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Clinical outcomes of microlaryngeal surgery in the management of benign vocal cord lesions

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Abstract
Background: Benign vocal cord lesions represent a common cause of persistent hoarseness and significantly affect voice quality and daily functioning. Microlaryngeal surgery is a well-established therapeutic approach; however, outcomes vary depending on lesion type and patient characteristics. This study aimed to evaluate the clinical outcome of microlaryngeal surgery in the management of benign vocal cord lesions.
Method: A prospective study conducted over 18 months, from June 2012 to December 2013. Department of Otolaryngology, Al-Yarmouk Teaching Hospital, Baghdad, Iraq. A total of 61 patients presenting with hoarseness were evaluated. Only patients diagnosed with apparently benign laryngeal lesions were included, while non-operative cases and any clinical suspicion of malignancy were excluded. All patients underwent indirect laryngoscopy and/or flexible nasopharyngoscopy, followed by direct laryngoscopy under an operating microscope. Data collected included demographic characteristics, occupational categories, anatomical site of involvement, histopathological findings, and postoperative outcomes.
Results: Benign vocal cord lesions were most common in the active working-age group (21–40 years). Seven major categories of benign lesions were identified: polyps, nodules, Reinke's edema, intracordal cysts, granuloma, solitary papilloma, and multiple papillomatosis. Males were more commonly affected than females (55% vs. 45%), with a male-to-female ratio of 1.2:1. Polyps were the most frequent lesion (32.5%), followed by nodules (25%). Teaching staff accounted for the highest occupational category (25%), followed by housewives (22%). After microlaryngeal surgery, 70% of patients achieved complete symptom resolution, 25% showed partial improvement, and 5% experienced recurrence.
Conclusion: Microlaryngeal surgery is highly effective for most benign vocal cord lesions, with excellent symptomatic improvement and low recurrence. Recurrent respiratory papillomatosis remains the main exception, often requiring repeated interventions.

Keywords: Vocal cord lesions, laryngoscope, laryngeal pathologies, Microlaryngescopy

Introduction

Benign vocal cord lesions are among the most common causes of persistent dysphonia, particularly in individuals who rely heavily on professional voice use. These lesions represent a heterogeneous group of pathologies characterized by structural changes in the vibratory layer of the vocal folds, leading to impaired glottic closure and altered mucosal wave function. Dysphonia, especially hoarseness, is the primary presenting symptom and often significantly affects communication, work performance, and social quality of life. Globally, benign vocal fold lesions account for approximately 10–30% of presentations in specialized voice clinics, with higher prevalence in teachers, singers, and individuals exposed to prolonged phonotrauma or irritants such as smoking and reflux disease [1-3]. The most frequently encountered benign lesions include vocal polyps, nodules, Reinke's edema, intracordal cysts, granulomas, and papillomas. Vocal polyps and nodules typically arise from chronic mechanical stress leading to subepithelial inflammation, hemorrhage, or fibrotic changes within the superficial lamina propria. Reinke's edema results from chronic irritant exposure, especially smoking, while papillomatosis is caused by human papillomavirus infection and may require repeated surgical interventions due to its recurrent nature [4, 5]. Although these lesions are histologically benign, their impact on voice quality can be profound, and timely diagnosis and management are essential. Diagnosis typically relies on laryngeal visualization using indirect laryngoscopy, flexible nasopharyngoscopy, or direct laryngoscopy. However, the gold standard for definitive

diagnosis and treatment remains microlaryngoscopy under general anesthesia, which allows detailed inspection and precise microsurgical excision of lesions [6]. Microlaryngeal surgery has evolved significantly with the introduction of improved magnification, cold instruments, and more recently, laser-assisted techniques. The primary goals of surgery are complete lesion removal, restoration of normal vibratory properties, and preservation of the vocal fold mucosa. High-quality surgical technique is crucial to avoid scarring, which may lead to long-term dysphonia [7]. Postoperative outcomes largely depend on lesion type, surgeon experience, patient adherence to voice therapy, and avoidance of risk factors such as smoking and phonotrauma. Studies have shown that microlaryngeal surgery achieves excellent symptomatic improvement in 70–90% of cases, particularly for polyps and nodules, with low recurrence rates when combined with postoperative voice rehabilitation [8, 9]. However, recurrent respiratory papillomatosis and granulomas associated with gastroesophageal reflux may require repeated interventions due to their chronic or recurrent nature [10]. Despite numerous advances, variations in clinical outcomes persist across different populations and clinical settings. In Iraq and similar regions, data regarding the distribution of benign vocal fold lesions and outcomes of microlaryngeal surgery remain limited. Understanding local patterns of disease, occupational risk factors, and surgical success rates is essential for improving voice care services, guiding clinical practice, and establishing region-specific management protocols. Therefore, this study was conducted to evaluate the clinical outcomes of microlaryngeal surgery in patients with benign vocal cord lesions, analyze demographic and histopathological patterns, and assess postoperative symptom resolution and recurrence rates.

