

STUDY OF ENTEROCUTANEOUS FISTULA

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ABSTRACT: BACKGROUND: A fistula is defined as abnormal communication between two epithelial surfaces.¹ Enterocutaneous fistula is defined as abnormal communication between hollow organ and skin. They are classified as congenital or acquired. We have excluded congenital and internal fistulas. We have also excluded esophageal, urinary, pancreatic and biliary fistulas as their management is complex and differs significantly from enterocutaneous fistulas.

AIM: 1. Study of aetiology, pathophysiology and management of enterocutaneous fistula. To evaluate previously laid principles of management of enterocutaneous fistula. 2. To assess the feasibility of early intervention safety and outcome as the conservative long term treatment appears to be cost prohibitive. 3. To study morbidity and mortality related to enterocutaneous fistula.

MATERIAL AND METHODS: In all, 50 cases of enterocutaneous fistula were studied during a period from June 2012 to November 2014 at a Government tertiary care Centre. Both, patients referred from other centres with post-operative fistulas and fistulas developed in this institute after surgeries or spontaneously were included in the study after fulfilling the inclusion and exclusion criteria. **RESULTS:** The maximum numbers of cases were between 39-48 years of age group. Spontaneous closure was achieved in 72.7% and surgical closure in 76.7% of the patients. Vacuum assisted closure was achieved in 66.66% of the patients in whom VAC was used. Of the patients in whom octreotide was used closure was achieved in 66.66% of the patients. The association between serum albumin levels and fistula healing and between fistula output and mortality were statistically significant. Overall mortality in this study was 26% with 44.44% among referred cases and 15.625% among institutional cases.

INTRODUCTION: A fistula is defined as abnormal communication between two epithelial surfaces.¹ Enterocutaneous fistula is defined as abnormal communication between hollow organ and skin. They are classified as congenital or acquired. We have excluded congenital and internal fistulas. We have also excluded esophageal, urinary, pancreatic and biliary fistulas as their management is complex and differs significantly from enterocutaneous fistulas.

Acquired Enterocutaneous fistula generally arises in two settings.

1) Spontaneous:

- a) Diseased bowel extending onto surrounding epithelial structures.
- b) Extraintestinal disease eroding onto otherwise normal bowel.

2) Acquired:

- a) Surgical trauma to normal bowel including inadvertent or missed enterostomies
- b) Anastomotic disruption following surgery for various conditions.

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There are six general principles in the management of enterocutaneous fistula.

- 1) The immediate and simultaneous assessment of the patient's general nutritional and surgical status.
- 2) The resuscitation of the patient involving the initiation of intravenous fluids electrolytes to correct volume electrolyte and acid base balance.
- 3) Stopping oral intake and instituting nutritional support in the form of either enteral or nutritional support to prevent further disease.
- 4) Obtaining fistula imaging to ascertain the number of fistulas the site of origin and it's route.
- 5) Prevention and treatment of local skin complications.
- 6) Prevention and treatment of systemic metabolic and septic complications and reducing fistula output.

Though it is controversial when one should operate the patient, there are schools of thought for both early and late intervention. It is wise to delay the operative intervention until inflammatory process has subsided and to buy time by way of nutritional support.

In this study we have tried to follow the previously laid principles of management of enterocutaneous fistula and have presented our experience in an institutional set up.

AIMS AND OBJECTIVES: The present study of enterocutaneous fistula was conducted in the department of surgery, at a Government tertiary care centre between June 2012 to November 2014.

Aims and objectives of this study are,

- 1) Study of aetiology, pathophysiology and management of enterocutaneous fistula.
- 2) To evaluate previously laid principles of management of enterocutaneous fistula.
- 3) To assess the feasibility of early intervention safety and outcome as the conservative long term treatment appears to be cost prohibitive.
- 4) To study morbidity and mortality related to enterocutaneous fistula.

INCLUSION CRITERIA: All types of acquired enterocutaneous fistula in the age above 18 years spontaneous or acquired.

EXCLUSION CRITERIA: All types of congenital fistulas in the paediatric age group. Fistulae involving, esophagus, pancreatic, biliary and urinary system.

MATERIAL AND METHODS: In all, 50 cases of enterocutaneous fistula were studied during a period from June 2012 to November 2014 at a Government tertiary care centre.

Both, patients referred from other centres with post-operative fistulas and fistulas developed in this institute after surgeries were considered for the study and included in the study after fulfilling the inclusion and exclusion criteria.

