

The etiological pattern of entero-cutaneous fistula, treatment, and outcome – A 5 year experience at Niger Delta University Teaching Hospital, Okolobiri and review of the literature.

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Abstract:

Background: Enterocutaneous fistula carries a high morbidity and mortality. It is preventable with good surgical decision making. It is common with emergency abdominal procedures but could arise from trauma or spontaneously.

Objectives: To study the etiological pattern and treatment outcome in a Teaching hospital in a Semi-Urban area in order to advise on treatment modalities.

Methods: It is a retrospective descriptive study conducted at the Department of Surgery, Niger Delta University Teaching Hospital, Okolobiri. All consecutive patients who developed or presented with ECF between September 2006 and August 2011 were included in the study. Twenty cases of fistulae are included as the study subjects.

Results: Eleven (55.0%) are females and 9 (45.0%) are males, female: male ratio of 1.2:1. The ages ranged from 8 – 62 years with a mean age of 28.4 ± 17.4 years. A total of 95% of the fistulas were due to postoperative causes and Appendicectomy as the leading surgical cause with 9 (45%) cases.

Out of the 20 cases, 13 patients died making a mortality of 65%. Early surgical intervention proved life saving. Mortality

was significantly higher in patients with high-output fistula ($P = 0.03$).

Conclusion: Postoperative causes with Appendicectomy as the lead are the major etiological causes of Entero-cutaneous fistula in our environment. Early surgical intervention can be life saving and seems to be the best treatment option currently in our environment.

Keywords: Entero-cutaneous fistula, etiology, outcome, best local treatment modality

INTRODUCTION:

Enterocutaneous fistulas (ECF) are abnormal communications between epithelial lining of the bowel and skin. Most arise as a complication of difficult and/or emergency abdominal surgery. They are among the most challenging conditions managed by general surgeons^{1,2}. Morbidity and mortality associated with ECF are still considerable, primarily due to inadequate nutrition, sepsis, fluid and electrolyte disturbance and skin digestion. Current treatment modalities even if successful may require prolonged hospitalization or repeated operations¹⁻³. The challenge is even more conspicuous in a developing country like Nigeria where parenteral nutrition for

nutritional support in these patients is commonly inaccessible.

In 75-85% of the cases of ECF fistulas appear because of consequence of iatrogenic agents like postoperative complications¹⁻⁴. Approximately, in 15-25% of cases, gastrointestinal fistulas are spontaneous¹⁻⁴. Main causes of spontaneous fistulas are inflammatory bowel diseases, ischemic bowel disease, radiotherapy, pancreas malignancy etc¹⁻⁵. The etiological pattern of ECF in the developed countries is reported to be different from that in the developing countries¹⁻⁴. While the most common causes of ECF in the developed countries are inflammatory bowel diseases and diverticular diseases, the main cause in the developing countries is due to iatrogenic postoperative complications of abdominal surgery^{1, 3, 4, 8}. Understanding the etiological factors involved in fistula formation and determination of fistula characteristics is essential in planning for prevention strategies to minimize its occurrence and also allows prediction of the course of the patient and likelihood of spontaneous closure.

Identification of factors that influence the likelihood of fistula closure and death is of greater value for the surgeon when making decision⁶. The skin sepsis, malnutrition and fluid and electrolyte imbalances are well known complications and are the main reasons for an increased morbidity and mortality associated with such fistulae^{7, 8}. Sepsis is reported as the leading cause of death in most studies¹⁻¹⁷. Aggressive approaches with effective control of sepsis, adequate nutritional support as well as fluid and electrolyte balance are the key to successful management of these fistulae⁹. It is generally known that conservative management with the hope that fistula will close spontaneously, is an expensive option with unpredictable and at times with lethal outcome⁵⁻⁸.

An improvement in the rate of spontaneous closure of such post-operative fistulae on conservative measures only is also denied by many studies^{10, 11}. More than 80% of such fistulae develop post-operatively as a consequence of anastomotic leak or repair failure, missed perforations or iatrogenic perforations which remain un-noticed during operation.

