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A PROSPECTIVE STUDY ON ENTEROCUTANEOUS FISTULA IN A TERTIARY CARE CENTRE: A SINGLE INSTITUTION STUDY

Karthikeyan Selvaraj[1]*, Rajalakshmi Ramamurthy[2], Prithvinathan V[1], Sasikumar Patabi[1]

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ABSTRACT
Background: Aberrant connection linking gastrointestinal tract and the skin is termed Enterocutaneous fistula. Enterocutaneous fistulas can lead to significant morbidity and mortality. Death pertaining to enterocutaneous fistulas remains enormous when juxtaposed with other surgeries. The treatment of Enterocutaneous fistula may be a significant challenge to surgeons and gastroenterologists. **Method:** After obtaining ethical committee clearance, a total of 25 patients of Enterocutaneous fistula who presented to Surgical department and Surgical Gastroenterology department were included in the study. The cause, site and output of fistula, clinical course and complications of fistula were studied. Patients were managed either surgically or conservatively depending on the output of the fistula, nutrition and metabolic profile. **Results:** 19 patients were managed conservatively and 6 patients were managed surgically. Amidst the conservative group, 16 out of 19 patients had spontaneous closure of fistula and remaining three had died as fistulas failed to close. Surgical closure was accomplished in 5 patients but failed in one patient and that patient died. 96% (24 out of 25) of patients in our study had developed fistula post operatively. Among 25 patients studied, nearly 44% each i.e., 11 out of 25 patients had colonic and small bowel fistula respectively followed by fistula at appendix accounting for 12% (i.e., Fistula Output: 11 (44%) fistulae were low output, 8 (32%) were medium output. **Conclusion:** Enterocutaneous fistulas are more common in postoperative period. Conservative treatment should be the mainstay in management of Enterocutaneous fistula.

INTRODUCTION

Aberrant connection linking gastrointestinal tract and the skin is termed Enterocutaneous fistula [1]. It is a dreaded ramification of abdominal surgeries, although inflammatory bowel disease, ischemic bowel disease, tuberculosis, diverticulitis, trauma, malignancy and radiotherapy very often contribute to it. Enterocutaneous fistulas (ECF) can lead to significant morbidity and mortality. Death pertaining to enterocutaneous fistulas remains enormous when juxtaposed with other surgical conditions [2]. Complications of enterocutaneous fistulas are

[1]*Department of General Surgery, Sree Balaji Medical College & Hospital, Chennai, Tamil Nadu, India*
[2]*Department of Dermatology, ESIC Medical College and Hospital, Chennai, Tamil Nadu, India*

For Correspondence: **drsk1287@gmail.com**

fluid and electrolyte disturbance, malnutrition, and sepsis. Septic complications related to ECFs vary from localized abscess, infection of soft tissue, generalized peritonitis, or even frank sepsis. It should be aggressively treated with control of fistula at earlier stage, drainage of any abscesses or localized collections and suitable antibiotic therapy. Postoperative ileus, loss of absorptive surface area, loss of bowel integrity, sepsis, and the external loss of protein-rich enteric contents result in malnutrition and fluid and electrolyte disturbance. Early and meticulous correction of fluid and electrolyte abnormalities and supplementing adequate (parenteral or enteral) nutrition are of great importance in reducing or circumventing these complications. The treatment of enterocutaneous fistula may be a significant challenge to surgeons and gastroenterologists. Management should begin with the aim of correcting imbalance in fluid and electrolytes, prevention and treatment of sepsis and control of fistula output [3,4].

METHODOLOGY

A prospective study was conducted in Sree Balaji Medical college during the period from August 2020 to October 2021 with 25 patients of Enterocutaneous fistula who presented to Surgical department and Surgical Gastroenterology department after obtaining ethical committee clearance (ref no: 002/SBMC/IHEC/2020/1316). After getting proper written consent the individuals in whom Enterocutaneous fistula emerged while under treatment in this hospital or those who presented to this hospital subsequent to occurrence of fistula were included in this study. 25 patients were included in the study on the basis of inclusion and exclusion criteria. The aims of the study were to study the various etiologies and types of gastrointestinal cutaneous fistulas encountered in this institution, to study the various complications of gastrointestinal cutaneous fistulas and their management and to study the results of conservative and operative management.

Inclusion criteria: 1) All enteric fistulas from oesophagus to rectum presenting on to the skin are included in this study. 2) Diagnosis of fistulae is based on clinical suspicion (bile, feculent discharge from abdominal incision or through drain), confirmed radiologically or at surgery 3) Patients referred to Sree Balaji Medical College & Hospital with fistula.

Exclusion criteria: 1) Congenital fistulae 2) Oral fistulae. 3) Fistula-in-Ano. 4) Fistulas resulting from a planned surgical procedure, like catheter duodenostomy, feeding enterostomies, gastrostomy, ileostomy and colostomies.

