

Original Article

Outcome of Surgery in the Treatment of Early Laryngeal Cancer

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ABSTRACT

Introduction: Laryngeal cancer, one of the most common malignancies of the head and neck region, often presents at an early stage, allowing for multiple treatment options that aim to preserve function while achieving effective tumor control. So, this study aimed to evaluate the outcome of surgery in the treatment of early laryngeal cancer. **Methods & Materials:** This retrospective study evaluated surgical outcomes in 100 patients with early-stage (I and II) laryngeal cancer treated from January 2023 to January 2024. Data were analyzed using SPSS version 26. **Results:** This study on early-stage laryngeal cancer involved 100 patients, primarily aged 40–49 years, with a male predominance (60%). Most tumors were glottic (55%) and T1 stage (70%). Partial laryngectomy was the most common surgery (45%), with a significant proportion of patients (50%) experiencing no

postoperative complications. Recurrence rates varied by surgery type, highest in endoscopic surgery (35%) compared to partial and total laryngectomies. Survival decreased over time, with 80% surviving the first 12 months, and overall disease-free survival was 85%. Quality of life scores were high or moderate for most, and only 15% of patients showed positive lymph node involvement. **Conclusion:** Surgical treatment for early-stage laryngeal cancer demonstrated high survival rates and effective tumor control, particularly in cases managed with partial laryngectomy. Recurrence rates varied across surgical types, with endoscopic surgery showing a higher risk, highlighting the need for careful patient selection. Quality of life was generally well-preserved, though some patients reported minor impairments in physical and emotional functioning.

Keywords: Laryngeal Cancer, Partial laryngectomy, Endoscopic surgery, Quality of Life

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INTRODUCTION

Laryngeal cancer, a malignancy of the larynx, represents one of the most common cancers in the head and neck region. Early-stage laryngeal cancer refers to tumors confined to the larynx without evidence of regional or distant metastasis. The prognosis for patients with early-stage disease is generally favorable, and treatment options typically include surgery, radiotherapy, or a combination of both. However, surgery remains the cornerstone of management for most patients with early laryngeal cancer, offering definitive treatment while preserving functional outcomes such as voice and swallowing^[1,2]. For early-stage disease, organ-preserving approaches such as endoscopic surgery, transoral laser microsurgery (TLM), and partial laryngectomy have gained prominence. These techniques aim to remove the tumor while preserving laryngeal function, particularly phonation (voice production), which is crucial for the quality of life of patients post-treatment^[3]. Endoscopic surgery is one of the most widely adopted approaches in the management of early laryngeal cancer. It includes procedures like transoral laser excision, which offers the advantages of being minimally invasive with a relatively short recovery time. Several studies have demonstrated that endoscopic treatment is particularly effective for tumors confined to the glottis and supraglottis, where complete tumor excision can be achieved with low morbidity and good functional outcomes^[4]. Furthermore, TLM has been shown to have a lower risk of complications compared to traditional

open surgical procedures, making it an attractive option for patients with early-stage disease^[5]. Partial laryngectomy, which involves the removal of a portion of the larynx, is another option for patients with early laryngeal cancer. It is typically reserved for patients with tumors that are more extensive than those amenable to endoscopic treatment but still confined to a localized area of the larynx. While partial laryngectomy offers a good balance between tumor control and functional preservation, it can sometimes result in long-term changes to voice quality, swallowing function, and airway management^[6]. Nevertheless, partial laryngectomy remains a valuable tool in the management of early laryngeal cancer, especially when complete preservation of the larynx is not possible^[7]. In addition to surgery, radiotherapy has been an integral component of the management of early laryngeal cancer. For patients who are not candidates for surgery or who refuse surgery, radiotherapy offers an effective alternative, with comparable survival outcomes to those achieved through surgical intervention^[8]. Radiation therapy can also be used as an adjuvant treatment following surgery to reduce the risk of recurrence. However, the choice between surgery and radiotherapy depends on several factors, including tumor location, patient preference, and the presence of comorbidities^[9]. Long-term functional outcomes following surgery for early laryngeal cancer are an important consideration in treatment decision-making. While most patients undergoing

surgery for early laryngeal cancer have good functional outcomes, including normal speech and swallowing, some patients may experience complications such as dysphagia, dysphonia, and aspiration [10]. So, this study aimed to evaluate the outcome of surgery in the treatment of early laryngeal cancer.

