

Complications of total laryngectomy in the Department of Otorhinolaryngology of the Hospital de Clínicas from 2015-2022

Complicaciones de la laringectomía total en la Cátedra de Otorrinolaringología del Hospital de Clínicas de 2015-2022

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ABSTRACT

Introduction: Laryngeal cancer is the most common malignant neoplasia of the aerodigestive tract, representing 4.5 % of the organism's cancers and the 30% of the head and neck cancers. Post-operative complications of the total laryngectomy are frequent and predisposing factors for them are known. Knowing the prevalence of total laryngectomy's complications, performed means for its treatment, anatomical site, presence or absence of previous adjuvant treatments were set as objectives. **Materials and methods:** A descriptive and retrospective study was conducted in the Clinical Hospital, Otorhinolaryngology Area, from 2015 to 2022. The study was constituted by a total of 46 patients admitted with the laryngeal cancer diagnosis, 21.7 % (10) of which had a total laryngectomy performed on them. Other surgical techniques were excluded. **Results:** 10 patients submitted to a total laryngectomy within an age range of 31-70 years old, all males. Supraglottic compromise was of 30 %. 70 % presented complications. The most frequent complication was pharyngocutaneous fistula, others were immediate post-operative bleeding and surgical site's infection. 71.4 % of patients with fistula were resolved only with conservative means, 2 required reintervention for the defect's closure. **Conclusion:** Total laryngectomy complications are present very frequently, affecting the quality of life, evolution, and post-surgical recovery of the patients.

Keywords: pharyngocutaneous fistula, laryngectomy, laryngeal cancer.

RESUMEN

Introducción: El cáncer de laringe es la neoplasia maligna más común de las vías aerodigestivas, representa el 4,5% de los cánceres del organismo y el 30% del cáncer de cabeza y cuello. Las complicaciones postoperatorias de la laringectomía total son frecuentes y se conocen factores predisponentes para ello. Se estableció como objetivo conocer la prevalencia de las complicaciones de la laringectomía total, las medidas realizadas para su tratamiento, el sitio anatómico, la presencia o ausencia de tratamiento adyuvante previo. **Materia-**


les y métodos: Se realizó un estudio descriptivo y retrospectivo en el Hospital de Clínicas, Cátedra de Otorrinolaringología, del 2015 al 2022. El universo estuvo constituido por un total de 46 pacientes ingresados con el diagnóstico de cáncer de laringe, 21,7% (10) de los cuales se les realizó laringectomía total. Se excluyeron otras técnicas quirúrgicas. **Resultados:** 10 pacientes sometidos a laringectomía total con un rango de edad de 31-70 años, todos de sexo masculino. El compromiso de la supraglotis fue del 30%. El 70% presentó complicaciones. La complicación más frecuente fue fistula faringocutánea, otras fueron sangrado en el postoperatorio inmediato e infección del sitio quirúrgico. El 71,4% de los pacientes con fistula se resolvieron únicamente con medidas conservadoras, 2 requirieron reintervención para el cierre del defecto. **Conclusiones:** Las complicaciones de la laringectomía total se presentan con mucha frecuencia, afectando a la calidad de vida, la evolución y recuperación post quirúrgica del paciente.

Palabras clave: fistula faringocutanea, laringectomía, cáncer de laringe.

INTRODUCTION

Laryngeal cancer is the most common malignant neoplasia of the aerodigestive tract, representing 4.5% of the organism's cancers and 30% of the head and neck cancers. Several risk factors have been implicated in laryngeal cancer's pathogenesis. The most significant of these is alcohol and tobacco consumption^(1, 2, 3). It has been proved that the use of tobacco has a lineal association with the development of laryngeal cancer, with a risk for smokers that is 10 to 15 times greater than it is for non-smokers. It has also been proven that alcohol and tobacco have a multiplying effect on the risk of laryngeal cancer^(1, 2, 4). It's believed that exposure to several other ambient factors potentially increase the risk of larynx's squamous cell carcinoma, such as asbestos,

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polycyclic aromatic hydrocarbons, and textile powder⁽¹⁾.

The clinical presentation of laryngeal cancer is variable and depends on the anatomical localization and size of the tumor. Tumors that sit on the glottis typically produce an early symptomatology, presenting dysphonia, which leads to consultation and earlier diagnosis. It's posed that every patient with a dysphonia longer than 15 days of evolution with risk factors of developing a laryngeal cancer must be evaluated by an otorhinolaryngologist. Cancers that sit on the supraglottic region are typically of later diagnosis given that they initially present vague symptoms such as sore throat, laryngeal strange body sensation, occasional dysphagia and later dysphonia, stridor, dysphagia. Subglottic tumors are less frequent, and symptoms are dyspnea or a lower cervical mass^(1,5).

