

Original Research Article

Rationale in management of entero-cutaneous fistula following routine and emergency surgery: a prospective study in a tertiary care hospital of Odisha

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ABSTRACT

Background: The enterocutaneous fistula is an abnormal communication between gastrointestinal tract and skin. It is a grave surgical complication following surgery on gastrointestinal tract. Despite in surgical nutrition and critical care, mortality from enterocutaneous fistula remains high. Improvements in outcome are focused on prevention and when fistula occurs, prompt recognition and intervention is essential.

Methods: This is institutional based prospective observational study which was conducted in S.C.B Medical college, Cuttack, Odisha for a period from September 2015 to September 2017 on 30 patients with enterocutaneous fistulae occurring as post-operative complication among patients admitted and operated at our institution for various gastrointestinal conditions and also referred from other centres after complication had set in. Detailed history, physical examination, routine workup, management and its outcome were studied.

Results: The maximum number of fistulae (86.7%) developed after emergency surgery than routine. Incidence of enterocutaneous fistulae was observed in cases operated for intestinal obstruction (40%) followed by operation for enteric perforation (28%). The highest incidence of enterocutaneous fistula occurred on 8th post-operative day (36.7%). 24 cases were treated conservatively while 6 patients underwent operative treatment.

Conclusions: Hence, the enterocutaneous fistula is frequently seen with emergency surgery of gastrointestinal tract, particularly on ileum, usually occurring around 8th post-operative day and most of them end in spontaneous closure with conservative treatment.

Keywords: Enterocutaneous fistula, Emergency laparotomy, Routine G. I. surgery

INTRODUCTION

The gastrointestinal cutaneous fistula (enterocutaneous fistula) is an abnormal communication between gastrointestinal tract and skin (two epithelial-lined surfaces).^{1,2} Enterocutaneous fistulas represent a catastrophic complication of abdominal disease, usually following surgical procedures. At least 85%, and perhaps as many as 95%, follow abdominal operations.³ Despite in surgical nutrition and critical care, mortality from enterocutaneous fistula remains high, 10% in recent

reports.⁴ Improvements in outcome are focused on prevention and when fistula occurs, prompt recognition and intervention is essential.⁴

Such fistulae although usually straightforward to handle, often present to the surgeon with fascinating challenges because of their combination of anatomical abnormalities, metabolic disorder and extensive sepsis. A complete management of this fistulae involves skill in nutritional support, stoma therapy, the elimination of

sepsis and carefully timed, well-judged and well-carried-out surgery afterwards.⁵

All the previous reports on the management of enterocutaneous fistulae have demonstrated the gravity of this complicating with overall mortality in different level of gastrointestinal tract ranging from 20% to 60%.⁶⁻⁸ The bleak outcome and a high mortality rate in enterocutaneous fistula was the result of enormous fluid and electrolyte imbalance.^{6,7,9} But the introduction and standardization of parenteral nutrition, has improved considerably the treatment and prognosis with patients with enterocutaneous fistulae bringing down the mortality rate to as low as 6.45%.¹⁰⁻¹² Treatment of this complication in the past has generally consisted of conservative measures, followed in case of failure by surgical means.^{5,7,9,13,14}

From conservative treatment like protein rich diets, parenteral fluids, antibiotics, blood transfusion etc. we have come to the stage of intravenous hyperalimentation, which not only improves the general conditions of the patients and make them fit for surgery but in fairly good number of cases these fistulae close spontaneously. Gone are the days when these patients were tackled by an early surgical attempt at closure. Such an approach was almost invariably followed by immediate recurrence and increase in mortality. Sustained enteral or parenteral nutritional support, common now-a-days allows an opportunity to the fistula to close spontaneously in as nearly as 70% to 80% of cases.⁵ Even if this does not the patient is made better to stand further surgical procedure well.

