

**Original Research Article**

# Anesthetic Management of Esophagectomies for Esophageal Cancer at Aristide Le DANTEC University Hospital, Senegal: a review of 18 Cases

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**Abstract:** *Introduction:* The anesthetic strategy for esophageal surgery has evolved thanks to optimization of patient care from the preoperative phase to postoperative rehabilitation. The objective of this study was to describe the anesthetic management of esophagectomies for esophageal cancer at the Aristide Le Dantec University Hospital. *Patients and Methods:* We conducted a retrospective and descriptive study from January 2014 to December 2021. We included all patients who underwent anesthesia for esophagectomy for esophageal cancer. We studied the epidemiology, the anesthetic technique, analgesia and postoperative complications. *Results:* We collected data on 18 patients with a mean age of 45 years and a male-to-female ratio of 0.63. Patients were classified as ASA I (American Society of Anesthesiologists) in 27.77%, ASA II in 56.66% and ASA III in 16.66% of cases. General anesthesia was combined with epidural analgesia in 61.11% of cases. Intraoperative analgesia was maintained with fentanyl in 11 patients. The mean intraoperative blood loss was 150 ml. The mean duration of surgery was 3 hours and 40 minutes (range: 2 hours and 50 minutes to 6 hours and 30 minutes). The predominant postoperative analgesia protocol was a combination of paracetamol, nefopam and epidural analgesia. Postoperative morbidity was 50%, and postoperative mortality was 16.66%. *Conclusion:* Perioperative management of this surgical procedure through good preoperative assessment improves patient prognosis.

**Keywords:** Anesthesia, Esophagectomy, Evolution.

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## INTRODUCTION

Esophagectomy for esophageal cancer is a major abdominothoracic surgery, hence the importance of a thorough preoperative assessment. The anesthesiologist-intensivist remains a key player due to their involvement in all stages surrounding the surgical procedure. Anesthetic procedures have undergone significant advancements thanks to optimization of patient care from the preoperative phase through to postoperative rehabilitation. The objective of this study was to describe the perioperative management of patients who underwent esophagectomy for esophageal cancer at the Aristide Le Dantec University Hospital.

## PATIENTS AND METHODS

This was a retrospective and descriptive study conducted over an eight-year period (January 2014-December 2021) at the Aristide Le Dantec University Hospital. We included all patients who underwent anesthesia for esophagectomy due to esophageal cancer

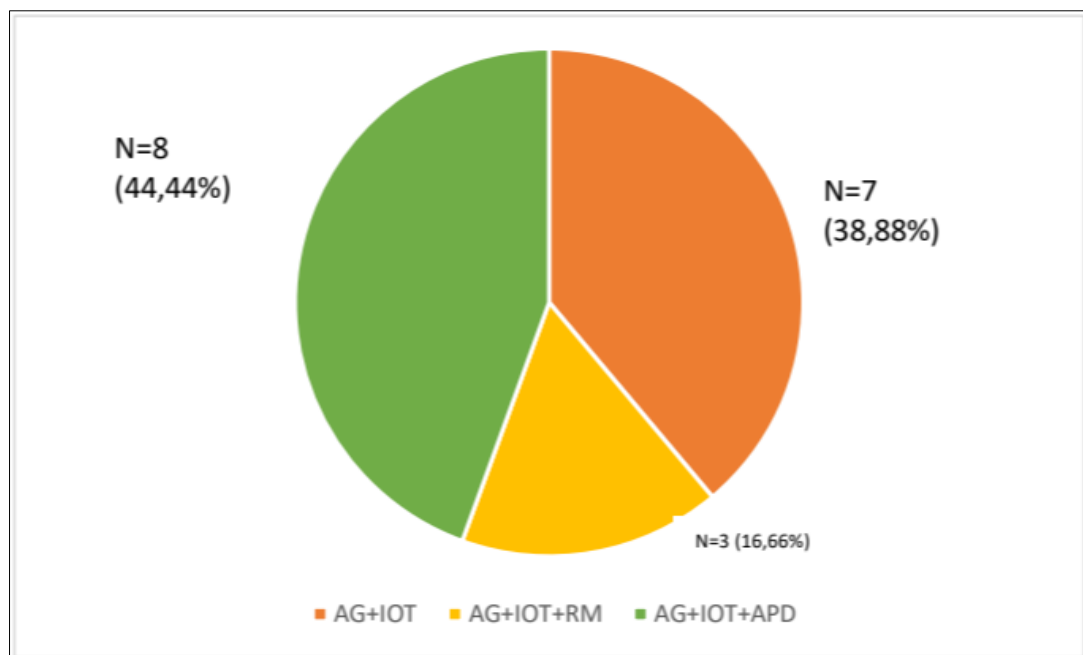
and were subsequently transferred to the intensive care unit for postoperative care. The parameters studied were epidemiological data, the anesthetic technique, postoperative analgesia, and patient outcomes. All recorded data were entered into Excel (Microsoft™) and analyzed using SPSS (Statistical Package for the Social Sciences) version 1.

