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Original Research Article

Different approaches in the management of enterocutaneous fistula

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ABSTRACT

Background: Enterocutaneous fistula (ECF) are abnormal communications between the skin and gastrointestinal tract. ECF are a difficult and costly surgical complication to manage.
Methods: The aim of this study is to compare the outcomes and review the different approaches in the management of ECF. We conducted a retrospective study on 50 postoperative ECF patients after abdominal surgeries over a period of 10 months admitted through PMCH OPD and emergency. We included 30 men and 20 females between age 10-70 years. We excluded spontaneous fistula in Crohn's disease, intestinal diverticulosis, or any inflammatory disease.
Results: Out of 50 patients of ECF 42 (8%) were managed conservatively initially. Out of that 9 patients failed to respond to conservative management and required later secondary exploration. Eight patients (16%) needed initial primary surgical intervention after formation of faecal fistula and peritonitis. The overall incidence of ECF is 4% varied according to surgery type, -4% after colorectal surgeries, 7% after gastroduodenal surgeries, 0.5% after extra-digestive surgery. Conservative approach includes resuscitation, nutritional support, sepsis control, output control and skin protection whereas in Surgical management we included permanent closure of fistula, resection of fistula tract, anastomosis and excision of tract and direct drainage.
Conclusions: Conservative treatment plays a pivotal role as an initial management in both low and high fistula output. There was no significant recurrence rate difference seen in conservative and surgical approach.

Keywords: ECF, Conservative approach, Secondary exploration

INTRODUCTION

Enterocutaneous fistula (ECF) are abnormal communication between the skin and gastrointestinal tract. It is one of the most severe and dramatic complication of abdominal surgery very disabling to patient and causes lot of morbidity, mortality and longer hospital stay.[1,2] ECF patients are generally malnourished. They also present with sepsis and wound infection or dehiscence. ECF have a history of longer hospital stay and high mortality and morbidity. ECF can be managed by conservative and surgical approach which aims to close the fistula and restore the digestive transit reducing the morbidity and mortality of the patient. This requires multidisciplinary approach with a complex team (surgeon, anaesthetist, radiologist, nutritionist, nurses, bedside care of wound and stoma psychotherapy, etc.). The conservative strategies for ECF management include nutritional support, correction of electrolyte imbalance, sepsis control, fistula output control, skin protection, localization and delineation of the anatomy of fistula.[3,4,22] The basic principle established by Chapman in 1964 along with newer techniques and methods, there is improvement in the mortality rates but the current reported figures still are 5% to 20%.[3,4,23] Spontaneous closure rates of ECF are small and persistent fistula ultimately need definitive surgery. Newer techniques including wound vacuum-assisted closure (VAC), fibrin glue and the use of somatostatin analogues have been used to promote the closure of ECF.[15]

METHODS

Study type

This retrospective study was conducted on an aggregated group of 50 ECF patient who underwent abdominal surgeries.

Study place

Patna medical college and hospital, PMCH, Patna. Patients operated in both emergencies and elective were included in this study. This group included 50 patients out of which 30 were men and 20 were women. Spontaneous fistula formation due to inflammatory bowel diseases such Crohn's disease, intestinal diverticulosis was excluded from study.

Study period

Study was conducted over the period of 11 month from (November 2022-September 2023).

Inclusion criteria

The 50 patients with ECF were identified and included in the study after going through any abdominal surgery. Both men and women were included in the study between age (10-60 years).

Exclusion criteria

Children <10 years were not included. Spontaneous fistula formation due to inflammatory bowel diseases such Crohn's disease, intestinal diverticulosis was excluded from study.

Procedure

Data were collected from clinical observation files, intensive care files, surgery transcript, imaging and investigation. Data about primary intervention, co-morbidities, laboratory investigation, nutrition status, surgical re-intervention, and output of fistula were collected. Patients with ECF were identified and included in the study. Each chart was reviewed for the following information: 1) origin of fistula; 2) volume of fistula output; 3) aetiology of the ECF; 4) length of hospital stay; 5) type of therapy (conservative and surgical); 6) use of TPN; 7) Use of antibiotics and 8) wound care.

Ethical approval

The study was approved by the intuitional ethics committee.

Statistical analysis

The conservative and surgical approaches towards management of ECF were compared and analysed using chi^2 test.

RESULTS

50 patients underwent treatment for ECF of which 3 were men and 2 were female. The overall incidence of ECF is 4% varied according to surgery type: - 4% after colorectal surgeries, 7% after gastroduodenal surgeries, 0.5% after extra digestive surgery.

