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# Tracheotomy in an African Hospital Setting: A 10-Year Retrospective Study in Parakou, Benin

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## Abstract

**Introduction**: Tracheotomy remains a vital procedure in otorhinolaryngology and cervicofacial surgery for the management of acute or chronic obstructions of the upper airways. This study aimed to describe the profile of tracheotomized patients and to analyze the indications, operative technique, postoperative course, and patient survival at the Departmental University Hospital of Borgou (CHUD-Borgou) from 2015 to 2024. **Methods**: This was a retrospective study including all patients who underwent tracheotomy in the ENT-Head and Neck Surgery Department over a ten-year period. Sociodemographic, diagnostic, radiological, histological, and therapeutic data were collected from the medical records. **Results**: A total of 35 patients were included, representing 5.55% of the department's surgical activity. Emergency tracheotomy was performed in 74.3% of cases. The mean age of the patients was 30 years ± 20.7 years, with a male predominance (65.7%). The main indications were laryngeal tumors suggestive of malignancy (28.5%), laryngeal papillomatosis (22.9%), and cervical trauma (22.9%). Surgical tracheotomy was performed in all patients, with general anesthesia used in 65.7% of cases. Early complications were mainly represented by tracheal obstruction due to mucous plugs (8.6%). Intraoperatively, four deaths (11.4%) were recorded among patients admitted for stage 4 laryngeal dyspnea. Complete resolution of the underlying pathology was achieved in 34.3% of patients, whereas 22.9% experienced recurrence. **Conclusion**: Tracheotomy remains a crucial procedure, particularly in emergency situations, with a low complication rate when performed under appropriate conditions.

## Keywords

Tracheotomy, Papillomatosis, Malignant Laryngeal Tumor, Cervical

Trauma, Parakou

## 1. Introduction

Tracheotomy is a surgical procedure that involves creating an opening in the anterior surface of the cervical trachea followed by placement of a cannula to allow breathing by bypassing the supraglottic airways [1]. It ensures airway patency and respiratory protection. It is a commonly performed medical intervention in many emergency situations or chronic airway diseases. Once an emergency surgical procedure codified by Chevalier Jackson in 1909, it is now standardized and performed in two modalities: surgical tracheotomy and percutaneous tracheotomy [2]. Tracheotomy is one of the oldest known surgical procedures, with historical descriptions dating back more than 5000 years [3]. In the United States in 2024, among patients intubated for respiratory distress due to COVID-19, 32.53% underwent tracheotomy indicated for prolonged intubation [4]. In Brazzaville in 2016, the prevalence of tracheotomy among all surgical interventions was 11.59% over a ten-year period [2]. At CNHU in Benin in 2021, 105 tracheotomies were performed in 10 years, *i.e.*, 10 to 11 per year. The main indication was obstructive tumors in 62.8% of cases [3]. Indications for tracheotomy are classically divided into three categories: urgent laryngological indications (tumoral and infectious pathologies), medical or intensive care indications (neurological diseases), and prophylactic indications (in anticipation of certain planned difficult surgical procedures that may cause respiratory difficulties). Upper airway obstruction from various causes is the most frequently encountered indication. Complications may occur, including accidental decannulation, which can be potentially fatal, as well as granuloma formation, mucous plugging, and tracheoesophageal fistula [1]. The Departmental University Hospital Center of Borgou (CHUD-Borgou) is located in north-western Benin, specifically in the city of Parakou, approximately 400 km from Cotonou. Parakou is the country's third city with special administrative status and serves a predominantly underprivileged population. In light of the local working conditions, we considered it relevant to conduct a 10-year review of tracheostomy procedures at CHUD Borgou. This study aims to provide an overview of tracheotomy practice in the ENT-head and neck surgery department of CHUD-Borgou, the main indications, the techniques used, the outcomes, and the evolutionary aspects.

## 2. Patients and Methods

This was a cross-sectional analytical study with retrospective data collection from January 1, 2015, to December 31, 2024, in the ENT-head and neck surgery department at the Departmental University Hospital of Borgou. This study involved all patients who underwent a tracheotomy in the ENT-head and neck surgery department.

