The Challenge of Enterocutaneous Fistulae

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Abstract

During a period of six years, 17 cases of enterocutaneous fistulae arising from the small intestine were managed. Majority of the fistulae, (76%) resulted from surgical complications. There were 6 females and 11 male patients. The mean age of the patients was 40 years. In 9/17 patients (52%) the fistulae arose from the proximal small gut (duodenum and jejunum) and in the remaining 48% from the ileum. Octreotide was used in 11/17 patients (64%). Enteral nutrition was used in 9/17 patients (52%) while re-feed from the proximal gut fistulae was used in 4/9 patients (44%) to maintain the nutrition of the patients. Only one fistula (6%) closed spontaneously. There were 2 deaths (12%) in this study. 14/17 patients (82%) required surgical intervention at some stage for successful closure of intestinal fistula. Aggressive surgical treatment with judicious use of octreotide, nutritional support, stoma care and control of sepsis significantly improves the outcome of small intestinal fistulae.

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Key Words : Enterocutaneous; Fistula; Nutrition; Octreotide

Introduction

Management of small intestinal fistulae is associated with high morbidity and mortality, primarily due to inadequate nutrition, sepsis, fluid and electrolyte disturbance and skin digestion [1]. Treatment even if successful, may require prolonged hospitalization.

The spectrum of aetiology is changing from the once common, spontaneous extension of intra-abdominal disease in the form of strangulated hernia, empyema gall bladder or extension of intestinal malignancy [2]. In our country these are seen only rarely and the single most common cause is a fistula following a surgical operation, followed by blunt and penetrating trauma [3]. As a general rule, the more proximal in the digestive tract, the greater the fistula output will be [4]. High output enterocutaneous fistulas 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 inter current disease and whether or not the fistula tract is simple or complex (i.e. if there is associated abscesses or multiple tracts). Expectant treatment for spontaneous closure is associated with high mortality and prolonged morbidity [5]. There is a need for abandoning the expectant line of management for more aggressive surgical approach once the patients' nutritional problems, fluid and electrolyte disturbance and sepsis have been tackled by selective use of octreotide, total parenteral nutrition (TPN) / enteral nutrition (EN) and antibiotics. A different strategy is needed for tackling the proximal

and distal small bowel fistulas, the difference arising primarily due to the fistula output and the availability of the proximal bowel for EN. In this prospective study, 17 cases of small intestinal fistulas treated with the above approach are presented.

Material & Methods

Between Apr 95 and Apr 2001, 17 patients with small intestine-cutaneous fistulas were treated by the author. The initial management was along the principles defined by Shelton et al [6]. Patients were aggressively resuscitated with fluid and electrolytes in the first 48 hours. Simultaneously, a stoma care apparatus was applied to the fistula opening to protect the skin from the effluent and to give an accurate measurement of the daily fistula output. Plan for nutritional support was also decided. Whenever possible, the gut was utilized for maintenance of nutrition. We used fistulography and barium study to define the anatomical site of the fistula and ultra sound (US) and computerized tomography of the abdomen (CT) to localize intra abdominal abscesses. Patients found to have intra abdominal abscess were treated by US guided aspiration and / or open surgical drainage. Once the patients condition stabilized, one of the following surgical procedures was undertaken :

- (a) laparotomy, drainage and feeding jejunostomy for leaks from duodenum,
- (b) laparotomy, exteriorisation of fistula and feeding jejunostomy for leaks from jejunum,
- (c) laparotomy, ileostomy and mucus fistula for ileal injuries and
- (d) excision of fistula, end to end anastomosis with removal of foreign body.

Octreotide was used in a dose of 100 micro gram eight

hourly subcutaneous for a maximum period of 14 days in all cases of high output fistula, to decrease the fistula output and to correct fluid, electrolyte and nutritional disturbances. Octreotide was used both before and after the initial surgery, as per the demands of a given situation. After a period of four weeks once sepsis and nutrition had been tackled, definitive closure of the exteriorized gut was done.

