

# Emergency Tracheotomy: Nine Years Experiences in National Center Hospital of Nouakchott, Mauritania

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## Abstract

**Introduction:** Tracheotomy is a commonly performed procedure, but with very large disparities according to the teams, both in terms of frequency and modality (percutaneous or surgical), tracheotomy has been evolved with medical advances. The objective of this study was to clarify the indications and complications of emergency tracheotomies at the National hospital center (CHN) in Nouakchott Mauritania. **Materials and Methods:** It is a retrospective study of tracheotomies performed in the ENT department of the CHN during the period from January 1, 2010 to December 31, 2018. The indications and complications were noted, as well as the modalities and time of decannulation. **Results:** Tracheotomy was motivated by upper airway obstruction (UAO) in 139 (94%) cases (mean age 32.5 years), or the need for prolonged ventilation in 8 patients (median age 46 years). Sixteen (7%) early complications were noted with 5 untimely decannulations including one fatal and 5 obstructive plug responsible for another death. Six pneumothorax was observed. Fifteen (26%) late complications required additional surgery; 7% (n = 11) of patients were decannulated with a mean duration of tracheotomy 26 months. In 19 (28%) cases of decannulations, the persistence of a tracheocutaneous fistula required surgery. **Conclusion:** Emergency tracheotomy is a survival gesture that is sure to be effective. A tracheotomy is not deprived of complications. Familiarity with the technique, the right choice of equipment, perfect knowledge of the anatomical relationships of the trachea, rigorous monitoring and postoperative care represent the main conditions for minimizing the risk of complications.

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## Keywords

Emergency, Trachea, Tracheotomy, Complications, Mauritania

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## 1. Introduction

Emergency tracheotomy is a survival gesture that is sure to be effective. A tracheotomy is not deprived of complications. Familiarity with the technique, the right choice of equipment, perfect knowledge of the anatomical relationships of the trachea, rigorous monitoring and postoperative care represent the main conditions for minimizing the risk of complications.

Tracheotomy is a commonly performed procedure, but with very substantial divergences between teams, both in terms of frequency and modality (percutaneous or surgical).

It is a procedure practiced for more than 5000 years [1].

The indications and consequences of tracheotomy have changed [1] [2].

However, in our country, acute infections such as epiglottitis and tetanus are still a cause of airway obstruction leading to tracheotomy.

Tracheotomy is the temporary or permanent opening of the trachea followed by the placement of a cannula.

The aim of our study is to specify the prevalence of tracheotomies at the Ear, Nose and Throat (ENT) department in the National teaching Hospital Center of Nouakchott in Mauritania, to determine the indications and to describe the complications observed.

## 2. Materials and Methods

This is a descriptive and cross-sectional retrospective study of tracheotomies performed in the ENT department of the Nouakchott hospital from January 1, 2009 to December 31, 2018.

Inclusion criteria:

- All emergency tracheostomy patients in our department;
- Patients operated and followed in our department;
- Study period from January 2008 to December 2018.

Exclusion criteria:

- Incomplete files;
- Patients lost to follow-up.

Only patients who were received in the emergency unit of ENT and benefited from tracheotomy as a life saving procedure and then followed up in hospital were considered.

We used the clinical observations of patients, the operative reports. Patients with tracheotomy elsewhere were excluded.

In addition to demographic data, the context of intervention we studied the indications and complications. The complication was considered early if it is intra-

operatively or immediately postoperatively, secondary in the case of an incident occurring at least one week after operation, when the first cannula was changed.

Performed in an emergency context, the technique has always been the same. It is made by an ENT surgeon on a patient in a supine position, sometimes in a seated position. The skin incision is horizontal at 1cm above sternal fork. The dissection continues plan by plan, strictly median, with a regular finger palpation ensuring the midline position of the trachea. The tracheal incision is made under the H-thyroid isthmus between the 3rd and 4th tracheal rings. Two stitch sutures are placed on each tracheal flap; gentle traction on the threads opens the tracheal opening thus created to introduce the tracheotomy cannula.

### 3. Results

Between January 2009 and December 2018, 147 patients were tracheotomized in our department; there were 98 male and 49 female patients.

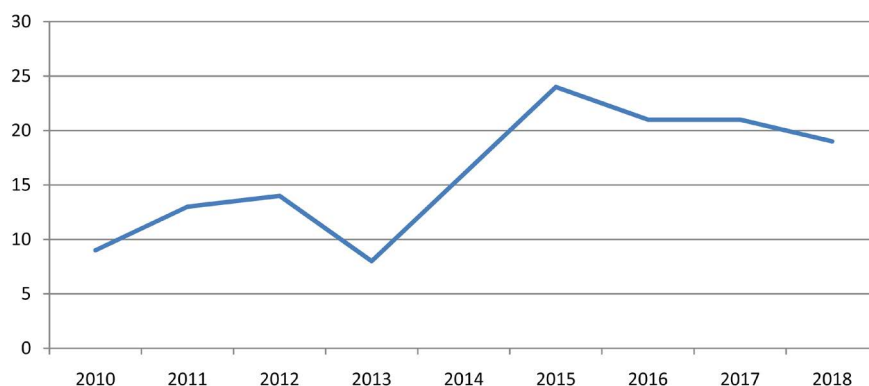
The number of emergency tracheotomies varied from year to year and reported in **Figure 1**.