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Etiologically we have considered fistulas due to inflammation, obstruction, trauma, malignancy and other causes. Since peptic ulcer, typhoid ulcer perforation and tuberculosis are major causes for peritonitis and fistula formation we have considered them under inflammation.

On the basis of location, fistulas were grouped into,

- 1) **Gastroduodenal:** Includes gastric and duodenal fistulas
- 2) **Small bowel fistulas:** Includes jejunal and ileal fistulas
- 3) **Large bowel fistulas:** Includes appendiceal and colo-rectal fistulas.

Initially stabilization of the patient was achieved by correction of existing deficits, control of infection and fistula, institution of nutritional support and blood transfusion if required. Various haematological and other investigations were done as per requirements.

After the stabilization of the patient, conservative management was continued. It included, adequate nutritional support, skin and fistula care, non definitive surgeries like abscess drainage, feeding jejunostomy and diagnostic evaluation. Since gastroduodenal, small bowel and large bowel fistulas behave differently and there are number of factors which determine the outcome of fistula we have not defined the limit for conservative management. It was continued till fistula was progressing towards closure as per expectation. But if the condition of the patient was not satisfactory, patient was investigated further.

Fistulography was done to know the details regarding fistula and ultrasonography to localize the intra-abdominal collection. Fistulography was performed by injection of a contrast through fistulous opening in a matured fistulous tract in collaboration with the radiologist. If after fistulography it appeared that some unfavourable local features for spontaneous closure of fistula were present, surgery was considered for fistula. In others we continued with conservative management. We considered surgery in these patients if fistula was draining continuously without any improvement, if patient's nutritional status was satisfactory and there was no evidence of sepsis. Surgical treatment comprised of laprotomy and resection of the bowel bearing the fistula with end to end anastomosis with or without proximal diversion enterostomy.

The major aspects of management were,

- 1) Control of infection.
- 2) Correction of electrolyte imbalance.
- 3) Nutritional supplementation.
- 4) Local care.

Antibiotics were given during the stabilization period. Initially broad spectrum antibiotics were preferred and given empirically but later on they were given according to the culture and sensitivity of the organism grown, once the report was made available. Further antibiotics were given only if there was evidence of sepsis.

Estimation of electrolytes (Na^+ , K^+) were done after every 48 hours during the stabilization period or when electrolytes were deranged. In other instances, estimation was done every 5th day. Correction was started immediately if electrolytes were deranged.

As far as possible we preferred, enteral nutrition as a source of nutritional supplementation. Enteral nutrition was given in most of low output fistulas. In more proximal

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fistulas we had performed feeding jejunostomy or insertion of nasojejunal feeding tube under fluoroscopic guidance for same; if possible. Most of the time during enteral nutrition we have used high protein hospital diet, containing milk, egg, pulses etc. We have also used groundnuts, jaggery and various other cheap and easily available high protein containing foods as supplementary to full diet. Elemental nutrition was given in selected patients.

Parenteral nutrition was also used during the study in following conditions.

- 1) Stabilization period, for rapid repletion of nutrients, electrolytes and trace elements.
- 2) At the start of enteral nutrition so as to increase it gradually over 5-6 days to its required amount without nutritional depletion.
- 3) When enteral nutrition was insufficient to maintain the nutritional need of patients as in high and some moderate output fistulas.
- 4) When enteral nutrition was not possible.

For parenteral nutrition we preferred subclavian vein catheterization. Hospital available solution as 5% and 10%, dextrose, amino acids, IV fluids were commonly used for this purpose.

In some cases combination of both enteral as well as parenteral nutrition was used.

Calorie and protein requirement of the patients were calculated according to the stress level, as maintenance, moderate or severe. Moderate stress included elective surgery, peritonitis, malnutrition and renal failure. Severe stress included major sepsis, multiple organ failure.

	Maintenance	Moderate stress	Severe stress
Calorie requirement	25-30 Kcal/kg/d	30-40 kcal/kg/d	40-50 kcal/kg/d
Protein requirement	1.0-1.2 gm/kg/d	1.3-1.4 gm/kg/d	1.5-2.0 gm/kg/d

Fluid was given as 40ml/kg and adjusted for existing deficits and ongoing fistula losses.

Fresh blood transfusion was given to improve Hb% and also general condition of the patient.

Octreotide or somatostatin agonist was used in a dose of 100 mcgms eight hourly. It was used only in few patients as it is a costly drug and most of the patients had a poor socioeconomic status. Also it was not readily available at our institute.

VAC therapy was used in some patients with enterocutaneous fistula. It's use was also limited by factors such as high cost, lack of easy availability and and poor socioeconomic status of the patients.