Patients of all ages and both sexes were eligible for inclusion:

- patients who underwent a tracheotomy in the ENT-head and neck surgery department of CHUD-Borgou during the study period regardless of the cause
- patients who had an operative report and a complete medical record

Tracheotomy was indicated for laryngological causes (obstruction of tumoral, infectious, traumatic, malformative, and neurological origin) and non-laryngological causes (prophylactic tracheotomy). The technique used was surgical tracheotomy. Patients were followed up in the department during the postoperative period and for the causal disease.

Patients with incomplete medical records following tracheostomy were excluded from the analysis. Outcome assessment was based on the regression or persistence of dyspnea, as well as on the occurrence of postoperative complications or recurrences. Outcome was considered favorable when the reduction of clinical symptoms was marked, continuous, or complete. Conversely, the course was considered unfavorable in cases of symptom persistence, worsening, or relapse after a short period of improvement.

Data entry and analysis were performed using Epi Info version 7.2.6.0. Fisher's exact test was used to compare proportions. The difference was considered statistically significant for a p-value less than 0.05.

## 3. Results

Among the 35 patients who underwent tracheotomy, 26 were salvage tracheotomies, representing a frequency of 74.29%, and 9 patients underwent elective tracheotomy, representing 25.71%. The mean age of the patients was 30 ± 20.74 years (range: 2 years to 77 years). The 0 to 20-year age group accounted for 35.29% of cases. Males represented 65.71% of cases, with a sex ratio of 1.91. In terms of profession, farmers constituted 34.29% of the patients, followed by students (20%), homemakers (17.14%), traders (8.57%), and one private-sector employee (2.86%). Figure 1 illustrates the age-group distribution of patients who underwent tracheotomy at CHUD-Borgou (n = 35).

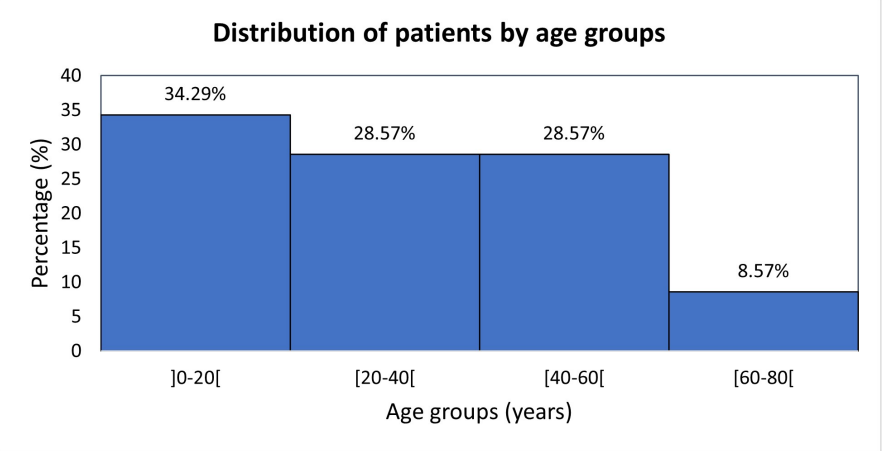


Figure 1. Distribution of patients who underwent tracheotomy in the ENT-head and neck surgery department at CHUD-Borgou by age groups (n = 35).

Among the patients, some had undergone procedures such as laryngeal stripping (4 patients, 11.43%), thyroidectomy (5 patients, 14.28%), or a prior tracheotomy (3 patients, 8.57%). Four patients (11.43%) consumed tobacco and an equal number consumed alcohol.

In 22 patients (62.86%), dyspnea was progressive, and acute in 13 cases (37.14%). Laryngeal tumors were the main circumstance of dyspnea onset (18 patients, 51.43%), followed by trauma (9 patients, 25.71%) and post-cervical surgery dyspnea (4 patients, 11.43%). Table 1 shows the distribution of patients according to the circumstances of dyspnea onset (CHUD-Borgou, 2015-2024) (n = 35).

Table 1. Distribution of patients according to the circumstances of dyspnea onset (CHUD-Borgou, 2015-2024) (n = 35).

| | Size | Percentage |
|---|---|---|
| Laryngeal tumors | 18 | 51.43 |
| Laryngeal trauma | 9 | 25.71 |
| Cervical surgical intervention | 4 | 11.43 |
| Other | 4 | 11.43 |
| **Total** | 35 | 100.0 |

Others = difficult intubation; prophylactic tracheotomy for pharyngeal tumor.

