% of these patients were clinically improved may be taken as an indication of the value of hospital treatment in this group with gastrointestinal disorders, whose average age is very high—nearly 80 years. Such satisfactory results could be obtained only by instituting treatment on the basis of an accurate diagnosis. In so far as the barium-meal and barium-enema examinations helped to make possible the correct diagnosis, they would seem to be valuable procedures even in the very old.

Some patients are so frail or disabled that even a barium-meal examination is a trial for them, and no amount of pre-operative treatment would make them fit for surgery. Such patients might well be treated on the basis of the clinical diagnosis alone. With these exceptions accurate diagnosis is as necessary in the elderly as in other age-groups. A neoplasm which may be the cause of the symptoms may be operable. A peptic ulcer, if present, should be treated until healed, and follow-up barium-meal examinations are desirable because complete relief of symptoms often precedes healing. An ulcer in an elderly patient may require elective surgical operation, and if emergency surgery is ever required for haematemesis it is helpful at operation if the site and size of the ulcer are known. These considerations apply particularly to giant gastric ulcer, which Strange (1959), in the largest reported series, has shown to have its maximum incidence in the older age-groups.

A definite diagnosis has been helpful in these elderly patients apart from the possibility of operation. Some with peptic ulcer were affected also by rheumatoid

arthritis, and here it was appreciated that phenylbutazone and steroids must be avoided. In others, the presence of hiatus hernia was a cogent reason for keeping the patients out of bed as much as possible in order to avoid or at least to minimize reflux oesophagitis. In fact, in four of our patients with hiatus hernia, symptoms thought to be due to the hernia began after confinement to bed for another condition. In others, again, a negative barium-meal examination made possible a more confident diagnosis of psychogenic disorder.

All the barium-meal examinations of this series are thought, on review, to have been justified except in the one patient with clinically obvious metastases in the liver in whom the demonstration of the primary growth in the stomach was of only academic interest. Many barium enemas, however, might have been avoided by the application of principles suggested by Haggie (1952). He reviewed all cases of carcinoma of the colon—apart from cases of carcinoma of the rectum—seen at the London Hospital over a three-year period from the point of view of method of diagnosis. 110 cases were studied. About one-third presented as acute or subacute intestinal obstruction or after acute perforation. Of the remaining 75 cases, one had ascites and one had generalized carcinomatosis. All the others had passed blood per rectum, or had a mass palpable per abdomen or per rectum, or had a growth visible on sigmoidoscopy.

Haggie pointed out also that a high proportion of barium-enema examinations are negative. In one year, out of 227 such examinations, 163 showed no abnormality. Most of them had been given to exclude carcinoma of the colon in patients without abnormal signs. With one possible exception none had developed carcinoma two years later. It seemed from this investigation that the greatest value of the barium-enema examination was to locate the site and nature of a mass already felt. Haggie concluded that it is highly improbable that a patient complaining only of colonic symptoms without blood in the stools, and showing no abnormal physical signs and no abnormality on rectal examination or on sigmoidoscopy, would be found to have carcinoma of the colon if a barium enema is given. He stated that this applies also to what Bockus has called the "much bally-hoed phenomenon" of alternating diarrhoea and constipation which is usually due to the misuse of aperients.

An attempt was made to confirm Haggie's conclusions by a review of a series of consecutive cases of carcinoma of the colon seen in this hospital. 123 cases were considered. Of these, 39 had presented as acute intestinal obstruction, nine after acute perforation, and one as acute appendicitis. Among the other 74 cases there was only one exception to Haggie's rule—a case of carcinoma of the caecum in a patient who had not passed macroscopic blood per rectum and without a palpable abdominal mass.

With Haggie's and these observations in mind the barium-enema examinations of the present series were analysed. Assuming the validity of Haggie's criteria, out of the 45 patients examined by barium enema, the examination was indicated in 16 who had either passed blood per rectum or had a palpable mass. In five who had passed blood per rectum no evidence of carcinoma or diverticulitis was found. Among the 11 who had a palpable abdominal mass there were three malignant tumours of the colon and one case of diverticulitis of

