ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 05 | May - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ENTEROCUTANEOUS FISTULA: PRESENTATION, TREATMENT MODALITIES, AND OUTCOMES IN 20 PATIENTS

General Surgery

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ABSTRACT

Background: Enterocutaneous fistula (ECF) is a difficult condition managed in surgical wards and is associated with significant morbidity and mortality. Sepsis, malnutrition, and electrolyte abnormality are the classical triad of complications of ECF. **Aims & Objectives:** This study explores different treatment modalities and outcomes in SUM Hospital. **Materials And Methods:** All consecutive patients who developed or presented with ECF during the study period were included. The etiology, anatomic distribution, fistula output, clinical course, complications, predictive factors for spontaneous closure, and outcomes for patients with ECF were studied. **Results:** A total of 20 patients were included in this prospective observational study, of which 13 were males and 7 were females. About 90% of ECFs were postoperative. The ileum was found to be the most common site of ECF. Also, 50% of fistulas were high and 50% were low. Serum albumin levels correlated significantly with fistula healing and mortality. Surgical intervention was required in 60% of patients. **Conclusion:** Most of the ECFs are encountered in the postoperative period. Serum albumin levels can predict fistula healing and mortality. Conservative management should be the first line of treatment. Mortality in patients with ECF continues to be significant and is commonly related to malnutrition and sepsis. Timely surgical intervention significantly improves the outcomes.

KEYWORDS

Entercutaneous fistula, Malnutrition, SOWATS, Management, Albumin

INTRODUCTION:

An enterocutaneous fistula is an abnormal connection between the intra-abdominal gastrointestinal tract and the skin, enterocutaneous fistulas are associated with significant morbidity & mortality, and sepsis synergistic with malnutrition act as chief causes of death. The prime focus should be treating sepsis, output control, wound care, and psychological support. A multidisciplinary approach is required to optimize the patient. This article reviews the presentation, different treatment modalities, and outcomes in managing enterocutaneous fistulas. In this research we present the clinical presentation, management & outcomes of 20 enterocutaneous fistulas with a thorough review of the literature.

AIMS & OBJECTIVES:

To study the different treatment modalities and outcomes of enterocutaneous fistulas in SUM Hospital, Bhubaneswar

MATERIALS & METHODS:

An experimental study was done at SUM Hospital, Bhubaneswar, from April 2022 to December 2023 on 20 patients satisfying inclusion & exclusion criteria.

Inclusion Criteria:

All consecutive patients who developed ECF during the study period were included.

Exclusion Criteria:

1) Critically ill patients were not included
2) Patients with esophageal, gastric, pancreatic, and biliary fistulas were omitted

20 continuous patients with enterocutaneous fistulas of various etiologies had been enlisted. There were 13 guys and 7 females with age ranges somewhere in the range of 45 and 78 years (mean 59.3 years). An intensive history and cautious clinical assessment were finished for all patients. (Table 1). Informed consent was gotten from all members. Clinical assessment incorporates imperative signs, whiteness, drying out, and nourishing status. Stomach assessment searching for the laparotomy wound, site, and, level of fistula action surveyed by examination of wound dressings were recorded. The type, and rate of fistula gushing and stomach wall imperfection were additionally recorded. Peri-fistulous skin was painstakingly analyzed for hyperemia, skin loss. Postoperative enterocutaneous fistulas were then grouped by their anatomy and outputs. All patients had a complete blood count, C-reactive protein, serum albumin, and plasma transferrin taken. Age, gender, the initial surgery that caused an enterocutaneous fistula, anatomical classifications (small or large intestine fistulas), the output of the fistulas (low, moderate, or high), the presence of sepsis, disturbances in fluid and electrolytes, nutrition status, and albumin concentration were all recorded for each patient. The state of the peri-fistulous skin and whether the abdominal wall was intact or open were also recorded. Patients were submitted to directed treatment as indicated by the SOWATS convention which represents Sepsis control, Improvement of nutritional status, Wound care, fistula anatomy, Timing of surgery, and surgical planning.

Table 1 Primary Surgery That Results In Enterocutaneous Fistula Formation.

