



## Postoperative enterocutaneous fistula - principles in non-operative approach

E.A. Sule<sup>a,\*</sup>, M.A. Nzegwu<sup>b</sup>, J.C. Okolo<sup>c</sup>, R.U. Onyemekheia<sup>d</sup>



<sup>a</sup> Dept of Surgery, Delta State University Abraka, Nigeria

<sup>b</sup> Dept of Pathology, University of Nigeria Medical School Enugu, Nigeria

<sup>c</sup> Dept of Surgery, Central Hospital Warri, Nigeria

<sup>d</sup> Dept of Internal Medicine, Delta State University Abraka, Nigeria

### A B S T R A C T

**Introduction:** Postoperative enterocutaneous fistulae could constitute a challenge when they occur following an abdominal surgery. Astute application of correct principles in its management is essential for good outcomes.

**Methods:** A retrospective review of records of patients with enterocutaneous fistulas managed non-operatively was done. Clinical assessment, anatomic and physiologic classification of fistula, fluid resuscitation, electrolyte correction, parenteral/enteral nutrition, antibiotic use and fistula effluent monitoring, formed the basis of management.

**Results:** (4/14) Four out of 14 patients with enterocutaneous fistulae were managed exclusively non-operatively. Their ages ranged between 34 and 63 years. Mean age 46 years. All four fistulae occurred postoperatively. Laparotomy for ectopic pregnancy, bowel obstruction constituted the primary surgery. There were two high output cases and two low output cases. Initial parenteral nutrition was employed in two cases while enterals were used solely in two cases. Fistula closure was achieved in all 4 cases at durations ranging from 7 to 16 days, a mean time of 12.5 days.

**Conclusion:** Non-operative approach to management for postoperative enterocutaneous fistulas was successful in these cases.

### 1. Introduction

Postoperative enterocutaneous fistula remains a source of concern in surgery with a study reporting it as being the commonest source of enterocutaneous fistulas at 95% [1]. It remains a potential source of embarrassment to the surgeon as it could mar the outcome of a seemingly well thought out surgery leaving mortality in its wake. It behoves on abdominal surgeons to have a working knowledge of its management in order to minimize or even abolish mortality in these cases [2]. This scenario is not unfamiliar with any experienced abdominal surgeon. Even though higher mortalities up to 39% have been reported from some studies [3], single digit mortality is increasingly being recorded in centres dedicated to the management of this 'surgical malady' [4,5]. This reflects cautious use of evidence based principles and a reflection of wise judgement in deciding the timing and form of surgical interventions [6].

In our environment, common surgical scenarios provoking this outcome include appendectomy, bowel resections and anastomosis as

well as gynaecological surgery such as myomectomy. Technical issues following appendectomy include inadvertent caecal enterotomy, ileal enterotomy, slipped stump ligature and a too low appendix stump amputation. A non-waterproof anastomosis, compromised vascularity, friable anastomotic bowel segments as well as doubtful viability of anastomotic intestinal segments, constitutes causes of anastomotic leak or dehiscence to cause a postoperative enterocutaneous fistula. Doing an anastomosis without adequate mobilization as well as tension on the anastomotic line are further causes of anastomotic failure.

However a surgeon could be embarrassed as this could occur without warning despite seemingly adhering to the rules. Due to the tendency for postoperative fistulas to occur following an apparently satisfying surgery and disastrous outcome occurring if correct management principles are not employed, we want to report these cases, describing the principles behind their management being apparently distressing. We report four cases of enterocutaneous fistulas. A well timed approach in employing conservative measures is advocated in the

\* Corresponding author.

E-mail address: [emmasule2010@gmail.com](mailto:emmasule2010@gmail.com) (E.A. Sule).

management of these conditions as worsening of the patient's state with ill-timed surgery is sometimes the bane of patient management. Study was written as a case series after Aghaz et al. [7].