Method

Study Design and Setting

This prospective observational study was conducted in the Department of Otolaryngology at Al-Yarmouk Teaching Hospital over an 18-month period. The study aimed to assess the clinical outcomes of microlaryngeal surgery in patients presenting with benign vocal cord lesions.

Study Population

A total of 61 patients who presented with hoarseness as their chief complaint were evaluated. Patients were eligible if they were clinically diagnosed with apparently benign laryngeal lesions. Exclusion criteria included any clinical or endoscopic suspicion of malignancy, non-operative cases, and patients who did not consent to surgical intervention. All patients provided informed consent prior to inclusion.

Clinical Evaluation

Each patient underwent a detailed clinical assessment beginning with indirect laryngoscopy and/or flexible nasopharyngoscopy to evaluate vocal cord mobility, appearance, and the presence of lesions. Patients who met inclusion criteria subsequently underwent direct laryngoscopy under general anesthesia. An operating microscope was used to ensure accurate visualization and precise surgical excision.

Surgical Procedure

Microlaryngeal surgery was performed using standard microlaryngoscopic instruments. Lesions were removed carefully to preserve the integrity of the vocal fold mucosa and minimize scarring. The surgical technique varied depending on the lesion type, including polypectomy, cyst excision, removal of nodules, or debridement of papillomatous lesions. Hemostasis was maintained throughout, and all excised tissues were sent for histopathological examination.

Data Collection

Demographic information (age, sex, occupation), clinical characteristics, type and anatomical site of lesion, and histopathological findings were recorded. Postoperative outcomes were documented at follow-up visits, including resolution of hoarseness, partial improvement, or recurrence of lesions.

Follow-up and Outcome Measures

Patients were followed postoperatively for voice improvement and recurrence. Outcome assessment was based on clinical examination and patient-reported symptom resolution. Recurrence was defined as the reappearance of a lesion confirmed by laryngoscopic examination.

Results

Demographic Characteristics: The majority of patients were within the active working-age group (21–40 years), and males constituted a slightly higher proportion. As in table 1.

Table 1: Demographic Characteristics

Category	n (%)
Male	34 (55.7%)
Female	27 (44.3%)
10–20 years	4 (6.6%)
21–40 years	41 (67.2%)
>40 years	16 (26.2%)

Presenting Symptoms and Duration

Hoarseness was the universal presenting symptom. Many patients reported prolonged symptoms, indicating chronicity. As in table 2.

Table 2: Symptoms

Symptom	n (%)
Hoarseness	61 (100%)
Vocal fatigue	22 (36.1%)
Throat irritation	18 (29.5%)
Dysphagia	5 (8.2%)
Duration	n (%)
<3 months	18 (29.5%)
3–6 months	21 (34.4%)
>6 months	22 (36.1%)

Risk Factors: Smoking was the strongest risk factor, followed by heavy voice use and GERD symptoms. As in table 3.

Table 3: Risk Factors

Risk Factor	n (%)
Smoking	26 (42.6%)
Heavy voice use	15 (24.6%)
GERD symptoms	12 (19.7%)
Recent URTI	8 (13.1%)

Histopathological Types: Polyps and nodules formed the majority of lesions, reflecting phonotraumatic causes. As in table 4.

Table 4: Lesion Types

Lesion Type	n (%)
Vocal polyps	20 (32.8%)
Vocal nodules	15 (24.6%)
Reinke's edema	8 (13.1%)
Intracordal cysts	7 (11.5%)
Granuloma	5 (8.2%)
Solitary papilloma	4 (6.5%)
Multiple papillomatosis	2 (3.3%)
Total	61 (100%)

Anatomical Distributio: Most lesions were located in the anterior and middle thirds where phonatory stress is highest. As in table 5.

Table 5: Anatomical Sites

Site	n (%)
Anterior third	29 (47.5%)
Middle third	21 (34.4%)
Posterior third	7 (11.5%)
Diffuse/Multiple	4 (6.6%)

Occupational Distribution: Teachers were the most affected occupational group due to prolonged phonation. As in table 6.

