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Original Research Article

Outcome and management of postoperative enterocutaneous fistula

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ABSTRACT

Background: Approximately 75% of enterocutaneous fistula (ECF) occur following surgery. Due to the high morbidity and mortality associated with ECF, prompt and effective treatment is important. This study was conducted to study the outcome and management of patients with enterocutaneous fistula.
Methods: Total 40 patients developing the enterocutaneous fistula following surgery were included. All patients were treated either conservatively or operatively by various means and varying period of time. Treatment was focused on the correction of dehydration, controlling sepsis, management of electrolyte imbalance and nutritional support.
Results: Overall 40 patients were included in this observational study, comprising 26 were males and 14 were females. About 97.5% of ECF were postoperative. Ileum was found to be the most common site of ECF. Also, 42.5% of fistulas were high output and 57.5% were low output. Serum albumin levels correlated significantly with fistula healing and mortality. Surgical intervention was required in 37.5% of patients.
Conclusions: Conservative management with emphasis on improvement of nutrition, control of sepsis, management of fluid and electrolyte balance and control of fistula output is first line of management. Operative intervention must be done in selectively after cases after aggressive and targeted measures for improvement of nutritional status and control of infection.

Keywords: Enterocutaneous fistula, Nutritional support, Serum albumin, Sepsis

INTRODUCTION

The enterocutaneous fistula (ECF) is an abnormal communication between two epithelialized surfaces - intestinal tract and the skin. It is a depressing complication not only for patient but also the surgeon. Nearly 75% of all ECFs are the direct result of either laparoscopic or open surgery with an anastomotic leak. In contrast only 25% of all enterocutaneous fistula are secondary to inflammatory bowel disease, diverticular pathology, trauma, radiation and malignancy.[1] Inadvertent iatrogenic injuries during or unrecognized thermal injury sustained during surgery can end up as enterocutaneous fistula.[1,2] Enterocutaneous fistula is a very serious complications and is associated with high morbidity and mortality rates. Difficulty related to enterocutaneous fistula are sepsis, malnutrition, fluid and electrolyte disorders. Adequate nutrition, control of sepsis, fluid and electrolyte balance and skin protection are appear to be a crucial factors in survival whether or not the patient requires definitive surgery.[3] A treatment that could shorten fistula closure time would be highly beneficial and also causes considerable reduction in hospital cost. We come across this condition as a complication of routinely performed surgeries and outcome of management would depend upon the site of communication with the enterocutaneous tract as well as the general condition of the patient. Therefore, this study was conducted to study the outcome of management of ECF and factors influencing it.

METHODS

This prospective descriptive study comprised 40 patients presenting with entero-cutaneous fistula and treated during

the period February 2016 to April 2019 in single surgical unit of S.M.S. hospital, Jaipur. Patients that developed the condition following surgery in the hospital as well as those operated in other institutes were included. Patients with esophageal, biliary, pancreatic, perianal, internal fistula, and those who developed fistula spontaneously were excluded. Data was recorded in predesigned proforma. Details like anatomical location of fistula, etiology of fistula formation, fistula output and outcome of management were recorded. A fistula output of 500 ml/day was taken as the cut off between high and low output fistulas. In the study, patients were treated by various means either conservatively or operatively and for a varying period of time according to department protocol. Treatment was focused on the correction of dehydration, control of sepsis, management of electrolyte imbalance by appropriate fluid resuscitation, maintenance of proper nutrition and skin care. After stabilization of patient, fistula anatomy delineation and intra-abdominal abscess drainage (if present) was drained by radiology department. Decision was taken to keep patient on conservative treatment or to operate by consultant in command. Serum electrolyte, serum protein, blood sugar, liver function test and renal function test were repeated every 3 days. Hemoglobin repeated in every week. Measurement were conducted to access the nutritional and hemodynamic status of the patients as well as to know the response to treatment. To examine the statistical significance of association between attributes, Chi-square test and Fisher's exact test were used. The MedCalc Statistical Software version 14.8.1 was used. A probability value of less than 5% ($p<0.05$) was considered significant.

RESULTS

In our study total of 40 patients were included, of which 26 were males (65%) and 14 were females (35%) and the male: female ratio was 13:7. Most patients with ECF were aged 20-60 years (mean age, 39.23±2.72). Nine patients had large intestine fistula, which were colonic in origin exclusively and the remaining had small intestine fistula, divided as 20 ileal, 5 duodenal, and 6 jejunal in origin. There were 17 patients (42.5%) with high output fistula and 23 patients (57.5%) with low output fistula. Duodenal and jejunal fistulae accounted for 41.1% of high-output fistulae. Colonic fistula was more likely to have a low output ($p=0.05$) (Table 1). Mortality was significantly higher in patients with high-output fistula ($p=0.05$) (Table 2).

