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Original Research Article

Analysis of risk factors and outcome in the management of Enterocutaneous Fistulae

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Abstract: Enterocutaneous fistulas remain one of the most serious complications of abdominal surgery as they comprise a diverse array of intestinal pathology and presents with a variety of clinical presentation. Despite of highly specific management plan that has been over the past 25 years, the mortality of ECF is still 15-20%.The contrasting results of treatment of patients with post-operative fistula reflect the heterogenicity of disease and depend on patients' condition and the characteristics of the fistulae.The aim of the study is comprehensive analysis of etiology, potential risk factors that lead to enterocutaneous fistulas, complications and to study outcome of management. 30 patients of all age groups presenting with enterocutaneous fistulae were admitted in Basaveshwar teaching and general hospital, attached to M R medical college, Kalaburagi and managed between December 2013 to November 2015. Out of 30 cases, 23 were males and 7 were females, a detailed examination was done as per proforma after admission. All the patients were appropriately investigated. Mean age of patients was 38.3 years. Incidences of fistulae were more common in males (76.67%) than females (23.33%). Duodenal perforation operation was the most common cause. Patients were treated conservatively and surgically. 6 patients were given enteral nutrition, all were recovered. 20 patients were given TPN, of which 3 expired. 4 (13.33%) patients underwent reoperations, out of which 1 patient expired. Overall mortality rate was 13.33%.
Keywords: Enterocutaneous fistulae, enteral nutrition, Total parenteral nutrition(TPN)

INTRODUCTION

Enterocutaneous fistulas (ECFs) represent a catastrophic complication of abdominal diseases, with majority following abdominal operations, with complications of sepsis responsible for the majority of deaths.

The contrasting results of treatment of patients with postoperative enterocutaneous fistulae reflect the heterogenicity of disease and depend on the patient's condition and the characteristics of the fistulae. Hence the need for the study of ECFs in respect to various appropriates modes of management and its outcome.

The decrease in the overall mortality in patients with ECF is due to the better knowledge of fluid and electrolyte balance, nutritional support, improved wound care, newer more potent antibiotics and better surgical technique[1].

OBJECTIVES OF THE STUDY

- To study prognosticating factors influencing outcome.
- To compare conservative vs. surgical management.
- To study complications.
- To find outcome of Enterocutaneous fistula.

MATERIALS AND METHODS

Study design

A prospective study of 30 patients who developed ECF at Basaweshwar Teaching and General Hospital, Kalaburagi between December 2013 and November 2015 were studied.

Inclusion criteria

All the patients who developed ECF after various abdominal surgeries. Patients with gastric fistula, duodenal fistula, small bowel fistula and colonic fistula were included in this study.

Exclusion criteria

This study excludes oropharyngeal, pancreato biliary and anal fistulas.

Method of collection of data

- History of all patients was noted to find out the possible risk factors.
- A detail general physical, local and systemic examination was done to find out various types of presentation.
- Patients were subjected to appropriate investigations as required.
- Analysis of incidence regarding age, sex, risk factors, and modes of presentation, modalities of treatment and its complications was done from the collected data.
- All patients managed by SHELDONs four phase approach[2].

Initial Phase (on presentation)

- ✓ Restore blood volume,
- ✓ Begin correction of fluid and electrolyte imbalance
- ✓ Control of fistula, protect skin, collect and measure effluent.
- ✓ Drain abscesses and consider antibiotic treatment.

Second Phase (up to 2 days)

- ✓ Continue fluid and electrolyte therapy.
- ✓ Begin intravenous feeding.

Third Phase (up to 5 days)

- ✓ Institute enteral feeding if possible either orally or by tube feeding or by jejunostomy below a high fistula.

Fourth Phase

- ✓ Continue nutritional treatment until the fistulae close or if it fails to close until the patient is able to withstand reoperation.

RESULTS

Out of a total of 604 patients who had undergone abdominal surgeries in the given time period, 30 patients developed ECF. Age group ranged from 9 years to 70 years with average being 38.3 years. Majority of patients were between 41-50 years (33.3 %). Out of the total, 23 were males (76.67%) and 7 were females (23.33%).76.67% of the patients of ECF belonged to low socio-economic status. Dietary habits in this series show almost an equal number of vegetarians and non-vegetarians.