METHODS

This is institutional based prospective observational study which was conducted in S.C.B Medical college, Cuttack, Odisha for a period from September 2015 to September 2017 on 30 patients with enterocutaneous fistulae occurring as post-operative complication among patients admitted and operated at our institution for various gastrointestinal conditions as emergency or routine surgery and also referred from other centres after complication had set in. The patients who met inclusion criteria and who gave an informed consent were studied.

Inclusion criteria

- Only external fistula that represents abnormal communication from some part of gastrointestinal tract to skin after elective or emergency surgery
- Patients of various age groups, diverse socio-economic status admitted and operated as elective surgery or emergency surgery

Exclusion criteria

- Biliary and pancreatic fistulae
- Planned fistulae like catheter duodenostomy, catheter gastrostomy, enterotomy for feeding, etc

- Oesophageal fistulae arising after total gastrectomy in which oesophagus anastomosed to duodenum or jejunum

The diagnosis was based on compressive clinical history of the case, thorough physical examination, routine laboratory investigations, and if needed radiological examinations and endoscopic studies.

Operative findings were carefully noted. Post-operative follow-up of cases, if enterocutaneous fistulae developed, were watched carefully and treated conservatively only and/or treated surgically. Detailed history related fistulae like post-operative day when leak occurred, amount of discharge, nature of discharge, culture and sensitivity of discharge etc were noted.

Patients were subjected to conservative treatment initially, but if following conditions occurred, they were subjected to operative management:

- Persistent drainage
- Abscess/peritonitis
- Obstruction
- Abdominal wound dehiscence

Patients were observed carefully and total duration of hospital stay was noted. They were regularly followed up and outcomes were noted.

RESULTS

During the period of study from September 2015 to September 2017, 30 cases of enterocutaneous fistulae were observed, who were admitted and operated in S.C.B Medical College and Hospital, Cuttack for various gastrointestinal conditions as emergency or routine surgery and also referred from other centres after this complication had occurred.

Table 1: Incidence of routine and emergency operations after which enterocutaneous fistula developed.

Type of operation	No. of cases (n=30)	%
Routine	4	13.3
Emergency	26	86.7

Age distribution

The maximum number of cases (33.3%) were between 21-30yrs of age. The minimum age recorded was 14yrs and the maximum age being 65yrs. The average age of the patients was 37.1yrs.

Sex

63.3% cases were male and 36.7% cases were female with male and female ratio being 1.7:1.