There was one case of intestinal tuberculosis. Anastomotic leak following resection of intestine and postoperative leak following modified graham's patch repair for peptic perforation accounted for half of the cases. The remaining cases included patients with intestinal perforation and intestinal obstruction. There were no cases of inflammatory bowel disease.

Complications citing skin excoriation, cellulitis, and intra-abdominal abscess were observed. Skin excoriation was seen in 18 of 40 patients (45%) with fistula. Ileum was the source of fistula in 50% of the cases with skin excoriation. Out of 17 patients (42.5%) with high-output fistula, 9 had this complication as compared to 8 of 23 patients (34.7%) with low-output fistula. The association between skin excoriation and fistula output was not statistically significant ($p=0.33$). Cellulitis was seen in three patients (7.5%). of 40 patients, 12 (30%) developed intra-abdominal abscess, for which percutaneous or open drainage was carried out. Seven of 23 patients (30.4%) in the low-output fistula group had intra-abdominal abscess as a complication as compared to five of 17 patients (29.4%) in the high-output group. The association between intra-abdominal abscess and fistula output was not significant. It was also found that the association between intra-abdominal abscess and mortality was not significant ($p=0.72$).

Total parenteral nutrition (TPN) was administered only in five patients. Parenteral nutrition supplemented enteral nutrition in five patients, while 30 patients were managed exclusively on enteral nutrition (EN). In cases of proximal ECFs, a feeding jejunostomy was done where feasible for supplementation by EN. In the EN group, 25 of 30 fistulae (83.3%) healed, while only two fistulae (40%) healed in the parenteral nutrition group. Mortality was lesser in patients receiving EN (20%) as compared to those on TPN (60%). This was, however, not statistically significant. ($p=0.06$).

The use of octreotide was not standardized but limited to patients with high-output proximal fistulae. Patients received octreotide subcutaneously at a dose of 100 µg every 8 hours. Eight of 11 patients (72.7%) who received Octreotide showed a reduction in fistula output as well as healing of fistula. Similarly, 24 of 29 patients (82.7%) who did not receive Octreotide injections showed healing of fistula. The association between the use of Octreotide and mortality was not significant (Table 2).

Anemia was defined as hemoglobin of less than 10 g%. Of the 40 patients, 18 (45%) had anemia and 22 (55%) were not anemic. There was no statistically significant association between anemia and healing of fistula (Table 2). Serum albumin was greater than 3.5 g% in 3 patients (10%), serum albumin level 2.5-3.5 g% in 24 patients (60%), and less than 2.5 g% in 12 patients (30%). Fistula healing was 100% in patients with serum albumin more than 3.5 g% and 100% in patients with serum albumin 2.5-3.5 g%. Of the total 12 patients with serum albumin, <2.5 g% fistula healed in only four patients (33.3%). All patients who died (n=8) had a serum albumin level less than 2.5 g%, and this was statistically significant (Table 2).

Of the 40 patients included in the study, 25 patients (62.5%) were managed conservatively, whereas 15 patients (37.5%) required surgical intervention. Resection of the fistulous segment was carried out with procedures such as primary anastomosis, re-anastomosis, enterostomy and laparostomy with sump drainage. Among the

surgically managed patients, three required multiple surgical interventions to close fistula.

Duration of hospital stay was in the range of 10-81 days (mean=30.2±1.7). Hospital stay was compared between high- output and low-output fistula patients. In the high-output fistula group, mean duration of hospital stay was 38.8±4.6 days as compared to 24.0±2.9 days in low-output fistula patients. This longer hospital stay in high-output fistula patients was statistically significant (p<0.001). In conservatively managed patients, mean duration of hospital stay was 25.5±2.8 days as compared to 35.3±6.1 days in operatively managed patients. Hospital stay in patients managed by surgical intervention was longer than conservatively managed patients.

Table 1: Comparison of small and large bowel fistula between patients with high and low output.

Output	Small bowel fistula	Large bowel fistula	P value
High output (n=17)	16	1	0.05
Low output (n=23)	15	8	

Table 2: Comparison of mortality between patients with different parameters (n=40).

Parameter	Healed	Died	P value
High output (n=17)	11	6	0.05
Low output (n=23)	21	2	
Enteral treatment (n=30)	25	5	0.06
Parenteral treatment (n=5)	2	3	
Octreotide used (n=11)	8	3	0.66
Octreotide not used (n=29)	24	5	
S. Albumin>3.5 g/dl (n=4)	4	0	<0.001
S. Albumin 2.5-3.5 g/dl (n=24)	24	0	
S. Albumin<2.5 g/dl (n=12)	4	8	
Anemia present (n=18)	13	5	0.42
Anemia absent (n=22)	19	3	

DISCUSSION

In Western countries, approximately 75%-85% of patients undergoing surgery of GI tract develop ECF as a complication. Spontaneous fistula accounted for the remaining 15%-25%. All cases, except one, in the present case series, developed an ECF following an operative procedure. In an earlier study held by Manisegaran et al, it was found that 88% of ECF occurred in the postoperative period.[4] The lesser incidence of inflammatory bowel diseases in this part of the world may account for this difference.

