



GASTROCOLIC FISTULA AS A COMPLICATION OF BENIGN GASTRIC ULCER

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always be obtained. All patients should therefore undergo surgery, even if closure of the fistula is demonstrated, in order to avoid recurrent gastrocolic fistulation and to obtain conclusive evidence of the nature of the underlying pathology.

S Afr Med J 1999; **89**: 1011-1014.

Background. While most of the complications of benign gastric ulceration are predictable, gastrocolic fistulation is rare and deceptive in presentation. In this review we present 14 such cases and highlight the role of nutritional support in patient management.

Patients and methods. Fourteen patients presenting at a surgical ward at King Edward VIII Hospital, Durban, with gastrocolic fistula as a complication of benign gastric ulcer between 1983 and 1994 were retrospectively reviewed. Patients were categorised clinically into two groups. Group A patients ($N = 8$) underwent surgery and group B patients ($N = 6$) received total parenteral nutrition (TPN) and an H_2 antagonist before surgery.

Results. There were 9 male and 5 female patients with a mean age of 42 years. Smoking was noted in 43% of patients and alcohol use in 64%. Only 1 patient used non-steroidal anti-inflammatories. Diarrhoea (71%) and weight loss (71%) were the commonest presenting complaints. Gastroduodenoscopy always diagnosed the presence of ulcers ($N = 14$), but overlooked fistula in 9 patients. Barium meal examination diagnosed fistula in 4 out of 6 patients and barium enema examination did so in 8 out of 9. Colonoscopy was used in 4 patients and diagnosed fistula in 2. One patient who presented with haematemesis had the fistula diagnosed at surgery. All group A patients underwent partial gastrectomy with a Billroth I gastroduodenotomy and segmental colonic resection with primary anastomosis. There was no recurrence during the follow-up period (6 - 104 weeks). Group B patients received TPN for a mean period of 16 days (7 - 32 days). One death resulted from catheter-related sepsis. The remaining 5 fistulas closed with this regimen.

Conclusion. An *en bloc* resection and primary reconstruction is the recommended surgical treatment for gastrocolic fistula. Nutritional deficiencies often exist and nutritional support is beneficial. Most patients will heal on TPN and medical management, but histological exclusion of malignancy must

While the complications of benign gastric ulcers are often predictable, a gastrocolic fistula as a consequence of this disease is rare and deceptive in presentation. The mainstay of management is surgery, although a few patients may be managed conservatively. To date, 111 cases have been reported in the English literature.¹⁻⁴ However, only a few authors discuss the nutritional effects of this condition and the role of nutritional support in patient management.^{4,8} On its own, chronic peptic ulcer disease is known to be associated with abnormalities in diet, with a deleterious impact on nutritional status. The end result of an abnormal communication between the stomach and colon consequent to peptic ulceration further adversely affects nutritional status, resulting in alarming weight loss, intractable diarrhoea and micronutrient imbalance.⁸

In this review we report our experience with 14 cases of gastrocolic fistula as a complication of benign gastric ulcer and highlight the role of nutritional support as an adjunctive and primary therapeutic modality in the management of these patients.

PATIENTS AND METHODS

Between January 1983 and December 1995, 14 patients with gastrocolic fistula as a complication of benign gastric ulcer presented to the surgical service at King Edward VIII Hospital in Durban. The clinical records of these patients were reviewed to produce the data for this retrospective, descriptive study. All patients had a full clinical, biochemical and haematological assessment. The 6 patients receiving total parenteral nutrition (TPN) also had a detailed nutritional assessment. From 1990 the Nae/Ke ratio was determined using a bio-electric impedance machine in 9 patients. A ratio of > 2 indicated protein-calorie malnutrition. Mean age at presentation was 42 years (range 36 - 62 years). There were 9 male and 5 female patients. Table I summarises the clinical presentation and associated risk factors. Smoking in excess of 5 cigarettes per day and consumption of alcohol more than 3 times per week was taken as significant. All patients were questioned on their use of non-steroidal anti-inflammatory drugs (NSAIDs). Diagnostic investigations included gastroduodenoscopy, colonoscopy, barium meal and follow-through examination and barium enema (Table II). On the basis of nutritional assessment, the patients were categorised into two groups in terms of their

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Table I. Clinical presentation and risk factors

	N (%)
Clinical presentation	
Diarrhoea	10 (71)
Weight loss	10 (71)
Abdominal pain	7 (50)
Faeculent vomiting	4 (29)
Haematemesis	1 (7)
Risk factors	
Alcohol	9 (64)
Smoking	6 (43)
NSAIDs use	1 (7)
Peptic ulcer history	6 (43)
Duodenal	2 (14)
Gastric	4 (29)

