

# The Crucial Role of Nurses in the Comprehensive Management of Postoperative Enteroatmospheric Fistula: A Narrative Review

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**ABSTRACT:** Postoperative enteroatmospheric fistula (EAF) presents a complex challenge in surgical care, with multifactorial causes and significant implications for patient outcomes and quality of life. This narrative review explores the essential role of nurses in the comprehensive management of EAF, encompassing preoperative, intraoperative, and postoperative care. It emphasizes the importance of wound care management, nutritional support, psychosocial assistance, patient education, collaboration, continuous professional development, and research engagement in optimizing patient outcomes. By addressing these facets, healthcare providers can enhance their understanding and management of EAF, ultimately improving patient care in this intricate surgical complication.

**KEYWORDS:** Nurse, postoperative, enterocutaneous, enteroatmospheric, fistula, review.

## Introduction

Postoperative enteroatmospheric fistula (EAF) is a challenging and often devastating

surgical complication characterized by an abnormal connection between the gastrointestinal tract and the external environment, resulting in the leakage of intestinal contents (Table 1) [1,2].

**Table 1 Classification of postoperative digestive external fistula.**

Classification Criteria	Parameters	Type of fistula	Particularities
Anatomic	Origin	Esophagian, Gastric, Duodenal, Intestinal, Colonic	
	Opening method	External digestive fistula or enterocutaneous fistula or enteroatmospheric fistula	Between a segment of the digestive tract and the skin
		Internal digestive fistula	Between bowel and another cavitory viscera (pleura, peritoneum). Intestinal between different segments of digestive tract (stomach, small bowel, colon) Extraintestinal between different segments of digestive tract and other cavitory viscera (genitourinary tract, biliary tree, respiratory)
	Complexity and severity of fistula	Simple	Lateral, with intestinal continuity kept and direct path
		Complex	Type I One origine orifice and multiple orifices of opening in the skin Fistula associated with intraperitoneal abscesses Type II Enteroatmospheric fistula or fistulas in evisceration

Physiologic	Output	Small Medium Large	<200 ml/24 hours 200-500 ml/24 hours >500 ml/24 hours
Etiologic	Etiology	Type I – spontaneous, primary (20-25%)	Specific diseases of digestive tract: inflammatory bowel disease, Crohn disease, diverticulitis, tuberculosis, typhoid fever, actinomycosis, mesenteric ischemia, appendicitis, genital neoplasia
		Type II – iatrogenic (75-80%)	Secondary to an aggression of the healthy bowel – majority postoperative

This condition can lead to a myriad of complications, including wound infections, malnutrition, impaired wound healing, emotional distress, and functional limitations [3]. The management of EAF requires a multidisciplinary approach, with nurses playing a pivotal role in ensuring comprehensive care throughout the patient's journey [4].

This narrative review aims to shed light on the crucial role of nurses in managing EAF, emphasizing their contributions in preoperative assessments, intraoperative care, postoperative management, wound care, nutritional support, psychosocial assistance, patient education, collaboration, continuous professional development, and research engagement. By understanding and addressing these key aspects, healthcare providers can enhance the quality of care provided to EAF patients and contribute to better patient outcomes.

## 1. Preoperative Nursing Care

### 1.1. Importance of comprehensive preoperative assessments

Comprehensive preoperative assessments are paramount in identifying potential risk factors for EAF development and ensuring that patients are prepared for surgery [5]. Nurses should collaborate closely with the surgical team to gather relevant patient information, assess nutritional status, and evaluate the patient's overall health [6]. By conducting thorough assessments, nurses can help identify modifiable risk factors, such as malnutrition or smoking, and take appropriate measures to mitigate these risks [7].

### 1.2. Collaborating with the surgical team to determine patient readiness for surgery

Effective communication and collaboration between nurses and the surgical team are essential to ensure that patients are adequately prepared for surgery [8]. Nurses should advocate for patient readiness assessments and facilitate discussions regarding the timing of surgery

[9,10]. This collaborative approach helps in optimizing patient outcomes by ensuring that surgery is performed under the best possible conditions.