All the patients were subjected to detailed clinical history and thorough clinical examination and essential blood and radiological investigations. The cause, site and output of fistula, clinical course and complications of fistula were studied. The site of the fistula was determined using a variety of diagnostic technique. Fistulogram was used in 5 patients and it helped in revealing the origin of the fistula. In a single patient alone, site of fistula was diagnosed intraoperatively. In the rest of individuals studied, a clinical diagnosis of fistula was made.

Patients were managed either surgically or conservatively depending on the output of the fistula, nutrition and metabolic profile. 19 patients (76%) were managed conservatively with aim to correct fluid and electrolyte disturbance and to supplement nutrition and adequate skin care. 6 patients (24%) were managed surgically.

Operative Group: Surgical closure of fistula was done in 6 patients. **Surgeries done for fistula closure:** i) Fistula excision and end to end anastomosis done in 2 patient ii) fistula exclusion and anastomosis in 1 patient iii) fistula closure in 3 patients.

RESULT AND DISCUSSION

Demographic factors: Enterocutaneous fistula were more frequently noticed in age group of 31yrs - 40yrs and 61yrs - 70yrs. The mean age of development of fistula was 52.64 years. In the present study 17 were males (68%) and 8 were females (32%).

Etiological factors: The most common cause of enterocutaneous fistulas were fistulas resulting from surgery. In the current study 24 out of 25 (96%) were post operative fistulas and 1 out of 25 (4%) were spontaneous fistulas. This almost correlates with *Prakash et al study* [5] wherein 95% of patients developed fistula postoperatively. In our study, enterocutaneous fistulas occurred as direct sequalae post-surgery in 24 patients. Surgeries which often resulted in occurrence of fistula in our study include perforation closure and resection & anastomosis of the bowel. Post-operative Enterocutaneous fistulas were observed more frequently with emergency surgeries in nearly 16 out of 25 (64%). 1 out of 25 fistulas occurred spontaneously.

Primary Disease: Viscous perforation (8), Malignancy (8), Tuberculosis (2), Sigmoid volvulus (2), Post appendectomy (3), Exploratory laparotomy for blunt injury abdomen (2) were among the primary diseases for which the patients were hospitalized for treatment.

Site of Fistula: Among 25 patients studied, nearly 44% each i.e 11 out of 25 patients had colonic and small bowel fistula respectively followed by fistula at appendix accounting for 12% (i.e. 3 patients).

Fistula Output: 11 (44%) fistulae were low output, 8 (32%) were medium output; 6 (24%) fistulae were high output [Figure 1]. When a fistula output is less than 200 ml then it's considered as low output, if the same is more than 500 ml then it is termed as high fistula. Fistula with output in the range of 200-500 ml is termed as intermediate fistula [6].

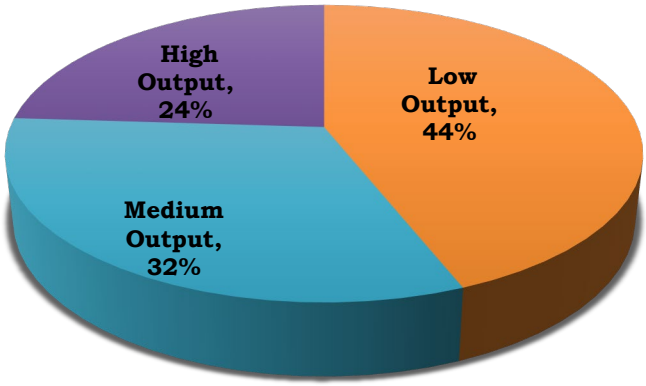

Fig 1: Enterocutaneous fistula- depending on the output

Conservative Group:

Nearly 64% that is 16 patients had spontaneous closure of fistula among 19 patients who were treated conservatively. The remaining 3 patients had died as fistulas failed to close. 11 patients with low output fistula, 6 out of 8 medium output fistula and 2 out of 6 patients were managed conservatively **[Figure 2]**. In the patients in whom spontaneous closure of fistula had occurred 5 medium output and 11 low output fistula. Early diagnosis, managing fluid and electrolyte imbalance, providing nutritional support, scrupulous skin care and sepsis control helped in decreasing mortality and allowed spontaneous closure of fistula.

Operative Group:

Surgical closure of fistula was done in 6 patients; closure was accomplished in 5 patients but failed in 1 patient.