The cause of ECF in these 50 patients was recent surgery. The primary lesion requiring surgery were ileal perforation, gangrenous gut after obstruction, sigmoid volvulus, duodenal perforation, entero mesenteric ischemia, strangulated incisional hernia, obstructed inguinal hernia, liver abscess, gynaecological causes. Most common surgical procedure included enteral hernia repair, small bowel resection and anastomosis, there were 32 emergency cases and 18 were elective cases. The most common site for ECF was small bowel (28 patient). Other sites were stomach, colon. Out of 50 patients, 10 were having high output fistula.

Fistula onset was early in (2-5 post-operative day) in 20 patients and late (after 7 post-operative day). The diagnosis was made clinically in most of the patient mainly through identifying purulent discharge or intestinal content through the wound, on the drain's tubes, or both accompanied by the localized or the generalised abdominal pain, symptoms of the sepsis, increased upper digestive aspiration and the feature peritonitis.

The fistula output was low (<200 ml/day) in 25 cases, medium in (200-500 ml/day) in 15 cases, and high output (>500 ml/day) in 10 patients.

Treatment was started immediately after diagnosis. Conservative medical treatment was the first- line treatment in all cases.

The objectives of conservative treatment were; a) patient stabilization(resuscitation); b) sepsis control; c) nutrition; d) ICU transfer; e) diminishing fistula output and f) skin protection.

After initial assessment, patients were kept NPO and started on metabolic support with parenteral nutrition. TPN were started in 45/50 patients. Patients were started on enteral diet (tube feeding-12, total parentral-10, entral+parentral-20) as soon as their fistula output was manageable with enteric feed. Five patients needed long term TPN because of their high output fistula and couldn't tolerate enteric feed. Fistula output initially controlled by keeping patients NPO and reducing oral feed, and, using H2 antagonist. Wound management comprised of specialised stoma bag placement at the stoma site. Patients were regularly evaluated for the local wound infection and sepsis control. The common

antibiotics used among these patients were meropenem, metronidazole.

Skin protection was done the spray, collection bag, active suction, normal wound dressing.

Success was determined by complete closure of the ECF.

Both surgical and conservative management were analysed for the following outcomes; - length of hospital stay, success rate, recurrence rate, mortality rate. Patients who failed initial conservative treatment underwent surgical approach. There was no any statistical difference in the outcomes in these patients observed.

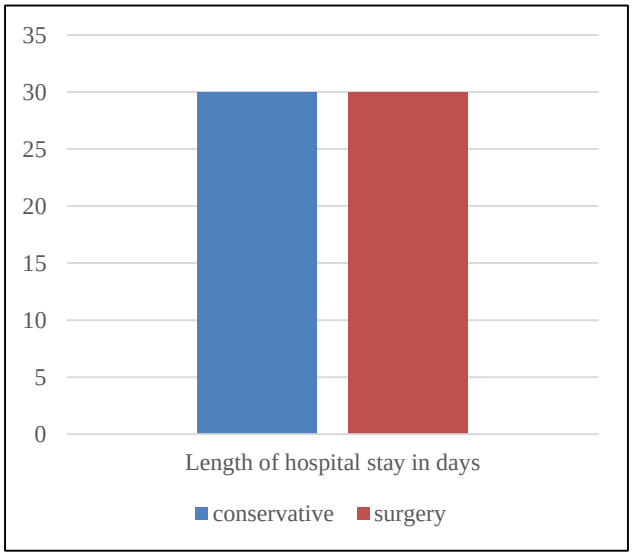

Figure 1: Comparison of duration of hospital stay.

Table 1: Favourable and unfavourable factors predictive of non-operative fistula closure.

Favourable	Unfavourable
Deep fistula	Superficial fistula
Low output fistula (<200 ml/day)	High output fistula (>200 ml/day)
Free distal passage	Distal occlusion
Preserved intestinal continuity	Intestinal dehiscence
Defect minor than 2 cm	Defect major than 2 cm
Single fistula	Multiple fistula
Intact abdominal wall	Abdominal wall defect
No sepsis, balanced electrolyte	Sepsis, electrolyte disturbances.
Surgical aetiology	Ileal, jejunal, non-surgical aetiology

Table 2: Types of fistula.

Type of fistula	Low (<200 ml/day)	Moderate (200-500 ml/day)	Severe (>500 ml/day)
N	25	15	10

Table 3: Timing of surgery.

Surgery	N	Percentages (%)
Timing		
<24 hr	0	
2-7 days	8	16
>7 days	9	18

Table 4: The objective of conservative treatment.