Conventionally such fistulae are treated by an aggressive control of sepsis and restoration of the nutritional status of the patients in the form of total parenteral nutrition (TPN), Octerotide, antibiotics etc. hoping that it will close spontaneously while surgical intervention to restore the gut continuity is delayed for 3–6 months^{11, 12}. This leads to a considerable financial burden as most of the patients cannot afford TPN which is a requisite for spontaneous healing of such fistulae¹³.

Despite tremendous improvement and optimization of treatment of ECF, the mortality has fallen between 5–25% as reported by many studies¹⁴⁻¹⁷. More proximal fistulae are usually of high output variety and pose a real difficult situation for the surgeon¹⁶. All such high output fistulae have an output over 500 ml in 24 hours and are associated with such complications like skin sepsis, malnutrition and its consequences. Increased mortality has been shown to be associated with high initial fistula output and the presence of complications¹⁴⁻¹⁷. Logistic regression analysis by Altomare & Co. identified increased Acute Physiology And Chronic Health Evaluation II scores and low serum albumin concentrations as predictors of mortality¹⁸. Similar multivariable logistic regression analyses of retrospective data from St Mark's Hospital identified high initial fistula output and the presence of patient co-morbidity as factors increasing the risk of death¹⁹. There are multiple factors that contribute to malnutrition in patients

with ECFs. The supply of nutrients may be limited, due to either anorexia or restriction of oral intake. Significant loss of protein, electrolytes and fluids can occur in fistula effluent as a result of loss of small bowel secretions that would ordinarily be reabsorbed²⁰. Many centers believe that conservative measures would bring spontaneous closure of such fistulae but in majority of the instances such a treatment causes total economical exhaustion and a fatal outcome¹⁷.

There is ongoing discussion about which is the better route of nutrition, and linked to this is the debate about whether periods of 'bowel rest' are beneficial or detrimental in patient's with fistulas. After the introduction of parenteral feeding, the practice of total parenteral nutrition (TPN) for ECF fistula was adopted widely. However, it should be remembered that the primary role of nutritional support, whether enteral or parenteral, is the prevention of malnutrition. Evidence of an additional therapeutic role for TPN in the promotion of fistula healing is currently lacking, and parenteral nutrition carries with it the risks of central venous catheter sepsis, venous thrombosis and pneumothorax. The widespread availability of parenteral nutrition since the 1970s has doubtlessly helped to reduce the incidence of malnutrition in patients with high-output ECF. It has also been suggested that this has influenced fistula closure rates and mortality positively²¹. The concept of 'bowel rest' in this setting is based on the observation that gastrointestinal secretions drop by 30–50 per cent in patients receiving TPN and that this might aid fistula closure²². Some authors have reported that enteral elemental diets may reduce fistula output as much as TPN²³, with similar rates of spontaneous fistula closure and mortality²⁴. Enteral nutrition via the fistula, a technique known as fistuloclysis has been described in detail²⁵.

The feeds in use are either polymeric, semi-elemental or elemental feeds, depending on tolerance. A similar technique is the reinfusion of fluid from a proximal fistula into a distal mucous fistula, with or without additional nutritional supplementation. This has the potential advantage of preserving small bowel secretions, although it is unacceptable to many patients. Another technique that has been used to facilitate enteral feeding is vacuum sealing of the fistula tract^{26–28}.

This study was conducted to describe our experience in the management of ECF, outlined the etiological spectrum, fistula characteristics, treatment outcome and prognostic factors for fistula closure, mortality in our setting and to advice on local treatment modality.

PATIENTS and METHOD:

This descriptive retrospectively study was conducted in the department of surgery, Niger Delta University Teaching Hospital, Okolobiri, between September 2006 and August 2011. All consecutive patients, who developed or presented with ECF during the study period were included in the study. Patients with esophageal, biliary, pancreatic, and perianal fistulas were excluded from this study. A diagnosis of ECF was made clinically on detection of intestinal or fecal effluent from the drain site or abdominal incision site. This study has received the approval of the Institute Ethics Committee. The following information was recorded for each patient; volume of fistula output, etiology, length of hospital stay, type of therapy done (non-operative, operative or both), timing of therapy, outcomes of nonsurgical and surgical treatments and mortality.