Table-1:Distribution of ECF among surgeries for the various pathologies

Etiology	Total surgeries	Fistulaoccurance	Percentage of cases in the study
Duodenal Perforation	131	11(8.39%)	36.66
Ileal Perforation	51	10(19.60%)	33.33
Jejunal perforation	6	1(16.66%)	3.33
Intestinal obstruction	44	1(2.27%)	3.33
Appendicular perforation	343	4(1.16%)	13.33
Gastric perforation	8	1(12.5%)	3.33
Cacolon	8	1(12.5%)	3.33
Rectal prolapse	13	1(7.69%)	3.33
Total	604	30	

Duodenal ulcers were found to be associated with highest number of fistula formation, followed by ileal perforations and appendicular perforations.

Table 2: Duration of symptoms on admission before primary surgery

Duration	Number of patients	Percentage
<24 hours	3	10
> 1-3 days	6	20.6
>3-5days	10	33.33
>5days	11	36.66
Total	30	

21 patients underwent primary surgery after 3 days of appearing of symptoms. Delayed primary surgery associated with mortality in 4 patients.

Table 3: Preoperative investigations

Investigations		No of Patients n=30	Percentage
Hb gram %	<10	25	83.33
	>10	5	16.66
Sr.Albumin (g/dl)	<3.5	22	73.33
	>3.5	8	26.66
Sr. Creatinine (mg/dl)	High	6	20.00
	Normal	24	80.00

None of the patients received pre operative bowel preparations. Majority of the patients were hemodynamically unstable, Hb % was 10 gms % or less and serum albumin < 3.5 gms%. 80% of the male patients were chronic smokers, tobacco chewers and alcoholics.

In all patients, peritoneal collection was sent for culture & sensitivity. In many cases more than one organism was isolated. In 3 patients, the culture result was sterile. Most common organism isolated was E. coli comprising 33.33%.

Table 4: Postoperative symptoms during ECF formation

Symptoms	Number of cases	Percentage of cases
Distension of abdomen	30	100
Discharge of GI content	30	100
Pain in abdomen	30	100
Fever	29	96.66
Excoriation of Skin	25	83.33
Not passing flatus	17	56.66

In almost all the patients the common complaints were distension of abdomen, pain abdomen and discharge of GI content from the drain site and the wound site. Next in frequency were fever, excoriation of skin, and patient not passing flatus.

Table 5: Objective signs in patients with ECF

Signs	Number of cases	Percentage of cases
Abdominal Tenderness	30	100
Tachycardia	30	100
Anaemia	25	83.33
Pedal edema	23	76.66
Tachypnoea	15	50
Jaundice	1	3.33

On examination, abdominal tenderness though vague was present in all cases, i.e., (100%). Majority of the patients were found to have anaemia and hypoproteinemia. Hb% in the present study was less than 10gm% in most of the cases. Bowel sounds were absent or sluggish in most of the patients.

Table 6: Distribution according to the type of fistula

Type of Fistula	Number of Patients	Percentage of Patients
High output	16	53.33
Low out put	14	46.67
Total	30	100

Sixteen patients (53.33%) had high output fistulas and 14 (46.67%) patients had low output fistulas.

Fistulogram

Fistulogram was carried out in only 5 patients, as most of the patients in our study were of high output fistulas with septicemia and there were signs of peritonitis. In 1 patient the tract was communicating between skin and the duodenum, another 2 patients tract between skin and the ileum and in 2 patients there was localized collection and tract not visualized.

Ultrasonography of Abdomen

This was done in 15 patients in our study and it showed localized collection in the peritoneal cavity with dilated bowel loops with sluggish peristalsis and in some features suggestive of peritonitis.

C.T. Scan of Abdomen

Abdominal CT scan was done in 4 patients. CT abdomen in these patients showed intra abdominal collections with the fistulous tract seen connecting to the duodenum in 2 patients and no tract identified in 2 patients.

Table 7: Type of nutrition given in patients managed with conservative and surgical approaches

Type of treatment	Type of nutrition	
	Parenteral	Enteral
Conservative (26)	20	6
Surgical (4)	4	0

Conservative treatment

Patients were treated conservatively in 26 patients (86.67%). Out of these, 20 patients were given TPN and 6 patients were given enteral feeding.

Enterocutaneous fistulae healed as early as in 10 days in low output fistulas, and taken up to 60 days to heal in high output fistula.