Variables	N	Percentages (%)
ICU	17	40
Resuscitation	42	100
Sepsis control	42	100
Nutrition		
Total parenteral	10	23.8
Enteral/oral	12	28.5
Both (enteral+parenteral)	20	47.6
Diminishing fistula output		
NPO	22	52.3
Reducing oral feeding	10	23.8
H2 antagonist	42	100
Somatostatine/octreotide	42	100
Skin protection		
Collection bag	15	35.71
Normal wound dressing	27	64.28

Table 5: Outcomes of conservative and surgical approaches.

Variables	Conservative approach	Surgical approach	X^2
Length of hospital stay	7-70 days, average-30 days	7-50 days, average-30 days	NS
Success of treatment	31/42 (73%)	10/13 (76%)	NS
Recurrence	9/42 (21%)	2/13 (15%)	NS
Mortality	2/42 (4%)	1/13 (7%)	NS

χ^2-test, NS- Not significant.

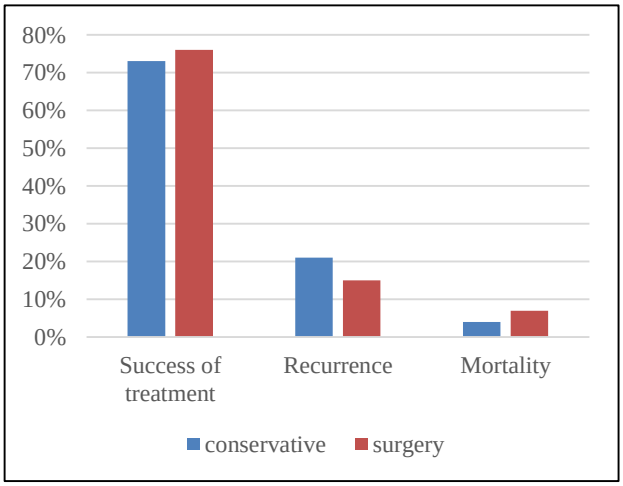

Figure 2: Comparison of treatment outcome, recurrence and mortality.

Table 6: Results: evolution, morbidity and mortality.

Variables	N	Percentages (%)
Closure of fistula		
Conservative treatment exclusively	28	56
Conservative + surgery	10	20
Morbidity		
General complication		
Sepsis	40	80
Cachexia	45	90
Coagulation disorder	12	24
Pulmonary	10	20
Haemorrhagic shock	8	16
Local complication		
Wound suppuration	15	30
Evisceration	5	10
Mortality		
Conservative treatment	2	4.76
Conservative + surgical	2	4
Causes of death: sepsis, MODS, severe malnutrition, haemorrhagic shock, pulmonary thromboembolism.		

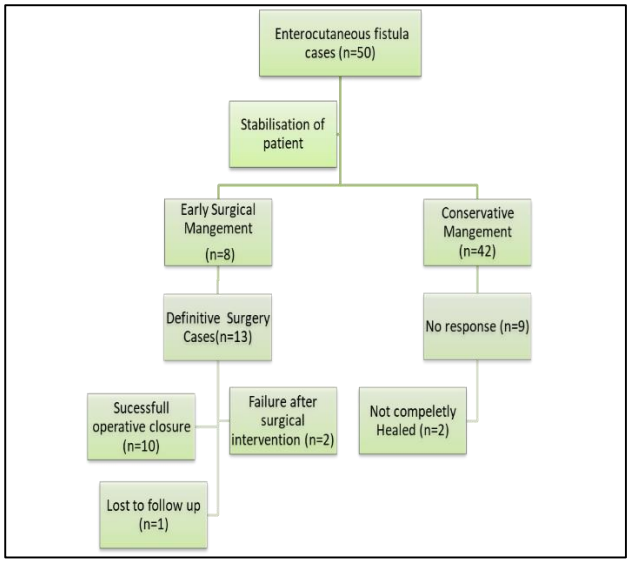

Figure 3: Algorithm of management of 50 patients with ECF.

DISCUSSION

ECF is very difficult and cumbersome to manage. It causes lots of morbidity to the patient. Its management is both complex and time consuming. The main aim of its management is the closure of fistula and restoration of digestive tract with minimal morbidity.[6,8]

Our primary motive is to stabilize and resuscitate the patient along with sepsis control. Management of hypovolemic, dehydration and correcting electrolyte imbalances were the initial treatment given to all 50 patients. Fistula output assessment was done, and patient fluid and electrolyte requirements were measured accordingly. The correction of volume and electrolyte imbalances was carried out with crystalloid solutions, to which we added electrolyte depend on balance.