the sigmoid. Among the 29 cases in which, according to these criteria, there was no need to consider carcinoma of the colon, there were 15 with no abnormality, five with diverticulosis, and nine with diverticulitis. All the cases of diverticulitis were treated medically. As the surgical treatment of uncomplicated diverticulitis is rarely undertaken in the elderly, the question arises whether confirmation of the diagnosis by barium-enema examination serves any useful purpose. Haggie was concerned with the value of this examination in the diagnosis of carcinoma of the colon. It is suggested that this approach might apply also to the diagnosis of diverticulitis, at least in the elderly, and that a barium enema is rarely indicated if the patient has not passed macroscopic blood in the stools or has no abnormal physical signs, and if no abnormality is found on rectal examination or on sigmoidoscopy. To make it even less likely that the occasional case of carcinoma will be missed we would add "and if the stools are negative for occult blood." If Haggie's approach had been applied in our 45 patients examined by barium enema, 29 would have been spared the enema, so far as we know without ill effect. Even with our proposed additional indication for barium-enema examination—a positive occult blood test—at least 10 in whom the test was negative would have been spared an enema and probably some if not all of another seven in whom the occult blood test was not done.

Apart from the discomfort of a barium enema and especially of the preparation involved, the examination is not free from risk. A fatal case of barium sulphate embolism is reported by Truemner *et al.* (1960). Cases of retroperitoneal emphysema due to barium enema followed by air insufflation have been recorded by Pyle and Samuel (1960) and by Brunton (1960). The number of published complications of the barium enema reviewed by Pyle and Samuel is formidable. In both these papers the authors stress the special risk in the older age-groups.

It is concluded that in spite of the effort involved for many old, frail, and disabled patients, the barium-meal examination is a useful diagnostic procedure in the aged. In many of these patients, however, the more distressing barium enema might reasonably be avoided.

Summary

102 barium-meal and 46 barium-enema examinations carried out on patients in a geriatric unit are reviewed, with special reference to whether or not the examinations might have been avoided. The barium-meal examinations were found to be surprisingly valuable. There is scope for reducing the number of barium-enema examinations performed, which is desirable in view of the distressing preparation involved and the occasional complications that occur.

We are grateful to Dr. Stachurko, who was responsible for many of these barium examinations; to Dr. T. St. M. Norris and Mr. J. M. Davis, who read the manuscript and made helpful suggestions; and to Mrs. C. Carlin and Mrs. G. Mercer, the x-ray department staff nurses, but for whose kindness and sympathy these old people would have found their examinations even more of a trial.

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CORTICAL MASTOIDECTOMY IS STILL NECESSARY

BY

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Since the advent of antibiotics surgical intervention in acute middle-ear and mastoid disease has tended to decrease. Perhaps the time has now arrived to review this policy.

Nowadays, with the changing pattern of response of bacterial organisms to antibiotics and the problems associated with antibiotic-resistant strains, a different picture of mastoid infections seems to be emerging. An increasing number of cases of inadequate response to appropriate antibiotic therapy is being reported in all departments of medicine. There is constant reference to such problems as unresolved pneumonia and persistent infections of the urinary tract. Over the past 18 months we have seen a number of acute mastoid infections which have shown little if any response to antibiotic therapy.

In this article I have attempted an analysis of a series of cases in which the operation of cortical mastoidectomy was performed. In several it will be seen that there were some of the classical indications for operation, such as facial palsy, lateral sinus thrombosis, and otitic meningitis. However, most operations were performed because of the inadequate response of the infection to drug therapy. It is felt that these cases have proved the value of surgical intervention in the control of this new aspect of mastoid infection.

Cases in the Series

During a 12-month period as registrar to the ear, nose, and throat unit in Northampton General Hospital I have personally performed 13 Schwartze-type operations. This hospital serves a district of some 250,000 people. This gives an idea of the relative incidence of the problem in a fairly healthy Midland community. All the cases occurred during the winter months and the average age of the patients was 7 years. The oldest child was 15 years and there were four children under 2 years. With the exception of one infant in whom the mastoid cavity became reinfected, a satisfactory result was obtained in all cases. Even this child settled eventually, although several months passed before she was finally discharged from hospital.

Table I shows those cases in which there was a classical indication for surgical intervention. All these children had been treated with antibiotics before admission to hospital and their complication developed while under antibiotic therapy.

With the exception of Case 1, all these children recovered quickly after a relatively short stay in hospital. At follow-up several months later they had good hearing and dry, intact tympanic membranes. Case 1 later had a successful excision of his cerebellar abscess (neurosurgical unit, Radcliffe Infirmary, Oxford). There is a possibility that this complication might have been prevented by an even earlier drainage of his mastoid infection, as he presented the problem of an acute flare of a chronic suppurative otitis media. However, there can be little doubt that the indication for operation was