Dysphonia was reported in 71.43% of cases (25 patients) and dysphagia in 14 cases (40%).

Signs of respiratory distress were present in 11 patients (31.43%), and signs of hypoxia in 5 (14.29%). One patient had signs of hypercapnia, two had consciousness disorders, while 6 patients (17.14%) were in good general condition. Eighteen patients (51.43%) presented with stage 4 laryngeal dyspnea according to the Chevalier Jackson and Pineau classification. One patient presented with stage 1 laryngeal dyspnea, twelve (34.29%) with stage 2, and four with stage 3.

Indirect laryngoscopy or nasofibroscopy, performed in all patients, revealed an exophytic laryngeal tumor in 9 cases (25.71%), suspected grape-cluster laryngeal papillomatosis in 8 cases (22.86%), edema or an inflammatory appearance of the vocal cords in 6 cases each (17.14%), and laryngeal immobility in 5 cases (14.29%). The examination was normal in 4 patients (11.43%).

Among the 35 patients, 14 (40%) did not undergo imaging. Lesions identified were laryngeal fractures or traumatic injuries in 8 cases (22.86%), and a laryngeal mass, with or without loco-regional extension, in 8 other patients (22.86%), and laryngeal fibrous thickening in 1 case.

Endoscopy performed under general anesthesia in 26 patients revealed traumatic lesions and laryngeal edema in 8 cases each (22.86%), tumoral lesions in 8 cases (22.86%), and clustered papillomatosis in 7 (20%). Vocal fold immobility was noted in 1 case, and the examination was normal in 2 patients.

Among the 35 patients, the causes of dyspnea were mainly: laryngeal tumor (18 patients, 51.43%), cervical trauma following a suicide attempt (8, 22.86%), and post-

thyroidectomy bilateral recurrent nerve palsy (4, 11.43%). Table 2 presents the distribution of patients according to the diagnosis (CHUD-B, 2015-2024) (n = 35).

Table 2. Distribution of patients according to the diagnosis (CHUD-Borgou, 2015-2024) (n = 35).

| | Size | Percentage |
|---|---|---|
| Obstructive tumors of the larynx | 18 | 51.43 |
| Cervical trauma due to suicide attempt | 8 | 22.86 |
| post-thyroidectomy bilateral recurrent nerve palsy | 4 | 11.43 |
| Difficult intubation in a patient with a sublingual cyst | 1 | 2.86 |
| Post-trauma penetrating neck wound from road traffic accident | 1 | 2.86 |
| Nasopharyngeal tumor complicated by dyspnea | 1 | 2.86 |
| Oropharyngeal tumor extending to the larynx | 2 | 5.62 |
| Total | 35 | 100.00 |

Among the 35 patients included in this study, surgical tracheotomy was performed in 100% of cases. Concerning anesthesia type, 23 patients (65.71%) received general anesthesia, and 12 patients (34.29%) received local anesthesia. Subisthmic transversal skin incision was used in 100% of cases. Among the 35 cannulas used, 7 were cuffed (20%), 28 uncuffed (80%), 31 non-fenestrated (88.57%), 4 fenestrated (11.43%), and 11 had inner cannulas (31.43%).

Procedures associated with tracheotomy included biopsy (n = 10, 28.57%), stripping (n = 9, 25.71%), and debridement with suture of cervical wound (n = 8, 22.85%). In tumor cases, histological examination revealed squamous cell carcinoma of the larynx in 10 patients (28.57%) and laryngeal papillomatosis in 8 (22.86%).

Treatment of the initial cause included chemotherapy (2 cases), stripping (8 cases), granuloma excision (1 case), debridement with suture (3 cases), and psychiatric consultation (4 cases).

Overall, 30 of 35 patients (85.71%) experienced no complications. Hemorrhage occurred in one patient. No injury to adjacent structures nor recurrence of dyspnea was reported. Four patients admitted with stage 4 laryngeal dyspnea died intraoperatively despite emergency surgical management. In tracheotomized patients, aerosol therapy, pericannular care, and tracheal suctioning were performed in 88.57% of cases. Cannula change concerned 14.29% of patients on day 7.