Table II. Diagnostic procedures and outcome (N)

Investigation	No. of patients	Ulcer diagnosed	Fistula diagnosed
Gastroduodenoscopy	14	14	5
Barium meal	6	5	4
Barium enema	9	-	8
Colonoscopy	4	-	2
Surgery	1	1	1

Table III. Patient profile and outcome

Group	No (%)
Group A	8 (57)
Surgery	
Group B	6 (43)
TPN + H ₂ antagonist	3 (22)
TPN + H ₂ antagonist + surgery	2 (14)
Deaths	1 (7)

nutritional support and pre-operative management (Table III); 8 patients underwent surgery with no preceding nutritional support at the discretion of the attendant surgeon (group A). The remaining 6 patients received TPN as part of their management for a mean period of 16 days (7 - 32 days) (group B). TPN consisted of a 3-litre bag containing 2 000 kcal and 14 g nitrogen per day. Both carbohydrate and fat provided the daily energy requirements. The calorie/nitrogen ratio was 150:1 and vitamins, minerals and trace elements were added daily to the regimen. All patients had an H₂ antagonist (cimetidine or ranitidine) prescribed as part of the management. These were continued until operation and as daily maintenance (ranitidine 300 mg at night) for those on long-term conservative treatment (N = 3). Following discharge, patients were reviewed monthly.

RESULTS

Diarrhoea and weight loss were the main presenting symptoms, in evidence for a mean duration of 4.2 weeks (range 3 - 7.6 weeks). Other symptoms included abdominal pain, faeculent vomiting and haematemesis (Table I). In terms of risk factors for the development of peptic ulcers, 1 patient was noted to have used NSAIDs regularly. The patient who presented with haematemesis had an endoscopy that confirmed a bleeding gastric ulcer, but the fistula was not visualised. Urgent surgery was performed because of ongoing haemorrhage and the fistula was diagnosed intra-operatively. Six patients had a history of previously treated peptic ulcers, 2 a history of chronic duodenal ulcers and the remaining 4 a history of gastric ulcers. Table II outlines the diagnostic procedures used. Endoscopy always diagnosed ulcers, but overlooked fistula in 9 patients. Barium meal and follow-through examination were used in 6 patients, and diagnosed ulcers in 5 patients and fistula in 4. The fistula was diagnosed in 8 of the 9 patients who had a contrast enema study. Fig. 1 shows the fistula in 1 such patient. Four conservatively managed patients underwent colonoscopy to exclude colonic malignancy. Gastroduodenoscopy and colonoscopy always included biopsy of the ulcer. *Helicobacter pylori* was specifically looked for in patients who had gastric biopsies and was noted

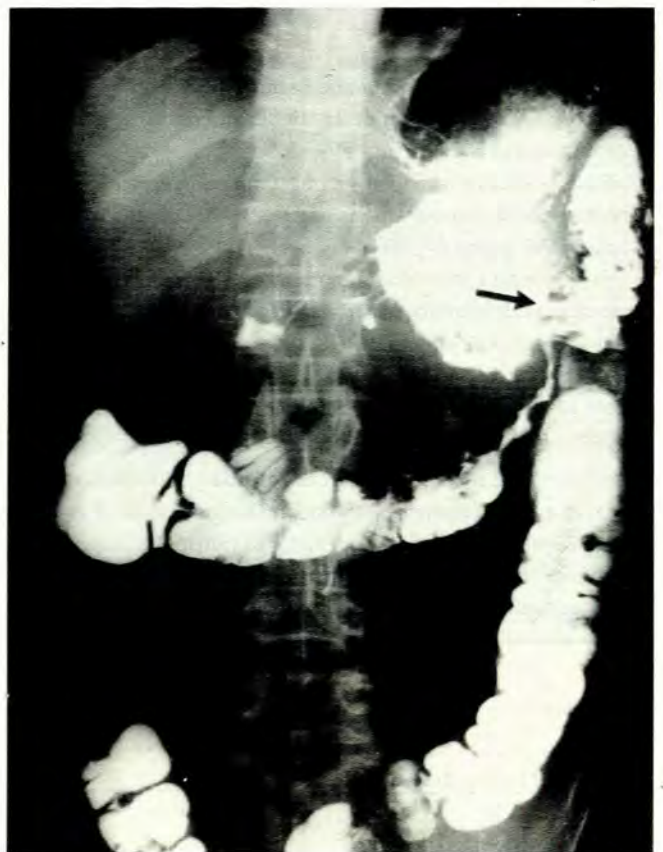


Fig. 1. Barium enema examination demonstrating gastrocolic fistula (arrow).



in 2 out of 3 patients. Patients in group A underwent surgery primarily at the discretion of the attendant surgeon. A partial gastrectomy with a Billroth I gastroduodenotomy and segmental colonic resection with primary anastomosis were performed on all group A patients. All these patients had a successful outcome with no recurrence of the fistula during the mean follow-up period of 8 weeks (range 6 - 104 weeks).