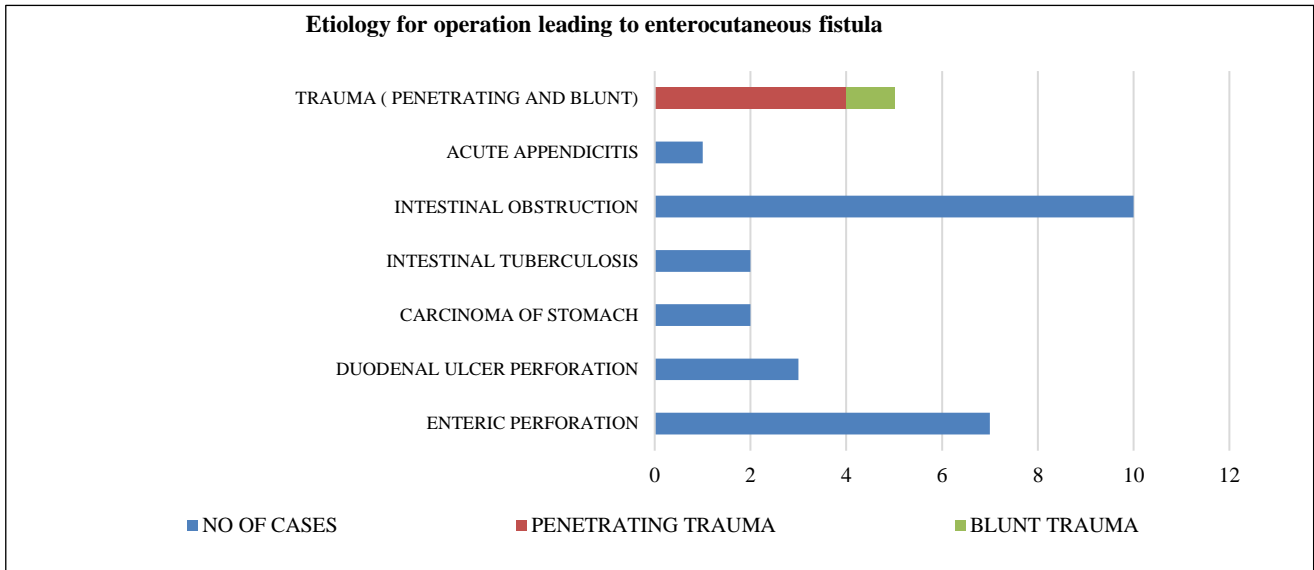


Figure 1: Etiology for operation which lead to development of enterocutaneous fistula.

Table 2: Incidence of leak in various routine and emergency operations performed.

Operation performed [non-traumatic]	n=25	%
Resection and Anastomosis of ileum	4	16
Enteric perforation closure	4	16
Duodenal ulcer perforation closure	3	12
Pelvic colectomy and end to end anastomosis	3	12
Laparotomy for peritonitis	2	8
Partial gastrectomy and gastrojejunostomy	2	8
Laparotomy for intestinal obstruction for bands and adhesions	2	8
Reduction of obstructed hernia and excision of gangrenous patch in base of caecum and repair	1	4
Closure of ileal perforation due to patchy gangrene	1	4
Appendectomy	1	4
Reduction of internal hernia and closure of rent	1	4
Resection of gangrenous ileum and ileo-transverse anastomosis	1	4
Operation for intra-abdominal injuries	n=5	
Removal of splinters (from Gun shot injury) from caecum and closure of perforation	1	20
Multiple perforations in ileum closed in layers	3	60
Laparotomy for peritonitis caused by ileal rupture after blunt trauma abdomen	1	20

Table 3: Incidence of various fistula output.

Output	No. of cases (n=30)	%
High (> 500 ml/24 hrs)	9	30
Moderate (200-500 ml/24 hrs)	16	53.3
Low (200 ml/ 24 hrs)	5	16.7

Table 4: Results of conservative treatment in various types of enterocutaneous fistulae.

Site of fistula	No. of cases	Spontaneous closure (%)	Average time taken for closure (days)	Death (%)
Duodenum	4	2 (50)	46	2 (50)
Jejunum	2	1 (50)	28.5	1 (50)
Ileum	14	7 (50)	31.2	7 (50)
Caecum	2	2 (100)	13	-
Colon	2	-	-	2 (100)
Total	24	12		12

Table 5: Results of operative treatment in various types of enterocutaneous fistulae.

Site of fistula	No. of cases	Fistula closure (%)	Death (%)
Duodenum	1	-	1 (100)
Jejunum	-	-	-
Ileum	3	2 (66.7)	1 (33.3)
Caecum	1	1 (100)	-
Colon	1	1 (100)	-
Total	6	4	2

Table 6: Various complications encountered in various types of enterocutaneous fistulae.

Complication	No. of cases
Weight loss	18
Moderate (5-10% of body weight)	4
Severe (>10% of body weight)	14
Infection	12
Controlled	10
Uncontrolled	2
Skin excoriation	6
Bed sore	3
Loose motion	5
Bleeding from fistula wall	1
Uraemia	1
Jaundice	1
Recurrence	2
Abdominal wound dehiscence	1

Religion

The maximum number of cases (83.3%) were Hindu followed by Muslim (16.7%).

Incidence of fistula after routine and emergency operation

The maximum number of fistulae (86.7%) had developed after emergency surgery while only (13.3%) cases developed fistulae after routine (Table 1).

