

Postoperative Laryngeal Cancer Complications

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ABSTRACT

Background: Postoperative complications of total or partial laryngectomy have an important impact on clinical evolution and patients' quality of life. These can be categorized according to the rate of incidence, early or late occurrence, and local or systemic involvement. Complications are most frequently linked to patient- as well as tumor-related risk factors.

Methods: A retrospective analysis of 64 patients diagnosed with laryngeal cancer who also associated postoperative complications over a period of 1 year.

Results: The results were compared with literature data. Local complications, such as pharyngocutaneous fistulas, hemorrhages, and hematomas, were seen as the most frequent early complications. Neopharyngeal stenosis and vocal prosthesis leakage were the most recurrent late complications. Patients with multiple comorbidities and who underwent salvage total laryngectomy were factors most commonly related to postoperative complications.

Conclusion: Identifying the incidence of complications and risk factor predictors are essential for determining a suitable prevention and management plan, in order to increase the quality of life of this particular group of patients who are already vulnerable due to effects related to this specific pathology.

Keywords: Complications, larynx, postoperative, radiotherapy

Introduction

Treatment options for laryngeal cancer depend largely on the site of the tumor, local extension, patient-related factors, surgeon's experience, and accessibility of rehabilitation services. Organ preservation therapy is beginning to outweigh surgical approaches.⁴ Total and partial laryngectomies still serve a critical role in locally advanced tumors and salvage therapy. As in all surgical procedures, the risk of complications development should be stratified prior to intervention. These complications can be divided according to the period of occurrence (early vs. late), frequency, site of occurrence (local vs. systemic), and patient-specific factors.

Material and Methods

The current study is a retrospective analysis of 64 patients with squamous cell carcinoma of the larynx diagnosed and treated within the Otorhinolaryngology department of a public hospital in Bucharest, Romania, between May 1, 2020, and September 1, 2021. Patient-specific data such as age, sex, cancer stage, tumor site, smoking and alcohol consumption, prior radiation and chemotherapy, and associated comorbidities, as well as intraoperative technique details, were collected. For this study, informed consent was obtained from all patients.


Results

The mean age was 61 years for both sexes, 97% of patients were male and 3% female, and most patients were from rural areas and were current smokers. A total of 55 patients

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underwent primary larynx cancer surgery (total or partial laryngectomy) and 9 were subjected to salvage total laryngectomy. Prior to surgery, data collected showed that 17% of patients had hypoalbuminemia, 35% were known with liver cirrhosis, and 26% were associated with diabetes. As for prior conservative treatment, 9 patients underwent primary radiation therapy.

The most common early complication was pharyngocutaneous fistulas (PCF) (Figure 1).² These represent communications between the

MAIN POINTS

- Complications after laryngeal cancer surgery are frequently related to patient-specific factors and organ preservation treatment before surgical intervention.
- Local complications, such as pharyngocutaneous fistulas, hemorrhages, and hematomas, were seen as the most frequent early complications.
- Neopharyngeal stenosis and vocal prosthesis leakage were the most recurrent late complications.
- Patients with multiple comorbidities and who underwent salvage total laryngectomy were factors most commonly related to postoperative complications.
- Preoperative risk factor stratification and a suitable management plan are essential to obtain satisfactory outcomes.



Figure 1. Pharyngocutaneous fistula 3 months after salvage total laryngectomy.



Figure 2. Intraoperative fistula reconstruction.

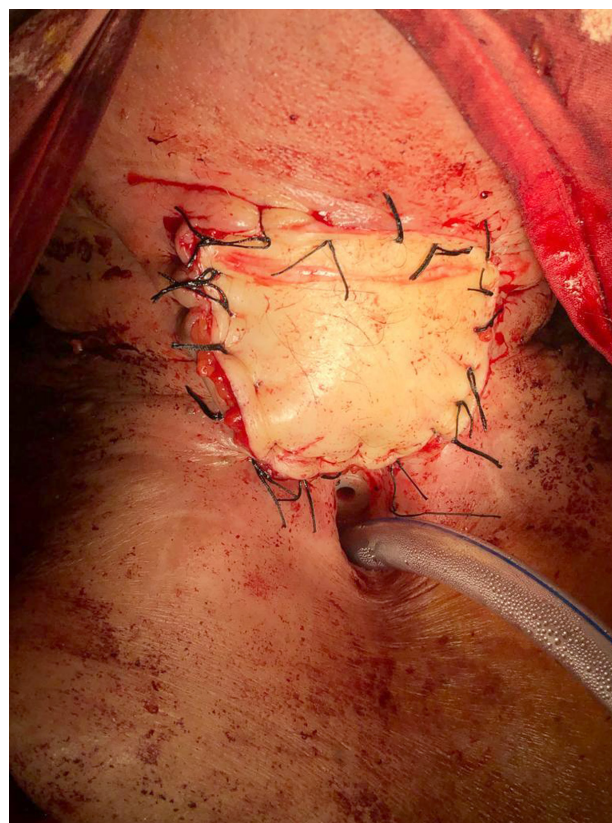


Figure 3. Immediate postoperative flap reconstruction.



