

# McKeown Esophagectomy for Obstructive Squamous Cell Carcinoma in a 24-Year-Old Man in a Resource-Limited Setting: A Case Report

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## Abstract

## Case Report

**Introduction:** Esophageal squamous cell carcinoma is exceptional before 30 years of age. **Case presentation:** A 24-year-old man who neither smoked nor drank alcohol, but regularly consumed hot beverages, presented with aphagia and 13.6% weight loss. Endoscopy and computed tomography showed an obstructive middle-third tumor staged cT3N0M0. Because chemoradiotherapy was unavailable, upfront three-stage McKeown esophagectomy was performed. A cervical anastomotic leak draining into the right pleural cavity healed with conservative management by day 28. Histology showed an R0-resected pT3N1 squamous cell carcinoma. **Interest:** In resource-limited settings, upfront surgery remains a realistic curative option.

**Keywords:** Esophageal squamous cell carcinoma; young adult; McKeown esophagectomy; sub-Saharan Africa.

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## INTRODUCTION

Esophageal cancer ranks eleventh in incidence and seventh in cancer mortality worldwide, with about 511,000 new cases and 445,000 deaths in 2022 [1]. Squamous cell carcinoma (SCC) predominates in sub-Saharan Africa, particularly along the East African corridor. In Central Africa the disease is less frequent but is diagnosed late. In a Cameroonian multicentre series, median survival was 6.7 months and only one patient in five underwent surgery [2]. Esophageal SCC is mainly a disease of the sixth and seventh decades. In African registries 12% of cases occur before 45 years, while presentation before 30 years remains exceptional [3].

The current standard for locally advanced resectable SCC is neoadjuvant chemoradiotherapy followed by esophagectomy. In much of sub-Saharan Africa, however, radiotherapy is scarce and treatment costs are borne by patients. We report the case of a 24-year-old man with obstructive middle-third esophageal SCC treated by upfront three-stage McKeown esophagectomy, and discuss the strategic choices and the management of a major anastomotic leak in a resource-limited setting.

## CASE PRESENTATION

A 24-year-old man with no tobacco or alcohol use, but with regular consumption of very hot beverages, presented with a 6-month history of dysphagia. It was initially intermittent, then permanent, and had progressed to aphagia, without regurgitation or reflux symptoms. On examination, his World Health Organization performance status was 2 and he had lost 13.6% of his body weight.

Upper gastrointestinal endoscopy showed a budding, stenotic, impassable tumor at 27 cm from the incisors that bled on contact (Figure 1a). Biopsies were taken, but the results were not available before surgery. Chest–abdomen–pelvis computed tomography (CT) showed a 5.3-cm stenosing tumor of the middle-third esophagus, extending from T4 to T6, in contact with the aortic arch, without distant metastasis (Figure 1b). Endoscopic ultrasound and ear-nose-throat panendoscopy were not available. The working diagnosis was a cT3N0M0 (stage II) tumor, presumed squamous given its location, the absence of reflux and the hot-beverage exposure.

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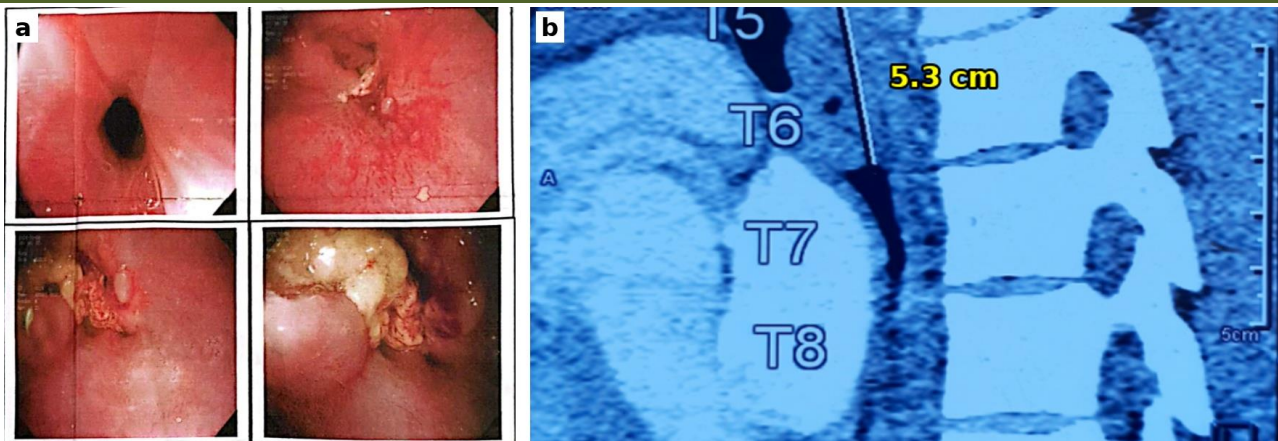