Results

17 cases of enterocutaneous fistulas were treated over a period of six years from April 95 to April 2001. There were 6 females and 11 male patients with a mean age of 40 years (range 19-65). The aetiology and location of the fistula is given in Table 1.

The mean fistula output was 650ml/day (range 150-1200ml/day). 11/17 patients (64%) had high output fistula (> 500ml/day). In this high output fistula group the mean output was 750ml/day (range 650-1200ml/day). In this group 48 hours after starting octreotide the fistula output decreased to a mean 120ml/day (range 50-200ml/day).

Significant intra abdominal collection was detected in 4/17 cases (23%), using US/CT scan study of the abdomen. All 4 cases were successfully treated by repeated US guided aspiration of the collections. The volume of pus aspirated per sitting was mean 106ml (range 40 -240ml). Number of sittings was mean 2.25 (range 1-3). The dominant organism was *Klebsiella* in two patients and *Pseudomonas* in the other two.

Fistulogram and / or barium study was done in 5/17 patients (29%) to find the location of the fistula. However, only in 2/5 cases (40%) the contrast study could convincingly show the location of the fistula.

In this study all 17 patients were given nutritional support either in the form of TPN or EN. 9/17 patients (53%) were given TPN for a maximum period of 14 days. 10/17 patients (59%) including 2 patients, who were initially given TPN,

were given EN either orally or through the feeding jejunostomy. In addition, 4/6 patients (66%) with jejunal fistula were given re-feed of the fistula effluent into the jejunostomy.

There were two deaths (12%) in this study. One of these patients developed a jejunal fistula due to erosion by tube drain after Whipples procedure and died seven days after the onset of fistula due to uncontrolled sepsis. The other patient who died had developed a fistula due to a missed small gut injury while separating adhesions for intestinal obstruction and died 15 days after the onset of fistula due to septicaemia. One fistula (6%) closed spontaneously with conservative treatment. In the remaining 14 patients (83%), the fistula was successfully closed with surgical intervention. Of these, only 4 patients required one procedure, while the remaining 10 patients required a second procedure for the final closure of the fistula. Operative procedures done in this study are given in Table 2.

Discussion

Enterocutaneous fistulas present a challenge to the combined surgical and medical management. Morbidity and mortality associated with fistulae are still considerable and the current treatment even if successful, may require prolonged hospitalization [1]. Seventeen cases of small intestine cutaneous fistulas were treated in this study. 'Surgical misadventure' or 'post operative' was the commonest cause, accounting for 76% of the cases, the remaining 24% were due to abdominal trauma. Leaking anastomosis was responsible for fistula formation in 5 cases, while missed small gut injury at laparotomy, leading to enterocutaneous fistula accounted for 4 cases. In a large series of 114 cases of gastrointestinal fistulae 51% resulted from surgical complications of which almost half were due to unrecognized intestinal injury [5]. In the same series,

Table 1
Aetiology and location of small intestinal fistulas

Age/Sex	Location	Broad aetiology	Exact cause
29/M	Jejunum	Blunt abdominal trauma	Missed injury at first laparotomy
19/F	Duodenum	Post Operative	Leaking duodenojejunostomy
38/M	Jejunum	Post Operative	Leaking jejunal anastomosis
56/F	Ileum	Post Operative	Leaking stricturoplasty for tuberculosis
32/F	Ileum	Post Operative	Ileal perforation during D & C
32/M	Duodenum	Blunt abdominal trauma	Leak from primary duodenal repair
64/M	Ileum	Post Operative	Missed ileal injury during surgery for burst abdomen
36/M	Jejunum	Post Operative	Prolene mesh eroding into jejunum
42/M	Jejunum	Penetrating injury abdomen	Missed injury at first laparotomy
68/M	Ileum	Post Operative	Post radiation for Ca Prostate; leak from ileal anastomosis
24/F	Ileum	Post Operative	Ileal perforation during D & C
36/M	Ileum	Post Operative	Leaking stricturoplasty for tuberculosis
26/F	Duodenum	Post Operative	Leaking duodenotomy done to retrieve stuck dormia
52/M	Jejunum	Post Operative	Erosion by tube drain after Whipple's
60/M	Ileum	Post Operative	Leaking ileo-transverse anastomosis after right hemicolectomy
26/F	Jejunum	Penetrating injury abdomen	Leaking jejunal anastomosis
40/M	Ileum	Post Operative	Missed injury during surgery for obstruction due to adhesions

