Summary

Pneumoperitoneum is a diagnostic procedure which enables useful radiographic studies to be made of various abdominal organs. In particular, the liver and spleen can be clearly demonstrated by examining the patient in the horizontal prone position.

In patients suffering from ascites, pneumoperitoneum can be induced with great ease and negligible risk by performing partial air replacement at the time of paracentesis abdominis. This should be done in all patients with ascites in whom the underlying diagnosis is in doubt.

In patients without ascites, formal induction of a pneumoperitoneum is an easy procedure the risk of which is sufficiently low to justify its use as a diagnostic method.

Results with this method are presented with special reference to the liver and spleen. Its more widespread adoption is recommended.

We are grateful to Dr. R. R. Tilleard-Cole for clinical assistance, and are much indebted to Miss M. Bell, who carried out most of the radiography. We wish to thank our colleagues in the United Oxford Hospitals for referring patients to us.

REFERENCES

Aubry, G., Pietri, H., Massonnat, J., and Thiebault, R. (1954). *Algérie méd.*, **58**, 133.
Pagel, W., Simmonds, F. A. H., and Macdonald, N. (1953). *Pulmonary Tuberculosis.* Oxford University Press, London.
Sellors, T. H., and Livingstone, J. L. (1952). *Modern Practice in Tuberculosis.* Butterworth, London.
Simmonds, F. A. H. (1946). *Lancet*, **1**, 530.
Stein, H. F. (1951). *Amer. Rev. Tuberc.*, **64**, 645.
Trimble, H. G., Eaton, J. L., Crenshaw, G. L., and Gourley, I. (1948). Ibid., **57**, 433.

DUODENAL ULCER TREATED BY VAGOTOMY AND GASTRO-ENTEROSTOMY

RESULTS OF 100 CONSECUTIVE CASES

BY

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Many observers have recorded their results following vagotomy and gastro-enterostomy for duodenal ulceration, and experiences have varied. The purpose of this report is to add to these experiences the results obtained from a series of 100 consecutive cases of duodenal ulcer similarly treated. None of the patients were selected for this operation as opposed to any other, the only criterion for inclusion in the series being the need for surgical as opposed to medical treatment. In addition, between 1946 and 1948 one of us performed this operation on 45 occasions and it was the apparently satisfactory initial follow-up of these patients which prompted us to undertake the present series. However, a further incomplete check of these patients reveals that at least 9 (20%) have required further gastric surgery.

Material

Of the 100 patients 78 were men and 22 women. The youngest was 25, the oldest 77, with an average age of 45 years. The operations were performed by members of the surgical unit of St. Mary's Hospital, and these followed a standard pattern. This consisted of confirmation of the diagnosis by laparotomy, and a posterior gastro-enterostomy combined with resection of at least 1 in. (2.5 cm.) of the vagi and their branches after mobilizing and withdrawing into the abdomen the supradiaphragmatic portion of the oesophagus.

There was one almost immediate post-operative death associated with collapse and peripheral circulatory failure, probably due to a coronary thrombosis. The remaining 99 patients recovered and in due course were discharged to attend the follow-up clinic. Ten patients (10%) have defied all efforts to trace them recently enough for their inclusion in an evaluation of the results. Nevertheless an analysis of their progress, so far as it is known, is given later.

Eighty-nine patients (89%) have been followed up for varying periods, the average length of follow-up at the time of submitting this report being 29 months. Such a short follow-up probably fails to represent the final picture, but, as will be seen, the results are of such a nature as to warrant an early report. These patients were seen at increasingly long intervals unless their progress was unsatisfactory, when they were seen more frequently. Attention was paid to the patients' subjective state of health, their ability to undertake their normal work being considered important. Examination was primarily clinical, barium-meal studies and gastroscopy being undertaken only when the clinical findings warranted them. Fractional test meals and insulin test meals were not undertaken as a routine, because of the invalidity of achlorhydric results due to biliary regurgitation after a gastro-enterostomy.

Results

The results in these 89 patients have been classified thus: (1) Excellent; (2) good; (3) persistent post-operative syndromes with or without dyspepsia; (4) persistent dyspepsia alone, with no proved recurrence of ulceration; (5) recurrence of peptic ulceration; and (6) miscellaneous.

1. *Excellent.*—These results occurred in patients who subjectively and objectively were completely free of any dyspepsia or post-vagotomy and gastro-enterostomy syndromes from the immediate post-operative period. There were 33 such patients (37.1%). One died from cerebral haemorrhage two years after operation. Up to the time of his death he had had no recurrence of his symptoms, and at necropsy there was no evidence of further peptic ulceration.

2. *Good.*—Into this category fell patients who post-operatively had temporary disturbances, but which have now completely disappeared. There were nine such cases (10.1%). Six patients had temporary post-vagotomy and gastro-enterostomy syndromes, one patient had temporary dyspepsia, and two patients had both temporary post-operative syndromes and dyspepsia.

3. *Persistent Post-vagotomy and Gastro-enterostomy Syndromes With or Without Dyspepsia.*—Thirty patients (33.7%) still had persistent disturbances dating from the operation. Five of them also had dyspepsia, in one of which it was temporary and in four permanent. Whether associated with dyspepsia or not, 38 patients (42.7%) had post-vagotomy and gastro-enterostomy disturbances, of which 8 (9%) were temporary and 30 (33.7%) permanent. In two of the permanent cases some of the symptoms had disappeared, suggesting that ultimately they may fall into the temporary category.