Fistula output was quantified by direct measurement, in the presence of drain or by

calculating number of dressing pads soaked per day. A fistula output of 500 mL/day was taken as the cutoff between high and low output fistulas. The choice of this method to quantify fistula output was mainly owing to the ease and cost of measurement and may have a higher error rate than a more objective measure using wound collection devices which are not locally available. Radiologic fistulograms, ultrasound (US) abdomen and contrast-enhanced computer tomography (CECT) were not routinely performed due to non-availability or cost.

Initial treatment consisted of an overall assessment of the patient, the nature of the fistula, and condition of the wound. We evaluated patients for infection and sepsis, and wound/ostomy care. Blood was taken for assessment of the hemoglobin, serum proteins, urea, electrolytes, and creatinine. Correction of fluid and electrolyte abnormalities was replaced by addition of the recorded fluid losses and another 1.7 liters for insensible loss. Patients were usually made NPO. A nasogastric tube was placed for the higher, more proximal fistulas, and proton pump inhibitors were given to decrease gastric secretion. Particular attention was paid to nutritional support, which was given as high calorie-high protein diets orally. This was occasionally supplemented by enteric feeding via a nasogastric tube. These diets were prepared by relations as the hospital had no dieticians during most part of the study, to ensure these patients got up to 3000 calories daily. There was no attempt at feeding through the distal limb of the fistulas. Sources of infection and sepsis were addressed early. Skin protection was achieved using petroleum jelly or zinc oxide paste and frequent wound dressings as needed daily; depending on the output of the fistula.

The initial objective included a trial of medical, non-operative therapy for each

patient to allow for spontaneous fistula closure, unless conditions such as distal bowel obstruction or ongoing abdominal sepsis precluded this approach. Decision to conserve or to operate and when to operate was taken by the consultant in charge of the patient.

Statistical data analysis was by Epi Info version 3.5.4 and manually.

Results:

A total of twenty (n=20) cases of ECFs were seen over a period of 5 years, between September 2006 and August 2011 with a mean age of 28.4 ± 17.4 years (Table 1). Among these, 4(20.0%) are less than 10years, 5(25.0%) are 11-20years, 3(15.0%) are 21-30years, 3(15.0%) are 31-40years, 3(15.0%) are 41-50years, none was 51-60 years while 2(10.0%) was 61years and above. 11 (55.0%) are females and 9(45.0%) are males, female: male ratio of 1.2:1.

Eighteen patients were referred cases from private clinics. All patients had faecal discharges, weight loss, skin excoriations, hypoproteinaemia, hypokalaemia, hyponatraemia and hypochloraemia at presentation. Anemia defined as hemoglobin of less than 10g% was in all cases. Serum albumin was greater than 3.5 g% in 3 patients (15%) and less than 2.5g% in 17 patients (85%). All patients who died (n=13) had a serum albumin level less than 2.5g% and this was statistically significant.

A total of 95% of the fistulas were seen in the postoperative setting (Table 2). Appendectomy was the leading cause with 9 (45%) cases. There were 15 patients (75%) with high-output fistula as compared to 5 patients (25%) with moderate output fistula (Table 3). No low output ECF was reported. The mean SD (in days) for hospitalization was 29.1 ± 18.4 days, 7(35.0%) were

hospitalized for 11-20days, 6(30.0%) for 21-30days, 2(10.0%) for 31-40days, 3(15.0%) for 41-50days, none for 51-60days while 2(10.0%) for 61 days and above; 10(30.0%) were managed conservatively, 2(10.0%) by conservative and surgical intervention while 8(40.0%) were managed by surgery alone. Among these, 7(35.0%) recovered while 13(65.0%) died (Table 3). Table 4 shows the relationship between treatment modality and management outcome At $P < 0.05$, Chi-square (X^2) = 7.235, df = 2 and p-value = 0.027, there was a statistical significant relationship between treatment modalities for ECF and management outcome. Mortality was significantly higher in patients with high-output fistula ($P = 0.03$).