Mean age of our patients is 43.5 years (extremes: 22 months to 76 years), 18 (12%) children.

Clinically tracheotomy was performed in an emergency setting: 89% of patients presented signs of severe hypoxia and 11% respiratory arrest. **Table 1** shows repartition of Sociodemographic and Clinical characteristics.

#### 3.1. Indications

In our study, the indications are summarized in the table (**Table 2**).



**Figure 1.** Number of emergency tracheotomies per year.

**Table 1.** Sociodemographic and clinical characteristics.

Gender		Age		Signs	
Male	Female	Less 1 year	8 cases	Intense dyspnea	132 cases
95 (64.6%)	52 (35.4%)	1 - 5 years	12 cases	Respiratory arrest	15 cases
		More than 5 years	127 cases	Dysphonia	142 cases
				Dysphagia	67 cases

**Table 2.** Indications.

Conditions	Sex		Percentage (%)
	male	female	
Malignant tumors of the larynx	51	3	37%
Malignant tumors of the pharynx	5	6	7%
Difficult Intubation	7	5	8%
Laryngeal papillomatosis	7	4	7%
laryngeal tracheal trauma	11	8	12%
Thyroid tumors	3	11	10%
Guillain Barre Syndrome	1	3	3%
Extensive cervical cellulitis	4	5	6%
Foreign bodies in the upper respiratory tract	9	4	9%

### 3.2. Complications

The postoperative treatment was straightforward in 126 (86%) patients. In all cases, postoperative treatment consists of the combination of antibiotic therapy, mucolytics and analgesics.

Care is provided by nurses from the department until it is taken over by the family or the patient himself. Twenty one (14%) complications are related to tracheotomy and are summarized in **Table 3**.

### 3.3. Decannulation

23 patients were successfully cannulated. The average decannulation time was 25 months (ranging from 11 days to 68 months). The tracheotomy opening closed spontaneously.

The tracheotomy was definitive with trachea open to the skin (tracheostomy) in patients with cancer of the larynx.

Follow-up is always ensured by the same team that operated on the patients.

The mean duration of patient follow-up was 73 days (range: 21 days to 3 years).

## 4. Discussion

The number of patients in our series is 147 over a period of ten years, with the prevalence of 15 patients per year which is higher than that reported by Akolbout *et al.* where they found 55 cases over 7 years (8 urgent tracheotomies per year) [1].

A clear male predominance with a gender ratio: M/F of 2.

The ages ranged from 22 months to 76 years, which is found in the majority of studies [2] [3] [4] [5]. Except for the study of Nassif *et al.* [6], which reported on tracheotomy in children, the age ranged from 0 to 12 years.

### 4.1. Indications

The main indications in adults are tumors of the larynx (37%), this percentage is

**Table 3.** Complications of emergency tracheotomies.

Intra operative complications		Early postoperative complications		Late complications		Deaths	
Bleeding	2	Emphysema	3	Stenosis	1	Accidental Decanulation	1
Cardiopulmonary arrest	1	Accidental Decanulation	2	peri-orificial granuloma	1	Obstruction plug	2
		Pneumothorax	4			catastrophic hemorrhage	1
		Obstruction plug	7				
Total	3		16		2		2

high compared to the series of Babu 24% [7] and Koffi-aka (19%). This can be explained in our context by the delay in consultation, laryngotracheal wounds (10%), which is not found in the literature probably due to the expansion of esogastric and laryngo tracheo endoscopy bronchique interventional in our country.

Ten thyroid tumors, particularly anaplastic cancers and large goitres compressing the trachea were found in our study; this was noted too in the work of Kadi [8] on 200 tracheotomies.

#### 4.2. Surgical Technique and Complications

The technique used is conventional without prior assessment under local anesthesia in 85% of cases, under general anesthesia in 14% of cases and exceptionally without anesthesia in 0.7% of cases.

As in the majority of the literature [9] [10] [11] [12] the tracheal incision has been horizontal under thyroid isthmus or transisthmic with an H-shaped tracheal flap, the cannula type was chosen according to the availability at the moment of placement and kept and held in place by bands wrapped around the neck.

Song *et al.* [13] reported 111 operated children underline the advantage of the horizontal incision which is to pass in inter cartilaginous and thus to spare the tracheal cartilages, thus avoiding the mechanisms of secondary cicatrization at the origin of granuloma formation.

During the first postoperative week, two cases of accidental decanulation were retained without sequelae because the patients were immediately canulated by the healthcare team. Early decanulations have been reported in several series [14] [15] [16] [17].

The technique of pulling the trachea across the incision of the tracheal rings facilitates decannulation.

Late complications are intratracheal mucosal plugs, granulomas around the tracheostomy [18] opening, and tracheal stenosis [19]. In our study, the number

of these late complications was undoubtedly underestimated due to retrospective data collection and the high number of patients lost to follow-up.

## 5. Conclusions

Emergency tracheotomy has a reputation for being dangerous. We perform it in a special context of under-medicalization.

It must obey a rigorous technique anticipating the therapeutic steps that will follow.

The emergency tracheotomy was the only possible procedure in these situations of acute dyspnea. This should be taken into account to organize effective continuing training of medical and paramedical staff so as to maintain sufficient familiarity and experience in the management of tracheotomies.

## Conflicts of Interest

The authors declare no conflicts of interest.

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