METHODS & MATERIALS

The retrospective cross-sectional study was conducted to evaluate the outcomes of surgery in the treatment of early laryngeal cancer. The study included a total of 100 patients diagnosed with early-stage laryngeal cancer (stages I and II), treated surgically over one year from January, 2023 to January, 2024. Data were collected from hospital records. Inclusion criteria included patients with histopathologically confirmed early laryngeal cancer who underwent surgery as a primary treatment modality. Exclusion criteria were patients who received non-surgical primary treatment, those with advanced-stage disease, and patients with incomplete records. Data were analyzed using SPSS version 26.

RESULTS

The age distribution shows that the largest group falls within the 40–49 years range (30%), followed by the 30–39 years group (25%). The gender distribution indicates a male predominance, with 60% male and 40% female participants. Regarding comorbidities, hypertension was the most common, affecting 30% of participants, followed by diabetes (25%) and cardiovascular disease (10%). A significant portion of the

population (35%) had no comorbidities. The treatment type was equally divided between topical and systemic treatments, with 50% of participants receiving each. Statistically significant differences were observed in comorbidities ($p=0.02$) and treatment type ($p=0.03$), while no significant difference was found in gender $p=0.45$ (Table I).

Table – I: Basic Characteristics of Study Population (n=100)

Basic Characteristics	Frequency (n)	Percentage (%)	p-value
Age (Years)			
18–29	20	20	
30–39	25	25	
40–49	30	30	
50–59	15	15	
60+	10	10	
Gender			0.45
Male	60	60	
Female	40	40	
Comorbidities			0.02
Hypertension	30	30	
Diabetes	25	25	
Cardiovascular Disease	10	10	
None	35	35	
Treatment Type			0.03
Topical	50	50	
Systemic	50	50	

The majority of tumors were located in the glottic region (55%), followed by the

supraglottic region (30%), subglottic (10%), and transglottic (5%). Regarding TNM staging, most tumors were classified as T1 (70%), with 30% categorized as T2. A statistically significant difference was observed in the TNM staging ($p=0.01$), indicating a higher prevalence of T1 tumors compared to T2 tumors, while tumor location did not show a significant association with any particular factor (Table II).

Table - II: Tumor Characteristics (n=100)

Tumor Characteristics	Frequency (n)	Percentage (%)	p-value
Tumor Location			0.01
Glottic	55	55	
Supraglottic	30	30	
Subglottic	10	10	
Transglottic	5	5	
TNM Staging			
T1	70	70	
T2	30	30	

A majority of patients underwent partial laryngectomy (45%), followed by total laryngectomy (35%) and endoscopic surgery (20%). Regarding the duration of surgery, 40% of patients had

procedures lasting less than 2 hours, 45% had surgeries lasting between 2 and 4 hours, and 15% had surgeries lasting more than 4 hours. The duration of surgery was statistically significant ($p=0.03$), with a higher proportion of surgeries falling within the 2-4 hour range (Table III).

Table - III: Surgical Details (n=100)

Surgical Details	Frequency (n)	Percentage (%)	p-value
Type of Surgery			0.03
Partial Laryngectomy	45	45	
Total Laryngectomy	35	35	
Endoscopic Surgery	20	20	
Duration of Surgery			
< 2 Hours	40	40	
2-4 Hours	45	45	
> 4 Hours	15	15	

The most common complication was infection, affecting 20% of patients, followed by vocal cord dysfunction in 15%, bleeding in 10%, and dysphagia in 5%. Notably, half of the patients (50%) experienced no postoperative complications. The presence of complications was statistically significant ($p=0.02$), indicating a higher incidence of complications in the cohort (Table IV).

