

## "Study of Small Intestine in Patients Operated For Duodenal Ulcer"

**S. C. SHAH,**  
 Hon. Gastroenterologist,  
 Sir H. N. Hospital,  
 Hon. Asst. Professor,  
 Grant Medical College,

**KEWAL P. JAIN,**  
 Resident Physician,  
 Sir H. N. Hospital,  
 Bombay.

**PRADIP GOYAL,**  
 House-Physician,  
**S. Y. WAGH,**  
 Physician, C.G.H.S.

### Introduction

There have been a number of reports from India on the followup of patients subjected to surgery for duodenal ulcer<sup>1,2,3,4,5,6</sup>. These have dealt mainly with the clinical assessment and incidence of post-operative complications. However, except for a detailed clinical description of diarrhoea<sup>1,2,6</sup> there have been no reports on the study of the small intestine post-operatively. We report a study of the small intestine in patients operated for duodenal ulcer.

### Patients and Methods :

The study was carried out on patients attending followup after surgery, for duodenal ulcer, at least six months earlier. Patients in whom the principal indication for surgery was intractable pain, not responding adequately to medical treatment, were included while patients operated for complications like perforation, haemorrhage and obstruction were not included in the study.

A detailed history regarding the pre- and post-operative symptoms was obtained from each patient. A particular note was made of the presence or absence of a history of chronic diarrhoea and significant weight loss, both before and after surgery. The reports of pre-operative investigations including the haemogram, stool examination and gastric analysis were noted. Details regarding the indication and type of surgery performed in individual patients were obtained.

At the time of followup, the patients were evaluated clinically for signs of malnutrition. The investigations done at this time included the haemogram and bone marrow, serum proteins, serum calcium, stool examination, fiber-optic endoscopy and jejunal biopsy by means of the Crosby capsule. Absorption of d-xylose was estimated by measuring its urinary excretion over 5 hours after an oral dose of 5 g. An excretion of 1.1 g or more was considered as normal. Faecal fat was estimated on a 24 hour collection of stools on three consecutive days with an oral intake in excess of 50 g per day. Other investigations, e.g. serum vitamin B<sub>12</sub> assay and urinary indican estimation were done in selected patients.

KEWAL P. JAIN,  
Resident Physician,

### Observations

Sir H. N. Hospital,  
Bombay.

Pre-operatively, the patients had symptoms classical of duodenal ulcer for an average period of about two years before undergoing surgery. All had received medical treatment including a bland diet, antacids and antispasmodics without significant sustained relief. Episodic diarrhoea was present in two patients. There was no history of continuous diarrhoea in any of the patients.

Pre-operative investigations showed normal haemoglobin in 13 of the 16 patients. It was mildly decreased in the remaining three patients. The stool examination was normal in all patients. Gastric analysis was done by the augmented histamine method in 13 patients. There was evidence of hyperacidity in ten. In none was it suggestive of Zollinger-Ellison syndrome.

Details regarding the pre-operative symptoms and investigations in individual patients are as in Table I.

Of the 16 patients, 14 had undergone a truncal vagotomy; 10 with a gastro jejunostomy and 4 with a pyloroplasty as a draining procedure. Of the remaining two patients, a partial gastrectomy was done in one and a highly selective vagotomy in the other.

The interval between surgery and followup ranged between six months and ten years with an average of two years. At the time of followup mild pain in the epigastrium was present in 13 patients. Nausea was present in 11 of the 16 patients. Of these, 4 also had vomiting. In subjective feeling of distension of the upper abdomen was present in 7 patients and flatulence occurred in three. There was a history of signi-

**Table I**  
**Pre-Operative Symptoms and Investigations**

Pre-Operative Symptoms	Males	Females
1. Pain in abdomen	11/13	2/3
2. Nausea	12/13	3/3
3. Occasional vomiting	5/13	2/3
4. Distension of abdomen	7/13	1/3
5. Episodic diarrhoea	2/13	1/3
6. Chronic diarrhoea	1/13	0/3
<b>Pre-Operative Investigations</b>		
1. Haemogram (low)	1	2
2. Stool examination	N.A.D.	N.A.D.
3. Blood Sugar	Normal	Normal
4. Hyperacidity (F.T.M.)	9/10	2/3

ficant weight loss in 12 patients. Diarrhoea was present in 5. In one it was debilitating with a frequency of 8 to 10 watery stools per day and associated with an urgency to defaecate. Three patients had intermittent diarrhoea with a frequency of 2 to 3 loose stools per day while the remaining patient admitted to the occurrence diarrhoea only on direct questioning.