## 2. Methods

This study was registered in Research Registry with registration no 2590. This is a retrospective report of patients with postoperative enterocutaneous fistulas managed non-operatively in a single centre following referrals from other centres. This report involved non-consecutive postoperative enterocutaneous fistula patients. The admission records of patients with enterocutaneous fistulae were retrieved and relevant information extracted. Patients had received care in a private health institution as well as public health institution all located in Delta state, Nigeria. Recruitment was over the period spanning January 2013 to December 2016. Inclusion criteria were cases managed without corrective surgery or bowel diversion. Exclusion criteria were all the cases that had surgical intervention. Patient assessment and treatment on arrival at the managing centre was done by a Consultant General Surgeon with experience with enterocutaneous fistula management. Patients diagnosed with postoperative enterocutaneous fistulas were the subject of this report. On presentation at the study centre, history taking and clinical examination was used in patients assessment. Emphasis was laid on ascertaining temperature, pallor, presence and extent of dehydration. Other parameters assessed were pulse rate, blood pressure, respiratory rate and presence of dyspnoea. Abdominal examination was done with focus on the laparotomy wound. Assessment was made of degree of fistula activity by the abdominal dressings which were usually stained or soaked, presence of intestinal contents, colour/volume of fistula collections in wound managers and the extent of dehiscence of the wound. The rate of exit of the intestinal contents was also noted. The presence of hyperaemic areas around the laparotomy wound was noted as well as the urinary output following catheterisation.

Fluid resuscitation was done with normal saline, using the urinary output as a guide. Potassium correction was done following electrolyte assessment of hypokalemia and the deficit calculated. Correction was done using potassium chloride (KCl) solution, 10 mmol instilled into 500 mls normal saline drip given 12 hourly against serum potassium estimation. Full strength darrows 500 mls 12 hourly was also employed in the correction. Antibiotic used was third generation cephalosporin, ceftriaxone 1g 12 hourly with metronidazole 500 mg 8 hrly added for anaerobes. Imipenem 500 mg 12hourly was used for one of the patients. A vital signs chart was kept for the patients with the dressings or wound managers changed or emptied with the volume of fistulous effluent measured where possible. Parenteral feeding was done using amino acid solutions as well as dextrose solutions. Saline enema was administered in all three cases to aid loosening and evacuation of hard faecal matter in colon. Progress in the cases was noted as reduction in the fistulous output, normal temperature, improvement in the general well being and patient's participation in conversation and social activity. On fistula closure, patients were discharged home and followed up on outpatient basis.

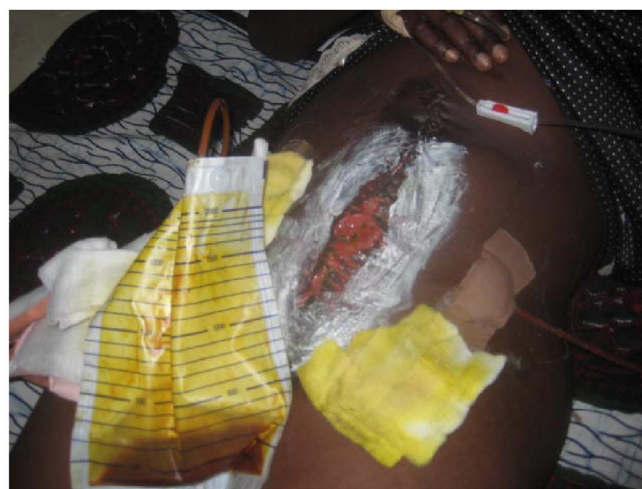
## 3. Results

There were (4/14) four out of fourteen patients who had non-operative management. Their ages ranged between 34 and 63 years with a mean age of 46 years. All four enterocutaneous fistulae occurred postoperatively. They occurred following laparotomy for ectopic gestation, small bowel resection and anastomosis for bands and adhesions, right hemicolectomy for obstruction or from intraoperative bowel enterotomy. Case A, B and C were done by resident gynaecologist or resident in training with abdominal surgery. Case D was done by a Consultant General surgeon. One of the cases had a failed emergency re-laparotomy to cure the fistula before presentation. Anatomic classification showed them to be ileal fistula, ileal/jejunal fistulae, ileal fistulae and colic for the cases respectively. Case A and B were high output fistulae while Cases C and D was a low output fistula. Case A and B had

