Small bowel enterocutaneous fistulae: the merits of early surgery

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Abstract

Background The treatment of patients with small bowel enterocutaneous fistulas is complex and a challenge for every surgeon. The mortality and morbidity associated with only conservative management is often high and expensive because most patients cannot afford prolonged parenteral nutrition which itself carries a high incidence of complications. Although operations are difficult if performed early they may be lifesaving in our situation. The focus of our study was to determine whether, in patients with fistulae, early intervention resulted in low mortality and morbidity rates and to identify prognostic factors for fistula closure and mortality.

Patients and methods Between August 1996 and July 2008 we treated 64 consecutive patients with small bowel enterocutaneous fistulae. There were 28 females and 36 males patients who had a mean age of 42.4 years. 49 (77%) of the fistulae resulted from surgical complications. Our policy was to intervene early once the patient was fit for a procedure.

Results In 4 patients (6.2%) the fistulae arose from the jejunum and in the remaining 94% from the ileum. Octreotide was administered in 49 (77%) patients. To maintain the nu-

trition of the patients enteral feeding was used in 47 (73%) while re-feeding of the proximal gut fistula output into the distal stoma was used in 7 patients. Spontaneous closure occurred in 10 patients (16%). There were 9 deaths (14%). Fifty-two patients (81%) required surgical intervention at some stage. A strong relationship was found between their preoperative albumin levels and mortality.

Conclusion Aggressive early surgical treatment with the judicious use of nutritional support, stoma care, octreotide, and control of sepsis results in a low mortality in patients with small intestinal fistulae. Preoperative hypoalbuminaemia is an important prognostic variable.

Keywords Enterocutaneous fistula · Early surgery · Octreotide · Abdominal sepsis

Introduction

The management of enterocutaneous fistulae is associated with a high morbidity and mortality, primarily due to inadequate nutrition, sepsis, fluid and electrolyte disturbance and skin digestion [1] and poses a major challenge to every surgeon.

The most common cause of a fistula in India is a surgical mishap followed by blunt and penetrating trauma [2]. Occasionally fistulae can occur spontaneously from intra-abdominal conditions like Crohn's disease, tuberculosis, strangulated hernia, empyema of the gall bladder or extension of intestinal malignancy.

Since the major report in 1960, [3] reporting a mortality rate of 44%, much energy has been invested in optimising the treatment of patients with enterocutaneous fistulae. In the second half of the last century the mortality in reputed centres decreased to 5%–25% [4–7] because of improved surgical, metabolic, and medical care. At present, the treatment of patients with an abdominal wall defect in which a

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fistula develops in the exposed intestine is probably the biggest challenge [8]. The few retrospective studies available in the literature concerning these patients are either incomplete or only describe small numbers [9–14].

As a general rule, the more proximally the fistula is situated in the digestive tract, the greater the fistula output will be [15]. High output enterocutaneous fistulae are more likely to be associated with malnutrition, sepsis, fluid and electrolyte disturbances and a lower incidence of spontaneous closure. Spontaneous closure is dependent on a number of factors which include anatomical site, presence of intercurrent disease and whether or not the fistula tract is simple or complex (i.e. if there are associated abscesses or multiple tracts). Spontaneous closure is less common in fistulae caused by malignancy or Crohn's disease [16–17] but is more likely seen in colonic fistulae, those with a low-output [17–20], and in patients who have a closed abdomen [21].

Expectant treatment consisting of octreotide, total parenteral nutrition and antibiotics waiting for spontaneous closure is associated with high costs, a high mortality and prolonged morbidity [21]. We believe that, in our country, there is a need to abandon expectant lines of management for a more aggressive surgical approach once the fluid and electrolyte disturbance and sepsis have been corrected.

The aim of the present study was to audit the results of an aggressive approach in patients with enterocutaneous fistulae, to identify the time of convalescence prior to restorative surgery and to identify prognostic factors for fistula closure and mortality.

Patients and methods

Patients

We retrospectively studied (from a prospectively maintained database) 64 consecutive patients with enterocutaneous fistulae from the small intestine who were admitted to our unit in the Sir Ganga Ram Hospital, New Delhi between August 1996 and July 2008.