**Figure 1: Preoperative work-up. (a) Upper gastrointestinal endoscopy: budding, stenotic tumor, bleeding on contact, impassable to the endoscope, at 27 cm from the incisors. (b) Sagittal computed tomography reconstruction: 5.3-cm stenosing tumor of the middle-third esophagus extending from T4 to T6.**

The multidisciplinary tumor board acknowledged that neoadjuvant chemoradiotherapy was indicated, but chose upfront surgery because of complete obstruction, unavailable radiotherapy and the family's limited financial resources. Preparation included parenteral nutrition and chest physiotherapy. Preoperative tests showed hemoglobin 13.6 g/dL, leukocytes 4,800/mm<sup>3</sup>, creatinine 9.1 mg/L, prothrombin time 89% and albumin 21.2 g/L. The patient was classified ASA II.

Under general anesthesia with selective left bronchial intubation for one-lung ventilation, a three-stage McKeown esophagectomy was performed. Through a right posterolateral thoracotomy in the fifth intercostal space, the inferior pulmonary ligament was divided, the azygos arch was ligated and the thoracic duct was ligated low in the mediastinum. Exploration revealed a bulky lymph node along the lower esophagus and a loose adhesion to the descending aorta. The esophagus was mobilized from the hiatus to the thoracic

inlet with mediastinal lymphadenectomy and carefully freed from the aortic arch (Figure 2a). Through a left presternocleidomastoid cervicotomy, the cervical esophagus was mobilized while protecting the recurrent laryngeal nerve (Figure 2b). During this step, the patient sustained a cardiac arrest, with return of spontaneous circulation after cardiac massage. The esophagus was then divided 4 cm below the cricopharyngeal sphincter. Through a laparotomy, the crura were opened, the esophagus was delivered into the abdomen, and the stomach was mobilized while preserving the right gastroepiploic arcade. A gastric tube was fashioned with a linear cutting stapler and the staple line was oversewn (Figure 2c). A Kocher maneuver was performed; no pyloroplasty was done. The conduit was transposed through the posterior mediastinum, and a hand-sewn end-to-end cervical esophagogastric anastomosis was performed with interrupted 3/0 polyglactin sutures over a nasogastric tube. The chest and neck were drained. The resected specimen is shown in Figure 3.

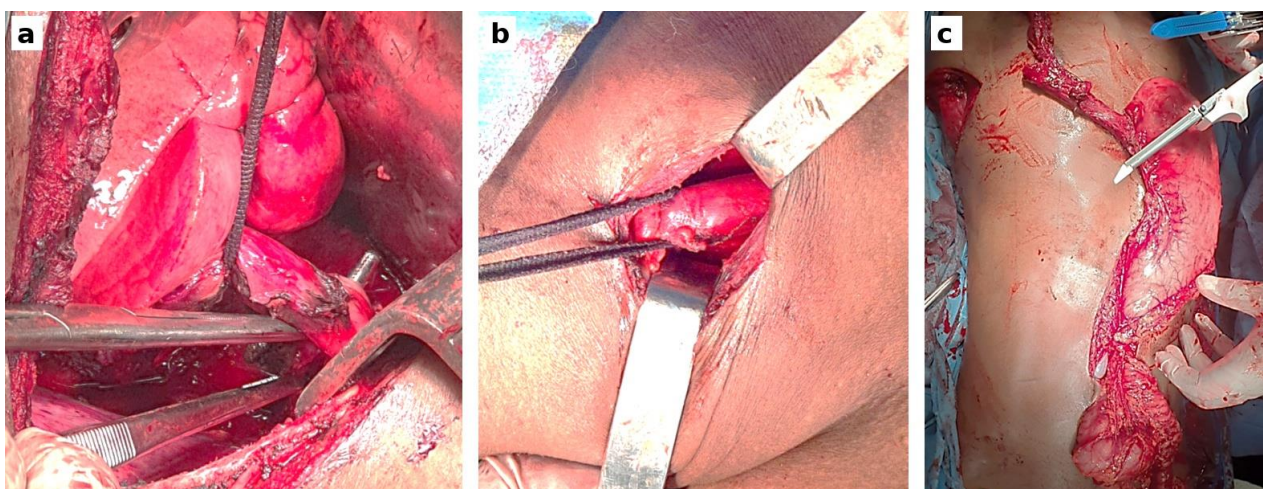


**Figure 2: Operative steps. (a) Right posterolateral thoracotomy: mobilization of the thoracic esophagus. (b) Left presternocleidomastoid cervicotomy: cervical esophagus encircled with tape. (c) Abdominal stage: esophagus delivered through the laparotomy and fashioning of the gastric tube with a linear cutting stapler**