Details of post-operative symptoms are as in Table II.

**Table II**  
**Post-Operative Symptoms**

Symptoms	Mild	Severe	Debilitating
1. Epigastric fullness	5/16	0/16	0/16
2. Early dumping	2/16	0/16	0/16
3. Nausea	6/16	0/16	0/16
4. Vomiting	0/16	0/16	0/16
5. Heartburn	0/16	0/16	0/16
6. Flatulence	2/16	0/16	0/16
7. Diarrhoea	1/16	0/16	0/16

The results of investigations done at followup are as presented below. The haemoglobin was decreased below 12 g per 100 ml in 10 of

the 16 patients. Serum vitamin B<sub>12</sub> levels assayed in 6 of the anaemic patients were normal. Bone marrow aspiration and serum iron and total iron binding capacity measured in the same patients suggested iron deficiency as the cause of anaemia. Serum proteins were markedly decreased (below 5.0 g per 100 ml) in 3 patients. Serum calcium and alkaline phosphatase were normal in all patients. Estimation of d-xylose absorption, done in 14 patients, revealed normal values in 10 and deficient absorption in four. Estimation of faecal fat revealed normal absorption in 10 and abnormal values in 5 patients. It was not estimated in one patient. Jejunal biopsy was normal in 10 patients, suggestive of tropical sprue with grade II mucosal changes in one and showed non-specific abnormalities in two patients. It was not done in three patients.

Fiber-optic endoscopy was carried out in 13 patients. Five patients were suspected clinically to have an anastomotic ulcer. This was demonstrated in only one patient. Another patient had multiple jejunal ulcers. Two others showed chronic gastritis while one had bile reflux with marked gastritis at the gastro-jejunal stoma.

Details of investigations at followup in individual patients are as in Table III.

**Table III**  
Details of Investigations at Followup

	Normal	Abnormal
1. D-xylose absorption	10/14	4/14
2. Faecal fat estimation	10/15	5/15
3. Endoscopy	7/13	6/13
4. Jejunal biopsy	10/13	2/13

### Discussion

With the introduction of cimetidine, carbenoxolone and bismuth sub-nitrate duodenal ulcer has become more amenable to medical treatment. In a developing country like India, the expense of these drugs render them impractical in a majority of patients as recurrence is likely on withdrawing them. Thus, there is a definite group of patients in whom surgery is the only answer. Surgery is done in the hope of gaining permanent relief from pain, healing of the ulcer, preventing its recurrence and for the management of complications. It is not free form problems and in addition to the immediate morbidity and mortality of the anaesthesia and surgical procedure there is a significant incidence of late complications<sup>8</sup>.

There have been a number of reports by Indian authors<sup>1,2,3,4,6</sup> on the followup of patients subjected to surgery for duodenal ulcer. In most series diarrhoea has been an important complication. Desai and Vyas<sup>1</sup> reported an incidence of 7.2%. Balasubramaniam and Fenn<sup>2</sup> an incidence of 8.3% and Chakrabarty et al<sup>3</sup> 9.4%. There is no report of a study of small intestine in any of these series.

Of the 16 patients studied by us, 5 had diarrhoea at the time of followup. In one it was debilitating with a frequency of 8 to 10 watery stools per day. This patient, on further investigation, was proven to have multiple jejunal ulcers. Three patients had moderate diarrhoea. Of these, one had a pre-operative history of episodic diarrhoea which had increased after surgery. At followup, he had moderately severe anaemia and steatorrhoea. His endoscopy was normal. The jejunal biopsy showed grade II mucosal changes suggestive of tropical sprue. Thus his diarrhoea, both pre- and post-operatively, was due to tropical sprue and it had increased after surgery. Diarrhoea responded to tetracycline therapy. In 1957 Paulley<sup>7</sup> suggested that "in those cases of post-gastrectomy syndromes in which steatorrhoea develops and patient loses weight, there may have been latent idiopathic steatorrhoea before operation". It is believed that gastrectomy provokes malfunctioning of the small intestine in predisposed individuals by causing an unnatural environment. Thought the patient with tropical sprue in this study had undergone a truncal vagotomy with a gastro-jejunosomy and not a gastrectomy, this may act in a similar way in a predisposed individual. In the other three patients with diarrhoea no specific aetiology could be demonstrated.