We excluded patients with salivary, colonic, pancreatic, biliary and perianal fistulae. Recurrence was defined as a renewed connection between the intestine and skin after the fistula had either been surgically removed or had closed spontaneously. An abdominal wall defect is defined as any defect of all layers of the abdominal wall leaving the abdominal contents exposed.

Methods

We followed the following treatment guidelines:

1. *Resuscitation with fluid and electrolytes* Aggressive resuscitation with fluid and electrolytes in the first 48 hours.

2. *Control of sepsis* Control of sepsis carried the highest priority. The suspicion of a septic focus was based on one or more clinical signs: fever, failure to respond to nutrition, and jaundice, accompanied with increased infection parameters, decreased plasma albumin levels, positive fluid balance, development of oedema, and organ failure. When clinical signs indicated the presence of a septic focus, enteral and intravenous contrast-enhanced CT was used to identify and outline abscesses and to guide percutaneous drainage or local surgical drainage procedures.
3. *Optimisation of the nutritional state* Nutritional management was always preceded by rehydration and electrolyte correction. Enteral nutrition was always the first option in cases of small bowel fistulae when the fistula output did not interfere with wound care. Patients were allowed to drink up to 500 ml of clear fluids per day.
4. *Wound care* Stoma care apparatus was applied to the fistula opening to protect the skin from maceration and excoriation by the effluent and to provide an accurate measurement of the daily fistula output.
5. *Anatomy* The anatomy of the fistula was defined prior to planned surgery. We used fistulography and a gastrografen contrast study to define the site of the fistula and ultrasound and computerised tomography of the abdomen to localise intra-abdominal abscesses.
6. *Timing of surgery* Patients were eligible for surgery when septic foci had been adequately treated.
7. *Surgical strategy* Once the patient's condition stabilised, one of the following surgical procedures was undertaken:
 - (a) Laparotomy, drainage and feeding jejunostomy for leaks from the duodenum
 - (b) Laparotomy, exteriorisation of fistula and feeding jejunostomy for jejunum leaks
 - (c) Laparotomy, ileostomy and mucus fistula for ileal injuries
 - (d) Excision of fistula, end to end anastomosis if circumstances were favourable e.g. a clean abdomen in a well nourished patient.

Octreotide was used in a dose of 100 micrograms eight hourly subcutaneously for a period of 14 days in all cases of high output fistulae, to decrease the fistula output and to correct fluid, electrolyte and nutritional disturbances. Octreotide was used both before and after the initial surgery.

Results

Patient characteristics

Data from 64 patients of small bowel enterocutaneous fistulae are provided in Table 1. Their mean age was 42 years

(range 17–75 years). Postoperative fistules after initial surgery appeared after a median of 7 days (range 1–29 days). The median length of hospital stay was 16.5 days (range 5–86 days).

Infectious complications and nutritional management

A total of 50 patients experienced one or more septic episodes. In this group 5 patients had radiological signs of small or superficial collections and were treated with antibiotics alone. Computerised tomography-guided drainage of abscesses was necessary in 4 patients, none of whom required further intervention. A drainage procedure was attempted in one patient but was technically impossible.

Total parenteral nutrition alone was only used in 1 patient. Sixteen patients received enteral nutrition in combination with parenteral feeding, and 47 patients received total enteral nutrition through a feeding jejunostomy or orally without compromising wound care. Seven patients

with jejunal fistulae were refed the fistula effluent into the jejunostomy.

Patient outcome

Fistula closure was achieved in 53 patients, giving an overall success rate of 83%. Spontaneous closure occurred in 12 patients (19%) and surgical closure was achieved in 41 patients (64%) (Table 2). The median time between fistula development and spontaneous closure was 13 days (range 5–49 days). Surgical intervention was performed after a median period of 15 days (range 3–34 days) from the occurrence of the fistula. The overall success of surgical treatment was 64%, and the mortality rate was 14% (9 patients). Of the 9 patients who died, 1 patient died of non-fistula-related cause i.e. cancer and sepsis was the cause of death in the remaining 8 patients, resulting in a fistula related mortality of 12.5%.

Failure in successful surgical closure was associated with the presence of sepsis ($p=0.037$) and a preoperative albumin level below 3.0 g/dl ($p=0.046$). Mortality was higher in patients receiving combined enteral and parenteral nutrition ($p=0.032$), with foregut fistulae ($p=0.007$), with high output fistulas ($p=0.048$) and a preoperative albumin level below 3.0 g/dl ($p=0.041$). Mortality was also higher in patients younger than 60 years, of female sex, and sepsis but the differences were not statistically significant ($p>0.05$). (Table 3).