DISCUSSION:

Despite the advances in gastro-intestinal surgery, ECFs dreaded and catastrophic complications of abdominal surgery^{8-11,31}. An incidence in the range of 75–85% has been described³⁰. Of the 20 cases reviewed, 19 (95%) occurred following surgery. This is consistent with other reports^{8-11,31}. One case (5%) of ECF due to native healer incision on her was seen. Such cases and the need to regulate traditional healer's activities have been reported³¹. The main causes of spontaneous fistulas, inflammatory bowel diseases, ischemic bowel disease, radiotherapy, pancreas malignancy were not seen in this study. These diseases have been reported to be rare in Nigeria^{8,31,32}. Eighteen patients (90%) were referred cases from private clinics. This is not surprising as most operations done in such places are by non-trained Surgeons.

Appendectomy was the leading cause with 9 (45%) cases with one HIV positive. This is consistent with other reports^{8-11,31,32}. Our experience of ECFs shows that an aggressive operative strategy in postoperative ECFs can be life saving provided an optimal nutritional and septic

control is achieved vigorously. Our results show an overall mortality of 65% which is very much inconsistent with the results of other similar reports^{8,10,14-17,30-32}. We could not adopt an initial vigorous treatment with TPN, use of Octreotide in selected cases of low output and in all the cases with high output as recommended by many reports due to unavailability and cost^{8-11,33}. Known prognostic factors that are crucial for both spontaneous closure and surgical closure alike includes site of fistula, output of contents in 24 hours, time since development, state of nutrition, pre-operative albumin levels and presence of septic complications. There were 15 patients (75%) with high-output fistula, 5 patients (25%) with moderate output fistula and none low output ECF. All patients who died ($n=13$) had a serum albumin level less than 2.5g% and this was statistically significant and accounted for our high mortality. These findings are consistent with the observations made in different similar reports³⁰⁻³³. Sepsis is the commonest and most important to control before a fistula can be expected to heal regardless of the mode of treatment. Studies suggest a prolonged trial of conservative treatment with the hope that the fistula will heal spontaneously³⁰⁻³³. This seems not practicable in our locality with non-availability of TPN, other current facilities and cost. Although there is a controversy as to the timing of definitive surgical repair³⁰⁻³³, only surgically managed cases after control of sepsis and malnutrition recovered in this study. Prolonged non-surgical treatment is usually associated with ongoing contamination of the peritoneal cavity by the faecal contents leading to frank sepsis. There is also rapid loss of weight and patient becomes severely emaciated due to nutritional deficit. There is a trend towards this early surgical intervention as evident from different reports³¹⁻³³. Sheikh & Co. also stated that early surgical intervention

can be life saving³³. This is similar to our findings. Early surgical intervention is advisable in our locality currently.

Conclusion:

Postoperative causes of ECF accounted as the most common causes of ECF with Appendicectomy as the leading surgical procedure. Most patients did not respond to conservative management while surgical intervention resulted to healing in some cases. Nutritional status of the patient and fistula output are significant predictors of healing of ECF as well as mortality. Control of sepsis, management of fluid, and electrolyte imbalance, meticulous wound care, and nutrition support allow spontaneous fistula closure and low mortality.

Table 1: Age distribution of Patients

Variable	Frequency (f)	Percent (%)
Age (Years)		
< 10	4	20.0
11-20	5	25.0
21-30	3	15.0
31-40	3	15.0
41-50	3	15.0
51-60	0	0.0
≥61	2	10.0

Table 2: Aetiological pattern of enterocutaneous fistulars

Aetiology	Frequency
Post Appendicectomy	9 (45%)
Post Laparotomy for intestinal obstruction	3 (15%)
Post Laparotomy for Typhoid perforation	2 (10%)
Termination of pregnancy	4 (20%)
Post Laparotomy for abdominal malignancy	1 (5%)
Native healer incision on inguinal hernia	1 (5%)
Total	20 (100%)

Table 3: Fistula Output, Duration of Hospital Stay, Treatment Modality and Management Outcome

Variable	Frequency (f)	Percent (%)
Fistula Output:		
Moderate	5	25.0
High	15	75.0
Duration of Hospital Stay:		
11-20	7	35.0
21-30	6	30.0
31-40	2	10.0
41-50	3	15.0
51-60	0	0.0
≥61	2	10.0
Treatment Modality:		
Conservative	10	50.0
Conservative and Surgery	2	10.0
Surgery	8	40.0
Management Outcome:		
Death	13	65.0
Recovered	7	35.0

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