Initial surgery that resulted in ECF	Number	%
Perforated duodenal ulcer	3	15
Recurrent incisional hernia	2	10
Adhesive intestinal obstruction	4	20
Left hemicolectomy	2	10
Total abdominal hysterectomy and salpingectomy	3	15
Ruptured ectopic pregnancy	2	10
Appendicectomy	2	10
Total gastrectomy	1	5
Gastric bypass procedure	1	5

Conservative Management :

All patients were at first treated safely for a period from 6 to 12 weeks with the expectation to spontaneous closure or to carry out surgical intervention after optimization. Correction of fluid was done utilizing glucose saline, Ringer lactate, or typical saline using the urine output of a minimum 0.5 ml/kg/hour as an indicator of satisfactory tissue perfusion. Rehydration of the patients was done by correction of electrolyte imbalances especially, hypokalaemia, hyponatremia, and metabolic acidosis. Complete enteral nourishment alone was managed to 8 patients for a period ran 15-72 days (middle of36 days) utilizing nasoduodenal or nasojejunal taking care of cylinders, 7 patients with high output fistulas got all out parenteral nutrition comprising of 75 g glucose, 20 g amino acids and 30 g lipids for every liter and 5 patients got enteral nutrition in mix with parenteral nutrition. supplementation with vitamin B12, folic corrosive, and copper was additionally given. Clear fluids could be taken in by patients up to 500 milliliters per day. Sepsis was analyzed in 14 patients by the presence of fever, leukocytosis, neutrophilia, raised C-receptive protein, decreased albumin, or organ failure. Anti-microbial utilizing parenteral third-generation cephalosporin (ceftriaxone 1 g two times every day) and metronidazole 500 mg in 20 ml infusion was given. Exploration was

done to drain abscess. Control of fistula effluent and peri-fistula skin excoriation was initiated soon as the enterocutanous fistula was made to diminish nearby skin abrasion and aggravation and forestall maceration and skin loss. For low output fistulas, a pouch was utilized. For high-output fistulas, a straightforward ostomy one-piece pocket was utilized to collect the effluent. gelatin-based powders or wafers, zinc glue or cream are used to protect peri-fistulous skin. In patients with proximal high-output fistulas, a sump drain is used to intubate the fistula tract and remove excess fluid. Octreotide, long-acting somatostatin simple, proton pump inhibitors, and loperamide were administrated to diminish the effluent of high results and proximal fistulas. CT was done for 17 patients to survey the state and length of the digestive tract, limitation of fistula beginning, and to search for any stenosis or any abscess. Preoperative CT scan was additionally taken for those patients whose fistulas failed to close following 4 month and a half of moderate measures (16 patients) for characterizing fistula anatomy. Fistulography utilizing methylene blue ingestion either orally or through the nasogastric or nasoduodenal tube was performed in 7 patients. Contrast douches and MRI were one more assistant used to characterize fistula anatomy preoperatively, (5 patients).

Table 2 Characteristics Of 23 Patients With Postoperative Enterocutaneous Fistulas

Variables	Number	%
Patients number	20	100
Sex		
Male	13	65
Female	7	35
Age		
< 60 years	9	45
≥ 60 years	11	55
Primary disease		
Benign	15	75
Malignancy	5	25
Anatomy of ECF		
Small intestine	16	80
Large intestine	4	20
Output of fistula (ml/day)		
Mild (<200)	3	15
Moderate (200–500)	4	20
High (>500)	13	65
Serum Albumin		
< 25 mg/dl	13	65
> 25 mg/dl	7	35
Plasma Transferrin		
< 250 mg/dl	11	55
>250 mg/dl	9	45
Sepsis		
Absent	8	40
Present	12	60
Skin excoriation		
Present	11	55
Absent	9	45
Abdominal wall and laparotomy wound		
Intact	12	60
Open (defect)	8	40
Fistulous tract		
Simple	9	45
Complex	11	55
Number of external fistulous opening		
Single	14	70
Multiple	6	30
Nutrition		
Enteral	8	40
TPN	7	35
Mixed	5	25
Co-morbidity		
Absent	16	80
Presen	4	20

Surgical Management :