### 1.3. Providing patient and family education on the procedure and potential complications

Patient and family education is a cornerstone of preoperative nursing care. Nurses should provide clear and comprehensive information about the surgical procedure, its purpose, potential risks, and expected outcomes [11]. It is crucial to address any concerns or questions the patient and family may have, fostering a sense of partnership in the decision-making process. Informed patients are more likely to actively participate in their care and adhere to postoperative instructions, ultimately contributing to better EAF management [12].

## 2. Intraoperative Nursing Care

### 2.1. Assisting in surgical procedures and maintaining a sterile environment

Nurses have a vital role in the operating room during EAF surgeries. They should assist the surgical team by ensuring the maintenance of a sterile environment and providing essential instruments and supplies [13]. Proper sterile technique is critical to prevent surgical site infections, which can exacerbate EAF complications [14].

### 2.2. Effective communication and coordination with the surgical team

Intraoperative communication and coordination are paramount in EAF surgery. Nurses should collaborate closely with surgeons, anaesthesiologists, and other team members to ensure the smooth progress of the procedure. Effective teamwork can minimize surgical complications and contribute to better patient outcomes [15].

### 2.3. Monitoring patient safety and advocating for patient well-being during surgery

Nurses serve as patient advocates in the operating room. They should continuously monitor the patient's vital signs, ensuring their safety and well-being throughout the surgical procedure. If any concerns arise during surgery, nurses must promptly communicate them to the surgical team to facilitate immediate interventions. Advocacy for patient safety is a fundamental responsibility that nurses uphold [16].

### **3. Postoperative Nursing Care**

#### **3.1. Transitioning the patient from the operating room to the recovery unit**

The transition from the operating room to the recovery unit is a critical phase in EAF management. Nurses play a key role in ensuring the patient's safe transfer and handoff to the postoperative care team. This includes thorough documentation of intraoperative events and the patient's condition, as well as communication of pertinent information to the receiving healthcare providers [17].

#### **3.2. Continuous monitoring of vital signs and assessment of wound healing**

Postoperative monitoring is essential in detecting early signs of complications and assessing wound healing progress. Nurses should vigilantly monitor the patient's vital signs, paying close attention to any signs of infection, hemorrhage, or hemodynamic instability [18]. Additionally, regular assessment of the wound site is crucial to track healing and identify potential issues that may require intervention.

#### **3.3. Recognizing and managing postoperative complications**

EAF patients are at heightened risk of various complications, including wound infections, sepsis, electrolyte imbalances, malnutrition, and organ failure [3]. Nurses should be well-versed in recognizing these complications and initiating appropriate interventions promptly. Early intervention can significantly impact patient outcomes and prevent the escalation of complications.

#### **3.4. Pain management strategies tailored to the patient's needs**

Pain management is a central aspect of postoperative nursing care for EAF patients. Nurses should collaborate with the healthcare team to develop individualized pain management plans that address the patient's specific needs and preferences. Effective pain management not only improves patient comfort but also facilitates early mobilization and participation in rehabilitation efforts [19].

### **4. Wound Care Management**

Wound care management is a critical component of EAF management. Nurses should be well-versed in various wound care techniques and interventions tailored to the unique challenges posed by EAF [20]. The following strategies are key in wound care management:

#### **4.1. Vacuum-Assisted Closure (VAC) Therapy**

VAC therapy, also known as negative pressure wound therapy (NPWT), is a valuable tool in managing EAFs [21]. It involves the application of controlled negative pressure to the wound, promoting wound healing, reducing edema, and stimulating granulation tissue formation. Nurses should be trained in the proper application and management of VAC therapy to optimize its benefits for EAF patients [22].

#### **4.2. Fistula Tract Closure Techniques**

Different techniques can be utilized to promote the closure of the fistula tract, such as fibrin sealants, endoscopic clips, fistula plugs, or injection of cyanoacrylate glue [23–27]. These methods aim to seal the communication between the intestine and the wound. Nurses should collaborate with surgeons and wound care specialists to select and implement the most suitable closure technique based on the patient's condition.

#### **4.3. Wound Bed Preparation**

Proper wound bed preparation is crucial for successful EAF management. This involves removing necrotic tissue, controlling infection, and optimizing the wound environment for healing [28]. Techniques such as debridement, application of topical medications, and surgical cleaning may be employed. Nurses should be skilled in wound bed preparation techniques to create an optimal healing environment.