The admission nutritional parameters of the two groups are outlined in Table IV. Student's unpaired *t*-test was used to compare the groups. The non-parametric Wilcoxon 2-sample test was used to confirm the results because of the small numbers involved. Group B patients received TPN and a H₂ antagonist for a mean period of 16 days (range 7 - 32 days). One patient died as a result of catheter-related sepsis after 18 days on TPN. Three patients who refused surgery had spontaneous closure of their fistula. This was confirmed on endoscopy and barium enema examination at days 11, 19 and 21 respectively. The remaining 2 patients underwent elective surgery after satisfactory nutritional repletion. Intra-operative inspection revealed closure of the fistula. Partial gastrectomy with a Billroth I reconstruction in 1 patient and a Billroth II anastomosis in the other patient was performed. No recurrences were noted in the mean follow-up period of 7.2 weeks (range 6 - 101 weeks). In all patients histological confirmation of the benign nature of the lesion was obtained either by endoscopic biopsy or by histology of the resected specimen.

DISCUSSION

The anatomical proximity of the stomach and colon readily predisposes a benign gastric ulcer to fistulate between these structures. While benign gastric ulcers may penetrate adjacent structures, it is the gastrocolic fistula that presents deceptively, often resulting in a parlous nutritional state. Gastrocolic fistula may complicate a carcinoma of the colon or stomach, a factor that necessitates the use of endoscopy and biopsy if conservative management is recommended. Other benign

conditions associated with gastrocolic fistula include radiation therapy, trauma, colonic diverticulosis, pancreatic pseudocysts and previous gastric surgery.^{2,3,8-11} Some 150 years before Billroth's first gastrectomy, Haller documented the presence of a gastrocolic fistula in association with abdominal cancer.² The first reported case in the English literature of a gastrocolic fistula complicating a benign gastric ulcer was documented in 1920.¹² Since then sporadic reports have accounted for 111 cases.^{2,13-17} It is apparent from these reports that with the earlier detection of gastric and colonic malignancies, and the improved techniques of gastric surgery, benign gastric ulcer is today an important cause of gastrocolic fistula.

The clinical features of gastrocolic fistula are well known. Diarrhoea and weight loss are common presenting symptoms, together with faeculent vomiting and epigastric pain. Haematemesis, which occurred in 1 of our patients, is a less common occurrence (reported in 30% of patients), and perforation is rare (3 reported cases).^{13,18,19} Absence of previous history of peptic ulcer disease does not exclude this diagnosis. This survey includes a higher proportion of male patients (male/female ratio = 2:1), which is in contrast with the findings of Soybel *et al.*,³ who reported a ratio of 1:2 (30 cases). Karakousis and Greenberg²⁰ reported an equal male/female distribution (50 cases). The overall ratio reported in the literature is 1:1.3. NSAIDs have often been quoted as a significant finding in patients with peptic ulcers;^{2,11,18} use of these drugs has been identified as an important factor in the pathogenesis of gastrocolic fistula in such patients.^{2,8} The low incidence of NSAID use and the different population reviewed in our study may account for the high male preponderance.

The superiority of barium enema over barium meal examination in making the diagnosis of gastrocolic fistula has been noted previously.²¹ Gastroduodenoscopy or colonoscopy with biopsy should be performed in all cases to exclude malignancy. In 1 of our patients, colonoscopy was used before gastroduodenoscopy because diarrhoea was the predominant symptom. In the 3 cases managed conservatively, colonoscopy

Table IV. Nutritional parameters of all patients

Parameter measured	Group A (N = 8)	P-value*	Group B (N = 6)		Overall mean (range)
			Pre TPN	Post TPN	
Weight (kg)	52	0.25	44	48	48 (32 - 78)
Height (m)	1.68	0.06	1.6	1.6	1.64 (1.5 - 1.8)
Haemoglobin (g/dl)	9.4	0.74	9	11.5	9.2 (4 - 12.2)
Sodium (mmol/l)	124	1.00	124	138	124 (119 - 141)
Potassium (mmol/l)	2.7	0.66	2.9	4.8	2.8 (2 - 4.9)
Urea (mmol/l)	7.2	0.11	9.3	4.6	8.1 (5.1 - 14.5)
Creatinine (mmol/l)	89	0.87	91	110	92 (76 - 135)
Albumin (g/dl)	26	0.02†	20	28	23 (15 - 32)
Bilirubin (mmol/l)	12	0.16	14	24	17 (14 - 21)
Nae/Ke ratio‡	3.5	N/A	4.6	3.8	4.1 (1.8 - 5.5)

* Unpaired Student's *t*-test. † Statistically significant. ‡ Nine patients only (3 in group A and 6 in group B).