documented hypokalaemia with Case A recording particularly low hypokalaemia at 2.11 mmol. Correction was done with KCL solution in Case A and full strength darrows in Cases B. Parenteral feeding was initially utilised exclusively in Case A and B with gastric 2 enterals commenced on the 7th day of admission following near fistula closure. Cases C and D had gastric 2 and later gastric 3 enterals utilised without parenteral feeding. Closure of fistulae was recorded on the 18th and 19th day of admission in Case A and B respectively and on days 7 and 8 respectively for Cases C and D (see Table 1).

**Table 1**  
Clinical summary of the cases.

Age	Surgery	No of previous surgery	Classification	Duration to enterals	Duration to closure
50	Bowel resection and anastomosis	One	High output	7 days	16 days
34	Salpingectomy for ectopic	Two	High output	7 days	19 days
37	Bowel resection and anastomosis	One	Low output	0	7 days.
63	Bowel resection and anastomosis	One	Low output	3 days	8 days



CASE A – 1<sup>st</sup> DAY POST PRESENTATION



CASE A -5 DAYS POSTPRESENTATION



CASE A -28 DAYS POSTPRESENTATION



CASE B 47 DAYS POSTPRESENTATION



CASE B - AT PRESENTATION IN OUR CENTRE

2 WEEKS POST FIRST LAP, 7 DAYS POST 2<sup>ND</sup> LAP.

CASE B 4 DAYS POST PRESENTATION

#### 4. Discussion

The challenge in managing enterocutaneous fistula is justified by the rewarding successes in the cases. Two of the cases developed enterocutaneous fistulae following abdominal surgeries at another centre. The first case had a laparotomy for ectopic gestation with a previous history of two abdominal surgeries. The second case had a previous myomectomy five months prior to the index surgery of bowel resection and anastomosis that resulted in the fistula and a failed relaparotomy attempt to curb the fistula. Inadvertent enterotomy in the course of adhesiolysis from previous surgeries is considered a factor in incurring a postoperative fistula. It has been reported that the risk of fistulation increases tenfold with patients who have had three or more laparotomies than in patients who have had less [8]. However we believe that the presence of an intestinal surgeon at the offending surgery, may have been useful in avoiding this complication. Hence a recommendation that gynaecological surgery in a non-virgin abdomen as in our cases, would benefit from the presence of an intestinal surgeon, given the higher risk of enterotomy in comparison with a virgin abdomen.

The marked abdominal sepsis exhibited by our cases was seen in the tachypnoea they experienced at presentation. However the abdomen did not show overt signs of peritonitis but patients exhibited improvement in their cardiovascular status with our non-operative management justifying its continuance. This was exhibited in a return to normal of the tachypnoea and tachycardia in our cases with response to sepsis treatment. Haemodynamic stability has been reported as evidencing successful response to non-operative management of sepsis from enterocutaneous fistula. Uncontrolled sepsis in enterocutaneous fistulas has been reported as a primary cause of mortality in up to 80% of cases [9]. The source of sepsis has been reported to be from the continued contamination of the peritoneal cavity from the fistulous point. Our approach at managing the sepsis using nonoperative measures of fluid resuscitation and antibiotic treatment was successful as poor response to these measures in suitable or selected cases may demand a return to the theatre for a bowel diversion [2]. However it must be noted that the risk of procuring further fistulae due to the inhospitable state of the peritoneal cavity right after a fistula may be strongly considered before embarking on a relaparotomy [6].