## RESULTS

During the study period, 25 patients underwent esophagectomy (3,125 cases per year). Our study included 18 patients (with usable records), representing a average 2.25 cases of esophagectomy for cancer per year. The mean age was 45 years (range 18-75 years), and the male-to-female ratio was 0.63. Three patients (16.66% of cases) had hypertension and one patient had chronic obstructive pulmonary disease. At the anesthesia consultation, dysphagia was present in all patients, weight loss in 14 patients (77%) and vomiting in three patients (16.16%). Patients were classified as ASA I in 27.77%, ASA II in 56.66% and ASA III in 16.66% of

cases. Three patients (16.66%) had received neoadjuvant chemotherapy and one of these patients received chemoradiation. Cefuroxime antibiotic prophylaxis was administered to all patients. All patients received general anesthesia with orotracheal intubation. General

anesthesia was combined with spinal cord analgesia in 11 patients (61.11%). The distribution of patients according to the anesthetic technique is shown in Figure 1.



**Figure 1: Distribution of patients according to anesthetic technique**

**AG:** general anesthesia; **IOT:** orotracheal intubation; **RM:** spinal anesthesia with morphine; **APD:** epidural analgesia

Intraoperative analgesia was maintained with fentanyl combined with epidural analgesia in 7 patients (38.88%). The mean intraoperative blood loss was 150 ml (range of 100 and 200 ml). The average duration of surgery was 3 hours and 40 minutes (range 2 hours and 50 minutes to 6 hours and 30 minutes). All postoperative patients received intravenous analgesics, including paracetamol combined with one or more of the

following: nefopam, tramadol, NSAIDs, or morphine. Eleven patients (61.11% of cases) received epidural analgesia, including eight with epidural analgesia and three with spinal cord analgesia. Eight different postoperative analgesia strategies, each with paracetamol, were used. Table I shows the distribution of patients according to the postoperative analgesia protocol.

**Table I: Distribution of patients according to postoperative analgesia strategy**

Pain relief protocols	Staff	Percentage(%)
Morphine IV+ RM	2	11.11
Nefopam + tramadol	1	5.55
Morphine IV	3	16.66
Nefopam + IV morphine	2	11.11
Nefopam + APD	5	27.80
Nefopam + RM	2	11.11
NSAIDs + APD	1	5.55
Morphine IV+ APD	2	11.11
Total	18	100

**RM:** spinal anesthesia with morphine **APD:** epidural analgesia **IV:** Intravenous

The average length of stay in intensive care was 6 days (range: 2 to 13 days). The patients progress was marked by the development of postoperative respiratory,

cardiac, and surgical complications in nine (9) patients (50% of cases). Postoperative complications are shown in table II.

**Table II: Postoperative Complications**

Nature of complications	Number (n)	Percentage (%)
Medical		
Pulmonary		
Pneumonias	05	27.77
ARDS	02	11.11
Atelectasis	03	16.66
Pleurisy	02	11.11
Pneumothorax	01	5.55
Septic shock	01	5.55
Cardiacs	01	5.55
Surgical		
Parietal suppuration	04	22.22
Anastomotic release	02	11.1
Cervical	01	5.55
Thoracic	01	5.55
Jejunostomy necrosis	01	5.55

**ARDS:** acute respiratory distress syndrome

Three cases of death were noted and the causes of death were acute respiratory distress syndrome (2 cases) and septic shock (one case).