Figure 4. Day 4 postoperative pectoralis major muscle flap reconstruction.



Figure 5. Large cervical hematoma.

pharynx and the skin with exteriorization of saliva. Eight out of the 9 patients who received initial radiation therapy developed fistulas during the hospital stay, approximately on day 8 after total laryngectomy and 4 patients with locally advanced T stage (T4a) presented with after total laryngectomy PCF during or immediately after adjuvant radiation therapy. For the management of this complication, we took a wait-and-see approach. Only 3 patients had spontaneous resolutions, while 7 patients required secondary closure or flap reconstruction (Figures 2-4). The emergence of PCF will undoubtedly postpone the removal of the nasogastric feeding tube and oral intake, lengthening hospital stays, raising costs, and impacting the quality of life. (Figure 1)

Out of the 64 patients, 3 patients presented with large hematomas that needed immediate surgical drainage (Figure 5). These patients were known with liver cirrhosis and blood clotting factors anomalies.

Wound dehiscence (Figure 6) was found in 4 patients, 2 of whom presented reconstruction pectoralis major musculocutaneous flap dehiscence (Figures 7 and 8). The common denominator for these patients was primary radiotherapy and advanced local T stage.

Pharyngoesophageal stricture is a secondary late functional problem that occurs in patients with total laryngectomy for advanced-stage larynx cancer. In our study, 2 patients developed pharyngoesophageal stenosis approximately 4 months



Figure 6. Cervical flap dehiscence.



Figure 7. Primary pectoralis major flap reconstruction for salvage total laryngectomy.

after surgery. Treatment options include serial dilation with progressive enlargement of the narrowed portion or reconstructive surgery with non-radiated flaps if the dilation attempts fail.⁶ Another category of total laryngectomy complication has to do with vocal rehabilitation. Primary or secondary voice prosthesis placement is associated in some cases with periprostheses leakage due to enlarged tracheoesophageal puncture which can lead to pneumonia needing prompt management.⁷ This was seen in 6 patients. This specific issue can be resolved with vocal prosthesis replacement with a larger flange. A rare complication is tracheoesophageal prosthesis (TEP) dislocation and aspiration. One patient was reported to have suffered from TEP aspiration which was retrieved under general anesthesia by rigid bronchoscopy.

Discussion

In our study group, the male percentage was net higher compared to females, 97% compared to 3%. The average age was 61 years, and most patients were of rural origin. Fifty-two subjects were current smokers with an average of 40 pack-years and the rest of 12 patients were previous heavy smokers.

Our analysis showed that 18% of cases developed PCF, the majority on day 8 after surgery during the hospital stay and others during adjuvant radiation therapy. The data obtained align with the

