International Journal of Otorhinolaryngology and Head and Neck Surgery
Muqtadir F et al. Int J Otorhinolaryngol Head Neck Surg. 2023 Jul;9(7):566-569
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937
DOI: https://dx.doi.org/10.18203/issn.2454-5929.ijohns20231815

Original Research Article

Upfront surgery vs radiotherapy for laryngeal cancer: descriptive study on the complications from rural cancer centre

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Received: 04 April 2023
Accepted: 09 June 2023

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ABSTRACT

Background: Significant shifts in therapy paradigms for advanced laryngeal carcinoma have occurred more recently. The number of patients receiving surgery alone has significantly decreased, while the number of patients receiving radiotherapy and chemoradiotherapy has significantly increased. Both the treatment modalities have its own advantages and disadvantages. The present study is a consideration to compare the complication rate of both the treatment modalities in the treatment of laryngeal cancer.
Methods: The head and neck oncosurgery department at the Kolhapur cancer center in Maharashtra conducted a five-year retrospective record analysis of the patients treated for carcinoma larynx [2017-2022]. The current analysis included all patients with histopathologically confirmed laryngeal cancer.
Results: Of the 24 cases if upfront surgery, 8 cases had complications and 8 cases of post RT, 6 cases had complications and this difference was statistically significant ($p<0.05$). There was significant difference between the pharynocutaneous fistula rates among the two groups. The rates were higher among post radiotherapy patients ($p<0.05$).
Conclusions: The most common complication among post radiotherapy was pharynocutaneous fistula. The most common complications among upfront surgery were pharynocutaneous fistula and stomal stenosis. Pharynocutaneous fistula was significantly higher among post radiotherapy patients when compared to upfront surgery.

Keywords: Larygneal cancer, Radiotherapy, Surgery, Rural

INTRODUCTION

One-third of head and neck cancers are laryngeal malignancies, which may significantly cause illness and mortality.[1,2] They are typically diagnosed in people who have a long history of smoking. Alcohol use and smoking are two major risk factors. Other risk factors include exposure to asbestos, industrial pollutants, a first-degree relative's history of laryngeal cancer, and insufficient consumption of the micronutrients with antioxidant properties present in fresh fruit and vegetables.[3-5] Males are more frequently affected than females; most patients are older than 40. Although several nations have recently reported a fall in the overall number of laryngeal cancer cases, this decrease is primarily attributable to the decline in cases affecting men, with a stable or rising number of cases affecting women. It has been determined that differences in smoking habits are to blame for these variations in larynx cancer epidemiology.[2,6,7]

They can affect several larynx sites, and the location of the affected site affects the presentation, patterns of dissemination, and available treatments. Early-stage illness is frequently highly treatable with larynx-preserving surgery or radiation treatment.[8] The disease is in its late stages, linked to worse outcomes, necessitates multimodal therapy, and is less likely to allow for larynx preservation. Advanced laryngeal cancer can be treated definitively with surgery, radiation, chemotherapy, or a combination.[9] The range of surgical options includes

open partial laryngectomy, minimally invasive transoral laser or robotic surgical resection, and total laryngectomy. However, total laryngectomy is the only practical choice in many cases of advanced larynx cancer.[8] Although it provides excellent local control, severe functional and psychological side effects exist. Significant shifts in therapy paradigms for advanced laryngeal carcinoma have occurred more recently. The number of patients receiving surgery alone has significantly decreased, while the number of patients receiving radiotherapy and chemoradiotherapy has significantly increased.[8,9] Both the treatment modalities have its own advantages and disadvantages. The present study is a consideration to compare the complication rate of both the treatment modalities in the treatment of laryngeal cancer.