Early complications observed consisted of tracheal obstruction due to mucous plugs, occurring in three patients. One case of recurrent dyspnea was recorded in a child followed by laryngeal papillomatosis.

Decannulation was successful in 65.71% of cases, after a mean duration of 15 days with extremes of 3 and 80 days. The rate of impossible decannulation was 34.29% (12 cases). These included seven laryngeal cancers, one oropharyngeal tumor, and one nasopharyngeal tumor.

Among all 35 patients included in the study, 12 patients (34.29%) showed resolution of the initial pathology. Eight patients (22.86%) experienced recurrence; all recurrences were laryngeal papillomatosis. Ten patients (28.57%) died during follow-up. Among them, four deaths occurred intraoperatively; these patients were admitted with stage IV laryngeal dyspnea, complicated by severe respiratory distress and altered level of consciousness. Five patients (14.29%) were lost to follow-up. Table 3 illustrates the distribution of patients according to the evolution of causal disease (CHUD-Borgou, 2015-2024) (n = 35).

Table 3. Distribution of patients according to the evolution of causal disease (CHUD-Borgou, 2015-2024) (n = 35).

| | Size | Percentage |
|---|---|---|
| Overall deaths | 10 | 28.57 |
| Recovery | 12 | 34.29 |
| Recurrence | 8 | 22.86 |
| Lost to follow-up | 5 | 14.29 |
| Total | 35 | 100.00 |

A significant relationship was observed between the diagnosis and clinical outcome ($p < 0.001$). Deaths mainly concerned laryngeal cancers, while cervical traumas had favorable outcomes. Laryngeal papillomatoses showed frequent recurrences, and other causes (cervical wounds) tended to evolve towards recovery. Table 4 presents the relationship between the diagnosis and clinical outcome (CHUD-B, 2015-2024) (n = 35).

Table 4. Relationship between diagnosis and clinical outcome (CHUD-Borgou, 2015-2024) (n = 35).

| Diagnosis/Indication | Deaths (n, %) | Recovery (n, %) | Lost to follow-up (n, %) | Recurrence (n, %) | Total (n, %) | p-value |
|---|---|---|---|---|---|---|
| Laryngeal/oropharyngeal cancer | 8 (80.0%) | 0 (0.0%) | 3 (60.0%) | 1 (12.5%) | 12 (34.3%) | 0.00 |
| Difficult intubation | 1 (10.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 1 (2.9%) | |
| Recurrent nerve palsy | 0 (0.0%) | 0 (0.0%) | 1 (0.0%) | 1 (12.5%) | 2 (5.8%) | |
| Penetrating neck wound | 0 (0.0%) | 1 (8.3%) | 0 (0.0%) | 0 (0.0%) | 1 (2.9%) | |
| Cervical trauma | 0 (0.0%) | 8 (66.7%) | 1 (20.0%) | 0 (0.0%) | 9 (25.7%) | |
| Nasopharyngeal tumor/nasal cavity tumor | 1 (10.0%) | 0 (0.0%) | 1 (20.0%) | 0 (0.0%) | 2 (5.7%) | |
| Laryngeal papillomatosis | 0 (0.0%) | 2 (16.7%) | 0 (0.0%) | 6 (75.0%) | 8 (22.9%) | |
| **Total** | **10 (100%)** | **12 (100%)** | **5 (100%)** | **8 (100%)** | **35 (100%)** | |

## 4. Discussion

In this study, 35 patients underwent tracheotomy between 2015 and 2024 in the ENT-head and neck surgery department of CHUD-B, out of a total of 630 surgical interventions, representing a rate of 5.55%. Among them, 26 tracheotomies

(74.29%) were performed emergently and 9 cases (25.71%) were elective. This rate is comparable to that reported by Diallo *et al.* in Conakry (5.42%) [5] and by Kpemissi *et al.* in Lomé (5.1%) [6], confirming that our frequency falls within the West African regional average. The predominance of salvage tracheotomies is also reported by Gilyoma *et al.* in Tanzania (80.4%) [7] and Olajide *et al.* in Nigeria (91.1%) [8], reflecting late presentation in the management of obstructive laryngeal pathologies in Africa. This high proportion of emergency procedures is likely attributable to delayed consultation and the rapid progression of obstructive laryngeal pathologies [9] [10].

