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# Management of Enterocutaneous Fistula: An Eleven-Year Experience from A Tertiary Hospital in North-Western Nigeria

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## Abstract

**Background:** Enterocutaneous fistula is still a problem in tropical Africa. It is commonly associated with emergency abdominal procedures, complicated hernias or trauma. It may also arise spontaneously from advanced intra-abdominal malignancies or tuberculosis. Management remains a challenge in our environment due to the associated malnutrition, sepsis, and fluid and electrolyte abnormalities. Most fistulas will close spontaneously if there is no distal obstruction, epithelialization of the tract, abscess cavity or malignancy. High-output fistulas often require surgical intervention after initial resuscitation.

**Aim:** To look at the pattern of Entero-cutaneous Fistula presentation, its outcome common risk factors, Management and Prognosis indicators in Usmanu Danfodiyo University Teaching Hospital (UDUTH) Sokoto, North-Western Nigeria.

**Methodology:** An eleven-year retrospective study in which the case note of all patients with a confirmed diagnosis of enterocutaneous fistula between January 2010 and December 2020 was retrieved reviewed and analyzed using the Statistical Package for Social Sciences (SPSS) Version 22 Inc Chicago USA.

**Results:** A total of 200 patients were managed with the highest incidence of 12.5% (25) in 2014. Age range: 17 – 80 years, Mean age: 30.81 years  $\pm$  8.031 SD and, Median age: 28.00 years. Male to Female ratio = 2.7:1, majority of the fistulae were a result of post laparotomy from typhoid fever (32%), post appendix surgery (30%), post obstetrics and Gynaecology surgery (22%). Most of the fistulas were low output 59.5% while 40.5% were high output. Many of the patients were severely malnourished 43.5%. most of the patients had spontaneous closure 60% with a mortality rate of 32.5%.

**Conclusion:** Enterocutaneous fistula remained a problem in our environment and occurred commonly among males within the younger population. There is a high rate of spontaneous closure with double-digit mortality.

**Keywords:** Enterocutaneous, Fistula, Management, output, closure, mortality

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## Introduction

Enterocutaneous fistulas, defined as abnormal communications between the epithelial lining of the bowel and skin, are among the most challenging conditions managed by the general surgeon. Morbidity and mortality associated with enterocutaneous fistulae are still considerable, primarily due to inadequate nutrition, sepsis, fluid and electrolyte disturbance and skin digestion and the current treatment even if successful, may require prolonged hospitalization or repeated operations (1,2). The challenge is even more pronounced in a developing country like Nigeria where parenteral nutrition for nutritional support in these patients is inaccessible and many patients cannot afford it (1,2,3).

Our Study is from a referral tertiary hospital in North-western Nigeria, where most of the cases we see are the result of complications from peripheral hospitals. This study was conducted to describe the presentation and outline the etiological spectrum, fistula characteristics, treatment outcome and prognostic factors for fistula closure and mortality in our setting. This study aimed to highlight the gaps in managing this pathology in a resource-limited setting and how these gaps could be breached.

## Patients and Method

### Study Location

This study was conducted at the General surgery unit of the Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto, Northwest Nigeria. A 700-bed capacity tertiary hospital that serves as a referral Centre from Katsina, Zamfara, Kebbi, Niger States and part of Niger Republic.

### Study Design

This was a retrospective cross-sectional study from January 2010 – December 2020.

## Study Population

All patients with enterocutaneous fistula admitted to the Usmanu Danfodiyo University Teaching Hospital (UDUTH), General Surgery unit from January 2010 to December 2020.

## Sampling Technique

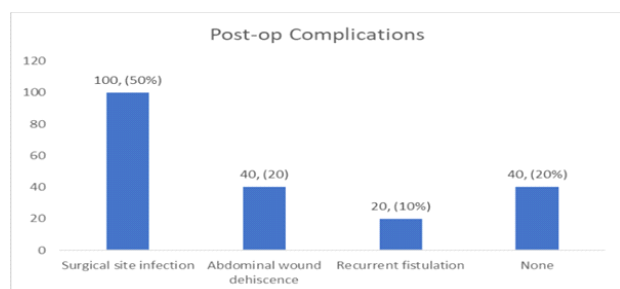
A universal sampling method was used, considering all patients managed within the time frame were selected.