The principle of bowel rest was sufficiently utilised in the management of two cases. The third and fourth cases constantly had gastric

1 and 2. Thus two patients required total parenteral nutrition in the early weeks. Although minimal use of the enteral route has been reported with its perceived advantages, utilizing the enteral route early, may be impracticable in high output fistulae as in two of our cases. In cases of low output fistula, like our third and fourth cases, utilizing the enteral route with caution is practicable. However tolerability on commencing enterals in the low output fistula case was determined with continued presence of haemodynamic stability. Nevertheless, potentially worsening of abdominal sepsis in some cases could occur with increased faecal stream [6]. Polk et al. [10] reported its use with high output fistula in association with management and metabolic complications [10]. However utilization of the enteral route was done in our cases when the fistula output was sufficiently reduced at 7 days post presentation. This is consistent with the views of Dudrick et al. that the presence of four feet of small bowel between the ligament of Treitz and fistula renders absorption possible [11]. One classical work by Levy et al. showed maintenance of high output enterocutaneous fistula patients on enteral feeds exclusively following stabilization with total parenteral nutrition with 40% spontaneous closure achieved and 19% mortality [12]. Monitoring of the fistula output was done following commencement of enteral feeding as well as the haemodynamic status to confirm tolerability. Rational introduction of enteral feeds reduced the cost incurred with the parenteral feeds as well as the degree of laboratory monitoring. This is quite an important factor when working with patients in a resource limited setting. Enhanced gut hormonal and immunological function, decreased bacterial translocation and enhanced protein synthesis have all being reported as perceived benefits from enteral feeding [13].

Potassium repletion from fistula losses is extremely important in the management of these patients. Our cases presented with profound hypokalaemia with values nearing 2 mmol. Hypokalaemia which is a regular accompaniment of high output fistulas has been reported with tachycardia, arrhythmias. This is particularly seen with proximal small bowel fistulas such as a jejunal fistula which our second case presented with. We think it is a reflection of the losses patient has had and thus the severity of the fistula.

Enema administration to loosen hard faecal matter in the colon was done in all the cases to enhance spontaneous closure by preventing obstruction from hard faecal matter in the colon. The rationale behind this was the presence of hard faecal matter in the colon due to its continual presence from patients not passing stool and continued water absorption from colonic contents. We believe that emptying the colon would enhance easier passage of ileal contents through the one way ileocaecal valve.

We refused embarking on surgery in with a prior failed relaparotomy at the previous centre despite its demand by the patients relatives in two of the cases. This was critical to achieving successes in these fistulae cases. We think the second case presented with more marked sepsis in comparison to the first case as evidenced by her tachypnoea, following the early surgical re-intervention (failed anastomotic repair) with the fistula development. There is sometimes a managing Surgeon's instinct to 'fix it once and for all' with such fistulae especially when he was not the primary surgeon. We recommend that good surgical judgement be utilised in resuscitation and non-operative management while monitoring the haemodynamic status for success as was in our cases. Our observations suggest that the hostile abdomen often encountered on an immediate relaparotomy coupled with efforts to dissect the fistula segment and effect primary repair in a septic field, risks further morbidity from a failed repair, worsening of the fistula output as well as increasing the fistulous points in the course of dissection [2]. Reber et al. in their classical study demonstrated patience at definitive surgery following a failed earlier surgery for a median period

of 8 months [14]. Datta et al. have utilised a management protocol which demanded waiting for 6 months for definitive surgery with a median of 8 months and a range of 6–48 months following previous major surgery or enterocutaneous fistula occurrence [15].

Although an abscess collection was detected on abdominal ultrasound in the first case, surgical intervention was not done. Some workers have indicated drainage of an abscess to be one of the indications for early surgical intervention. We must add that this may depend on the volume of abscess collection. Monitoring for a response with non-operative principles by way of stable haemodynamic status and a contraction in the volume constitute ways of ascertaining continued non-operative management as surgical intervention may still be quite hazardous.

This study is limited by the sample size.

## 5. Conclusion

The use of non-operative approach in managing enterocutaneous fistulas gave a resounding success in these cases even though some of the fistulae appeared distressing on presentation. More research needs to be conducted for identifying criteria for non-operative management using a larger patient pool.

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## Author contribution

Dr E.A Sule, managed the patients, conceived and wrote up the article.

Prof Nzegwu read and agreed with write up.

Dr Okolo and Dr Ralph were involved in the management of the patients and agreed with the writeup.

## Conflicts of interest

There is no conflict of interest.

## Guarantor

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