Etiology for operation leading to enterocutaneous fistula

Incidence of enterocutaneous fistulae was observed in cases operated for intestinal obstruction (40%) followed by operation for enteric perforation (28%) (Figure 1). 5 cases of intrabdominal injuries amounting to enteric perforation, after operation presented with fistulae, out of which 4 cases (80%) were due to penetrating injuries and one case due to blunt injury.

Types of routine or emergency operation leading to enterocutaneous fistula

Maximum number of leaks occurring in non-traumatic cases was due to resection and anastomosis of ileum (16%), and after operative closure of enteric perforation (16%) and followed by duodenal ulcer perforation closure (12%). Among traumatic cases, maximum incidence of leak was seen in cases with multiple perforations in ileum which were closed in layers (60%) (Table 2).

Post-operative day of occurrence of enterocutaneous fistula

The highest incidence of enterocutaneous fistula occurred on 8th post-operative day (36.7%) with minimum and maximum time of onset being 3rd and 23rd post-operative day respectively.

Site of fistula

Maximum number of cases found to have a fistula from ileum (56.7%), followed by duodenum as fistula site (16.7%). No case of enterocutaneous fistula found from stomach, rectum, and appendix (Figure 2).

Output of fistula

Maximum number of cases (53.3%) had 200-500ml/24hrs fistula output. 30% cases had >500ml/24hrs fistula output and 16.7% cases had <200ml/24hrs output (Table 3).

Management of enterocutaneous fistula and the outcome

About 80% cases of enterocutaneous fistulae of various types were treated on conservative method and only 20% cases required operative treatment. Out of 24 cases treated with conservative methods, 12 cases (50%) underwent spontaneous closure of fistulae but rest 12 cases did not improve and died. It was also observed that 2 fistulae from caecum got spontaneous closure by conservative treatment (100%). Fistulae from duodenum and ileum had 50% mortality each, where as two cases of colonic fistula in present study died (100%). Average days taken by fistulae to close was highest (46 days) for duodenal and lowest (13 days) for caecal fistula (Table 4).

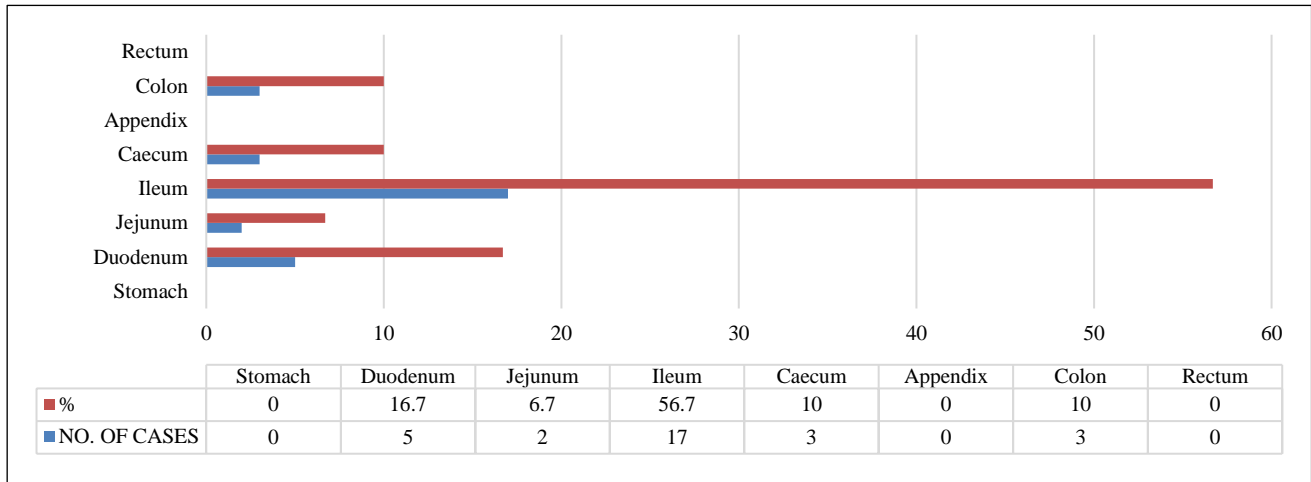


Figure 2: Site of enterocutaneous fistula.