METHODS

The head and neck oncosurgery department at the Kolhapur cancer center in Maharashtra conducted a five-year retrospective record analysis of the patients treated for carcinoma larynx. [2017-2022] The current analysis included all patients with histopathologically confirmed laryngeal cancer. The subset of patients included in the current analysis had locally progressed laryngeal carcinomas (cartilage erosion) and recurrent disease following chemoradiation. The study eliminated individuals with poor performance status, early-stage laryngeal cancer that could be preserved, and patients who were hesitant to receive treatment. We discovered the sample size to be 30 cases after considering the complication rate to be roughly 23% based on a survey of several studies, with a 95% confidence interval and 15% absolute error.[10-13] Thirty-two instances that were handled during evaluation period were included in current study.

Every patient had a comprehensive examination focused on the larynx, and a thorough history was collected. In addition to baseline investigations, a neck CT scan was done, and in some instances, when the CT scan was ineffective, an MRI was done. In addition, the patient's risk of disease metastasis was evaluated. In each case, an endoscopy, a direct laryngoscopy evaluation, and a biopsy were performed to get a histological diagnosis. According to the TNM (Tumor, node, and metastasis) staging system, the disease was staged. All patients and their family members received counseling regarding the disease's nature, available treatments, cost of surgery, and voice recovery. Patients and family members were asked for their informed consent after being told about the risks, advantages, and potential problems of total laryngectomy. All patients monitored for any postoperative complications throughout their hospital stay, and a regular follow-up visit record was kept after their release. Patients underwent routine examinations every month for the first three months and six monthly later. Each follow-up appointment included comprehensive clinical evaluation of every patient and, where needed, relevant investigations. A thorough record of difficulties, diagnoses, and treatment was kept throughout that time, and hospital's ethical review board approved the study. Some patients underwent total laryngectomy, unilateral selective neck dissection, bilateral selective neck dissection, unilateral modified radical neck dissection, bilateral modified radical neck dissection and total laryngectomy along with PMMC flap reconstruction.

Statistical analysis plan

The data was collected, compiled, and analyzed using EPI info (version 7.2). The qualitative variables were expressed in terms of percentages. The quantitative variables were categorized and expressed in percentages or terms of mean and standard deviations percentages. The difference between the two proportions was analyzed using the chi-square or Fisher exact test. All analysis was two-tailed, and the significance level was set at 0.05.

RESULTS

The mean age of the cases was 62.34 years with male preponderance. Of the 32 cases studied, 65.63% were carcinoma larynx, 43.75% had bilateral disease and 78.13% were pathological staging IV.

Table 1: Demographic particulars of present sample.

Demographic particulars	N	Percentage (%)
Age group (years)		
31 to 40	1	3.13
41 to 50	5	15.63
51 to 60	13	40.63
>60	13	40.63
Gender		
Female	3	9.38
Male	29	90.63
Diagnosis		
Carcinoma hypopharynx	11	34.38
Carcinoma larynx	21	65.63
Laterality of disease		
Bilateral	14	43.75
Unilateral	18	56.25
Pathological staging		
IV a	25	78.13
IV b	7	21.88

Table 2: Distribution based on approach towards the patients.

Approach	N	Percentage (%)
Upfront surgery	24	75
Post radiotherapy	8	25
Total	32	100

Of the 32 cases studied, 24 cases were upfront surgery and 8 cases were post RT.

Table 3: Distribution of complications based on the approach.

Complications	Upfront surgery		Post RT		P value
	N	%	N	%	
Present	8	33.33	6	75.00	0.0032
Absent	16	66.67	2	25.00	
Total	24	100.00	8	100.00	

Of the 24 cases if upfront surgery, 8 cases had complications and 8 cases of post RT, 6 cases had complications and this difference was statistically significant ($p<0.05$).

Table 4: Various complications based on the approach.

Complications	Upfront surgery		Post RT		P value
	N	%	N	%	
Bleeding	0	0	0	0	-
Airway compromise	1	4.16	0	0	0.562
Haematoma/ seroma	0	0	0	0	-
Pharynocutaneous fistula	3	12.50	5	62.50	0.023
Pharynoeso-phageal stenosis	1	4.16	0	0	0.562
Stomal stenosis	3	12.50	1	12.50	1.00

Of the complications studied in upfront surgery, one case had airway compromise, three cases had pharynocutaneous fistula and the one case had pharynoesophageal stenosis and three cases had stomal stenosis. Of the complications studied in the post RT group, 62.50 percentages had pharynocutaneous fistula as well as the 12.50 percentages had stomal stenosis. There was significant difference between the pharynocutaneous fistula rates among the two groups. The rates were higher among the post radiotherapy patients and the p value <0.05.

