

A single Centre study of management outcomes of iatrogenic enterocutaneous fistulas.

¹Dr. Shashank Pinnamaneni, Post Graduate

²Dr. Malla Ramya Sai, Post Graduate

³Dr. Sushama Surapaneni, Professor

⁴Dr. I. Kamalesh, Assistant Professor

Corresponding Author: Dr. Shashank Pinnamaneni, Post Graduate

How to citation this article: Dr. Shashank Pinnamaneni, Dr. Malla Ramya Sai, Dr. Sushama Surapaneni, Dr. I. Kamalesh, “A single Centre study of management outcomes of iatrogenic enterocutaneous fistulas”, IJMACR- March - 2023, Volume – 6, Issue - 2, P. No. 486 – 491.

Open Access Article: © 2023, Dr. Shashank Pinnamaneni, et al. This is an open access journal and article distributed under the terms of the creative commons attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Case Study

Conflicts of Interest: Nil

Abstract

Introduction : Enterocutaneous fistula is known to be a major challenging issue to the surgeons. It's an external type of Intestinal fistula. Ileum is the most common site for Enterocutaneous fistula. Enterocutaneous Fistulas may be: Iatrogenic that develop as postoperative complication (75-85%), Major abdominal trauma (15-25%) and Spontaneous.

Despite the advances in treatment of EC Fistulas as in control of sepsis and higher antibiotics, mortality rate in EC Fistulas is 10-30%. Post operative or Iatrogenic EC fistulas are due to anastomotic leak, unnoticed and iatrogenic injury, bowel exposure to large abdominal defects or prosthetic mesh or compromised blood supply.

Aims and Objectives: To study and assess the management outcomes of 20 patients with iatrogenic fistulas following SOWATS protocol.

Materials and Methods: Place of study: NRI Medical college and General Hospital, Chinaka kani, Study population - 20 patients who developed postoperative Enterocutaneous fistulas of various etiologies in our hospital. Type - prospective and observational study. Duration of study- Dec 2020 to Mar 2022.

Results: ileum is the most common site of fistula seen in 11 patients (55%). Spontaneous closure is observed in 6 patients (30%) within 12-65 days, mean duration of 32 days. 14 patients (70%) underwent surgical correction after 14-60 days of failed conservative management, mean duration is 37 days from diagnosis. Success rate is 78.7%. 2 patients died due to sepsis, hypoalbuminemia.

Keywords: Enterocutaneous Fistula, Spontaneous Closure, Mortality, Timeline. SOWATS Protocol.

Introduction

In general surgery, enterocutaneous fistulas are regarded as a significant problem and are challenging. About

75%–85% of enterocutaneous fistulas are iatrogenic in origin and occur as a postoperative complication, while in 15%–25% of cases they develop due to abdominal trauma or spontaneously due to malignancy, inflammatory bowel disease (mainly Crohn's disease), radiation enteritis, ischemia, or infectious conditions like diverticulitis and appendicitis. Despite advances in the management of these fistulas with the better control of sepsis by new and powerful antibiotics, improvement of the intensive care unit, improved nutritional status, and the advent of new imaging modalities, the mortality rate is still high, with a range between 10% to 30% or even more in some series. The most frequent unintentional technical mistakes that result in enterocutaneous fistulas due to unintentional technical mistakes, such as an enterotomy that went undetected or an anastomosis that was broken by too much tension or by a poor blood supply. Fistulas can also develop as a result of the bowel wall being eroded by a foreign substance, such as a tube drain, or a nearby abscess.

Once the enterocutaneous fistula is discovered and diagnosed, the principal aim of management is to promote spontaneous closure of the fistula, and when this is not possible, to resect the fistulous tract and to restore the continuity of the bowel, if it is possible after optimization of the clinical conditions of the patient. In this study, we provide a comprehensive analysis of the clinical presentation, treatment, and outcome of 20 postoperative enterocutaneous fistulas.

Case study

Place of study

NRI Medical College and General Hospital, Chinaka Kani. Study population: 20 patients who developed postoperative Enterocutaneous fistulas of various etiologies in our hospital who underwent emergency

laparotomy procedure for various conditions such as intestinal obstruction, ileal perforation, post LSCS, caecal perforation, necrotising pancreatitis, appendectomy and other surgeries such as hernioplasty for incisional hernia, TAH and salpingectomy.

Inclusion criteria

Patients who developed enterocutaneous fistulas post operatively after abdominal surgeries.

Exclusion criteria

Patients with

- Oesophageal fistula.
- Gastric fistula.
- Biliary fistula.
- Pancreatic fistula.

Variables

- Age
- Sex
- Primary aetiology.
- Anatomical site.
- Output fistula.
- Serum albumin.
- Type of fistula.
- Presence or absence of sepsis.

Modes of management

- Conservative management-

Following SOWATS protocol i.e.,

Sepsis control, Optimization of nutritional status, Wound and skin care, Delineation of fistula Anatomy, Timing of surgery surgical planning and strategy.