## DISCUSSION

Esophageal cancer is generally rare in Africa, except in the Transkei region, which appears to be its epicenter on the continent. The highest incidences are found in Asia, from the region extending from northern China to the Iranian coast of the Caspian Sea [1, 2]. Surgical resection, the only treatment that appears to prolong survival when feasible, represents a unique entity in the fields of surgery and anesthesia/intensive care, both due to the extent of the surgical trauma it entails and the frequency and potential severity of postoperative complications. In this study, we described the anesthetic management of a poor-prognosis condition requiring major surgery. In our study, we collected 18 cases of esophagotomy, representing a frequency of 2.25 cases per year of this surgery at the Aristide Le Dantec University Hospital. Diop in Senegal between 2004 and 2010 reports a number of 5 cases per year in his study [3]. This low rate is found in African series: Nigerian which reports 20 cases in five years, Togolese with 120 cases in 20 years and Nigerien with 36 cases in 15 years [1, 2]. In general, it is estimated that 50% of patients with esophageal cancer are candidates for a surgery with curative aim, due to the field and the diagnosis is often delayed [4-6]. The average age of patients was 45 years. In Senegal, Diop found an average age of 48 years in 72 patients [7]. Regarding esophageal cancer, more than 70% of patients were under 60 years old, whereas in Western series, more than 75% of patients on average are over 60 years old, including 50% over 70 years old [8]. The differences in the age of onset of esophageal cancer according to countries and especially continents are probably related to the heterogeneous distribution of risk factors (alcohol, tobacco, dietary habits, etc.) contributing to the development of cancer [7]. At the anesthesia

consultation, dysphagia was the primary symptom and was present in all patients. The circumstances surrounding the discovery of esophageal cancer are diverse and varied. Dysphagia is almost always present and is sometimes associated with other signs such as weight loss, odynophagia, hypersalivation... etc. In our series, as in other studies, it is dysphagia to solids and significant weight loss that necessitate consultation [9, 10]. In advanced stages, symptoms are related to the size, extent, and location of the tumor. It is typical in published series that an average of 50% of patients present with locally advanced disease at the time of diagnosis [11]. In our series, three patients (16.66% of cases) received preoperative chemotherapy following a multidisciplinary team meeting. The protocol used was a combination of cisplatin and 5-fluorouracil. In DIOP's series, no patients received neoadjuvant chemotherapy [10]. This highlights the need to standardize patient management, which should involve referral to a multidisciplinary team meeting. Patients who have received preoperative chemotherapy must be carefully reassessed before surgery, both cardiac and hematologically, due to the toxicity of the drugs used. In our series, preoperative chemotherapy is not routinely used. The rarity of this procedure can be explained by the difficulty of accessing chemotherapy (low socioeconomic status, limited access to hospital facilities) and by the short-term complications of chemotherapy, which can potentially delay surgery. In our study, 55.55% of patients were classified as ASA II and 16.66% as ASA III. Cohen found an ASA II classification in 60% of cases and an ASA III classification in 12% of cases [12]. The ASA score is assessed during the anesthesia consultation based on clinical and paraclinical examination data and the patient's overall health. A high ASA score is a predictive factor for operative mortality and morbidity after esophagectomy for cancer [13]. Esophagectomy for cancer is a major abdominothoracic surgery. For its performance, general anesthesia (GA) combined with

Perimedullary regional analgesia during surgery is the most appropriate technique. In our series, 61.11% of patients were operated on under general anesthesia with peripheral anesthesia (GA+PAM) (including 44.44% under GA+PAD and 16.66% under GA+RM) and 38.88% under GA + intubation alone. General anesthesia, justified by the level of anesthesia required (neck), has the advantage of providing amnesia, control of the airways and allows for deep curarization.