The mean age was 30 ± 20.74 years, with 12 patients (35.29%) aged 0 to 20 years. The mean age of 30 years is relatively comparable to ages reported in African series. Dolou *et al.* in Cotonou reported 27.2 years with 41.9% children (<15 years) [3], and Gilyoma in Tanzania reported 37.9 years [7]. Tracheotomy in young subjects is explained by the frequency of pediatric diseases (papillomatosis) and cervical traumas. In developed countries, the mean age is higher, related to prolonged intubation and degenerative diseases [3].

Males predominated, comprising 65.71% of cases. The same observation was made by Dolou *et al.* in Cotonou (61.9%) [3] and Alabi *et al.* in Nigeria (69.2%) [11]. This male predominance may be explained by the higher exposure of men to cervical trauma and risk factors for laryngeal cancer, whereas some higher-care countries report a male/female balance [12].

Laryngeal dyspnea was progressive in 22 patients (62.86%) and acute in 13 patients (37.14%), reflecting the predominance of slow forms related to tumoral, infectious, or inflammatory pathologies, whereas acute forms are typically traumatic [13]. These proportions are comparable to those reported by Dolou *et al.* at CNHU-HKM in Cotonou (60.47%) [3], Gilyoma *et al.* in Tanzania (58.4%) [7], and Diallo *et al.* in Conakry (63.2%) [3]. Slow progression is explained by delayed consultation, self-medication, and limited access to specialized facilities, while acute forms often necessitate salvage tracheotomy [14] [15]. Dysphonia was the most frequent symptom (31 patients, 88.57%), followed by dysphagia (14 patients, 40%). These results are consistent with those of Dolou *et al.* (82.35% dysphonia) [3] and Diallo *et al.* (85.7%) [5]. Dysphagia often reflects pharyngeal or laryngeal involvement, with similar proportions reported by Gilyoma *et al.* (37.4%) [7] and Adoga *et al.* (41.2%) [13].

According to the Chevalier Jackson and Pineau classification, eighteen patients (51.43%) presented with stage 4. One patient (2.86%) presented with stage 1 dyspnea, twelve (34.29%) with stage 2, and four (11.43%) with stage 3, reflecting a substantial proportion of severe upper airway obstruction. Stage 4, characterized by severe dyspnea with signs of respiratory struggle, most often warrants urgent tracheotomy. This proportion is comparable to the results of Gilyoma *et al.* in Tanzania (45%) and Diallo *et al.* in Conakry (50%) [5] [7].

Indirect mirror laryngoscopy or nasofibroscopy had been performed in all 35 patients, making it possible to identify obstructive and functional abnormalities responsible for laryngeal dyspnea. Major observations included: exophytic tumor

in 9 patients (25.7%), clustered laryngeal papillomatosis in 8 patients (22.9%). These results confirm the crucial role of nasofibroscopy in guiding patient management. The proportion of exophytic tumors observed is close to African data reported by Diallo *et al.*, who noted a similar prevalence in a retrospective study in Guinea [5]. Laryngeal papillomatosis and inflammatory changes correspond to observations from African and international studies on obstructive laryngeal anomalies, notably those described by Fagan [16] and Selekwa *et al.* [17]. These results underscore that nasofibroscopy is an indispensable examination to identify the primary causes of laryngeal dyspnea and to guide the decision for tracheotomy, whether elective or emergent. Laryngeal endoscopy under general anesthesia after tracheotomy was performed in the majority of patients, although 9 patients (25.7%) could not undergo it due to emergency circumstances or logistical constraints. Main findings included traumatic lesions and diffuse edema each in 8 patients (22.9%), laryngeal tumoral lesions in 8 patients (22.9%), and laryngeal papillomatoses in 7 patients (20%). The examination was normal in 2 patients. These proportions are comparable to African and international series: Dolou *et al.* reported 21% trauma and 23% diffuse edema, respectively [3].