A thorough surgical history and examination was done in all 20 patients. Nutritional status of patient, complete blood picture, serum albumin, CRP were recorded. Postoperative fistulas are classified based on their anatomy and output. All 20 patients were initially

observed for spontaneous closure of the fistula for 6 -12 weeks.

Hypokalemia, hyponatremia, metabolicacidosis were corrected if present.Total enteral nutrition was administered in 4 patients (20%) using ryles feeding. Total parenteral nutrition (TPN) was administered for 8 patients with high and moderate output fistulas.6 out of 8 patients had good outcome after TPN administration. 2 of them had both TEN and TPN.Containment of fistula effluent and peri fistulous skin were taken care.Regular dressings were done for low output fistulas and sometimes a pouch bag is used. In high output fistula, a one-piece ostomy pouch is used and skin barriers as pectin-based powders, zinc paste, cream or spray are used.

In some patients negative pressure dressing were done to reduce the area of fistula and decreasing the output. CECT abdomen was done in 17 patients to know anatomy of fistula, stenosis or obstruction of fistula which may lead to abscess formation. Preoperative CECT or Fistulography with methylene blue dye ingestion was done in cases where spontaneous closure was not attained.

Surgical Management

14 patients mostly with complex and high output fistulas failed to close spontaneously after 6-12 weeks (mean of 8 weeks).Albumin was corrected to be >2.5gm/dl,Hb, dyselectrolytemia& nutrition were corrected, sepsis if present was controlled. Single step surgery was main aim for these patients.

Surgical procedures performed

- Wedge excision
- Resection of involved segments of intestine and anastomosis with / without omental patching over anastomosis.Post operative follow up for 6-12 months.

Results

Variables	No. of patients	%
Sex- male	12	60
female	8	40
Age - <60 yrs	15	75
>60 yrs	5	25
Primary etiologybenign	16	80
Malignant	4	20
Anatomysmall intestine	17	85
large intestine	3	15

Table 2: Incidence of variables.

Variables	No. of patients	%
Outputs - low (<200ml/day)	10	50%
moderate(200-500ml/day)	3	15%
high(>500ml/day)	7	35%
Serum albumin- <2.5gm/dl	14	70%
>2.5gm/dl	6	30%
Type - simple	13	65%
complex	7	35%
Sepsis - absent	15	75%
present	5	25%

Figure 1

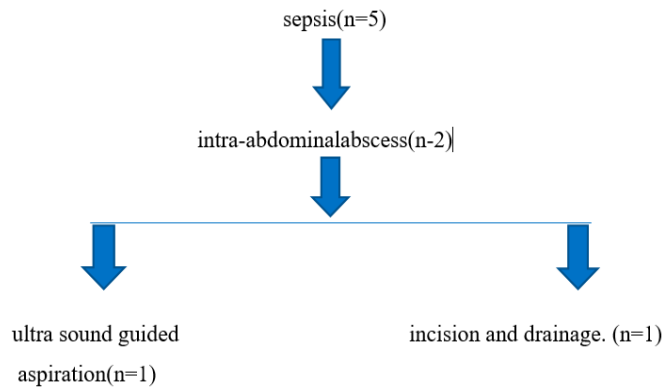


Table 3: primary surgery after which EC Fistula developed.

Primary etiology & Previous surgery resulted in ECF	No of patients(N)	%
Intestinal obstruction emergency laparotomy and ileostomy followed by closure	4	20
Duodenal perforation - repair	2	10
Ileal perforation - resection and anastomosis	4	20
Post LSCS	1	5
Caecal perforation - blow hole caecostomy	1	5
Incisional hernia - hernioplasty	3	15
Necrotizing pancreatitis - necrosectomy	1	5
appendicectomy	2	10
TAH and Salpingectomy	2	10

Ileum is the most common site of fistula seen in 11 patients (55%). Spontaneous closure is observed in 6 patients (30%) within 12-65 days, mean duration of 32

days. 14 patients (70%) underwent surgical correction after 14-60 days of failed conservative management, mean duration 37 days from diagnosis. Success rate is 78.7%. 2 patients died due to sepsis, hypoalbuminemia, malnourishment, multiple and complex high output fistula. 2 patients had recurrence after surgical intervention for fistula, of whom 1 patient died after 1 week after recurrence.

Table 4

Site of origin	No of patients	Spontaneous closure	Surgical correction	deaths
Ileum	11	1	10	1
Duodenum	3	2	1	1
Caecum	1	1	-	-
Colon	2	1	1	-
Jejunum	3	1	2	-

Tab 3 ECF outcomes based on site

Abdominal wall defect is commonly observed in fistulas originating in ileum and post operative recovery. Proximal high output fistulas of ileum caused skin excoriation in almost 30% cases.

2 patients with abdominal wall defects had recurrence after correction and 1 out of 2 died due to multiple factors. Negative pressure wound therapy in 3 patients with abdominal wall defect assisted in wound healing. The average hospital stay of all patients is 14-70 days, mean 42 days. It's delayed in patients with high output, sepsis and malnourishment.