It was seen that early surgical intervention with exteriorisation of bowel before 3 weeks of occurrence lead to better fistula closure rates as compared to intervention after three weeks ($p=0.049$).

Discussion

Our experience shows that adherence to a strict treatment guideline for patients with small bowel enterocutaneous fistulae results in a good outcome with a relatively short period of convalescence.

The relatively low overall mortality rate of 14.1% in the present study compares favourably with rates of 15–35% reported in the literature [9–13]. Mortality was related to sepsis, age, sex, fistula output and preoperative albumin

Table 1 Patient characteristics of the total population and of patients with an open abdominal wall

Patients	64	100
Age (years)		
< 60	50	78.1
≥ 60	14	21.9
Sex		
Male	36	56.2
Female	28	43.8
Aetiology		
Tuberculosis	6	9.4
IBD	5	7.8
Radiation	3	4.7
Malignancy	1	1.6
Surgical	49	76.5
Output (ml/day)		
< 500	14	21.9
≥ 500	49	76.6
Site of fistula		
Foregut	4	6.2
Midgut	60	93.8
Time of exteriorisation		
< 3 weeks	41	64.1
≥ 3 weeks	11	17.2
Sepsis		
Yes	50	78.1
No	14	21.9
Preoperative albumin (g/l)		Total population
< 30		36
30		28

Table 2 Outcome of treatment in the total population and specified for abdominal wall status

	Total population (n = 64)	
	Number	%
Closure	53	82.8
Spontaneous	12	18.7
Surgical	41	64.1
Success of surgery	41/52	78.8
Mortality	9	14.1

Table 3 Analysis of outcome

Variable	Spontaneous closure	Surgical intervention		Mortality	
	Ratio	Ratio	p value	Ratio	p value
Age (yrs)					0.310
< 60	11/50	39/ 50		7/50	
≥ 60	1/14	13/14		2/14	
Sex			0.070		0.610
Male	4/36	32/36		4/36	
Female	8/28	20/28		5/28	
Output (ml/day)			0.538		0.0484
< 500	2/14	12/14		1/14	
≥ 500	9/49	40/49		8/49	
Sepsis			0.037		0.091
Yes	12/50	38/50		8/50	
No	0/14	14/14		1/14	
Nutrition			0.281		0.032
Parenteral	0/1	1/1		1/1	
Enteral	11/47	36/47		4/47	
Both	1/16	15/16		4/46	
Site of fistula			0.426		0.007
Foregut	0/4	4/4		3/4	
Midgut	12/60	48/60		6/60	
Preoperative albumin (g/dl)			0.046		0.041
< 3.0	5/36	31/36		7/36	
≥ 3.0	7/28	21/28		2/28	

levels. Multi-organ failure caused by sepsis is still the main cause of death in spite of advanced medical treatment.

We used octreotide in all cases of high output fistulae and found a significant reduction in the fistula output within the first 48 hours. Significant reduction in fistula output after octreotide has also been reported by Paran et al, Sleth et al, and Kocak et al [26–28]. Although somatostatin effectively reduces the fistula output, the rate of spontaneous closure is not changed [29–30].

With conservative medical management spontaneous closure of fistula occurs in about 19% patients within 5–49 days. It must be noted that these results were seen in those favourable group of patients who had low output fistula, no organic disease, no abscess cavity etc, and were thus, subjected to conservative treatment.

However in the high risk group who have a fistula output of more than 400 ml per day and are also socially disadvantaged at not being able to afford prolonged conservative treatment with parenteral nutrition (which has its own attendant complications) we have demonstrated that early surgery is associated with acceptable results which match the western experience.

Conclusion

The main lesson to be learned from this study is that adherence to standardised guidelines including early surgery can result in good patient outcomes. We advocate phased treatment, with the initial emphasis on the treatment of septic foci, aiming to improve the patient's condition. Surgical repair is performed when the patient is stable. Rather than following a prolonged conservative line of management, hoping for spontaneous closure, we feel that in India surgery at earliest possible time will lead to morbidity, mortality and fistula closure rates which are comparable with western countries.

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