The most important adverse forecast factors for laryngeal cancer include increasing the T stage and the N stage. Other forecast factors can include sex, age, functional state, and a variety of the tumor's pathological characteristics, including the degree and depth of the invasion^(3, 4, 6, 7). Total laryngectomy is indicated on advanced injuries with intrinsic muscular invasion of the vocal cord, thyroid cartilage's compromise, exophytic lesions which compromise both commissures and arytenoids or in patients with subglottic or supraglottic invasion above the epiglottis' borders and aryepiglottic folds, and in failure of radiant treatment in T1 and T2 of the larynx, in which a conservative surgery is not possible^(3, 4, 7, 8). Post-operative complications of the total laryngectomy are frequent. Local-regional complications appear to be the most common ones such as surgical site's infection and hematoma, necrosis of the flap used in the neopharynx's closure, tracheostomy, pharyngostoma complications, lymphorrhea or vascular rupture^(3, 5, 8, 9).

Multiple favoring factors have been studied, amongst them malnutrition and previous radiotherapy are the most significant ones. Other favoring factors exist in several studies like anemia, preexisting tracheostomy, lymph node dissection, and lesser surgical experience^(7, 8, 10). In the past few years, systemic hematological markers have become increasingly more renowned as results' forecasts of malignant neoplasia. Recently, the RDW (red blood cell distribution width) has proven to be of forecasting utility in patients with different malignant neoplasia. A previous study yielded that RDW could predict the survivability of laryngeal cancer patients, an extracapsular extension, that affects the neck and results of the surgical treatment. These factors are associated with the disease's ailing; little is known about forecast factors not related to the disease^(11, 12, 13).

The present article's objective is to describe the post-surgical complications' type and quantity of patients who've had a total laryngectomy, performed measures for its treatment, neoplasia's most frequent anatomical site, presence of absence of adjuvant treatment before surgical treatment.

MATERIALS AND METHODS

A revision of total laryngectomy's complications was performed in the Clinical Hospital of the Medical Sciences' Faculty's Otorhinolaryngology Services during a period of 7 years, comparing our results with the results of international actors and national statistics. An observational, descriptive, cross-cut retrospective investigation was performed. The sampling was of consecutive cases by convenience. The data was obtained from the patient's clinical files and registered in a Microsoft Excel® 2016 spreadsheet and descriptive statistics were done in the SPSS® Statistics

28 software. A characterization of the patients was performed according to the following variables.

- Age.
- Sex.
- Complication.
- Complication's treatment.
- Lesion's anatomical site.
- Adjuvating treatment.
- Histological differentiation.
- RDW.
- Symptoms' evolutive time.
- Follow-up time.

The target population were post-operative total laryngectomy patients by larynx's neoplasia within our services from the year 2015 to 2022 from general otorhinolaryngology consultations or redirected from other centers that fit the inclusion criteria.

Inclusion criteria: Patients older than 18 years old, total laryngectomy post-operative patients with larynx's neoplasia anatomopathological diagnosis.

Exclusion criteria: Patients that haven't been submitted to a surgical procedure, patients with an incomplete file, patients that abandoned follow-up.

RESULTS

Within the studied series, 46 files from patients who consulted through our service from 2015 to 2022 were revised, with the larynx's neoplasia diagnosis, of which (10) 21.7 % of patients had a total laryngectomy performed (*see Image 1*).

The average age of the 10 patients was of $56,3 \pm 10,2$ years-old, in an age range from 31 to 70 years old, all males. 90 % of patients presented risk factors related to laryngeal cancer. 30 % of patients had a supraglottic affectionation, 70 % of them only had a glottic-region affectionation. Half of the patients had received pre-operative radiotherapy (*see Table 1*).

70 % of operated patients presented a pharyngocutaneous fistula as a complication, furthermore this group of patients presented post-operative bleeding (which required reintervention) and a patient presented a surgical site infection (*see Table 1*).