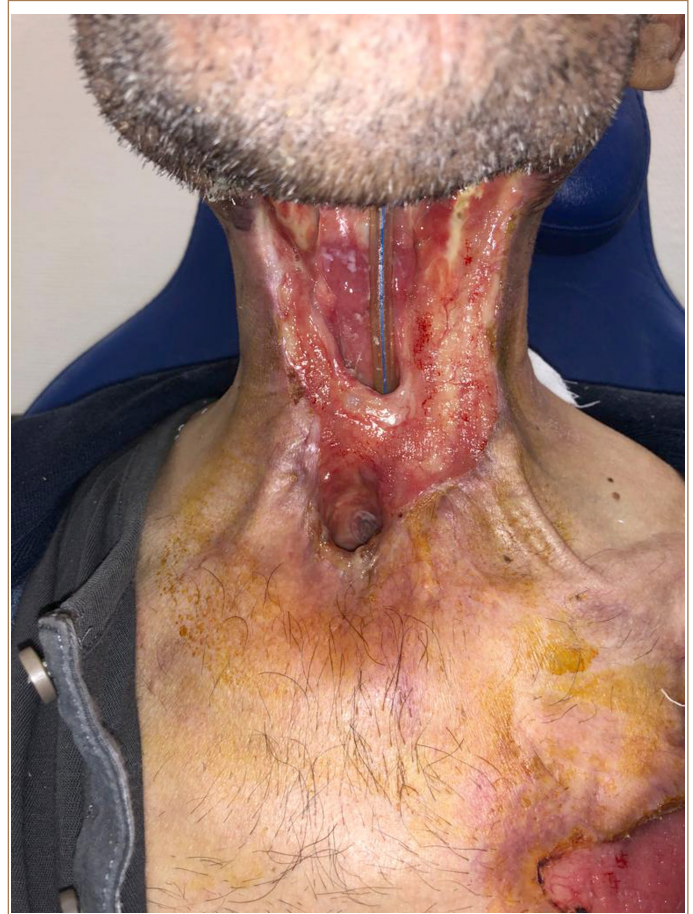


Figure 8. Flap dehiscence 2 months after surgery.

results of previous publications such as Boscolo-Rizzo et al⁸ in which it was stated that the incidence of PCF formation ranges from 8% to 22% and the period of occurrence is between 8 and 27 days. Management of this complication depended on the size of the fistula and patient-related comorbidities. In the cases of the 3 patients with no prior radiation therapy and who did not associate major comorbidities, a conservative approach was taken on which included twice-daily local dressing, lengthening nasogastric tube feeding, and intravenous albumin supplementation with spontaneous closure of the fistula in approximately 30 days. Analyzing the risk factors for fistula appearance, we found that 1 out of the 3 patients had T4a stage and the other 2 were over 70 years of age. According to Herranz et al,⁹ complications are more common in older patients and with more advanced T classifications. Flap reconstruction with pectoralis major muscle was performed on the 7 cases with large PCF after salvage total laryngectomy. The percentage of major flap dehiscence was that of 6.25% which needed pectoralis major muscle flap reconstruction with tube-type pharyngeal reconstruction. This specific complication arises most frequently in patients with poorly designed neck flaps, tension skin closure, low nutritional status, hypoalbuminemia, and prior primary radiation therapy.¹⁰ The rate of pharyngoesophageal stenosis in our study was 3% which needed serial dilations. The patients included in this percentage had a partial pharyngeal extension of the tumor leading to mucosa-alone closure rather than mucosa and muscle pharynx closure.

According to Sweeny et al,¹¹ stricture development rates were lower when cartilage invasion occurred compared to cartilage-sparing tumors where the growth is alongside the pharyngeal wall entailing the extension of resection to the posterior wall.

The main limitation of this study is that almost all patients associate multiple predicting factors for postoperative wound complications. It is difficult to appreciate and categorize risk factors for each specific complication.

Complications after laryngeal cancer surgery have a high impact on the quality of life of patients who are already vulnerable due to the impairment of basic human functions like speech and oral intake, related to this specific pathology. According to group of patients studied, the appearance of complications is most frequently related to patient-specific factors and organ preservation treatment before surgical intervention.

Pharyngocutaneous fistulas and wound dehiscence occur most commonly in patients with salvage total laryngectomy.^{1,3} Irradiated tissue is hypoxic, hypocellular, and hypoperfused making it a medium prone to the appearance of complications, as the results in our study show. Other factors that have a huge impact on postoperative results are patient nutritional status, level of serum albumin, advanced local T stage, and surgical techniques. Patients with associated comorbidities such as liver cirrhosis, hypoalbuminemia (<3.5 g/dL), and anemia but no prior radiotherapy all presented with postoperative complications, most often PCF, local hematomas, and wound infections.⁷ As prevention measures for PCF, intraoperative nasal feeding tube mounting, pre- and postoperative antibiotics, antisecretory and antireflux medication, and adding albumin and nutrient-rich supplements are proven to be beneficial.² Pharyngeal closure technique is also important, vertical or "T" methods are always preferred.

Preoperative risk factor stratification and a suitable management plan are essential to obtain satisfactory outcomes, to pursue patients' high quality of life, and to reduce hospital stay and cost.

Ethics Committee Approval: This study was approved by Ethics Committee of Coltea Clinical Hospital, Bucharest, Romania (Approval No: 5661, Date: March 03, 2023).

Informed Consent: Informed consent was obtained from the patients who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – T.B.; Design – B.P.; Supervision – P.B., B.S.; Resources – E.A., S.C.; Materials – N.R., O.I.; Data Collection and/or Processing – R.S., P.C.; Analysis and/or Interpretation – C.A., B.G.; Literature Search – T.B.; Writing – T.B.; Critical Review – B.P., S.T.

Declaration of Interests: The authors have no conflict of interest to declare.

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