Other requirements were supplemented depending on the fistula output and deficiency.

We have used aluminium paint for application over the perifistular area to prevent skin changes. If fistula output was less, we preferred dressing, but if output was more, drains, colostomy kit or ileostomy bag were preferred to know the amount of output and also to prevent skin changes.

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Prone positioning for efficient drainage, chest physiotherapy for prevention of chest complication and early ambulation was done.

To examine the statistical significance of association between attributes, Chi-square test was used. The Statistical Package for Social Sciences (SPSS) software version 16.0 was used. A probability value of less than 5% ($p < 0.05$) was considered significant.

DISCUSSION:

Sl. No.	Study	Spontaneous closure
1	GE Njeze et al (2013) ¹ (n=82)	31.7%
2	PL Chalya et al (2010) ² (n=92)	65.6%
3	Deepa Taggarshe et al (2010) ³ (n=83)	65%
4	Present Study	72.7%
Overall Spontaneous Closure		

Study	No. of patients in whom octreotide used	Closure achieved (%)
Prakash Kumar et al (2011) ⁴	10	80%
Deepa Taggarshe et al (2010) ³	21	57%
Present study	12	66.66%
Role of Octreotide and it's effect on healing		

Sl. No.	Study	Surgical closure
1	GE Njeze et al (2013) ¹ (n=82)	84%
2	PL Chalya et al (2010) ² (n=92)	34.4%
3	Deepa Taggarshe et al (2010) ³ (n=83)	80%
4	Present Study	76.7%
Surgical Closure		

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Study	Average duration of spontaneous closure	Average duration of surgical closure
P. Kumar et al (2011) ⁴ (n=35)	26 days	35.2 days
Present Study	43.19 days	39.52 days
Duration of spontaneous and surgical closure		

Study	Fluid and electrolyte imbalance (%)	Malnutrition (%)	Sepsis (%)
Soeters et al (1979) ⁵			
1) (1960-70) (n=119)	45%	87%	55.5%
2) (1970-75) (n=128)	27%	51%	74%
Present Study (n=50)	72%	80%	68%
Complications			

Study	Mortality	
	Referred case	Institutional case
Schein and Decker (1991) ⁶ (n=117)	42.00%	28.00%
PL Chalya (2010) ² et al (2010) (n=92)	35%	6.8%
Present study (n=50)	44.44%	15.62%
Mortality among Referred and institutional cases		

Study	Number of patients	Mortality (%)
Draus et al (2006) ⁷	106	7%
Martinez et al (2008) ⁸	174	13%
Visschers et al (2008) ⁹	135	9.6%
GE Njeze et al (2013) ¹	82	17%
Present study	50	26%
Overall Mortality		

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CONCLUSIONS: Following conclusions can be drawn from this study on enterocutaneous fistula:

- Small bowel fistulas are the most common type of fistulas.
 - Ileal fistulas are more common than jejunal fistulas.
 - Operations for inflammatory conditions of bowel like peptic ulcer, typhoid and tuberculosis are common causes for fistula formation.
 - Leak/ discharge of intestinal contents is the most common presenting complaint.
 - Fistulography is a useful investigation in the management of enterocutaneous fistula.
 - Gastroduodenal fistulas are generally high output fistulas and large bowel fistulas are low output fistulas.
 - Gastroduodenal fistulas have low spontaneous closure rates but high mortality whereas large bowel fistulae have high spontaneous closure and low mortality.
 - Use of Octreotide and VAC therapy promotes healing although as the sample size of patients in whom they were used was low more studies are needed to assess their role in enterocutaneous fistula.
 - Surgery is an effective mode of treatment of enterocutaneous fistula. With robust preoperative resuscitation and correction of sepsis and electrolyte imbalance surgical intervention can be taken up at an earlier date in select group of patients with reduced length of hospital stay and less morbidity and mortality.
 - Serum albumin levels and healing rates are directly associated. Higher albumin levels are associated with higher healing rates.
 - Conventional enteral nutrition can be used satisfactorily as a source of nutrition in distal bowel fistulas.
 - Malnutrition is the most common complication of enterocutaneous fistula. Sepsis and electrolyte imbalance are other major complications. Skin changes add considerably to the morbidity of patients. Malnutrition and mortality have significant association.
 - Fistula output and mortality are significantly associated. Higher fistula output leads to higher mortality.
 - Referred patients have higher mortality compared to institutional cases.
- Further studies with larger sample size are advisable to address the various aspects in the study of enterocutaneous fistula.

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