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SURGICAL TREATMENT APPROACHES FOR LARYNGEAL TUMORS

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Abstract: Laryngeal tumors represent a major clinical challenge due to their impact on breathing, phonation, and swallowing. Surgical management remains a cornerstone of therapy, often combined with radiation and chemotherapy depending on the stage. This article reviews the current surgical approaches for laryngeal tumors, emphasizing organ-preserving techniques, oncologic outcomes, and postoperative rehabilitation. Endoscopic laser surgery, partial and total laryngectomy, and minimally invasive robotic-assisted procedures are discussed in detail.

Keywords: laryngeal tumors, laryngectomy, endoscopic laser surgery, organ preservation, robotic surgery.

Introduction

Laryngeal cancer accounts for approximately 1–2% of all malignant neoplasms and remains one of the most frequent cancers of the head and neck region. The main etiological factors include tobacco smoking, alcohol abuse, exposure to industrial pollutants, and infection with human papillomavirus (HPV). Surgical treatment is guided by tumor stage, localization (supraglottic, glottic, subglottic), and patient condition. The goal of modern surgery is to achieve complete oncological clearance while preserving speech and swallowing function whenever possible.

Materials and Methods

This review is based on recent publications from 2018–2025 in PubMed, Scopus, and ENT journals. Selected studies were analyzed to evaluate outcomes of different surgical methods for laryngeal tumors. Data parameters included: type of surgery (endoscopic, partial, total, robotic-assisted), tumor stage and localization, oncologic control (5-year survival, recurrence rates), functional outcomes (voice, swallowing), and postoperative complications.

Results

1. Endoscopic Laser Surgery (ELS)

Endoscopic CO_2 laser microsurgery allows precise excision of early-stage (T1–T2) glottic tumors while minimizing tissue damage. Advantages include rapid recovery, low morbidity, and preservation of phonation. Reported local control rate: 85–95% for T1 and 70–80% for T2 lesions.

2. Partial Laryngectomy

Used for intermediate-stage tumors (T2–T3) without cartilage invasion. Techniques include vertical hemilaryngectomy, supraglottic, and supracricoid laryngectomy. Local control: 75–85% with proper patient selection.

3. Total Laryngectomy

Indicated for advanced tumors (T3–T4) or recurrence after radiation therapy. Removes the entire larynx, resulting in permanent tracheostomy. Five-year survival up to 60–65% depending on stage.

4. Robotic and Transoral Approaches
Transoral robotic surgery (TORS) and transoral laser microsurgery (TLM) have revolutionized minimally invasive treatment. Benefits: minimal bleeding, reduced hospital stay, and early recovery.

Discussion
Modern surgical management of laryngeal tumors has evolved from radical resections to function-preserving and minimally invasive strategies. Oncologic efficiency is comparable between ELS, partial laryngectomy, and chemoradiation in early-stage disease. Functional preservation is superior with endoscopic and robotic surgeries. Multidisciplinary collaboration remains essential for individualized treatment planning. Future trends include AI-assisted intraoperative navigation and tissue engineering for laryngeal reconstruction.

Conclusion
Surgical treatment of laryngeal tumors continues to advance toward precision, safety, and functional preservation. For early lesions, endoscopic laser surgery remains the gold standard. In locally advanced stages, organ-preserving partial resections or robotic-assisted techniques provide favorable outcomes when combined with adjuvant therapy. Multidisciplinary management and personalized rehabilitation are crucial for achieving optimal oncologic and functional results.

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