The observed laryngeal tumoral lesions and clustered papillomatosis are similar to data reported by Fagan [16] and Selekwa *et al.* [17]. The main causes of dyspnea prompting tracheotomy were dominated by laryngeal and oropharyngeal tumors (54.29%), followed by cervical traumas after suicide attempts (22.9%) and post-thyroidectomy bilateral recurrent nerve palsies (11.4%). These results illustrate the predominance of acute and/or chronic obstructive causes of the upper airway in our context. Laryngeal tumors constitute a frequent indication for tracheotomy, emergent or elective, as highlighted by Fagan [16] and the international meta-analyses of Ferro *et al.* [18]. Cervical traumas, including suicide attempts and accidents, represent a notable proportion of indications, consistent with African observations by Prin *et al.* in Malawi [19]. Post-thyroidectomy bilateral recurrent nerve palsy remains a significant cause of laryngeal dyspnea, warranting elective tracheotomy when respiration is compromised, as discussed in the clinical review by Raimonde *et al.* [20].

In this study, surgical tracheotomy was performed in 100% of cases. This predominance of conventional tracheotomies reflects the African context, where emergency indications or complex obstructive lesions require maximal anatomic control, as described by Dolou *et al.* [3]. Conversely, in developed countries, percutaneous tracheotomy is more common, representing up to 60% of procedures in intubated patients in some international series [16] [18]. Regarding anesthesia, 23 patients (65.7%) received general anesthesia and 12 patients (34.3%) received local anesthesia. The choice depended on the clinical context: emergency situations and advanced stages of dyspnea led to general anesthesia, while elective procedures or those with contraindications to general anesthesia were performed under local anesthesia. These proportions are comparable to African series by Dolou *et al.* (70% general, 30% local) and align with practical recommendations reported by Fagan and international review articles by Raimonde *et al.* [3] [16] [20]. The

predominance of surgical tracheotomy and general anesthesia underscores the importance of technical mastery, procedural safety, and the ability to manage immediate complications, particularly in situations of severe obstruction or cervical trauma, as illustrated by studies on trauma and critical care in Africa and internationally [21]. In this series, the sub-isthmic transversal skin incision was used in 100% of cases, offering good anatomic control and a better aesthetic result. This choice is consistent with Cotonou (96%) [3], as well as observations by Diop in Senegal and Kpemissi in Togo [6] [22]. Conversely, some European teams favor a vertical incision in extreme emergencies, particularly for difficult access or a short neck [23].

Regarding cannulas, 80% of patients received uncuffed cannulas and 20% received cuffed cannulas. Non-fenestrated cannulas were predominant (88.57%), fenestrated represented 11.43%, 28.57% had an inner cannula, and a single cannula had a speaking valve. This predominance of simple, non-fenestrated cannulas reflects the nature of indications (rescue for tumoral or traumatic dyspnea) and material availability, similar to the series by Dolou *et al.*, Adoga *et al.*, and El-Anwar *et al.* [3] [13] [24].

In contrast, in European or North American contexts, cuffed cannulas are the majority (60-80%), related to prolonged ventilation in intensive care [11] [25]. Thus, the choice of incision and cannula type is guided by safety, clinical indications, and material availability, while taking local constraints into account. In this series, various surgical procedures were associated with tracheotomy: biopsy in 10 patients (28.57%), laryngeal stripping in 9 (25.71%), debridement-suture of cervical wound in 8 (22.85%). Performing concomitant biopsies or stripping allows confirmation of tumoral or infectious etiology, similar to observations by Dolou *et al.* in Cotonou (32% diagnostic procedures and 20% therapeutic acts) [3], Diop in Senegal (27%) [22], and Adoga in Nigeria (30%) [13]. In developed countries, tracheotomy is often isolated, performed for prolonged ventilation, with few associated procedures [25]. The association with debridement of cervical wound (22.85%) reflects the frequency of cervical traumas, as reported by Kpemissi *et al.* in Togo (18%) [6].

Histological examination, performed in part of the patients, identified mainly squamous cell carcinoma in 9 patients (25.71%) and laryngeal papillomatosis in 8 patients (22.86%). These results are consistent with Dolou *et al.* (carcinoma 27%, papillomatosis 21%) [3] and Diop *et al.* (carcinoma 26.5%, papillomatosis 19.7%) [22]. In West Africa, squamous cell carcinoma remains the main tumoral cause requiring tracheotomy, followed by laryngeal papillomatosis [5] [13]. Shah *et al.* and Marioni *et al.* emphasize that squamous cell carcinomas represent the majority of tumoral indications, but benign lesions may also justify temporary or definitive tracheotomy [26] [27].