Table V. Conservative treatment of gastrocolic fistulas — reported cases

Author	N	Healed with
Tan <i>et al.</i> ⁴	1	TPN + cimetidine
Strang <i>et al.</i> ⁶	1	TPN + carbenoxolone
Ekbom and Liedberg ²²	2	Cimetidine
Rivera ²³	1	No treatment
Morgan and Kapila ²⁴	1	Cimetidine
Al Jurf and Jochimsen ²⁵	1	Cimetidine
This study	5	TPN + H ₂ antagonist



was also performed for the reasons outlined above.

Since the original description of this condition a variety of management protocols have been described. These include resection of the fistula only, definitive ulcer surgery with *en bloc* resection, and medical management.^{2,4,6,8,11,20} The relative rarity of this condition has precluded the establishment of an optimal management protocol. However, *en bloc* resection of the fistula with primary gastro-intestinal reconstruction is currently widely accepted.² This surgical approach has provided us with excellent results. Patients in group A had no mortality and no recurrences were noted. Resection of the fistula without a definitive ulcer operation has been reported to result in a high recurrence rate.^{6,22}

Healing of gastrocolic fistulas using conservative treatment has been reported sporadically.^{6,7,22-24} One patient was reported to have healed on no treatment,²³ 4 on cimetidine alone,^{22,24,25} 1 on TPN and carbenoxolone,⁶ and 1 on TPN and cimetidine (Table V).⁴ It has been reported that those patients receiving TPN healed more quickly than those on medical treatment alone.^{4,6,22-25} This study more than doubles the number of reported cases where TPN was used as primary therapy (Table III). Five of our patients healed on TPN and H₂ antagonists. In 2 of these patients healing of the fistula was confirmed at subsequent surgery. In the remaining 3 patients who refused surgery, healing was confirmed radiologically and endoscopically.

Although surgery has become the mainstay of management, any nutritional support in these invariably nutritionally depleted patients is of paramount importance. Atwater *et al.*⁵ recognised the severe underlying nutritional abnormalities in up to 50% of patients with gastrocolic and gastrojejunal fistulas. This was re-emphasised by Macfadyen and colleagues.⁷ This study reaffirms the impaired nutritional reserves (low weight, low albumin and low haemoglobin) in these patients. In addition, protein-calorie malnutrition was confirmed in all 9 patients in whom bio-electrical impedance analysis of body composition was performed. These patients had a Nae/Ke ratio of > 2. Pre-operative correction of nutritional abnormalities is likely to be beneficial given the extensive nature of the operative procedure.² Nutritional support in these malnourished patients improves their wound-healing potential and promotes healing of the underlying peptic ulceration when used in conjunction with anti-ulcer therapy. Nutritional support in the form of TPN for a period of at least 14 days, rather than enteral nutrition, is recommended for patients with a Nae/Ke ratio of > 2 on bio-electric impedance analysis, or patients with rank C on Subjective Global Assessment of Nutritional Status (severe loss of subcutaneous tissue, muscle wasting, oedema and ongoing weight loss).²⁶ TPN affords effective gastric rest and a relatively rapid repletion of the nutritional deficit. TPN does have profound side-effects, the most devastating of which is catheter-related sepsis, which accounted for the only mortality in this study. It is appropriate, then, that all patients with gastrocolic fistula be managed in a dedicated nutritional unit with close liaison between the surgeon and a nutritional team. All patients should undergo

surgery, even if closure of the fistula is demonstrated, because recurrent gastrocolic fistulation has been documented.² Furthermore, resectional surgery affords the most conclusive evidence of the nature of the underlying pathology.

CONCLUSIONS

Gastrocolic fistula as a complication of benign gastric ulcers is an uncommon condition and should be suspected if a patient complains of diarrhoea, weight loss and faeculent vomiting. It is possible that a number of patients with gastrocolic fistula heal on anti-ulcer treatment without the diagnosis ever having been established. Once the diagnosis is made, nutritional repletion should be part of the pre-operative work-up. In the well patient, *en bloc* resection with gastroduodenal and primary colonic anastomosis is recommended. In patients who refuse or are unfit for surgery, TPN with an anti-ulcer drug provides acceptable rapid results. With recent refinements in enteral feeding techniques, naso-enteral jejunal tube feeding may be an attractive alternative. However, it is imperative that underlying gastric or colonic malignancy be excluded if conservative treatment is contemplated.

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Accepted 1 May 1998.