In the present study, 95% (all except, one case of abdominal tuberculosis and one from cautery burn in case of intestinal obstruction) of the patients developed fistula postoperatively due to leak from anastomosis site. The general procedures that were performed were intestinal resection with end-to-end anastomosis, or enterostomy closure following ileal perforation and gangrene gut. Reber et al. in their study found that ileum was the most frequent site for fistula formation, representing 50% of all fistulas.[5] A similar distribution is also reported by Roback et al., in a study including 55 patients.[6]

Levy et al concluded their study on 335 patients and provided EN as the exclusive nutritional support in 85% of their patients, that conservative management is the treatment of choice in the preliminary period.[7] In this study, 75% patients were started on oral feeds and 25% were started on TPN. While an association between the mode of nutrition and healing was not significant, this finding is a pointer to the fact that the majority of patients with ECF can be managed with EN. It is also similar with study done by Reber et al. stating that the results of fistula treatment with both TPN and enteral feeds showed no considerable difference in deaths and spontaneous closure rate.[5] In our study, duodenal and jejunal fistulae accounted for 41.17% of high-output fistulae. The mortality rate of high-output fistulae was 28.5%, whereas ileal and colonic fistulae with a low output accounted for 82.6% of patients with a mortality rate of 10.5% (p=0.28). Narsos et al. also narrated a mortality rate of 48% for jejunal fistulas and 18% for ileal fistulas.[8] Patients with high output fistulae have a higher frequency of fistula-associated complications such as fluid and electrolyte imbalance, infection, and skin excoriation. The fistula closure rate is also lesser. Fazio et al. reported that mortality rate was twice in high-output fistula patients as compared to low-output fistula patients.[9]

In this study, patients with ECF and serum albumin of <2.5 g/dl had a higher mortality of 66.6%. Patients with serum albumin of >3.5 g/dl had no mortality; this was comparable to a study by Fazio et al., who reported no mortality in patients with serum albumin >3.5 g/dl and a mortality rate of 42% in patients with serum albumin level <2.5 g/dl.[9] Serum albumin is an important factor for prediction of mortality and ECF closing rate. In our study, 72.7% of the patients who received Octreotide showed a reduction in fistula output and healing time. However, there was no statistical difference noted between patients who received Octreotide and those who did not. This was also supported by a randomized control trial by Nabiola et al., concluding the use of octreotide did not help in healing of fistula, it reduces the fistula output by 70% in the first 48 hours in patients with ECF.[10]

In the present study, intra-abdominal abscess was present in 30% of the patients and a mortality of 10%. In

Hollender's series (1983), the presence of intra-abdominal infection was observed in 63% with a mortality rate of 82%.[11] The advances in percutaneous drainage of abscesses and the availability of better antibiotics could be responsible for the huge difference in mortality reported.

In the present study, 62.5% of the total patients were managed conservatively, whereas 37.5% of patients required surgical intervention. The common surgeries done in our patients are adhesiolysis with excision of segment of bowel containing fistula and end-to- end hand sewen anastomosis or exteriorization of both ends. Rubelowsky et al. conveyed that reoperation and conservative management are complementary in-patient treatment. Spontaneous closure rates have been estimated to be between 50% and 80%.[12] Same evidence given by Lorenzo et al. and Tarazi et al., in that the timing of operation and selection of the operative procedure depends on the type of fistula, response to conservative management, and the state of the patient.[13,14]

Studies conducted in previous decade shows that the overall mortality rate for postoperative fistulas of the small intestine averages 30%.[4,15,16] In the present study, the mortality rate in patients with small intestinal fistulas managed conservatively and with operation was 20% and 13.3%, respectively. In our series, 22.5% of the patients had colo-cutaneous fistulas, of which 88.8% of patients were managed conservatively, with one mortality. Of the 40 patients in the present study, fistula healed in 32 patients (80%), while eight patients (20%) died. 25 (62.5%) were treated conservatively and 15 patients (37.5%) required surgical intervention. The mortality rate in patients treated conservatively was 20% and in those who required surgical intervention it was 13.3%. The overall mortality in the present study is 17.5%

CONCLUSION

Postoperative ECF is the most common etiology of ECF. Most patients respond to conservative management; however, surgical intervention is required in a number of patients when conservative methods for healing of fistulas fail. Nutritional status of the patient and fistula output are significant predictors of healing of ECF as well as mortality. Control of sepsis, management of fluid, and electrolyte imbalance, meticulous skin care and nutrition support allow spontaneous fistula closure and low mortality.

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