14 patients with complicated and high output fistulas failed to close immediately following 6-8 weeks of moderate treatment, and hence corrective surgical procedure is done. They were improved clinically to go through surgical procedure. The hemoglobin level was 10 g/dl, and the albumin level was 25 g/L. Prior to surgery, their nutrition, fluid, and electrolyte disturbances were fixed, and the sepsis was controlled. Additionally, their coagulation profile was examined. One-stage repair was the main aim for patients. A consultant surgeon with more than 5 years of experience performed the procedures in a SUM hospital, Bhubaneswar. They included careful adhesiolysis, wedge excision or resection of the involved intestine segments with a minimum number of anastomoses, cover sutures with healthy, viable omentum.

The median length of medical clinic stay was 29.4 days(range 14-60 days). The enterocutaneous fistulas were considered shut when there was no communication between the bowel and abdominal wall or the laparotomy wound and no effluent or signs of inflammation are noticed following 6-12 months follow up period.

RESULTS:

This study included 20 consecutive patients who presented with enterocutaneous fistulas from April 2022 to December 2023. The median age of the patients was 59.3 (territory 45-78) years. Thirteen (65%) patients were guys and 7 (35%) were females. Postoperative fistulas showed up following a median of 18 days(range 4-70 days) from the beginning of different medical procedures. (Table 1). Patient's attributes and socioeconomics are delineated in Table (2). All patients have been overseen as per the SOWATS guidelines as referenced in the strategies. Ileum was the most well-known site for fistulas representing 80% (16 patients). Different destinations and their appropriation are displayed in Table (3). 11 patients (55%) experienced skin loss, cellulitis, and excoriation. Proximal high-output ileal fistulas were the reason for skin abrasion in most of the cases (8, 72%). The relationship between skin injury and fistula yield was huge ($p > 0.05$). Sepsis was recognized in 8 (40%) patients, showing the presence of ECF. The intra-abdominal abscess was analyzed by CT examination in 6 of these patients. drainage under imaging (ultrasound and CT scan) was done in these 6 patients, though the other 2 patients required surgical intervention. Sepsis was controlled in 6 patients. The other 2 patients died because of disseminated sepsis and organ failure for the most part renal failure despite surgical intervention (two patients). Moreover, 3 patients were found to have an intra-abdominal abscess with practically no indication of sepsis. drainage under imaging was done in all 3 of them.

Total enteral nourishment was given to 8 patients for a period of 10-60 days (median of 31 days), 7 patients got complete parenteral nourishment and 5 patients got mixed. The utilization of Octreotide was restricted to patients with high-output fistulas (13 Patients). In eight of them, fistula output decreased (61.5%). In this open wound and abdominal wall defect study, Octreotide was not associated with fistula healing or mortality reduction and 8 patients (40%) had the defect. The wound complications and abdominal wall defect came about because of careful locales disease, wound dehiscence after the medical procedure because of abdominal distension and paralytic ileus and iatrogenic injury due to the laparotomy to drain the intra-abdominal abscess and relieve the intra-abdominal pressure and prevent compartment syndrome. Ostomy straightforward one-piece pocket with a drainable clasp or fistula sack was utilized to gather high-output fistula liquid in 13 patients. A channel was embedded straightforwardly into the fistula parcel to eliminate the moderate result of fistula liquid in 6 patients. Cloth dressing with skin boundary was utilized to gather fistula liquid in four patients with low results and flawless stomach wall. In general Conclusion of the fistulas was achieved in 16 patients (69.6%). An unconstrained conclusion after fruitful moderate management was found in 4 patients (17.4%). (The median time from the onset of a fistula to its spontaneous closure was 32 days (range: 12–66 days), as shown in Tables 3 and 5. Of 19 patients who went through a restorative procedure, a conclusion was accomplished in 12 patients (52.2%), hence the careful achievement rate was 63.2%. Careful assessment was performed after a normal

time of 28 days (range 18-42 days) from the determination of the fistula. (Table 4). Five patients with high results (21.7%) passed on due to sepsis, serious ailing health, and organ disappointment, one during moderate treatment, and 4 patients following a medical procedure. Tow (8.7%) patients created tireless fistulas after remedial and supportive medical procedures and a choice made to avoid further medical procedures due to cutting-edge threats. The typical clinic stay in this study was 32.6 days (range 14-75 days). It was essentially longer in patients with high-output fistulas contrasted those with moderate and low result fistulas (43.5 days and 26.2 days individually).