DISCUSSION

After a laryngectomy, complications such as pharynx cutaneous fistulas, wound infections, chyle leaks, swallowing issues, and airway issues substantially impact morbidity, leading to prolonged hospitalization and higher medical costs expenses and a delay in adjuvant therapy. In addition, complications have been linked to various circumstances, including prior radiation (RT), tracheostomy placement prior to surgery, central neck dissection, and prolonged surgery as well as flap restoration.[14,15]

In the postoperative phase, we encountered some difficulties but managed most of them successfully. As seen in other investigations, pharynx cutaneous fistula is still a significant complication following total laryngectomy in our cohort. Following TL, pharyngocutaneous fistula (PCF) is the most frequent complication. The rate of pharyngocutaneous fistula varies between reports by 2.6% to 65.5%.[11-16] Most significantly, PCF postpones patients' prospective adjuvant therapy regimens, such as radiotherapy and chemotherapy, following the operation, which may significantly alter the disease's prognosis.

Advanced laryngeal cancer patients may opt for organ preservation therapy. In the case of a total salvage laryngectomy, it is unclear if adding chemotherapy to radiation raises the risk of postoperative problems. Five hundred seventeen individuals were split into three groups in a randomized prospective trial: radiation therapy alone, concurrent chemotherapy, and chemotherapy followed by radiation therapy. Arm 3 had the lowest PCF (15%), and arm 2 had the highest (30%). Patients who had previously had a tracheotomy had a greater rate of PCF than those who had not (60% vs. 8%, $p=0.012$).[17] This was most likely caused by pollution, fibrosis, and a higher T stage. According to their analysis, neck dissection, T stage, and peri-operative blood transfusion are only tangentially significant. In the literature, there have been several contentious reports. According to one series, patients who received blood transfusions had a 28% PCF rate compared to patients who did not have one, a rate of 7%. However, other Authors still need to discover a link. Early PCF was connected with histological infiltration of the surgical margins of the tumor (11% negative vs. 38% with positive margins). Despite this conclusion, these authors did not believe PCF was a bad predictor of patient survival. Since they performed a frozen section evaluation of the surgical margins taken from the patient's surgical field rather than the pathological material as a safety measure, the surgical margins are not considered a variable.

Once the tenth postoperative day had passed, the nasogastric tube was regularly withdrawn. On the first postoperative day, 48 patients in one series received oral nutrition, and the PCF rate was 12.5%. The only statistically significant factor that raises this rate is the extension of total laryngectomy with pharyngeal mucosa resection.[2] Additionally, early oral feeding beginning was not considered a significant factor in PCF in case-controlled research. In a different study, patients fed before the seventh postoperative day had lower PCF (5.7%) than those fed after that day (29.6%) and were fed later.[18]

The present study had some limitations. It was a cross sectional study, more precise results would have been inferred if it was a longitudinal study. Secondly it was the single center study, multi centric studies would yield better outcome. Nonetheless, this paper projects our experience of these two approaches in management of laryngeal cancer.

CONCLUSION

We tried to identify retrospectively, the probable causes of complications for the proper management of patients. One in three patients who underwent upfront surgery had complications. Similarly, three in four patients who received radiotherapy had complications. The most common complication among post radiotherapy was pharynocutaneous fistula. The most common complications among upfront surgery were pharynocutaneous fistula and stomal stenosis. Pharynocutaneous fistula was significantly higher among post radiotherapy patients when compared to upfront surgery.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Muqtadir F, Patil C, Watve P, Anap Y, Patil P, Soni A. Upfront surgery vs radiotherapy for laryngeal cancer: descriptive study on the complications from rural cancer centre. Int J Otorhinolaryngol Head Neck Surg 2023;9:566-9.