Discussion

Management of EC Fistula is a challenging issue to the surgeons. Radiological imaging and delineating the anatomy, surgical intervention and management of

metabolic disturbances improves the prognosis of EC fistulas. Main motto of ECF treatment is to achieve spontaneous closure or single stage correction surgery without recurrence. This study shows following the SOWATS protocol its proven to have a better outcome. Spontaneous closure is affected by various patient and metabolic factors. Hence maintenance of general condition and electrolyte balance plays a key role. Prolonged conservative management in low output fistula has no significance on outcomes in comparison to high output fistulas. Proximal fistulas i.e., jejunal and ileal fistulas are aggressive and spontaneous closure rate is low (31.3%) due to marked fluid and electrolyte disturbances and malnourishment. Serum albumin levels plays a key role in fistula closure. Patients with albumin <1.8gm/dl had recurrences and had abdominal defects due to poor wound healing. Proximal EC Fistulas as jejunum and ileum fistulas have less spontaneous closure as in 2 patients (14%) of 14 patients and had long hospital stay and need for surgical correction. Comparatively large intestine fistulas are low output fistulas and had high chances of spontaneous closure as in this study 75% of large intestine fistulas had spontaneous closure. Sepsis control is also crucial for spontaneous closure and for post operative recovery. About 70% of patients required surgical correction after a certain time period with a persistent fistula even after 6-8 weeks mostly with high output and complex fistula. Other indications for surgery include fistula with an abscess, with distal obstruction, large defect, end type fistula, complex, multiple fistulas and recurrent fistulas. In our study, about 12 patients (85.7%) had no recurrence and mortality rate is 14% that is 2 patients even after surgical intervention due to added risk factors and comorbidities. Mawdesley et al reported that patients

treated conservatively, a decreased probability of ECF closure was seen with a high output fistula, comorbidities and referred from higher institutes while successful ECF closure for patients treated surgically mainly contribute to complexity of fistula. Sepsis, malnutrition, fluid and electrolytes disturbances are the main causes of mortality.

In our study, mortality rate is 10%. The mortality is seen in surgically managed proximal enterocutaneous fistulas. Mortality rate is high in duodenal fistula compared to ileal fistulas. Mortality is also seen in multiple, complex and high output fistulas with recurrence in our study.

Conclusion

Management of EC Fistula is a big surgical dilemma. Following strict standardized protocols and multi-disciplinary approach can result in better outcome. Conservative management initially aids for spontaneous closure and to improve general status of the patient for correction surgery. Correction of fluids, electrolytes and albumin helped in early recovery in both closure or surgical patients and decreased hospital stay.

Surgical correction in malnourished and in patients with low albumin levels may lead to recurrence and deterioration of patient and increase the mortality rate. Most of the patients are corrected by single stage correction. All patients should be observed for spontaneous closure before opting for surgical intervention for a certain time period. The complexity of fistulas, sepsis, high output effluent and associated comorbidities are the main factors affecting healing and mortality of patient.

Table 5

Factors	Favorable	Unfavorable
Anatomy of fistula	Colonic, ileum	Duodenum, proximal jejunum
Output	Low (<200ml/day)	High (>200ml/day)
Sepsis	Absent	Present
Nutritional status	Well-nourished	Malnourished
Fistula character	End fistula, long tract fistula, end fistula and small defect fistula	Short tract 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

References

1. Ibrahim Fahil Noori, post operative enterocutaneous fistulas: management outcomes in 23 consecutive patients 2021.
2. S.M.Berry, J.E.Fischer - classification and pathophysiology of enterocutaneous fistulas. surg. Clin., 76(5) (1996), pp.1009-1018.
3. L.J.William, S.Zolfaghari, R. Boushey - complications of enterocutaneous and their management - Clin.Colon Rectal Surg., 23(3) (2010), pp.209-220.
4. Carla I. Haack, John R. Galloway, Jahnvi Srinivasan Enterocutaneous fistulas: a look at causes and management Curr Surg Rep, 2 (2014), p. 71

5. Irena Gribovskaja-Rupp, B. Genevieve Melton. Enterocutaneous fistula: proven strategies and updates Clin. Colon Rectal Surg., 29 (2016), pp. 130-137
6. K. Parkash, K.M. Nanda, K. Vikram Enterocutaneous fistulae, etiology, treatment and outcomes A study from south India Saudi J. Gastroenterol., 17 (6) (2011), pp. 391-396
7. D.A. Lloyd, S.M. Gabe, A.C. Windsor Nutrition and management of enterocutaneous fistula Br. J. Surg., 93 (9) (2006), pp. 1045-1055.
8. Surgical treatment of enterocutaneous fistulas Korean J. Radiol., 13 (1) (2012), pp. 517-520.
9. J.A. Mawdesley, P. Hillington, P. Bassett, A.J. Windsor, A.Forbes, S.M. Gabe An analysis of predictive factors for healing and mortality in patients with enterocutaneous fistulas
10. J.L. Martinez, E. Luque de león, G. Ballinas Oseguera, J.D.Mendez, M.A. Juarez Oropeza, R. Román Ramos.