#### **4.4. Proper cleaning and dressing techniques**

Nurses must possess expertise in proper wound cleaning and dressing techniques [29]. This includes maintaining strict adherence to hand hygiene protocols, utilizing appropriate personal protective equipment (PPE), assessing wound characteristics, selecting suitable dressings based on wound status, and ensuring dressing changes are performed at the

appropriate intervals. Adhering to evidence-based wound care practices minimizes the risk of infection and supports the healing process [30].

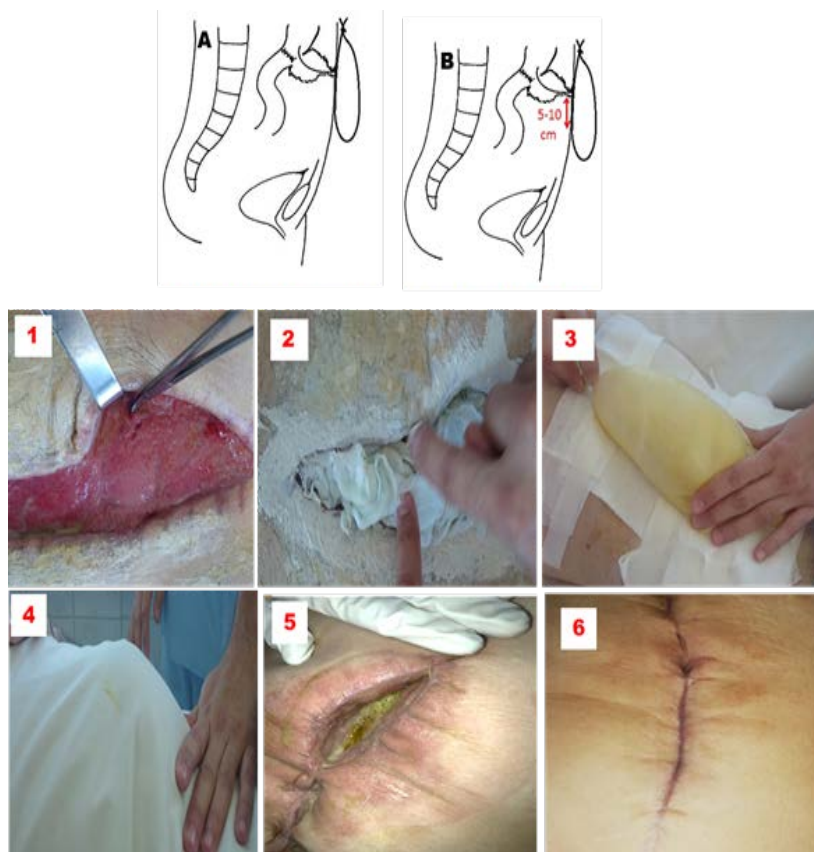
#### **4.5. Utilization of advanced wound care products and therapies**

Advanced wound care products and therapies are essential in the management of EAF. Nurses should be knowledgeable about these

interventions and collaborate with wound care specialists to select and implement the most appropriate options. Some advanced wound care modalities include negative pressure wound therapy (NPWT), biological dressings, hyperbaric oxygen therapy (HBOT), and biologic

agents. The choice of intervention should be tailored to the patient's specific needs and wound characteristics [31–33].

**4.6. Closure of fistulas exposed in evisceration by containment/compression with an elastic balloon with variable pressure (Figure 1)**



**Figure 1. Closure steps (1-6) of enteroatmospheric fistulas by contention/compression with an elastic balloon with variable pressure (original procedure Clinica I Chirurgie Craiova).**