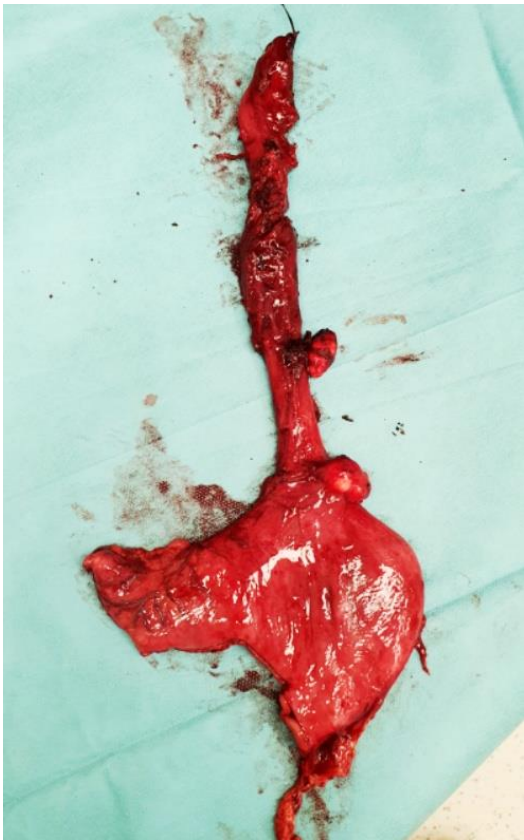


**Figure 3: Resected specimen: total esophagectomy with the proximal stomach (lesser curvature) and periesophageal lymph nodes**

The postoperative course is summarized in Table 1. On day 4, purulent fluid in the chest drain revealed an anastomotic leak draining into the right pleural cavity (Esophagectomy Complications Consensus Group [ECCG] type II). It was managed conservatively with nil by mouth, second-line antibiotics, parenteral nutrition, daily saline irrigation

and aspiration through the chest drain, and wound care. The leak had closed by day 28. Histology showed a poorly differentiated invasive SCC with two involved lymph nodes, classified pT3N1 (stage IIIB if M0), with R0 margins. The patient was discharged on day 30 and referred for adjuvant chemotherapy.

**Table 1: Postoperative course**

| Postoperative day | Event                                                                        | Management                                                                                                                           |
|-------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Day 0             | Immediate postoperative period                                               | Intravenous fluids 3,500 mL/day, oxygen 3 L/min, antibiotics, multimodal analgesia, omeprazole, tranexamic acid, chest physiotherapy |
| Day 1             | Nasogastric tube kinked in the pharynx                                       | Endoscopic repositioning                                                                                                             |
| Day 3             | Barium swallow: no leak                                                      | Oral and nasogastric feeding started (water, then porridge)                                                                          |
| Day 4             | Turbid, then purulent fluid in the chest drain: anastomotic leak             | Nil by mouth, second-line antibiotics, parenteral nutrition, high-protein diet                                                       |
| Day 8             | Persistent leak with food debris in the chest drain; surgical site infection | Daily saline irrigation and aspiration through the chest drain; wound care                                                           |
| Day 28            | Leak closed; satisfactory contrast swallow                                   | Chest drain removed; progressive oral feeding                                                                                        |
| Day 30            | Discharge                                                                    | Referral to medical oncology for adjuvant chemotherapy                                                                               |

**DISCUSSION**

This case combines three unusual features: esophageal SCC at 24 years of age, upfront surgery for a locally advanced tumor, and survival after a major anastomotic leak managed without reoperation.

Esophageal SCC is rare in young adults. In Cameroon, the mean age at diagnosis is about 58 years [2]. The higher proportion of early-onset cases reported in Africa largely reflects the young age structure of the population rather than a higher age-specific risk [3].

Our patient had no alcohol or tobacco exposure, the classical risk factors in West and Central Africa. His only identified exposure was regular consumption of very hot beverages. In western Kenya, drinking very hot beverages was associated with a 3.7-fold higher risk of esophageal SCC, independently of alcohol and tobacco [4], and the International Agency for Research on Cancer classifies very hot beverages above 65 °C as probably carcinogenic (group 2A) [5]. Poor oral hygiene, household smoke and contaminated grain have also been linked to early-onset disease in Africa [3]. Young age should therefore never delay endoscopy for organic dysphagia. The 6-month delay to diagnosis in our patient is typical of the late presentation reported in Cameroon [2].

Staging was incomplete. Without endoscopic ultrasound or positron emission tomography, nodal status is often underestimated. Our patient was staged cN0 but was pN1, and a bulky lymph node was found during surgery. Conversely, CT suggested aortic invasion, whereas the adhesion proved loose at surgery. Operating without preoperative histological confirmation departs from standard practice; it was accepted here because the endoscopic appearance was typical and the tumor was completely obstructive.