DISCUSSION:

Management of the patient with enterocutaneous fistula still represents one of the major challenges and dilemmas in general surgical practice. Although the management of such fistulas has been improved with a better understanding of the anatomical, pathophysiological, and metabolic derangement, better control of sepsis, adequate nutritional support, and improvement in the critical care and surgical treatment; the mortality rate is still high The main concern in the treatment of enterocutaneous fistula is to enhance the spontaneous closure. Although spontaneous closure occurs in some patients most of the cases need definite surgical intervention to excise the fistulous tract and to restore the continuity of the intestine if the clinical and operative conditions permit. The present study shows that adherence to a treatment guideline results in a good general outcome. We found that optimization of the patient's general conditions results in increased spontaneous closure and the recurrence rate and mortality did not influence significantly over a prolonged time of conservative treatment. Furthermore; delaying surgery and improving patients' health status improve surgical outcomes by increasing closure rate and decreasing recurrence]. Proximal fistulas (duodenal and jejuneal) are indolent and aggressive and unlikely to close spontaneously than distally located fistulas. Proximal fistulas result in marked fluid and electrolyte deficiency, malnutrition, and sepsis. Serum albumin levels and plasma transferrin provide good nutritional markers.

Table 3 Enterocutaneous Fistula Outcomes According To Location Of The Fistula.

Origin	No.of patients (20 patients)	Spontaneous closure	
	Operative closure	Total closure	Deaths
Duodenum	2	0	
	2	2	0
Jejunum	4	1	
	3	4	0
Ileum	8	1	
	6	7	1
Appendix	1	0	
	1	1	0
Colon	5	1	
	3	4	1

Surgery should be delayed until their levels are normalized. Serum transferrin could be useful in predicting which patients with enterocutaneous fistulas should precede surgery despite anatomic features favorable for spontaneous closure. In this study, most patients with low albumin and transferring were normalized prior to surgery except in 6 patients when surgery was deemed necessary to prevent further deterioration. Levels below 25 g/l underwent the operation. These patients represented a seriously ill group that continued to show signs of inflammation despite all endeavors to treat infection and in which postponement of surgery was thought to lead to further deterioration. Proximal small bowel fistulas have a lower probability of spontaneous closure, about 20–30% (average 25%) with prolonged courses of treatment (45–70 days, average 50 days), compared to distal small bowel and colonic fistulas (75–90%, average 80%, 21–40days, 25 days respectively.) [10,20]. the rate and time elapsed between diagnosis of the fistula and spontaneous closure or operative treatment for various origins in our study are shown in Table [4]. Because spontaneous closure of enterocutaneous fistulas after conservative treatment depends on many variables, a range, varies from 15% to 70% was reported in the literature in our study 17.4% of the fistulas healed spontaneously. We reported a low rate of spontaneous closure for proximal small bowel fistulas; it was recorded in only 3 of 23 patients (13.1%).Spontaneous closure of ECF did not occur after 7 weeks. Control of sepsis and fistula effluent is essential for spontaneous closure. We found Spontaneous closure rate of fistulas with sepsis was significantly less than those without sepsis (4.3% versus 13%, respectively). Fluid and electrolyte loss from proximal high-output fistulas can be decreased with administrations of the long-acting somatostatin analog octreotide, proton pump inhibitors, and loperamide. The use of octreotide was reported to decrease fistula output, but whether it promotes or decreases the time for spontaneous closure remains a controversial issue and needs to be determined.

Recent studies found that, although the output of enterocutaneous fistulas has been decreased by these hormones, results from randomized controlled studies have not included them in the standard management of enterocutaneous fistula.We prescribed octreotide for 16 patients with proximal high-output fistulas. Diminished output was observed in 12 (52.2%) patients.

Table 4 Time Intervals (average) For Spontaneous Closure And Post-operative Treatment.