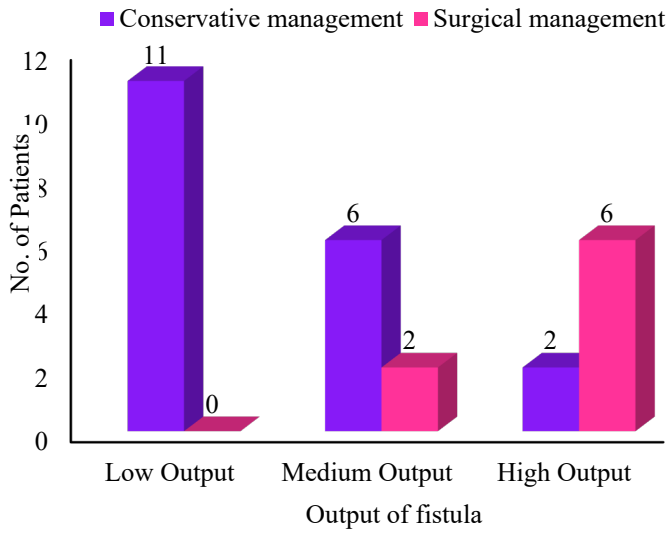

Fig 2: Enterocutaneous fistula management

Fistula Non closure:

4 fistulas did not close either conservatively (3) or surgically (1). All these 4 patients died which included 3 patients with high output fistula and 1 patient with medium output fistula. There were 2 small bowel fistula and two from colon. Reasons ***for non-closure of fistula*** is mentioned in Table 1

Table 1: Reasons *for non-closure of fistula*

Cause of Non-Closure	Total No. of Patients
Malignancy	1
Tuberculosis	1
Sigmoid Volvulus (Anastomotic leak)	1
Traumatic jejunal perforation with intra-abdominal abscess	1

Complications of fistulas: Metabolic Complications:

1) Hyponatremia occurred in 11 patients (44%), hypokalemia in 12 patients (48%), and hyperkalemia occurred in 2 patients (8%). Hypoalbuminemia was observed in twenty patients whom intensified over time in 18 patients. 2) Amidst 25 individuals studied, 24 patients were anemic. 3) *Skin Complications:* Skin excoriation was seen in 18 out of 25 patients (72%). Fistulous output was managed by drainage tubes in 2 patients and ostomy bag application in 1 patient and sump suction in 1 patient and with dressings and zinc oxide in remaining patients. Taking advantage of recent advances in techniques of pre- and post-surgical management and support, employing a multidisciplinary approach and executing a well delineated management plan provide the patient and the surgeon with the best possibility of success in treating this potentially devastating condition [7].

Total Parenteral Nutrition (TPN): Total parenteral nutrition was initiated in 2 patients. Closure of fistula happened in 1 patient. T.P.N was suspended in the other patient as a consequence of financial burden to the patient. Depending on fistula site and nutritional status, clinicians have to decide whether total parenteral or enteral nutrition should be established [8].

Complication of Treatment: Pleural effusion occurred in 5 individuals, acute renal failure in 2 persons, and deep vein thrombosis in 1 patient.

Mortality: Mortality rate was 16% i.e 4 out of 25 patients had demised. The reason for demise was septicemia in 3 patients and multi organ dysfunction syndrome (MODS) in 1 patient. Among the 4 patients who died, 3 suffered from high output fistulas and 1 from medium output fistula. Depending on the site, two were from small bowel and 2 from colon. All these patients deteriorated as a consequence of multiple electrolyte imbalances and hypo albuminemia. The patients in whom fistulas failed to close had died. Hollington et al study [9] reported mortality rate of 10.5% due to enterocutaneous fistula which is slightly less than the current study. ECF related morbidity and mortality can be high due to fluid loss and electrolyte imbalance, sepsis and malnutrition [8]

Hospital Stay: When gastrointestinal fistulas occurred, a prolonged hospital stay is needed. Mean hospital stay in our study was 38.76 days. Successful management of the ECF presents complex physiological and anatomical challenges. It is often a prolonged, multiphase process [10]. The principal concern in treating enterocutaneous fistula is to intensify the closure spontaneously. Intricate management of ECF can be done with multidisciplinary approach. In a case of postoperative fistula, surgical treatment is planned only when fistula remains unresponsive with conservative treatment.

Proper counselling to the patient and family and appropriate psychiatric help in needy cases and antidepressants in some chronically hospitalized Enterocutaneous fistula patients may help to maintain their mental and physical wellbeing.

The current article has reviewed the rationale behind the current treatment approach for enterocutaneous fistula. The current study has a limitation of smaller sample size. Since restricted number of cases studied, it consequently affects statistical power of work. In future, similar studies may be carried out with larger sample size.

CONCLUSION

Enterocutaneous fistulas are more common in postoperative period. Conservative treatment should be the mainstay in management of Enterocutaneous fistula. Despite poor nutritional status, financial constraints (to receive TPN and ICU care) low educational status and associated stigma, prognosis is good with supportive care, early enteral nutrition and by taking patients and relatives into confidence. Sepsis control, maintaining electrolyte balance and providing nutritional support are vital in managing the same. Surgical management is done when the conservative management fails.

FINANCIAL ASSISTANCE

Nil

CONFLICT OF INTEREST

The authors declare no conflict of interest

AUTHOR CONTRIBUTION

Karthikeyan Selvaraj designed the entire work. Rajalakshmi Ramamurthy, Prithvinathan and Sasikumar Patabi contribute in making necessary correction and revision of the manuscript. The final draft was checked by all the authors.

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