Neoadjuvant chemoradiotherapy is the reference treatment for cT3 tumors. In the CROSS trial it increased the R0 resection rate from 69% to 92% and doubled median overall survival (49 versus 24 months), with a 49% pathological complete response rate in SCC [6]. Where radiotherapy is unavailable, neoadjuvant chemotherapy is an evidence-based alternative. In JCOG9907, preoperative cisplatin plus fluorouracil improved 5-year overall survival compared with the same chemotherapy given postoperatively (55% versus 43%) [7].

In our patient, aphagia and malnutrition made a neoadjuvant phase difficult without a feeding jejunostomy, which was not placed. Upfront surgery followed by adjuvant chemotherapy for node-positive disease was the pragmatic choice, but it probably carries a higher risk of recurrence.

### Three surgical approaches were possible.

Transhiatal esophagectomy avoids thoracotomy and reduces pulmonary morbidity, but dissection of the middle-third esophagus is done blind. With a tumor in contact with the aorta, the risk of vascular injury was considered too high. In a randomized trial, the transthoracic approach yielded more lymph nodes, and a non-significant trend towards better long-term survival, at the cost of higher morbidity [8]. In an Ethiopian series of 139 transhiatal resections for mostly advanced tumors, hospital mortality reached 18.7%, mainly from sepsis, anastomotic leak and respiratory complications [9].

The Lewis Santy procedure limits the proximal margin for a tumor whose upper end lies at 27 cm. The three-stage McKeown technique [10] combines complete thoracic dissection under direct vision with a wide proximal margin. Its cervical anastomosis carries a higher leak rate and a risk of recurrent laryngeal nerve injury, although cervical leaks are generally less lethal than intrathoracic ones [11]. A right thoracotomy avoids the aortic arch and the left subclavian artery.

### Minimally invasive esophagectomy reduces pulmonary complications but was not available.

The stomach was chosen as the conduit because of its robust right gastroepiploic blood supply and the need for a single anastomosis. Colonic interposition is reserved for patients with previous gastric surgery or caustic injury.

The posterior mediastinal route is shorter than the retrosternal (Akiyama) route and avoids angulation of the conduit.

Pyloroplasty was omitted. In a meta-analysis of randomized trials, pyloric drainage reduced early gastric outlet obstruction without a significant effect on leak or mortality [12].

Intraoperative cardiac arrest during cervical and upper mediastinal mobilization is rare. Plausible mechanisms include a vagal reflex from traction on the esophagus, mechanical compression of the heart or great vessels during blunt dissection, hypovolemia, and arrhythmias favored by malnutrition-related electrolyte disorders. Close communication between surgeon and anesthesiologist enabled immediate resuscitation.

The leak had several risk factors : severe hypoalbuminemia (21.2 g/L), weight loss, a cervical anastomosis, a period of low conduit perfusion during the cardiac arrest, and early oral feeding. A normal contrast study on day 3 does not rule out a leak; water-soluble contrast or CT is preferred to barium when a leak is suspected. Because the conduit lay in the posterior mediastinum, the cervical leak drained into the right pleural cavity and behaved like an intrathoracic leak. Standardized ECCG definitions make it possible to compare such events across centers [13]. A systematic review found that most cervical leaks can be managed by local drainage, whereas intrathoracic leaks often require endoscopic stenting, vacuum therapy or reoperation [14]. Here, daily saline irrigation through the existing chest drain, combined with antibiotics and nutritional support, was a simple, low-cost and effective alternative.

In an international cohort, 90-day mortality after esophagectomy was 9.4% in low- and middle-income countries versus 3.7% in high-income countries. The excess was attributed to failure to rescue patients after complications, not to more frequent complications [15]. Our patient survived a severe complication, which

shows that rescue is achievable with basic resources when complications are recognized early. Preoperative nutritional optimization and a feeding jejunostomy for enteral support during a leak are simple measures that could improve outcomes further. The limitations of this report are the lack of preoperative histology and endoscopic ultrasound, the unreported number of lymph nodes examined, and the short follow-up.

## CONCLUSION

Esophageal SCC can occur in young adults without alcohol or tobacco exposure, and prolonged dysphagia warrants early endoscopy at any age. When neoadjuvant therapy is unavailable, upfront three-stage McKeown esophagectomy offers a curative option for obstructive middle-third tumors. Anastomotic leaks can be rescued with simple, low-cost conservative measures, provided they are detected early and backed by nutritional support.

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## Authors' contributions

All authors contributed to the patient's management and the writing of the article.

## Conflicts of interest

The authors declare no conflicts of interest.

## Patient consent

Written informed consent was obtained from the patient for publication of this case report and the accompanying images. All images were de-identified.

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