## Procedure of Data Collection/Analysis

Patient's case notes were retrieved, and relevant information like biodata, presentation, comorbidity, investigation result, intraoperative findings, complications, and outcome of management were documented and analysed with SPSS Version 22. Quantitative variables were presented as mean and Standard deviation while qualitative variables were presented as frequencies and percentages. Binary logistics regression analysis was used to determine independent factors for spontaneous closure and predictors of mortality.

## Results

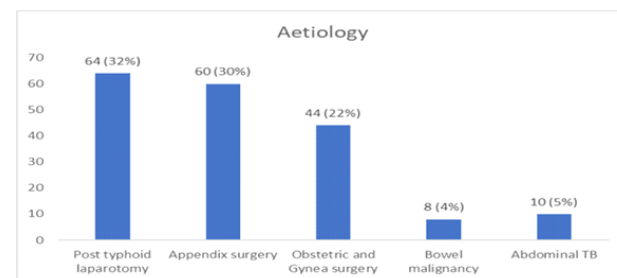
For the period under review, we had a total of 200 patients with the highest incidence of 25(12.5%) in 2014. With an age range: of 17 – 80 years, a Mean age: of 30.81 years  $\pm$  15.031 SD and a Median age: of 28.00 years. Male to female ratio of 2.7: 1. The gender distribution is shown in Figure 1.



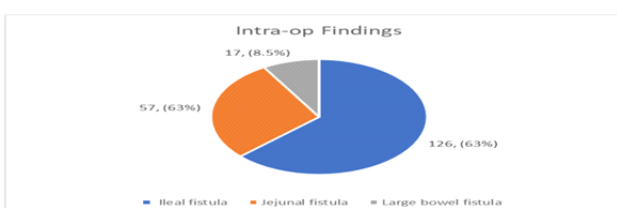
**Figure 1:** Pie chart showing gender distribution of patients.

The majority of the patients had a post-operative enterocutaneous fistula with post-typhoid ileal perforation being the commonest 64(32%) as shown in figure 2 below. 59.5% of the fistulas were low output as shown in figure 3. The pattern of complication is as follows - Dehydration: 100%, Shock: 59 (29.5%), Severe malnutrition: 87(43.5%) Mean serum Pre-albumin: 2.5mg/dl and Mean serum Protein: 2.1g/dl. The majority 180(90%) had enteral nutrition while

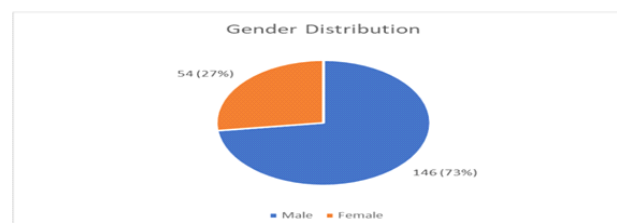
20(10%) had parenteral Nutrition. The intraoperative findings and treatment offered are shown in Figures 3 and 4 respectively.



**Figure 2:** Bar chart showing patterns of aetiology of Enterocutaneous Fistula.



**Figure 3:** Pie chart showing intra-op findings.



**Figure 4:** Bar chart showing post-op complications.

The pattern of post-op complications is shown in Figure 5. Mortality: 65 (32.5%) post-operatively: 11 (5.5%), Overwhelming malnutrition, electrolyte derangement and sepsis: 54 (27%) Follow-up at 1 year: 16 (8%). The analyzed predictors of spontaneous closure are Age, complications, fistula output and Nutrition they showed an increased likelihood of occurrence by an odd ratio but only complications were statistically significant as shown in Table 1. The analyzed predictors of mortality were age, sex, output, nutritional status, aetiology, premorbid illness, and complications however only age, output, and premorbid illness were statistically significant as shown in Table 2.

## Discussion

Our study shows that enterocutaneous fistula occurs more commonly in males than females, with an age range of 17 – 80 yrs., with a Mean age: of 30.81 yrs.  $\pm$  15.031 SD and Median age: 28.00 yrs. Male to female ratio of 2.7: 1. Most studies agree with our finding of

young population and male preponderance. Njeze and Achebe from Enugu, South-East Nigeria reported a median age of 31.7 years and a male/female ratio (1). similarly, Eni et al from Maiduguri Northeastern, Nigeria reported a peak incidence among the young age group and a male preponderance (2). furthermore, Okoli et al, Dodiya et al, Ugochukwu et al, and Chayla et al from Tanzania reported similar findings to our experience (3-6).