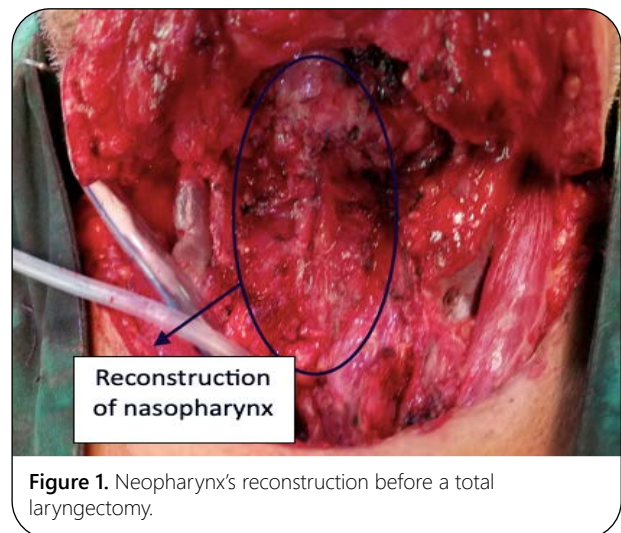


Figure 1. Neopharynx's reconstruction before a total laryngectomy.

Table 1. Demographic data and clinical characteristics

Clinical-demographical characteristics	
Average age	56.3 years-old ± 10.2 (31-70)
Sex	
Male	10 (100%)
Female	0 (0)
Previous radiotherapy	
Yes	5 (50%)
No	5 (50%)
Anatomical location	
Glottis	7 (70%)
Glottis + supraglottis	3 (30%)
Post-operative complications	
Pharyngocutaneous fistula	7
Bleeding	1
Surgical site's infection	1
Patients with post-operative complications' total	7 (70%)
Complication's treatment	
Compressive bandaging	5 (71.4%)
Reintervention: pectoral flap	2 (28.6%)
Antibiotic therapy	1 (14.3%)
Reintervention due to bleeding	1 (14.3%)
RDW value in complications	
<13%	4 (57.1%)
13-14.3%	2 (28.6%)
>14,3%	1 (14.3%)

Of the 7 pharyngocutaneous fistula patients, 5 (71.4 %) received compressive bandaging as therapeutic measure, only 2 patients (28.6 %) required a second intervention for the defect's closure consisting of a rotatory pectoral flap (*see Image 2*).

Of the patients that presented complications, 4 (57.1 %) received radiotherapy before surgical treatment. 57.1 % presented a RWD lesser than 13 %, and only one presented a RWD greater than 14.3 %.

All patients had a squamous cell carcinoma preoperative anatomopathological diagnosis. Afterwards the most frequently histological differentiation found in 7 patients was grade II-III, a patient presented a grade I-II differentiation.

The evolutive time of the disease before the laryngectomy was of 10.4 months (±7.7). The average follow-up time was of 7.3 months (±5.1).

DISCUSSION

Almost all the patients included in our study were adult males, justified by the fact that being a neoplastic pathology means that the patients are usually older adults, and matching Gülpembe

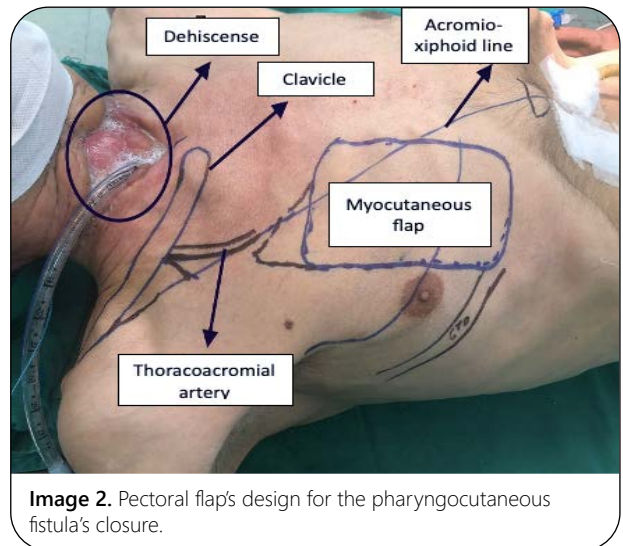


Image 2. Pectoral flap's design for the pharyngocutaneous fistula's closure.

Bozkurt's research in which they obtained similar results with an average age of 59.7 ± 9.4 ^(8, 11).

All patients were of the masculine sex, matching with the study done by María Fernández-Prada, in which 98.6 % were males. This finding could be due to the social environment with more risk factors associated to the masculine sex, likewise Valero Ruiz reported the highest incidence during the 60's and it affected men 10 times more than women^(14, 15).

Of the sample total only 21.7 % was submitted to a total laryngectomy, this due to the greater radiotherapy availability and good results of it, hence many of our patients choose a conservative treatment. Despite this, total laryngectomy is still the first line in some patients with infiltrating carcinomas in stages III and IV, where conservative isn't entirely effective.