1. Duodenal fistulae healing rate in days Mean ± SD = 17.90 ± 5.4
2. Ileal fistulae healing rate in days Mean ± SD= 21.l ±4.41
3. Appendicular fistulae healing rate in days Mean ± SD= 30± 18.70

Table 8: Distribution according to duration of Fistula Healing (In Days)

Duodenal Fistula	Jejunal fistula	Ileal fistula	IntestinalObstruction fistula	Appendicular fistula	Gastric Fistula	Ca. Colon	Rectal Prolapse
20	10	15	10	10	28	12	12
10		14		60			
14		30		20			
15		20		30			
20		20					
15		21					
20		25					
20		22					
32		20					
15		24					
16							

Table 9: Distribution according to outcome

Out Come	Number of Patients	Percentage
Recovered	26	86.67
Expired	4	13.33
	30	100

Out of 30 Patients, 26 (86.67%) patients recovered and 4 (13.33%) patients expired. Causes of death in all 4 patients were sepsis, malnutrition, electrolyte imbalance and associated diabetes mellitus. Mortality in our series was 13.33%.

DISCUSSION

The most common age group in the study to develop ECF were between 41-50 years with an average of 38.8 years. According to Altmore *et al*[2] patients aged > 60 years were considered to be at high risk but this was not statistically associated with outcome.

Duodenal (36.66%) and ileal (33.33%) fistulas were commonest. Complications of surgery play an overwhelming role in the cause of duodenal and ileal fistulas.

Preoperative symptoms for a period of longer than 3 days is a potential risk factor. This was also suggested by Altmore *et al*.[2]. Pedal edema, indicative of hypoproteinemia was a potential risk factor for post-operative enterocutaneous fistulae[3].

16 patients with output more than 500 ml per day had high output fistula. The fistula output in a 24 hour period is the most important determinant of the physiologic impact of a fistula on a patient.

26 (86.67%) patients were treated by conservative management 23 (76.67%) recovered and 3 (10%) patients died. All the patients were put on antibiotics depending upon the culture and sensitivity of discharge. If culture was sterile, antibiotics were given

on emperical basis. Majority of patients received cephalosporins, aminoglycosides, quinolones, pipercillin and tazobactum, metronidazole and imipenams.

Enteral feeding was given in 6 patients because, these patients were having

a. Distal, low output Enterocutaneous fistula.
b. Functioning small intestine.

All 6 patients received enteral nutrition recovered. Total parenteral nutrition was given to 20 patients in the form of Celemix G, Celipid, Human Albumin and Amino acid through central or peripheral venous route. For all patients electrolytes supplementation were done. Out of 20 TPN given patients, 17 patients recovered over a period of 10-60 days. 3 patients expired because of sepsis, malnutrition and electrolyte imbalance in conservatively managed cases.

Four (13.33%) patients underwent reoperation, in that 2 patients re-exploration with perforation closures were done, in 1 patient resection of the segment of bowel and end to end anastomosis done, and in another 1 patient exploration and drainage of multiple abscess were done. Among 4 patients treated surgically, 1 patient succumbed to sepsis, malnutrition, electrolyte imbalance and associated diabetes mellitus.

Levy *et al*[4] emphasized the importance of continuous enteral nutrition in the management of high output external fistulae of the small bowel.

Pricket *et al*[5] in his study adopted a multifaceted approach in the management of external fistulas including control of infection, correction of fluids and electrolyte imbalance, nutritional support, proper wound care and often operative intervention which brought down mortality rate as low as 19%.

In 1992 Sarfeh *et al*[6] also supported this approach and predicted spontaneous closure of fistulas in the absence of factors like distal obstruction, foreign body, malignancy, radiation enteritis and epithelization of the fistula tract maintaining fistula patency, requiring formal operative intervention.

Conservative management is the treatment of choice in the initial period. Emergency surgery should be restricted to the treatment of hemorrhage or intra-abdominal abscesses associated with uncontrolled systemic sepsis. 6 to 8 weeks of conservative management before a patient is taken to the operating room. Surgical mortality and fistula recurrence rates are highest between the first and sixth weeks. The patient should demonstrate weight gain and wound healing, and laboratory tests should reflect a positive nitrogen balance and normal albumin levels. The operation of choice is resection of the fistula-bearing segment and end-to-end anastomosis. Bypass or exclusion procedures are the only safe alternative here. A needle catheter or standard tube jejunostomy can also be used for nutritional support.

Haffejee[7] in 2004, suggested that control of sepsis and correction of fluid and electrolyte imbalance plays a vital role in management of external fistulas and definitive surgical closure of fistulae should be planned only when the patient is apyrexial and is of good nutritional status and if fistulae showed no signs of decreasing in volume after 4-6 weeks of nutritional support. He was also of the opinion that the definitive resection and end to end anastomosis is the best surgical technique with an acceptable rate of morbidity and mortality.