The procedure, originally belonging to Prof. Dr. Ion Georgescu and the staff of the First Surgery Clinic Craiova, was later applied in all surgery clinics in Craiova in enteroatmospheric fistulas (fistulas in evisceration) as well as in fistulas extended on the surface, with a short or absent path, severe complex type II enterocutaneous fistulas. The procedure consists of obturation of the fistulous opening with an elastic balloon applied to the external opening of the fistula and the eviscerated wound in such a way that it exceeds the edges of the wound/evisceration by 5-10 cm (Figure 1 A and B). The application of the balloon is preceded by the mechano-chemical toilet of the wound and the protection of the skin (Figure 1.1 and 1.2) and of the eviscerated wound with skin protectors (pastes, creams, powders). The wound prepared in this way is covered with sterile gauzes that are fixed with a 15/20 cm circular bandage, after which the balloon is applied (Figure 1.3), which

is fixed with a 15/20 circular bandage and secured with adhesive tapes (Figure 1.4). The fastening of the balloon must be tight enough not to allow the effluent to flow beyond the edges of the evisceration, but at the same time loose enough not to obstruct the intestinal transit or impair breathing.

## 5. Nutritional Support

Nutritional support is a cornerstone of EAF management, as malnutrition is a common concern in these patients. Nurses have a vital role in assessing the patient's nutritional needs and implementing appropriate interventions:

### 5.1. Assessing the patient's nutritional needs and addressing deficiencies

Comprehensive nutritional assessments are crucial in identifying patients at risk of malnutrition [34]. Nurses should evaluate dietary intake, body composition, laboratory values (e.g., albumin, prealbumin, vitamins), and functional

status. Identifying nutritional deficiencies or imbalances allows for targeted interventions.

### **5.2. Protein Intake**

Sufficient protein intake is essential for wound healing in EAF patients [35]. Nurses should educate patients on the importance of meeting their protein requirements, as it supports collagen synthesis, immune function, and tissue repair.

### **5.3. Micronutrients**

Micronutrients, including vitamins and minerals, play a vital role in wound healing processes [35]. Nurses should emphasize the importance of adequate micronutrient intake to support collagen production, cell proliferation, and immune function.

### **5.4. Supplementation**

In cases of severe malnutrition or inability to consume adequate nutrients orally, nurses may need to collaborate with dietitians and physicians to implement oral nutritional supplements or enteral feeding. Ensuring patients receive the necessary nutrients is critical for wound healing and overall recovery.

### **5.5. Collaborating with dietitians and implementing appropriate enteral or parenteral feeding regimens**

Collaboration with dietitians is essential in addressing the complex nutritional needs of EAF patients. Nurses should work closely with dietitians to develop and implement enteral or parenteral feeding regimens tailored to individual patient requirements. This collaborative approach ensures that patients receive optimal nutrition support, especially when oral intake is insufficient.

### **5.6. Monitoring and adjusting nutritional interventions as necessary**

Continuous monitoring of the patient's nutritional status is essential. Nurses should regularly assess weight, laboratory values, and clinical response to the nutritional interventions [36]. Adjustments to feeding regimens may be required based on changes in the patient's condition and nutritional requirements.

## **6. Psychosocial Support**

Psychosocial support is integral to the holistic care of EAF patients, considering the emotional distress associated with this condition. Nurses must address the emotional needs of patients and their families:

### **6.1. Addressing the emotional needs of patients and their families**

Nurses should recognize and acknowledge the emotional impact of EAF on patients and their families. It is essential to create a supportive environment where patients can express their

fears, anxieties, and concerns without judgment. Providing empathy and active listening is crucial in addressing emotional distress.

### **6.2. Providing empathetic care and counselling throughout the recovery process**

Nurses should offer empathetic care by demonstrating compassion and understanding [37]. Additionally, involving mental health professionals, such as psychologists or social workers, can provide counselling and psychological interventions to help patients and their families cope with the emotional challenges they may face.

### **6.3. Facilitating communication and collaboration between the patient, family, and healthcare team**

Open communication is key to addressing psychosocial needs. Nurses should facilitate communication between the patient, their family, and the healthcare team, ensuring that concerns are heard and addressed. Involving patients and their families in decision-making and care planning fosters a sense of control and empowerment.

### **6.4. Support Groups and Peer Connections**

Informing patients and families about support groups or peer connections can provide valuable emotional support [38]. These groups offer opportunities for individuals to connect with others who have experienced similar challenges, share insights, and receive practical tips for managing EAF.