Table 2**Operative procedures done**

Time gap between fistula & operation	Initial operation	Time gap between 1 st & 2 nd operation	Final operation
4 days	EF, FJ	30 days	EEA of jejunum spontaneous closure on day 6
3 days	EF, FJ	27 days	EEA of jejunum
6 days	I & MF	33 days	right hemicolectomy
17 days	I & MF	30 days	EEA of ileum
13 days	Closure of duodenum over T-tube, FJ	-	-
16 days	EEA of ileum	-	-
69 days	Removal of mesh, EEA of jejunum	-	-
5 days	EF, FJ	28 days	EEA of jejunum
4 days	I & MF	43 days	SSA of ileum
23 days	I & MF, right hemicolectomy	31 days	Ileo transverse Anastomosis
5 days	I & MF	29 days	EEA of ileum
3 days	Drainage, FJ	-	-
2 days	EJ, FJ	-	Died after 5 days
4 days	I & MF	31 days	EEA of ileum
3 days	EF, FJ	31 days	EEA of jejunum
2 days	Nil	-	Died after 15 days

EF - exteriorisation of fistula, FJ - feeding jejunostomy, EEA - end to end anastomosis, I & MF - ileostomy and mucus fistula, SSA - side to side anastomosis

inflammatory bowel disease caused 30% of all fistulas, Crohn's being the commonest cause. In this series there was no case of Crohn's but there were 2 cases of breakdown of stricturoplasty done for tuberculosis strictures.

Fistulography and barium study as a modality of investigation to find the location of fistula and presence of distal obstruction was used in 5 cases in this study. Only in 2 out of 5 cases was fistulography able to define the location of the fistula and in these patients too, it did not contribute to the overall management of the patient. This is in contrast to the time old teaching of using these studies in the management of enterocutaneous fistulas [3]. We found US and CT scan of the abdomen useful in detecting intra abdominal abscesses and US guided aspiration of the abscess an effective modality of treatment.

Nutritional support has gained a central role in the management of enterocutaneous fistulas. To optimize nutrient metabolism, circulation and tissue oxygenation must be adequate [7]. After initial resuscitation, prompt initiation of nutritional support is crucial. The breakdown of lean body mass is relentless and sufficiently rapid, so that each day the patient suffers septic starvation, significant deficits are compounded [8]. In our study, nutritional support was instituted the moment fistula was

identified. It was also our aim to use the gut for nutrition whenever possible. In proximal small intestine fistula, we used the re-feed technique in 4 patients, thereby obviating the need of prolonged TPN.

The need to decrease the fistula output, particularly in high output fistulas, is felt by one and all, to help in nutritional and fluid and electrolyte management in the initial phase and in non surgical closure of fistulas in the long run [9,10]. Octreotide, a synthetic analogue of somatostatin, inhibits the release of practically all known gut hormones and decreases splanchnic and portal flow, thereby decreasing the fistula output [11,12]. We used octreotide in all cases of high output fistulas and found a significant reduction in the fistula output within the first 48 hours. However, except for one fistula that closed spontaneously after six days of octreotide, all other patients required a surgical procedure to close the fistula. Significant reduction in fistula output after octreotide has been reported by Paran et al, Sleth et al, and Kocak et al [13-15]. Although somatostatin effectively reduces the fistula output, the rate of spontaneous closure is not modified [16,17].

With conservative medical management including TPN, spontaneous closure of fistula occurs in about 24% patients within 27-39 days, with a mortality of around 29% [18]. 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. We used an aggressive protocol in which surgical intervention was done after a maximum period of 14 days of conservative treatment. We differentiated proximal small gut fistula from distal small gut fistula in the type of surgery done and the method of nutritional support used. In our study, the mean fistula closure time was 26 days for all types of fistulae (favourable and unfavourable), with a mortality of 12%.