Table 7: Mortality rate of various kinds of enterocutaneous fistulae.

Site of fistula	No. of cases	Death (%)
Duodenum	5	3 out of 5 (60)
Jejunum	2	1 out of 2 (50)
Ileum	17	8 out of 17 (47)
Caecum	3	-
Colon	3	2 out of 3 (66.7)
Total	30	14 out of 30 (46.7)

Table 8: Hospital stay in cases of enterocutaneous fistulae.

Hospital stay (days)	No. of cases	Conservative treatment (%)	Operative treatment (%)
0- 30	17	16 (66.7)	1 (16.7)
31-60	10	7 (29.2)	3 (50)
>60	3	1 (4.1)	2 (33.3)
Total	30	24	6

Six cases required operative treatment. Out of which 3 cases were of persistent discharge from fistula (>4wks), 2 cases of persistent discharge from fistula with peritonitis or deep-seated abscess and one with abdominal wound dehiscence.

Three cases (50%) underwent fistulectomy and repair of rent and 2 cases (33.3%) drainage of deep seated abscess. Remaining one underwent secondary suturing. Out of 6 cases who were subjected to surgical treatment 4 cases (66.7%) had successful result.

However, 2 cases (33.3%) died even after operation. 100% mortality was observed in duodenal fistula. Complete 100% cure rate was observed in colonic and caecal fistula respectively (Table 5).

Complications of enterocutaneous fistula

Among various complications encountered in various types of enterocutaneous fistulae, weight loss was the most outstanding complication followed by infection, skin excoriation, bed sore, loose motion, and other least complication like bleeding from fistula wall, uraemia, jaundice, abdominal wound dehiscence etc (Table 6).

Mortality

Overall mortality observed in the entire study was 46.7% (14 out of 30), in which major share was ileal fistula (57%) followed by duodenal (21.4%), colonic (14.28%) and jejunal fistulae (7.1%). No mortality was observed in caecal fistula in present study (Table 7).

Hospital stay

Mean duration of hospitalisation was 35.3 days with maximum number of cases (56.7%) had 30 days hospital stay and about 10% cases had 60 days hospital stay. Rest remained in hospital for 31-60 days (Table 8).

DISCUSSION

According to previous literature, some authors showed the maximum incidence of enterocutaneous fistula occurring in third decade of life, while some others observed the sixth decade had maximum incidence.^{8,15-17} In our study of 30 cases, the maximum number of patients were found to be between 21-30 years of age (33.3%) followed by another peak incidence between 41-50 years (30%). The minimum age recorded was 14 years and the maximum being 65 years. Average age was 37.1 years. This difference of age incidence may be due to the fact that the average age of population of our country which is lower than those of European and Americans.

In the present study the ratio of male and female was 1.7:1 showing male predominance over female. When scrutinising the patient on the basis of religion out of 30 cases studied, 83.3% and 16.7% cases were Hindu and Muslim respectively. This tallies with the population's religious composition.

Out of 25 cases of enterocutaneous fistulae of primary disease for which operation was performed, the highest incidence of enterocutaneous fistulae were with cases operated for intestinal obstruction (40%) followed by enteric perforation (28%), duodenal ulcer perforation (12%), and other causes. However, western studies stated carcinoma of various organs, diverticulitis, regional enteritis, duodenal ulcer, Crohn's, ulcerative colitis as the important etiological factor for enterocutaneous fistula.^{9,16,18} These do not agree with our study, being fact that enteric fever and its complication like perforation is common in our part of population, which is rare in western and developed countries.

The present study showed the highest incidence of enterocutaneous fistula occurring on the 8th post-operative day which agrees with past studies which showed that maximum incidence of enterocutaneous fistula was seen between 5th-11th post-operative day.¹⁹ A large number of factors may have some influence on the occurrence of fistulae and their timing such the parent disease for which operation was performed, general status of patient, post-operative period management and nursing care etc.