Out of 50 patients 42 patients initially managed conservatively which included resuscitation, correction of electrolyte imbalances and nutritional support. 33 patients had spontaneous closure. Success of spontaneous closure in ECF, which were managed conservatively was 28/33 (84%) and only 8 patient (16%) needed urgent surgical intervention which shows sign of peritonitis.

Resuscitation and electrolyte repletion

Correction of electrolyte imbalances and nutritional support was central to treatment of ECF. We added electrolyte depending on imbalance, hypokalaemia most common electrolyte imbalances diagnosed among these patients, corrected immediately by adding 10 meq/litre of KCl infusion solution. We added bicarbonates with high output duodenal fistula. We added all necessary supplement such as zinc, vitamin, and micro-elements to correct intestinal fistula with high output.[9,10]

Nutrition

Parenteral nutrition was given to all 42 patients for decreasing enteric secretion, therefore, it helped decreasing fistula output. Out of 42 patients 33 patients shows spontaneous closure. They also useful in hydro-electrolytic rebalancing, reducing the incidence of dehydration and electrolyte imbalance. Enteral nutrition has general method of choice for all patient with functional gastrointestinal tracts because it preserves the integrity of intestinal mucosa and hormonal and immunological function of intestine. We in 12 patients give 30% calorie requirement enterally. The route depending on the location of fistula. Example: - for ileal and colic fistula, food administered orally or by nasogastric tube. In duodenal fistula, by jejunostomy.[11-13,19] Enteral nutrition plays essential role in preventing sepsis and improving protein synthesis, intestinal absorption and decreasing microbial translocation.

Sepsis control

In ECF we found sepsis was leading cause of death. Sepsis control was carried simultaneously with patient's stabilization. The management of sepsis involves identifying the source, drainage and antibiotic therapy. Patient who doesn't respond to resuscitation and antibiotic coverage, required an emergency intervention for evacuation, peritoneal drainage and fistula control by externalizing the intestinal loop with fistula, diversion or proximal stoma. We used surgery exclusively in 8 patients of which 6 found to be due to anastomotic dehiscence with generalised peritonitis and 2 was due to localized collection.[18,19] Bacteriology of the abscess was done for antibiotic therapy. Broad-spectrum antibiotics were immediately started after onset of fistula for 12 days

followed by antibiotic therapy according to antibiogram.

Control of fistula output through drugs

We also used Octreotide (somatostanin 14 analogue) in all patients though it uses is controversial. We found that octreotide decreases the fistula output.[14,15]

Antacid medication was also used in all 42 patients for their beneficial in reducing fistula output, gastric acid secretion and corrosive action of the effluent on the skin preventing gastritis and stress ulcer.[20]

Wound management

Wound VAC was not much used in our study except for 2 patients to contain the output, protect skin and promote healing of ECF.

Outcomes

Both conservative and surgical management have equal recurrence rate. No significant difference in success rate was found in these two approaches. Patients with high output fistula needed more intensive care than with low output fistula.

Limitations

Management of ECF represents one of the most protracted and difficult problems. It can be very challenging because of massive electrolyte imbalance, severe dehydration, malnutrition, and sepsis. Now a days due to introduction of newer advances such as fibrin glue, OTSC (over- the-scope- clip), 3D-printed personalized fistula stent, etc definitive surgical management could be avoided and better outcome can be achieved which could be possible in our study due to lack of resources and unaffordability. ECF management need multidisciplinary approach, in which social support group is very important which we couldn't able to incorporate. Also due to unavailability of newer approaches of wound management and sticking to conventional methods would have influenced our results. This limitation of this review is that its focus is too narrow and includes no newer advancement to be a comprehensive review.

CONCLUSION

ECF management requires a multidisciplinary approach conducted to an algorithm with well-established objective and priorities. There were no any statically significant differences in the outcomes was seen between conservatives and surgical management of ECF. Low output fistula shows good response in conservative management. Patients presenting with peritonitis and very early presentation of fistula are better to be managed through early surgical intervention. Surgery was reserved for complications or permanent repair of fistulas that did not close under conservative management. Conservative management was the cornerstone management for all patients whether surgical intervention needed afterward or not. It was mainstay for managing early presentation of high output fistula. This study helps us understand outcome of both approaches whether its surgical or conservative there were no any difference in the recurrences, and the management of ECF is very intricate which remain complex problem that is optimally management using a careful and interdisciplinary approach.

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