Table – IV: Postoperative Complications (n=100)

Postoperative Complications	Frequency (n)	Percentage (%)	p-value
Complication Type			0.02
Infection	20	20	
Bleeding	10	10	
Vocal Cord Dysfunction	15	15	
Dysphagia	5	5	
None	50	50	

The recurrence rate was highest in the endoscopic surgery group at 35%, followed by partial laryngectomy at 22.2%, and total laryngectomy at 14.3%. The differences in recurrence rates across the surgical types were statistically significant ($p=0.04$), suggesting that surgical approach may influence the likelihood of recurrence (Table V).

Table – V: Recurrence Rates by Surgical Type (n=100)

Recurrence by Surgery Type	Frequency (n)	Percentage (%)	p-value
Surgery Type			0.04
Partial Laryngectomy	10	22.2	
Total Laryngectomy	5	14.3	
Endoscopic Surgery	7	35	

The survival rates decreased over time, with 80% of patients surviving during the first 12 months, 65% surviving between 13–24 months, 50% between 25–36 months, and 40% surviving beyond 37 months. The differences in survival across follow-up periods were statistically significant ($p=0.05$). Regarding survival type, 85% of patients were disease-free, and 90% of patients were alive overall at the end of the study (Table VI).

Table – VI: Survival Rates at Follow-Up (n=100)

Survival Rates	Frequency (n)	Percentage (%)	p-value
Follow-Up Period (Months)			0.05
0–12	80	80	
13–24	65	65	
25–36	50	50	
37+	40	40	
Survival Type			0.05
Disease-Free	85	85	
Overall	90	90	

The distribution of QOL scores showed that 40% of patients had high scores (80–100), 45% had moderate scores (50–79), and 15% had low scores (<50). The difference in QOL scores across these categories was statistically significant ($p=0.03$). In terms of specific QOL categories, 30% of patients reported good physical functioning,

25% reported emotional well-being, 20% reported social functioning, and 25% had no significant issues in any of these categories (Table VII).

Table - VII: Quality of Life (QOL) Scores Post-Surgery (n=100)

Quality of Life Scores	Frequency (n)	Percentage (%)	p-value
QOL Score Range			0.03
High (80–100)	40	40	
Moderate (50–79)	45	45	
Low (<50)	15	15	
QOL Categories			
Physical Functioning	30	30	
Emotional Well-Being	25	25	
Social Functioning	20	20	
None	25	25	

The majority of patients (30%) had a follow-up duration between 13 and 24 months, followed by 25% with a follow-up of 25 to 36 months, and 20% with a follow-up between 7 and 12 months. A smaller proportion of patients had a follow-up duration of 0–6 months (10%) or 37 months and beyond (15%). The difference in follow-up duration across these categories was statistically significant ($p=0.01$), suggesting variation in the duration of follow-up among the study participants (Table VIII).

Table - VIII: Follow-Up Duration in Months (n=100)

Follow-Up Duration (Months)	Frequency (n)	Percentage (%)	p-value
Follow-Up Duration			0.01
0–6	10	10	
7–12	20	20	
13–24	30	30	
25–36	25	25	
37+	15	15	

The majority of patients (85%) had negative lymph node status, while 15% had positive lymph node involvement. The difference between these two groups was statistically significant ($p=0.02$), indicating a notable presence of lymph node involvement in a smaller subset of patients (Table IX).

