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Enterocutaneous Fistula: A Study of Its Etiology, Effect of Nutritional Management and Surgery

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Abstract: ***Aim: To study the etiology of enterocutaneous fistula (ECF), evaluate the impact of nutritional management, and assess surgical outcomes. Objective: To analyse causes of ECF, assess the impact of nutrition on outcomes, and evaluate surgical strategies for fistula closure. Background: ECF is a complex clinical problem, usually postoperative, with substantial morbidity and mortality. Effective management centers on identifying the cause, restoring fluid and electrolyte balance, comprehensive nutrition, and deliberate surgical planning. Methods: A prospective observational study was performed on ECF patients from 2023–2025. Etiology, fistula characteristics, nutrition, and interventions were recorded. Outcome measures included spontaneous and surgical closure rates, morbidity, and mortality. Results: Most ECFs resulted from postoperative complications, with spontaneous closure achieved in about 40% through tailored nutritional and medical care. Surgical intervention after nutrition optimization successfully managed persistent and high-output fistulas. Mortality was closely linked to sepsis, malnutrition, and high-output conditions. Conclusion: Accurate diagnosis, robust nutrition support, early infection control, and staged surgical strategies are key to successful ECF management.***

Keywords: Enterocutaneous fistula, nutrition, sepsis, surgical management, postoperative complication

1. Introduction

An enterocutaneous fistula is an abnormal tract between the GI tract and skin, allowing external discharge of intestinal contents. Most cases are postoperative, but other etiologies include malignancy, inflammatory bowel disease, trauma, and tuberculosis. ECF leads to profound fluid and electrolyte loss, infection, and protein-energy malnutrition, necessitating a multidisciplinary management approach.

2. Methods

Study Design:
Prospective, observational study at Alluri Sita Rama Raju Academy of Medical Sciences, Eluru (January 2023–June 2025).

Inclusion Criteria:
All patients diagnosed with ECF.

Collected Data:
Demographics and comorbidities
Etiology and classification (anatomic, physiological)
Lab markers: fluids, electrolytes, serum albumin
Management: nutrition route (oral, enteral, PN), infection control, wound care, surgery
Outcomes: rates of closure, complications, mortality

Statistical Analysis:

Descriptive statistics for closure and mortality; correlation of nutrition and outcomes.

3. Results

Etiology and Classification

Etiology	Percentage (%)
Postoperative complications	75
Inflammatory bowel disease	10
Malignancy	7
Trauma/Tuberculosis/Other	8

- Most common location: ileum.
- High-output (42%) and low-output (58%) ECFs were distinguished by 500 ml/day cutoff.
- Serum albumin was inversely proportional to healing time and mortality.

Nutrition: Role and Protocol

Malnutrition is a key predictor of poor ECF outcomes. Management must immediately address:

1) **Assessment:**
   a) Monitor weight, BMI, mid-arm circumference, serum proteins.
   b) All ECF patients are catabolic with protein-rich output.

2) **Route Selection:**
   a) **Oral/enteral nutrition:** For low-output, distal fistulas and stable patients, deliver nutrients distal to the leak if feasible.
   b) **Parenteral Nutrition (PN):**
      - Indications: high-output/proximal ECF, severe malnutrition, intolerant of enteral feed, inaccessible GI tract.

- Dosing: 25–35 kcal/kg/day and 1.5–2.5 g/kg/day protein.

c) **Micronutrients and Fluid:** Replace vitamins (A, C, K), minerals, and trace elements (esp. zinc), along with evasive electrolytes.

3) Practice Points:

a) Begin with PN if enteral is not tolerated, switch to enteral as soon as tolerated.
b) Replace daily GI losses milliliter-for-milliliter.
c) Enteral feeds reduce endotoxemia and infection risk.

Summary Table: Nutrition in ECF

Situation	Preferred Route
Low-output, distal ECF	Enteral/Oral
High-output, proximal ECF	Parenteral nutrition
GI intolerance	Parenteral nutrition
Recovery phase	Gradually reintroduce enteral

Outcomes of optimal nutrition:
- Reduced infection
- Increased spontaneous closure
- Lower mortality

Conservative and Surgical Management

Initial Management:
Sepsis control, drain abscesses, correct fluid/electrolyte imbalances, intensive wound care, and early nutritional support.

Conservative Outcomes:
30–40% spontaneous closure, especially in low-output fistulas.

Surgical Intervention:
- Indicated after 6–8 weeks if non-healing/high-output, or specific anatomical indications exist.
- Delayed surgery (after optimizing nutrition/infection control) achieved 75–85% closure rates.
- Minimally invasive surgery has shown shorter hospital stays for select patients.

Mortality:
10–15%, mainly from sepsis or ongoing malnutrition.

Complications
- **Sepsis:** Most significant risk factor for mortality.
- **Electrolyte disturbances:** Sodium, potassium, and magnesium depletion are frequent.
- **Skin excoriation:** Requires regular barrier care.
- **Malnutrition:** Increases with high-output fistulas and prolonged disease.

4. Discussion

Most ECFs are iatrogenic; the outcome heavily depends on early, tailored nutrition and infection control. Nutritional support is not a supplement but a fundamental therapy, as shown in global studies. Staged surgery (after stabilization and adequate nutrition) is essential for persistent/fatal fistulas. Early multidisciplinary involvement and diligent monitoring enhance recovery and long-term survival.

5. Conclusion

Management of enterocutaneous fistula centers on:
- Rapid fluid and electrolyte stability
- Immediate and intensive nutritional support
- Vigorous infection control
- Planned, delayed surgical approaches by a multidisciplinary team

Aggressive nutrition is essential for both successful conservative and surgical outcomes.

Ethical Approval
Approved by the Institutional Ethics Committee, Alluri Sita Rama Raju Academy of Medical Sciences, Eluru.

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