Small intestine cutaneous fistulas are a challenging problem. Majority of them are an end result of postoperative complications. Contrast studies do not contribute significantly to the ultimate outcome of the patient. Rather than following a conservative line of management, hoping for spontaneous closure of fistula, we feel staged surgery at appropriate time will lead to lesser morbidity and mortality with a higher fistula closure rate.

References

1. Martineau P, Shwed JA, Denis R. Is Octerotide a new hope for enterocutaneous and external pancreatic fistula closure? *Am J Surg* 1996;172:386-95.
2. Fischer JE. The pathophysiology of enterocutaneous fistulas. *World J Surg* 1983;7:446-50.
3. Sachdev A, Agarwal A, Chowdhary A. Management of

- enterocutaneous fistula. In: Chattopadhyay TK, editor. *GI Surgery Annual*, 1994;1:65-84.
4. Rubelowsky J, Machiedo GW. Reoperative versus conservative management for gastrointestinal fistulas. *Surg Clin North Am* 1991;71(1):147-57.
 5. Rose D, Yarborough MF, Canizaro PC, Lowry SF. One hundred and fourteen fistulas of the gastrointestinal tract treated with parenteral nutrition. *Surg Gynae Obstet* 1986;163:345-50.
 6. Sheldon CF, Gardiner BN, Way LW. Management of gastrointestinal fistulas. *Surg Gynae Obstet* 1971;133:385-90.
 7. Fischer JE. Enterocutaneous fistula. In: Norton LW, Eiseman B, editors. *Surgical decision making*, 2nd ed. Philadelphia, PA; WB Saunders, 1985:146-7.
 8. Christou NV, Tellado-Rodriguez J, Chartland L. Estimating mortality risks in preoperative patients using immunologic, nutritional and acute phase response variables. *Ann Surg* 1989;210:69-77.
 9. Ottery FD. Nutritional consequences of reoperative surgery for recurrent malignancy. *Semin Oncol* 1993;20:528-37.
 10. Spiliotis J, Briand D, Gouttebel MC. Treatment of fistulas of the gastrointestinal tract with total parenteral nutrition and octreotide in patients with carcinoma. *Surg Gynecol Obstet* 1993;176:575-80.
 11. Reichein S. Somatostatin. *N Engl J Med* 1983;309:1556-63.
 12. Chaudhry R, Singh B, Subhas P. Octreotide in gastroenterology. *MJAFI* 1997;53:293-4.
 13. Paran H, Neufeld D, Kaplan O, Klausner J, Freund U. Octreotide for the treatment of postoperative alimentary tract fistulas. *World J Surg* 1995;19(3):430-34.
 14. Sleth JC, Andraos Y, Borie F, Dumay R, Legroux P. Value of octreotide in the treatment of postoperative enterocutaneous fistulas. *Ann Francaises d Anesthesie et de Reanimation* 1994;13(5):738-40.
 15. Kocak S, Bumin S, Karayalcin K, Alacayir I, Aribal D. Treatment of external biliary, pancreatic and intestinal fistulas with a somatostatin analogue. *Dig Dis* 1994;12(1):62-8.
 16. Sitges-Serra A, Guirao X, Pereira JA, Nubiola P. Treatment of gastrointestinal fistulas with sandostatin. *Digestion* 1993;54(Suppl 1): 38-40.
 17. Hernandez-Aranda JC, Gappo-Chico B, Florse-Ramirez LA, Avalos-Haunte R, Magos-Vazquez FJ, Ramirez-Barba EJ. Treatment of enterocutaneous fistula with or without octreotide and parenteral nutrition. *Nutricion Hospitalaria* 1996;11(4):226-9.
 18. McIntyre PB, Ritchie JK, Hawley PR. Management of enterocutaneous fistulas: a review of 132 cases. *Br J Surg* 1984;71:292-6.

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