In 1998, Bosscha[8]stated that in patients with uncoltrolled peritonitis and severe intra abdominal sepsis, early surgical treatment is sometimes inevitable. They also advocated a totally diverting proximal jejunostomy in the surgical therapy of persisting intestinal fistula. This procedure seems to be a useful measure where long segments or multiple areas of small bowel are affected.

In 2000 Lomis *et al*[9] suggested that, closure of abdominal cutaneous tracts by occlusion with a modified vasoseal collagen plug shows promise in the management of fistulas refractory to catheter drainage

Poritz *et al*[10] in 2004 stated that surgical management with bowel resection, including the fistula is the preferred method of treatment.

In 2011 Polk TM *et al*[11] suggested aggressive nutritional therapy is necessary to reverse the catabolic state associated with ECF/EAF patients.

In 2010 study by Gyorki DE *et al*[12] definitive surgery was undertaken in 64% ECF patients at median of 6.4 months following presentation. Fistula closure rate was 97% in operative group. They believe that patients with ECF should be referred to specialist units for management.

The mortality rate in the present study was 13.33 % which was comparable with Pricket[5] 19%, Lomis[9] 21%, Martinez JL[13] 13%.

CONCLUSION

Risk factors associated were delayed primary surgery, peritonitis, anemia, hypoproteinemia, electrolyte imbalance, malnutrition and those patients unstable at the time of admission. The main causes of mortality were septicemia, malnutrition and electrolyte

imbalance and associated co morbid conditions like multiple fistula, diabetes mellitus and renal failure. Better TPN management and intensive care will help in reducing the morbidity and mortality in this catastrophic complication. Mortality can be reduced by better knowledge of fluid and electrolyte balance, nutritional support, improved wound care, newer more potent antibiotics and better surgical techniques.

REFERENCES

1. Gupta RL; Gastrointestinal fistulae. Recent advances in surgery. No. 6, New Delhi: Jaypee brothers; l998; 57-59.
2. Sheldon GF, Gardians BN; Management of GIT fistulae. Surg Gynac Obst., 1971; 133:385.
3. Altomare DF, Serio G, Pannarale OC, Lupe L, Palasciano N, Memeo V, Rubino M; Prediction of mortality by logistic regression analysis in patients with postoperative enterocutaneous fistulae. Br J Surg., 1990; 77:450.
4. Levy E, Frileux P, Cugnence PH, Honiger J, Olliver J M, Pare R; High output external fistulae of the small bowel: management with continuous enteral nutrition. Br J Surg., 1989; 676: 679.
5. Prickett D, Montagomery R, Cheadle WG; External fistulas from the digestive tract. South Med J., 1991; 84(6): 736-9
6. Surfeh IJ, Jakowatz JG; Surgical treatment of Enteric 'Bud' fistulas in contaminated wounds. Arch Surg., 1992; 127:1027-31.
7. Haffeje AA; Surgical management of high output enterocutaneous fistulae a 24- years' experience Cuff Opin. ClinNutrMetab Care, 2004; 7(3):309-16.
8. Bosscha K, Van Vroonhoven TJMV; Novel approach to the treatment of intestinal fistula in the inaccessible abdomen: Transbursal end to side duodeno gastrostomy. Br J Surg., 1998; 85:276-8.
9. LomisNNT,Miller FJ, Loflus TJ, Whiting JH, Giuhano AW, Yoon HC; Refractory Abdominal-cutaneous fistulas or leaks Percutaneous management with a collagen plug. JAm Coil Surg., 2000; 190:588-92.
10. Poritz LS, Gabhano GA, McLeod RS, MacRac H, Cohen Z; Surgical management of entero and coloutaneous fistula in Crohn's disease : 17 year's experience. Int J ColorectalDis., 2004; 19(5):481-6.
11. Polk TM, Schwab CW; Metabolic and nutritional support of the enterocutaneous fistula patient: a three-phase approach. World journal of surgery, 2012; 36(3):524-33.
12. Gyorki DE, Brooks CE, Gett R, Woods RJ, Johnston M, Keck JO, Mackay JR, Heriot AG;Enterocutaneous fistula: a single-centre experience. ANZ journal of surgery, 2010; 80(3):178-81.
13. Martinez JL, Luque-de-Leon E, Mier J Blanco-Benavide SR, Rabledo F; systematic management of postoperative enterocutaneous fistulas: Factors related to outcome. World J Surgery, 2008;32(3):436.