The maximum incidence of enterocutaneous fistula was found with ileum (65.7%) followed by duodenum (16.7%), jejunum (6.7%), which agrees with various past studies which stated the highest incidence of enterocutaneous fistula arising in small bowel.^{12,16,17,20-22} This does not indicate that incidence of gastric, appendicular or rectal fistula is nil, but is matter of coincidence that during the period of study no such case occurred in our institution. It was observed that the higher the fistula was located in gastrointestinal tract the discharge was more profuse while the discharge was less in cases of fistula located in lower in the gastrointestinal tract. The systemic effect of former was more marked as compared to later.^{6,17}

In this study, 80% cases underwent conservative treatment alone, first with intravenous fluids, systemic antibiotics, multivitamins etc and once patient could tolerate orally, it was then switched to oral comprising high protein diet, oral multivitamins etc. Locally, dressings were done with soframycin ointment and sialoderm cream around fistula. About 50% cases among these had spontaneous closure and rest didn't improve and died.

About 6 cases (20%) needed operative treatment in addition to conservative treatment. Persistent discharge of fistula (>4 weeks) was the most important indication (50%) followed by persistent discharge associated with peritonitis or intra-peritoneal abscess (33.3%) and

abdominal wound dehiscence (16.7%). These observations agree with past studies that showed persistent discharge as the most important indication of surgical intervention.^{17,18} Out of above 6 patients, 4 cases (66.7%) showed successful outcome where as rest died which included duodenal fistula (100% mortality).

In our study, malnutrition or weight loss, infection, skin excoriation were the most important complications and this agrees with past studies which stated the malnutrition and infection as most common complications.^{17,18} These complications held responsible for prolonging hospital stay and increasing both mortality and morbidity. Mean hospital stay in our study was 35.3 days, which is less when compared to different past studies (one study showed 42.5 days while another study showed 73 days as mean hospital stay).^{23,24} This shows a decreasing trend in overall morbidity due to improved nutritional support, especially switching to oral route.

CONCLUSION

Hence, the enterocutaneous fistula is frequently seen with emergency surgery of gastrointestinal tract, particularly on ileum, usually occurring around 8th post-operative day and most of them end in spontaneous closure with conservative treatment.

Enterocutaneous fistulae are normal sequelae mainly after the emergency surgical procedures. Long standing cases of these fistulae are better managed by buying time to wait for maturation of tract and the second look re-anastomosis is to be done. Before this second look operation, the general condition of the patient should have been improved, which ushers in good union of both proximal and anastomosing ends.

In early fistulae, especially low-output fistulae may be done preferably within 72 hrs of fistula formation, keeping in view of intra-peritoneal contamination, viability of ends of resection and the overall general condition of the patient. In dealing with cases of multiple injuries in a particular segment of small gut, it is better to go for enterostomy rather than attempting for primary repair. A single perforative gut may be tried for primary resection and anastomosis instead of local repair without resection.