Classification According to Severity

	Temporary	Permanent
Severe..	—	6
Moderate	2	11
Mild ..	6	13

Of those suffering from permanent severe syndromes two felt worse for having the operation, two had to abandon their original jobs and undertake light work, and one has had to absent himself from work for a day or two every few weeks.

Classification According to Symptoms in Order of Prominence

Fullness after meals	22	Flatulence	4
Biliary regurgitation	8	Diarrhoea	4
Faintness related to meals	8	Easy fatigue	2
Nausea	7	Anorexia	2
Non-biliary regurgitation	5	Dysphagia	1

Some of the patients had multiple symptoms, and so the sum of the above figures exceeds the total of cases exhibiting post-operative syndromes.

4. *Persistent Dyspepsia Without Post-operative Syndromes and With no Proved Ulcer.*—There were five such patients (5.6%). These, together with the four cases of persistent dyspepsia occurring with post-vagotomy and gastro-enterostomy syndromes, are here analysed, making a total of nine (10.1%). In one case the symptoms were only those of "heartburn," but in the remainder they were similar to pre-operative symptoms, only in most cases milder. Six were mild, two were moderate, and one was severe. All these patients underwent barium studies apart from two of the mild cases, one being the patient with "heartburn" and the other a patient who has so far failed to attend for his radiological examination. In none of those examined was there any radiological evidence of ulcer recurrence. In view of this and the fact that all were able to work or attend to their household duties, their symptoms have been controlled by medical treatment and they remain under observation.

5. *Further Peptic Ulceration.*—There were 11 cases (12.4%)—eight have been proved at operation, and three have not undergone operation because one refused operation (gastric and duodenal ulceration), one was unfit for operation for other reasons (gastric and duodenal ulceration), and one was pregnant at the time this report was written and was awaiting operation (gastric ulceration). In all these three patients the diagnosis has been made not only on clinical grounds but on the unequivocal demonstration of an active ulcer crater radiologically.

Site of the Peptic Ulceration

Gastro-jejunal	Duodenal	Gastric	Gastric and Duodenal
6	1	1	3

Of these recurrences six occurred in men and five in women. The average duration before recurrence of symptoms was 16 months, the shortest being five months and the longest 26 months.

6. *Miscellaneous.*—One patient remained well for 22 months, when he had a severe melaena. Clinically and radiologically it was probable that he had a gastro-jejunal ulcer. Laparotomy failed to show such an ulcer, but following his gastrectomy, which was performed at this second operation, he has remained well up to date.

The Defaulters

Of the 10 defaulters there was no trace of five from almost immediately after discharge. Of the remaining five one was seen three months after operation with recurrence of pain, but refused treatment, and shortly afterwards left the country; one was seen one year later with recurrence of pain and vomiting, but he is a seaman and has since been untraceable; one was seen one year later and was well, apart from occasional pain and postprandial fullness; and two were seen one year later and were very well.

Summary of Results

Out of 100 cases of vagotomy and gastro-enterostomy for duodenal ulcer there was one post-operative death. Of the remaining 99 cases 10 defaulted and 89 were followed up. The results in these cases are as follows:

Category	No. of Cases	% of Cases Followed up
Excellent	33	37·1
Good	9	10·1
Persistent post-operative syndromes with or without dyspepsia	30	33·7
Persistent dyspepsia alone with unproved recurrence of ulceration	5	5·6
Proved recurrent ulceration	11	12·4
Miscellaneous	1	1·1

Conclusions

A recurrence rate of 12.4% is undeniably very high, particularly as the average duration of follow-up has been only 29 months: further continuation of the follow-up might produce an even higher percentage of recurrences. It is interesting to note that no fewer than eight patients in this series have undergone further operation for peptic ulceration.

Quite apart from the recurrences, there has been a remarkably high incidence of post-operative syndromes that have so far persisted. Admittedly many of these have been mild in nature, but in our experience vagotomy has little to offer in the search for an operation free of sequelae such as the syndromes which may follow partial gastrectomy. Indeed, in six cases the symptoms have been severe and have interfered with the patients' normal work.

Our inevitable conclusions are that vagotomy and gastro-enterostomy, in our hands, is an unsatisfactory operation for duodenal ulcer. If the operation demands for its greater success a highly specialized technique, we still consider it unsatisfactory: any operation for such a common disorder must stand or fall by the results obtainable in average hands.

We wish to thank Mr. H. H. G. Eastcott and Mr. D. L. P. Farley, who performed many of the operations included in this series and who have assisted us with the follow-up.

SPIROMETRY IN ASSESSMENT OF ANALGESIA AFTER ABDOMINAL SURGERY

A METHOD OF COMPARING ANALGESIC DRUGS*

BY

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Pain is a complex experience, and the comparison of pain-relieving drugs is complex also. Clinical trials of analgesics based on subjective reports are notoriously unreliable unless hedged around with stringent precautions to keep the patient and administrator in ignorance of what is being given. Similarly, estimations of pain-relief based on objective degrees of tranquillity tell us very little, for a patient can be made completely tranquil with drugs which make no pretence of analgesic action. Moreover, procedures such as these are qualitative rather than quantitative.

Hardy, Wolff, and Goodell (1940, 1952) have carried out quantitative comparisons of analgesics in experimental pain, using a machine called the "dolorimeter." This machine inflicts graded thermal burns, and has been the basis of a great deal of sound laboratory work, but for accurate results it must be used on trained subjects under standard conditions. Attempts have been made to equate the pain caused by this machine with naturally occurring pain (Javert and Hardy, 1951), but it is doubtful whether comparisons of such entirely different kinds of pain have any value (Haugen and Livingston, 1953). Ideally, analgesic drugs should be

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