After surgery, weight loss of a significant degree was present in 75% of patients. However, all these patients had undergone a form of vagotomy and the incidence of significant weight loss with this procedure is recognised<sup>8</sup>, though it is commoner after gastrectomy<sup>9</sup>.

Anaemia was present pre-operatively in 18.75% of patients but at followup the incidence had increased to 43.75%. Investigations revealed iron deficiency as the cause of anaemia. Anaemia is a known complication of both vagotomy<sup>8</sup> and gastrectomy<sup>9</sup>, though commoner with the latter procedure.

Serum proteins were markedly decreased in three patients. One of these had tropical sprue, another had associated postnecrotic cirrhosis and in the third patient a poor diet was the only factor which could account for the marked hypoproteinaemia.

Faecal fat estimation, done in 15 patients, showed steatorrhoea in one third. It could be explained on the basis of tropical sprue in one patient but in the other four there was no obvious cause. A blind loop syndrome was unlikely as urinary indican estimation in 3 patients with steatorrhoea was normal. An abnormal d-xylose absorption in 4 of 13 patients was a further indication of disordered small intestinal function.

Jejunal biopsy was not very helpful in elucidating the cause of steatorrhoea and d-xylose malabsorption. In one it showed tropical sprue.

while in two patients it revealed nonspecific abnormalities. In one of the latter there was no steatorrhea. Thus, except in the patient with tropical sprue jejunal biopsy was uncontributory.

Pulmonary tuberculosis is reported to occur more frequently in patients operated for duodenal ulcer by either vagotomy<sup>9</sup> or gastroectomy<sup>5</sup> but none of our patients developed it, though one had tuberculosis of spine. Weight loss and deterioration of nutrition are believed to be the predisposing factors for the occurrence of pulmonary tuberculosis in this group of patients<sup>5</sup>. Thus it is surprising that it did not occur in this series as most of the patients lost weight and deteriorated nutritionally.

### Summary

Sixteen patients operated for duodenal ulcer were studied for small intestine function and morphology. Most of them complained of pain in abdomen and nausea, one-third of them had diarrhoea and anaemia and weight loss was significant in two-third of them. Jejunal biopsy was normal in nearly all of them. However one third of cases showed evidence of malabsorption.

### References

1. Balasubramaniam S. and Fern A. S. (1972) : 5 — 10 years after vagotomy and gastro-jejunosomy in South India. *Ind. J. Surg*; **34**: 137.
2. Budhraja S. N; Perianayagam W. J. and Pasupathy N. K. (1973) : Problems in the management of gastrojejunal ulcer. *Ind. J. Surg*. **35**: 393.
3. Chakarabarty P. B; Sai P. L. and Das K. K. (1977) : Truncal vagotomy and gastrojejunosomy for chronic duodenal ulcer. *Ind. J. Surg*; **39**: 110.
4. Desai J. R. and Vyas B. K. (1969) : Mortality and morbidity in peptic ulcer surgery. *Ind. J. Surg*; **31** : 372.
5. Harding Rains A. J. and David Ritchie H, Bailey and Love's Short Practice of Surgery. 17th Edition, London H. K. Lewis and Co. Ltd; 1977, 817 — 819.
6. Kumar R; Rowe T. R. and Dave P. B. (1974) : Selective vagotomy without drainage in the treatment of chronic duodenal ulcer. *Ind. J. Surg*; **36** : 417.
7. Thompson J. C; Davis-Christopher Textbook of Surgery. The Biological Basis of Modern Surgical Practice. Editor: David C. Sabiston Jr; 11th edition. Philadelphia, W. B. Saunders Company, 1977, 937.
8. Wheldon E. J; Venables C. W. and Johnston I D A (1969) : The nutritional effects of vagotomy and gastroenterostomy 15 — 20 years after surgery. *Br. J. Surg*; **56** : 706.