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REFERENCES

1. Carlson G, Epstein J, Mc Mortensen NJ, Ashraf S. The small intestine. In: Williams N, O'Connell R,

- Mc Caskie A W, eds. *Bailey & Love's Short Practice of Surgery*, 27th ed. Boca Raton, Florida BR: CRC Press;2018:1256.
2. Tawadros PS, Simpson J, Fischer JE, Rotstein OD. Abdominal Abscess and Enteric Fistulae. In: Maingot R, Zinner MJ and Ashley SW, eds. *Maingot's Abdominal Operations*, 12th ed. New York, NY: McGraw-Hill;2013:204-214.
 3. Fischer JE, Evenson AR, Gastrointestinal-Cutaneous Fistulas. In: Fischer JE. ed. *Fischer's Master of Surgery*, 6th ed. New Delhi, ND: Wolters Kluwer India Pvt Ltd;2012:1564-1574.
 4. Harris JW, Evers BM. Small intestine. In: Townsend, Jr CM, Beauchamp RD, Evers BM, Mattox KL, eds. *Sabiston Textbook of Surgery, The Biological Basis of Modern Surgical Practice*, 1st SOUTH ASIA ed. New Delhi, ND: Elsevier;2016:1286-1289.
 5. Irving M. Local and surgical management of enterocutaneous fistulas. *Br J Surg.* 1977;64:690-4.
 6. Edmunds LH Jr, Williams GM, Welch CE. External fistulas arising from the gastro-intestinal tract. *Ann Surg.* 1960;152:445-71.
 7. Chapman R, Foran R, Dunphy JE. Management of intestinal fistulas. *Am J Surg.* 1964;108:157-64.
 8. Halversen RC, Hogle HH, Richards RC. Gastric and small bowel fistulas. *Am J Surg.* 1969;118:968.
 9. Roback SA, Nicoloff DM. High output enterocutaneous fistulas of the small bowel: An analysis of 55 cases. *Am J Surg.* 1972;123:317.
 10. Dudrick SJ, Wilmore DW, Vars HM, Rhoads JE. Can intravenous feeding as the sole means of nutrition support growth in the child and restore weight loss in an adult? An affirmative answer. *Ann Surg.* 1969;169(6):974-84.
 11. Fischer JE, Foster GS, Abel RM, Abbott WM, Ryan JA. Hyperalimentation as primary therapy for inflammatory bowel disease. *Am J Surg.* 1973;125:165.
 12. MacFadyen BV Jr, Dudrick SJ, Ruberg RL. Management of gastrointestinal fistulas with parenteral hyperalimentation. *Surgery.* 1973;74(1):100-5.
 13. Nassos TP, Braasch JW. External small bowel fistulas: Current treatment and results. *Surg Clin North Am.* 1971;51:687.
 14. Sheldon GF, Gardiner BN, Way LW, Dunphy JE. Management of gastrointestinal fistulas. *Surg Gynecol Obstet.* 1971;133:385.
 15. Marshall SF, Gerber ML. Persistent fecal fistula. *Surg Clin North Am.* 1950;30(3):901-9.
 16. Blackett RL, Hill GL. Postoperative external small bowel fistulas: A study of a consecutive series of patients treated with intravenous hyperalimentation. *Br J Surg.* 1978;65:775.
 17. Soeters PB, Ebeid AM, Fischer JE. Review of 404 patients with gastrointestinal fistulas. Impact of parenteral nutrition. *Ann Surg.* 1979;190(2):189-202.
 18. Aguirre A, Fischer JE, Welch CE. The role of surgery and hyperalimentation in therapy of gastrointestinal-cutaneous fistulae. *Ann Surg.* 1974;180(4):393-401.
 19. Bury KD, Stephens RV, Randall HT. Use of a chemically defined, liquid, elemental diet for nutritional management of fistulas of the alimentary tract. *Am J Surg.* 1971;121(2):174-83.
 20. Voitk AJ, Echane V, Brown RA, McArdle AH, Gurd FN. Elemental diet in the treatment of fistulas of the alimentary tract. *Surg. Gynecol. Obstet.* 1973;131:68.
 21. Rocchio MA, Cha CJ, Haas KF, Randall HT. Use of chemically defined diets in the management of patients with high output gastrointestinal cutaneous fistulas. *Am J Surg.* 1974;127:148-56.
 22. Kaminsky VM, Deitel M. Nutritional support in the management of external fistulas of the alimentary tract. *Br J Surg.* 1975;62:100-3.
 23. Athanassiades S, Notis P, Tountas C. Fistulas of the gastrointestinal tract. Experience with eighty-one cases. *Am J Surg.* 1975;130:26-28.
 24. Sitges-Serra A, Jaurrieta E, Sitges-Creus A. Management of postoperative enterocutaneous fistulas: The roles of parenteral nutrition and surgery. *Br J Surg.* 1982;69:147-50.

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