Table 6: Occupations

Occupation	n (%)
Teachers	15 (24.6%)
Housewives	13 (21.3%)
Laborers	11 (18.0%)
Office employees	8 (13.1%)
Students	7 (11.5%)
Others	7 (11.5%)

Surgical Findings: Unilateral lesions dominated, and most surgeries used cold instruments. As in table 7.

Table 7: Surgical Characteristics

Variable	n (%)
Unilateral	44 (72.1%)
Bilateral	17 (27.9%)
Cold instrument excision	49 (80.3%)
Microdebridement	8 (13.1%)
Laser excision	4 (6.6%)

Postoperative Outcomes: Microlaryngeal surgery resulted in a high rate of complete recovery with minimal recurrence. As in table 8.

Table 8: Outcomes

Outcome	n (%)
Complete recovery	43 (70.5%)
Partial improvement	15 (24.6%)
Persistent symptoms	3 (4.9%)
Recurrence	3 (4.9%)

Discussion

In this study, benign vocal cord lesions were most commonly observed among young and middle-aged adults, with vocal polyps and nodules forming the majority of cases. This pattern is consistent with numerous studies included in the attached references. Dikkers *et al*. reported that vocal cord polyps are among the most common benign non-neoplastic lesions of the larynx and a significant cause of dysphonia in adults [11]. Hegde *et al*. similarly identified vocal polyps as the leading lesion requiring surgical removal [12], while Omori also recognized polyps as the most frequent pathology associated with voice disorders [13]. Zheng *et al*. further emphasized that vocal polyps occur more commonly in adults and often result from phonatory overload [14]. The present study revealed smoking and vocal abuse as major predisposing factors. These findings align closely with the literature. Wani *et al*. found that 70% of their patients were smokers and 55% had significant vocal misuse [15]. Ehab T.Y also demonstrated that vocal abuse (51.7%) and smoking (47.8%) were the predominant risk factors in benign vocal fold lesions [16]. Kyung Tae reported that laryngopharyngeal reflux contributes significantly to Reinke's edema and vocal polyps, suggesting reflux as an additional etiologic factor [17]. Together, these findings highlight the strong multifactorial nature of benign laryngeal disease, primarily driven by phonotrauma, irritant exposure, and reflux. The distribution of lesion types in this study—polyps followed by nodules—also matches earlier reports. Suliman S. found polyps in 51% of patients and nodules in 28.7% [18]. Mahesh Chandra *et al*. and Nikhil Gupta *et al*. documented similar patterns, with polyps and nodules forming the bulk of benign lesions [19, 20]. The consistency across multiple studies reinforces the dominant role of vocal trauma in the pathogenesis of these lesions. Microlaryngeal surgery produced excellent functional outcomes in this study, with a complete recovery rate of 70.5% and a recurrence rate of only 4.9%. Comparable outcomes were reported by Hemant CH *et al*., who observed recurrence in only 7% of their surgical cases [21]. Singhal and Bhandari reported that 92.6% of patients remained recurrence-free after a single procedure [22]. Kumar and Khanna found just 6.2% recurrence, limited exclusively to papilloma cases requiring multiple interventions [23]. Suliman S. also noted that recurrence occurred only in papillomatosis, requiring repeated CO_2 laser surgery [24]. These parallels strongly support microlaryngeal surgery as a safe and highly effective modality. The anatomical predominance of lesions in the anterior and middle thirds of the vocal cord corresponds to areas of greatest vibratory stress. Zheng *et al*. demonstrated that the anatomical site influences polyp behavior and postoperative voice quality, confirming the mechanical basis of lesion formation [14]. Microlaryngeal surgery remains the cornerstone of management. Kleinssaser emphasized its effectiveness in restoring voice in benign vocal fold lesions [25], while Robenson described low complication rates and reliable postoperative recovery [26]. Overall, the current study reinforces the findings of prior research included in the attached thesis: benign vocal fold lesions are largely phonotraumatic, respond well to microlaryngeal surgery, and have low recurrence except in cases of papillomatosis.

Conclusion

Microlaryngeal surgery proved highly effective in treating the majority of benign vocal cord lesions, with excellent voice recovery and minimal complications. Most patients achieved complete symptom resolution, reflecting the value of early diagnosis and precise surgical technique. Recurrence was rare and primarily associated with papillomatous lesions requiring repeated intervention. Overall, surgical management remains the cornerstone of therapy for benign vocal fold pathology.

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