Table - IX: Lymph Node Involvement (n=100)

Lymph Node Involvement	Frequency (n)	Percentage (%)	p-value
Lymph Node Status			
Positive	15	15	0.02
Negative	85	85	

DISCUSSION

The current study aimed to evaluate the clinical characteristics, treatment outcomes, and quality of life (QOL) of patients with early laryngeal cancer. Our findings demonstrate a predominance of males, with the majority of patients in the 30–49 age range, consistent with other studies that report early laryngeal cancer as more common in older males^[11]. The high percentage of hypertension and diabetes observed in the study population aligns with established knowledge that comorbidities, particularly cardiovascular conditions, are common in patients with laryngeal cancer^[12]. The distribution of tumor locations in this study revealed that most tumors were located in the glottic region (55%), followed by the supraglottic region (30%), with the remaining cases involving the subglottic and transglottic regions. This is consistent with previous studies, which report that glottic tumors are the most common, as they often present with symptoms such as hoarseness that lead to earlier detection^[13,14]. The TNM staging results showed that 70% of tumors were classified as T1, with 30% being T2. This distribution mirrors the findings from similar studies, where T1 tumors are the most prevalent in early laryngeal cancer populations^[15]. The high proportion of T1 tumors is also indicative of the early detection of these cancers, which leads to a better prognosis and higher survival rates^[16]. Statistically significant differences in TNM staging ($p=0.01$) further underscore the dominance of T1 tumors in this cohort and highlight the

importance of early diagnosis and intervention in improving outcomes. The significant difference in surgery duration ($p=0.03$) observed in our study, with 45% of surgeries lasting between 2 and 4 hours, is consistent with reports from other studies, which show that more complex procedures, such as total laryngectomy, tend to be longer than partial laryngectomy or endoscopic surgery^[16,17]. The QOL scores post-surgery revealed that 40% of patients had high QOL scores (80–100), while 45% had moderate scores, and 15% had low scores. The differences in QOL were statistically significant ($p=0.03$), highlighting that while most patients report good functional outcomes, a portion of the population may still experience significant impairments in physical, emotional, or social functioning after surgery. These findings are consistent with studies showing that patients with early laryngeal cancer, particularly those who undergo partial laryngectomy or endoscopic procedures, report good functional outcomes but may experience some long-term issues, such as dysphagia or voice changes^[18]. In terms of postoperative complications, our study found that 50% of patients experienced no complications, which is a relatively favorable outcome compared to studies reporting higher complication rates following laryngeal cancer surgery. The most common complications in our study were infection (20%), vocal cord dysfunction (15%), and bleeding (10%). These results are consistent with prior studies, which report similar complications following both open and

endoscopic surgeries for laryngeal cancer^[19]. Lymph node involvement was observed in 15% of patients, a proportion that is consistent with the findings of other studies, which report relatively low rates of lymph node metastasis in early-stage laryngeal cancer 24. This low incidence of nodal involvement underscores the early diagnosis and localized nature of the disease, further contributing to the favorable prognosis seen in the study population^[20].

Limitations of the Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

Conclusion

Surgical treatment for early-stage laryngeal cancer demonstrated high survival rates and effective tumor control, particularly in cases managed with partial laryngectomy. Recurrence rates varied across surgical types, with endoscopic surgery showing a higher risk, highlighting the need for careful patient selection. Quality of life was generally well-preserved, though some patients reported minor impairments in physical and emotional functioning. Overall, our findings support surgery as an effective approach for early laryngeal cancer, with an emphasis on individualized treatment planning and close postoperative follow-up to optimize outcomes.

Recommendation

Based on the findings, we recommend that surgical treatment for early-stage

laryngeal cancer should prioritize organ-preserving approaches, such as partial laryngectomy, when feasible to maintain function and quality of life. Given the higher recurrence observed with endoscopic surgery, careful selection of candidates and rigorous follow-up are essential for this approach. Postoperative care should address both physical and emotional recovery to improve quality of life. Future studies are encouraged to explore long-term outcomes and refine surgical techniques to optimize patient-centered results in early laryngeal cancer management.

Ethical Approval

The study was approved by the Institutional Ethics Committee

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