## **7. Patient Education and Self-care**

Patient education and self-care are essential components of EAF management, empowering patients to actively participate in their recovery [39].

### **7.1. Educating patients about their condition, including possible causes and preventive measures**

Nurses should provide comprehensive education to patients regarding the causes of EAF and potential risk factors. Emphasis should be placed on preventive measures, such as adhering to postoperative care instructions, adopting a healthy lifestyle, and recognizing early signs of complications.

### **7.2. Demonstrating proper wound care techniques and supporting self-care management**

Nurses play a crucial role in teaching patients how to perform proper wound care. This includes demonstrating techniques for cleaning and dressing the wound, as well as explaining the importance of adherence to these practices.

Patients should feel confident in managing their wound care to promote healing and prevent complications.

### *7.3. Emphasizing the importance of medication adherence and follow-up appointments*

Medication adherence and regular follow-up appointments are essential in EAF management. Nurses should stress the importance of taking prescribed medications as directed and attending scheduled follow-up visits. These measures are crucial in monitoring progress and addressing any emerging issues.

## **8. Collaborative Approach and Teamwork**

A collaborative approach and teamwork are fundamental to the successful management of EAF:

### *8.1. Fostering effective communication and collaboration with the multidisciplinary team*

Effective communication and collaboration among healthcare providers are essential for delivering coordinated and patient-centered care [8]. Nurses should maintain open lines of communication with the multidisciplinary team, which may include surgeons, dietitians, wound care specialists, and others. Teamwork promotes a holistic approach to EAF management.

### *8.2. Participating in regular team meetings to discuss patient progress and plan care interventions*

Regular team meetings or interdisciplinary rounds provide an opportunity for healthcare providers to discuss patient progress, share insights, and plan coordinated care interventions [40]. Nurses should actively contribute to these meetings to ensure that the patient's needs are met and that care is optimized.

### *8.3. Advocating for the patient's needs and ensuring a coordinated approach to care*

Nurses serve as advocates for their patients, ensuring that their needs and preferences are considered in the management plan [41]. This involves facilitating communication between the patient, their family, and the multidisciplinary team. Nurses play a pivotal role in ensuring a coordinated approach to care that addresses all aspects of EAF management.

## **9. Continuous Professional Development and Research**

Continuous professional development and engagement in research are crucial for healthcare providers managing EAF:

### *9.1. Staying updated on best practices and evidence-based guidelines for managing postoperative EAF*

Nurses should actively seek to stay updated on the latest best practices and evidence-based guidelines related to the management of EAF [42]. This includes guidelines on surgical techniques, wound care, nutrition, and infection control. Staying informed ensures that care is delivered based on the latest evidence.

### *9.2. Participating in research studies to contribute to advancements in care*

Engagement in research studies related to EAF management can contribute to advancements in care. Nurses may participate as study investigators, collaborate with research institutions, or join multicenter research networks. Their involvement in research helps generate valuable knowledge and informs future practice.

### *9.3. Engaging in educational opportunities to enhance skills and knowledge in the field*

Continuing education is essential to enhance skills and knowledge in EAF management. Nurses should actively seek out educational opportunities, such as conferences, workshops, and webinars, that focus on surgical techniques, wound care strategies, and innovations in EAF management. These educational experiences empower nurses to deliver high-quality care.

## **Conclusion**

In conclusion, nurses play a critical and multifaceted role in the comprehensive management of postoperative enteroatmospheric fistula (EAF). Their involvement spans from preoperative assessments to wound care management, nutritional support, psychosocial support, patient education, and collaboration with the multidisciplinary team. EAF is a complex condition with significant physical and emotional challenges for patients. Therefore, nurses must be well-equipped with the knowledge, skills, and empathy needed to provide holistic care.

The evolving nature of nursing care in relation to surgical complications like EAF necessitates continuous professional development, engagement in research, and a commitment to evidence-based practice. By staying updated on best practices, participating in research, and engaging in ongoing education, nurses can contribute to advancements in EAF management and improve patient outcomes. The collaborative efforts of healthcare providers across disciplines, with nurses at the forefront, are essential in

ensuring the best possible care for individuals facing the challenges of EAF.

### Conflict of interests

None to declare

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