Origin	No. of patients	Diagnosis-spontaneous closure (days)
	No.of patients	Diagnosis-operative treatment (days)
Duodenum	0	-
	2	17
Jejunum	1	30
	3	35
Ileum	1	17
	6	23
Appendix	0	-
	1	13
Colon	1	24
	3	16

About 70–85% of patients with enterocutaneous fistulas require operative correction in spite of initial conservative trials. In our series, surgery was done for 19 patients. The main indication for surgery was abscess drainage and persistent fistula after at least 4–6 weeks of conservative treatment. Other indications for surgery include fistulas with features that preclude spontaneous closure, such as proximal high output fistulas, large defect, end-type fistula, complex multiple fistula, distal obstruction, and recurrent fistulas. several studies have shown that better outcomes were reported in patients who waited on conservative treatment for a long period (6–12 weeks or even more) while others stated that such prolonged delays can result in increase in the risk of fluid and electrolyte depletion, sepsis, and malnutrition. In our study, surgery resulted in the closure of 12 fistulas (52.2%). Mawdesley JE et al. [29] reported that for patients treated conservatively, a decreased probability of enterocutaneous fistula closure was associated with a high fistula output, co-morbidity, and being referred from an external institution while successful enterocutaneous fistula closure for patients treated surgically depends mainly to the complexity of the fistula (presence of an internal abscess cavity and multiple fistulas). Sepsis, malnutrition, and fluid and electrolyte disturbances are the main causes of mortality. In our study, the mortality rate was 21.7%.The mortality rate among patients treated conservatively was 4.3% and those who have had surgery were 17.3% (Table 5). Patients with small bowel, proximal high-output fistulas have high mortality rates. Our findings are consistent with the results of similar research.

Table 5 Several Variables Were Used Clinically To Judge The Likelihood Of Spontaneous Closure.

Factors	Favourable	Unfavourable
Anatomy of fistul	Colon, Ileum	Duodenum, Jejunum
Output Low	Low	High
Sepsis	Absent	Present
Nutritional status	Well-nourished	Malnourished
Fistula character	Small defect fistula	Large defect fistula
Intestinal continuity	Present	Absent
Serum albumin	> 25g/l	<25g/l
Transferrin	>200mg/dl	<200mg/dl
Distal obstruction	Absent	Present
Diseased bowel	Absent	Present
Previous abdominal;	Absent	Present
Pelvic irradiation	Absent	Present

Death due to duodenal and Jejunal fistulas have been reported to have double the death rates associated with distal ileal and colonic fistulas

due to higher effluent. Several variables used clinically to judge the likelihood of spontaneous closure are illustrated in Table 6. Our results showed that the main causes of failed conservative treatment of enterocutaneous fistulas are high output, proximal and complex fistulas associated with internal abscess cavities whereas the main causes of operative treatment were the underlying cause of the fistula such as malignancy, comorbidities, and overwhelming sepsis. Our findings were consistent with Table 4 Time intervals (average) for spontaneous closure and post-operative treatment. Origin No. of patients Diagnosisspontaneous closure (days) The main limitations of this study are that of any retrospective study, a small number of patients involved, and the follow-up periods were deemed insufficiently long to evaluate the management outcomes of various surgical repairs. Large sample sizes and high-quality prospective studies with longer follow-up periods are required for better evaluation of the management outcomes of enterocutaneous fistulas.

CONCLUSION :

Management of postoperative enterocutaneous fistulas is challenging and a big surgical dilemma. Strict adherence to standardized protocols and a multidisciplinary approach can result in a better outcome. Initial conservative treatment is always required to optimize the general health of the patients by correcting nutritional status, replacement of fluid and electrolytes, improvement of serum albumin and transferrin, and most importantly controlling sepsis. Operative correction in a poor general condition and sepsis would be catastrophic for the patient. Surgery however is usually required for proximal, high output fistula and fistulas associated with diseased bowel. One-stage repair can be performed successfully in the majority of stable patients. The complexity of the fistulas, sepsis, high output effluent, and comorbidities are the main factors affecting healing rates and fistula-related mortality.