In this series, etiological treatment was adapted to the causes: chemotherapy in 2 patients (5.71%), laryngeal stripping in 8 cases (22.86%), granuloma excision in one patient (2.86%), debridement-suture in 3 cases (8.57%). These results are comparable to those of Dolou *et al.* in Cotonou, where 34% of patients benefited

from complementary etiological treatment, including stripping, chemotherapies, and psychological care [3], as well as to Diop *et al.* in Senegal, with 42% surgical treatments, 15% medical treatment, and nearly one-third of patients without treatment [22].

In countries with more developed technical resources, tracheotomy is often a respiratory support procedure, performed after stabilization of the causal pathology [24]. The relatively high proportion of patients (31.43%) who did not receive etiological treatment reflects the structural and technical limitations prevailing in many African referral centers, notably late diagnosis, limited access to chemotherapy, and insufficient technical platforms [6] [13]. Thus, etiological treatment varies according to available resources and the nature of the pathology, with tracheotomy often remaining a life-saving procedure whose long-term effectiveness depends on follow-up and comprehensive management of the underlying cause.

In this series, early complications were infrequent. Tracheal obstruction by mucous plug was reported in 3 patients (8.57%) and recurrence of dyspnea in one patient (2.86%). Obstruction by mucous plug constitutes the most reported early complication, often related to insufficient humidification or suctioning [28] [29]. Nyanzi in Uganda reported 52.6% early complications, with cannula obstruction being the most frequent [28]. Sérémé in Burkina Faso also reported obstructive complications in 46.66% and infectious complications in 33.33% [30]. Continuous improvement of care protocols, particularly active humidification, systematic suctioning, and paramedical training, remains an essential lever to further reduce complications and optimize tracheotomy care.

Of the 35 patients who underwent tracheotomy, 12 patients (34.3%) had complete resolution of the initial pathology, 8 patients (22.9%) experienced recurrence, 10 patients (28.6%) died during follow-up, and 5 patients (14.3%) were lost to follow-up. Recoveries mainly concerned benign obstructive pathologies, such as laryngeal papillomatosis, or cervical traumas managed early. These results are comparable to those of Prin *et al.* in Malawi [19].

In this study, decannulation was effective in 65.71% of cases, after a mean duration of 15 days with extremes of 3 to 80 days. The rate of impossible decannulation was 34.29%. Decannulation could be performed in the majority of temporary tracheotomy cases after respiratory stabilization and treatment of the initial cause. These results are close to those of Dolou *et al.* in Cotonou (≈ 62.5% temporary) [3]. The death rate (28.6%) was mainly associated with the severity of neoplastic diseases, notably laryngeal and hypopharyngeal cancers diagnosed at an advanced stage. It should be noted that mortality could be reduced if tracheostomy procedures were subsidized in health facilities in Benin. Despite being admitted in emergency settings, patients are required to bear the cost of consumables and surgical supplies used in the operating theatre to perform the procedure.

## 5. Conclusion

This ten-year retrospective study confirms that tracheotomy remains an essential,

often life-saving procedure that is predominantly performed in emergency settings. Indications are dominated by malignant laryngeal tumor, cervical traumas, and obstructive laryngeal papillomatoses. The mean age of patients was 30 years, with a male predominance, reflecting the epidemiological distribution. The techniques employed were predominantly surgical, performed under general anesthesia, with a transverse skin incision in all cases. The types of cannulas used were varied, with a majority being non-fenestrated and uncuffed. Postoperative medical management, including antibiotics, analgesics, and corticosteroid therapy, was systematically carried out, while specific care such as humidification, pericannular care, and tracheal suctioning involved nearly 89% of patients. Early complications were infrequent, dominated by obstructions related to mucous plugs, and intraoperative deaths (4 cases). The evolution of the underlying pathology was marked by a predominance of recoveries, with a non-negligible rate of recurrence.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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