Perimedullary analgesia, which can be epidural analgesia (PAD) or spinal morphine analgesia (SM), allows for sparing of morphine analgesics and early extubation, thus contributing to improved postoperative outcomes [14]. The determining factors in the choice of anesthesia technique depend on the patient's medical history, the anesthesia team's practices, the availability of regional anesthesia products, and, above all, the patient's preference, which is well-informed from the anesthesia consultation. The use of general anesthesia with intravitreal injection (IGI) alone can be explained by the frequent unavailability of epidural kits and morphine. Antibiotic prophylaxis was systematically administered to all patients and was based on a second generation cephalosporin, in accordance our institution's protocols for esophageal surgery. Cefuroxime, at a dosage of 1.5 g before the induction of general anesthesia as a single infusion over 15 to 30 minutes, was used in all patients. It was continued for 24 to 48 hours post-operatively to prevent surgical site infections. The targeted pathogens are staphylococci, streptococci, and aerobic and anaerobic Gram-negative bacteria. This approach is based on the SFAR's recommendations for antibiotic prophylaxis in digestive surgery. Esophagectomy is a clean - contaminated surgery. The spontaneous infection risk of 5 to 15% from this surgery is reduced to less than 7% if antibiotic prophylaxis is properly carried out [15]. The occurrence of postoperative infections can be explained by the patients' underlying conditions (neoplasm, malnutrition, chemotherapy). Esophageal surgery is a procedure that causes significant postoperative pain, hindering postoperative rehabilitation. The most frequently adopted pain management protocol is multimodal analgesia combining epidural and intravenous analgesia [14]. Thus, in our series, 61.11% of patients received multimodal analgesia. Epidural analgesia (EDA) and spinal anesthesia with morphine were performed in 44.44% and 16.66% of cases, respectively. The optimal analgesic regimen should aim for pain relief but also allow for early mobilization, rapid return of bowel function, early resumption of oral intake, and minimize the occurrence of complications. EDA perfectly meets this requirement. It remains an excellent analgesic technique for this type of surgery where early postoperative rehabilitation is important. Using a morphine dose of 0.1 to 0.3 mg, spinal morphine

analgesia provides excellent, prolonged analgesia without significant side effects following major digestive surgery. The risk of respiratory depression is reduced, and the dose should not exceed 0.3 mg [16]. The dose of morphine used for spinal analgesia in our series was 100 micrograms. This inexpensive technique appears to be better suited and should be combined with intravenous patient-controlled analgesia (PCA) postoperatively, which allows for seamless analgesic transition. Its use requires monitoring in the post-anesthesia care unit within 24 hours. Our study has put in evidence of an overall morbidity rate 50% (9 patients) were in intensive care. This rate is higher than the average found in France within the cohort of the French Association of Surgery (31% of morbidity) [17]. Diop in Senegal, a study found a postoperative complication rate of 42.84% [3]. Morbidity of esophageal surgery is due to the close anatomical relationships of this organ, atground often polypathological, to the surgical technique and to features of there tumor often imposing a resection extensive.

In our series, the rate of postoperative respiratory complications was 38.88% of cases. The identified risk factors for respiratory complications are the patient's condition, the surgical procedure, pre-existing chronic obstructive pulmonary disease, advanced age, smoking, malnutrition, preoperative neoadjuvant treatment, high ASA score, palliative nature of the surgery, inadequate postoperative analgesia, blood loss requiring transfusion, tumor location, and the extent of mediastinal and cervical lymph node dissection [18]. The management of postoperative respiratory complications combines good preoperative assessment and preparation, well-adapted intraoperative monitoring with optimization of cardiovascular and respiratory functions, and postoperative rehabilitation based on good postoperative physiotherapy, nutritional support, non-invasive ventilation, and effective multimodal analgesia. Anastomotic fistula most often occurs between the 5th and 7th postoperative day and is the leading cause of early surgical mortality. It involves frequently the prognosis vital of for this patient, it is essential to be able to detect and treat it early [19]. In our study, the fistula rate was 11.11%. Stay more frequent in our series that in THE "centers experts » which report a rate of 2.2% [20]. The overall mortality rate was 16.66% of cases. The overall mortality rate varied from 3.5% to 13.21% according to some studies. This work shows us that despite our small sample size, our immediate results in terms of mortality are close to those found in other series. This mortality rate is higher than the average rates of French-speaking expert centers performing an average of ten esophagectomies per year (mortality 4%) [17]. Table III represents the overall mortality of esophageal surgery from different series.



**Table III: Mortality results of esophagectomy for cancer in different series**

Studies	Year	Patients(n)	Overall mortality (%)
Diop [10]	2011	35	10
Zinng [21]	2010	858	3.5
Hijri [22]	2000	70	7.14
Abounouh [23]	2010	174	13.21
Our study	2021	18	16

Predictive factors for mortality include the presence of preoperative respiratory disease, the surgical procedure and intraoperative blood transfusion, advanced age, the occurrence of postoperative pneumonia and intra-abdominal infection [24].

## CONCLUSION

Esophagectomy for esophageal cancer is a major abdominothoracic surgery requiring thorough preoperative assessment. The anesthesiologist remains a key player in providing high-quality perioperative care and postoperative rehabilitation. Improving the management of this surgical procedure necessitates interdisciplinary training and the prevention of postoperative complications.

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