**Table 1:** Binary Logistic regression for Predictors for spontaneous closure

Independent Predictor Variable	Odd ratio	CI 95%	p-value
Age	2.1	1.0-4.6	Not significant
Complications	15.3	5.9-37.2	0.001
Aetiology	3.2	1.3-7.1	Not significant
Nutrition	14.3	5.6-38.7	Not significant
output	12.1	4.3-24.5	Not significant

Most of our patients presented with a post-operative enterocutaneous fistula while very few came up with spontaneous fistula this agrees with Eni et al, Dodiya et al, Ugochukwu et al, and Okoli et al however a hospital experience report from India has shown an increased rate of spontaneous fistulas from tuberculosis (7). on the contrary, another Hospital experience from Tanzania showed the majority of the fistula were post-operative (6).

Intraoperative findings revealed the Majority were small bowel fistulae which accounted for a larger proportion of high output fistulae in our experience this is consistent with national and international studies (4, 6-11). Most of our patients had enteral nutrition while few had parenteral nutrition this is consistent with the report from this environment due to cost, availability, and insurance coverage (2, 6, 8, 12-16).

This study revealed that most of our patients had spontaneous closure of their fistula while few had to undergo surgery. Our work is in agreement with Kaur et al who reported a 45.6% spontaneous healing rate (7), Igwe et al reported a high spontaneous healing rate of 75% (4), Eni et al reported a 59.3% spontaneous healing rate (2) while Okoli et al and Njeze et al reported a lower spontaneous healing rate of 10% and 31.7% respectively (1, 3). The Tanzanian experience by Chyla et al reported a spontaneous healing rate of 69.6% (6). similarly, the rate of spontaneous closure as reported by the literature is within 23- 80% which agrees with our findings (6, 14, 17, 18).

The pattern of complications from this series includes dehydration, sepsis, malnutrition and dyselectrolytaemia. The mortality rate in our series was 32.5% which is consistent with reports from our

environment with double-digit mortality (3, 4, 12, 13, 19). Furthermore, the reported mortality rate in the literature varies from 6.45-48% which agrees with our findings (1, 6, 12, 17, 20). The double-digit mortality reported by most studies in our environment could be attributable to delayed presentation, sepsis, malnutrition, high rate of high-output fistula (6, 14, 17, 21-24). Additionally, this research showed a high rate of malnutrition with few patients affording Total parenteral Nutrition(TPN) which has contributed to a high rate of morbidity and mortality. Dardai et al have shown that TPN increases fistula closure rate and decreases mortality similarly Lloyd et al reported somatostatin analogue and TPN increases high fistula closure(26).

The analyzed predictors of spontaneous closure as shown in Table 1 are Age, complications, fistula output and Nutrition they showed an increased likelihood of occurrence by an odd ratio but only complications were statistically significant. The analyzed predictors of mortality as shown in Table 2 were age, sex, output, nutritional status, aetiology, premorbid illness, and complications however only age, output, and premorbid illness were statistically significant. Chyla et al reported similar predictors for closure with the presence of complication as statistically significant also the presence of complication was a significant predictor of Mortality Additionally, they reported HIV Positivity and CD4 count as significant (6). Mawdsely et al reported fistula output, site of fistula and comorbidity to significantly affect spontaneous closure while comorbidity and site of fistula affected mortality (24). Ravindran et al reported malnutrition and spontaneous fistula affect mortality (25). While Martinez et al reported sepsis, malnutrition fistula output significantly affects mortality (23). In contrast, Lynch et al reported the number of previous attempts at surgical repair to affect spontaneous healing while the age, aetiology and duration of fistula do not affect spontaneous closure (21).

**Table 2:** Binary Logistics Regression for Predictors of Mortality

Independent Predictor Variable	Odd ratio	C.I 95%	p-value
Age	0.9	0.8-0.9	0.00
Sex	0.6	0.3-1.4	0.32
High output	0.9	0.4-1.9	0.80
Low Output	6.1	2.2-16	0.00
Nutritional status	0.8	0.4-1.8	0.70
Aetiology	1.1	0.3-3.7	0.76
Premorbid illness	0.1	0.1-0.03	0.00
Complications	1.1	0.5-2.5	0.67

## Conclusion

Enterocutaneous fistula remained a problem in our environment and occurred commonly among males within the younger population. Most of our patients had low output fistula with wide-ranging complications. There is a high rate of spontaneous closure with double-digit mortality, the significant predictors of spontaneous closure are complications while significant predictors of mortality are age, fistula output, and premorbid illness.

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