Of the patients included in our study a lesion sitting on the glottis was mostly discovered, and only 30 % had lesions that also covered the supraglottic region, in a previous study of our service a supraglottic compromise was found in 50 % of the cases. Other authors speak of a greater prevalence of supraglottic lesions found in up to 66 %. As far as primary lesion's localization concerns, supraglottic tumors are associated in several series with a higher risk of fistula formation, given that their location requires greater pharyngeal mucosa resection and with it a greater tension of the suturing during the defect's closure^(7, 8, 9, 12, 18).

Of the 10 patients submitted to a total laryngectomy, 90 % presented risk factors related to laryngeal cancer, which relates to María de los Ángeles Reynaldo González's study where 91.3 % of patients had some risk factor⁽³⁾. Most of the patients with a larynx squamous cell carcinoma were or are heavy smokers. Often with high alcohol consumption^(2, 3, 8).

Pharyngocutaneous fistula is the most frequent post-operative complication after a total laryngectomy. Pharyngocutaneous fistula's prevalence in our sampling was 70 % of patients submitted to a laryngectomy, this being greater than the results found by María Fernández-Prada who reports a 48.6 % incidence, other authors report different values such as 49,6 % Aires et al., 34.5 % Sarra et al. In a similar study within our services, a 50 % prevalence was found in 2012^(3, 8, 9).

It was also found that a patients presented a surgical site infection, as a complication besides pharyngocutaneous fistula, in similar studies this complication was reported in 67.53 % in the

study done by María Antonieta Álvarez Urbay et al. A previous study within our services yielded an 8,3 % prevalence, very similar to the one found in the current data. Acevedo Ortiz et al. published a surgical site infection rate of 14.5 %, similar to the data found in our sampling^(9, 10, 11, 16).

The 10 %, a patient, presented surgical site bleeding which required a reintervention to contain the bleeding, while in the reports this complication was found with 11.3 % prevalence in the study by Laura Acevedo Ortiz et al^(11, 16). We must highlight that some patients met many of the complications, which are often cause and effect of each other.

71.4 % of post-laryngectomy pharyngocutaneous fistula were resolved by conservative measures without the requirement of other types of interventions for the defect's closure, this matches the work of Víctor Palomar-Asenjo et al. who reported that 72.7 % of patients were resolved spontaneously with conservative measures⁽⁶⁾. Only 2 patients required the defect's closure with a reintervention, both of which had a pectoral rotatory flap performed for the closure (*see Figure 2*).

There are many authors who point out that patients who have received adjuvant treatment before surgery have greater pharyngocutaneous fistula incidence. In our patients, a greater tendency towards pharyngocutaneous fistula was observed in previously irradiated patients. Treatment with radiotherapy before the laryngectomy has been said to, not just increase the risk of fistula's incidence but also increase in-patient stay and the need for surgical treatment^(19, 20).

RDW is a simple marker of easy systemic inflammatory response's attainment, and it was recently reported that it negatively affects clinical results of several types of cancer. However, there are few studies related to head and neck cancers. There are authors who report a great chance of suffering distance metastasis or a greater prevalence of non-surgical systemic complications, such as deep vein thrombosis, pneumonia, cardiovascular

events, and difficulty to disconnect from mechanical ventilation with RWD values greater than 14.4^(11, 12).

CONCLUSION

All patients were of the masculine sex, with an average age of 56.3 years old and a previous evolutive time of 10.4 months.

Of the 10 patients who had a total laryngectomy, 7 presented complications afterwards. The most frequent complication and present in all 7 patients was pharyngocutaneous fistula, which was mostly handled conservatively. Only two patients required a major pectoral muscle flap. Neoplastic lesions were mainly found in the glottic region and half of the sample had received radiotherapy before the surgical procedure. A patient presented immediate post-operative bleeding which required an emergency intervention. The RDW value in complicated patients was generally less than 13 %.

Author's contribution

All authors have equally contributed to the following aspects: a. Creation and design of the work/idea; b. Data recollection and obtaining results, c. Data analysis and interpretation; d. Writing of the draft; e. Draft's revision; f. Approval of the final draft; g. Patients or study material contribution.

Conflict of interest

There are no factors that can lead to a conflict of interest between the work's authors.

Ethical considerations

The study had the permission of the Otorhinolaryngology Services and all people involved, respecting the principles of: beneficence, non-maleficence, autonomy, and justice.

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