ORIGINAL RESEARCH PAPER
Volume - 15 | Issue - 09 | September - 2026 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ROLE OF VIDEO LARYNGOSCOPY IN THE DIAGNOSIS OF LARYNGEAL LESIONS

ENT

Dr. Ganesh Mohan* — Senior Resident, Department of ENT, Government Medical College, Chhatrapati Sambhajinagar, Maharashtra. *Corresponding Author

Dr. Vandana Pramod Thorawade — Professor and Head of the Department, Department of ENT, Dr Vaishampayan Memorial Government Medical College and Shri Chhatrapati Shivaji Maharaj, Sarvopachar Rugnalay, Solapur, Maharashtra.

Dr. Sheetal Nagnath Babar — Assistant Professor, Department of ENT, Dr Vaishampayan Memorial Government Medical College and Shri Chhatrapati Shivaji Maharaj, Sarvopachar Rugnalay, Solapur, Maharashtra.

Dr. Avani Hitesh Someshwar — Resident Doctor, Department of ENT, MT Agarwal Hospital, Mulund (W), Mumbai, Maharashtra.

Dr. Shrutika Shankar Bhoir — Senior Resident, Department of ENT, V N Desai Hospital, Mumbai, Maharashtra.

ABSTRACT

Background: Video laryngoscopy (VL) provides magnified, real-time visualisation of laryngeal structures and has increasingly replaced conventional indirect examination in outpatient laryngology, yet comparative data on its diagnostic accuracy across benign, premalignant and malignant lesions remain limited in tertiary-care settings. **Objectives:** To evaluate the diagnostic accuracy of VL in laryngeal lesions against final clinicohistopathological diagnosis, and to assess patient convenience and compliance with the procedure. **Methods:** This cross-sectional observational study was conducted over 24 months in the Department of Otorhinolaryngology of a tertiary-care hospital. Fifty-seven patients presenting with change in voice, breathing difficulty or noisy breathing underwent VL, and provisional endoscopic diagnoses were compared with final diagnosis based on clinical and histopathological correlation. Sensitivity, specificity, positive and negative predictive values, and diagnostic accuracy were calculated, and associations were tested using the Fisher-Freeman-Halton exact test. **Results:** The cohort had a mean age of 44.95±16.93 years and a male predominance (77.2%). VL showed 100% sensitivity, specificity and accuracy for benign lesions, 90% sensitivity and 100% specificity (96% accuracy) for malignant lesions, and 100% sensitivity but only 33% positive predictive value for premalignant lesions. Provisional and final diagnoses correlated strongly ($p<0.001$). Malignancy was significantly associated with older age ($p=0.002$) and male sex ($p=0.025$). Most patients (91.3%) rated the procedure convenient or acceptable. **Conclusion:** VL is a highly accurate, well-tolerated diagnostic tool for benign and malignant laryngeal lesions, though its lower positive predictive value for premalignant change warrants routine histopathological confirmation.

KEYWORDS

Video Laryngoscopy, Laryngeal Lesions, Diagnostic Accuracy, Histopathology

INTRODUCTION

Video laryngoscopy (VL) couples a rigid or flexible endoscope with a high-definition camera to project magnified, illuminated images of the larynx onto an external monitor, allowing assessment of the supraglottic, glottic and subglottic regions beyond the examiner's direct line of sight (Aziz et al., 2012; Doyle, 2015). Compared with mirror-based indirect laryngoscopy, VL improves detection of subtle mucosal change, permits video documentation for counselling and multidisciplinary review, and is generally better tolerated by outpatients. Prior work has shown VL to be an effective screening tool for early mucosal change in high-risk smokers and drinkers, and emerging computer-vision approaches are being explored to further standardise lesion classification (Arora et al., 2021; Kanerva et al., 2022). However, most published series emphasise airway-management applications of VL, and comparative diagnostic-accuracy data—particularly separating benign, premalignant and malignant laryngeal disease against a histopathological reference standard—remain limited from Indian tertiary-care practice. Patient-reported convenience and compliance with outpatient VL are also infrequently reported alongside diagnostic performance. This study was undertaken to address this gap, with the objectives of determining the diagnostic accuracy of VL in laryngeal lesions and evaluating patient convenience and compliance with the procedure.

MATERIALS AND METHODS

This cross-sectional observational study was conducted in the Department of Otorhinolaryngology of a tertiary-care hospital over a 24-month period, after approval from the Institutional Ethics Committee. Written informed consent was obtained from all participants (or their guardians, for minors). Patients of all age groups presenting with change in voice, difficulty in breathing or noisy breathing were included; patients unwilling to participate or with restricted mouth opening were excluded. All eligible patients underwent detailed history-taking, general and ENT examination, and video laryngoscopy in the outpatient or casualty setting, using rigid and/or flexible video endoscopes as clinically indicated. Provisional diagnosis was based on endoscopic appearance, and final diagnosis was established by histopathological examination of biopsy or excised tissue, supplemented by clinical follow-up. Patient-reported comfort, compliance and convenience during the procedure were also recorded. Categorical data were summarised as frequencies and percentages; associations between categorical variables were tested using the Fisher-Freeman-Halton exact test. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and overall diagnostic accuracy of VL were calculated against the final clinicohistopathological diagnosis as reference standard, with $p<0.05$ considered statistically significant.

RESULTS

Fifty-seven patients were evaluated (age range 6–81 years; mean 44.95±16.93 years); 68.4% were aged 19–60 years and 77.2% were male (male:female ratio 3.4:1). Change in voice (98.2%) and hoarseness (96.5%) were near-universal presenting symptoms, followed by voice fatigue (86.0%), regurgitation/aspiration (45.6%) and dysphagia (28.1%). Tobacco use (56.1%) and vocal/voice abuse (~40–42%) were the leading risk-factor exposures (Table 1).

Table 1: Demographic, Clinical and Risk-Factor Profile of Study Participants (n=57)

Variable	N	%
Age (years), mean ± SD: 44.95 ± 16.93 (range 6–81)		
≤18 years	3	5.3
19–60 years	39	68.4
>60 years	15	26.3
Sex		

Male	44	77.2
Female	13	22.8
Presenting symptoms		
Change in voice	56	98.2
Hoarseness of voice	55	96.5
Voice fatigue	49	86.0
Regurgitation / aspiration	26	45.6
Dysphagia	16	28.1
Dyspnoea with noisy breathing	13	22.8
Risk factors		
Tobacco use	32	56.1
Vocal / voice abuse	24	42.1
Alcohol with smoking	7	12.3

On VL, 63.2% of lesions were provisionally classified as benign, 31.6% as malignant and 5.3% as premalignant; corresponding final diagnoses were 63.2%, 35.1% and 1.8% respectively, with strong agreement between provisional and final categorisation (Fisher-Freeman-Halton, p<0.001). Squamous cell carcinoma was the single most common histopathological diagnosis (31.6%), followed by vocal cord polyp (14.0%) and vocal nodule (12.3%).

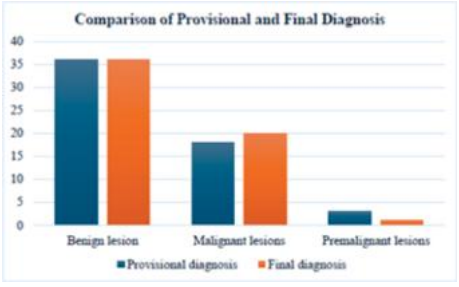

Figure 1 Comparison of Provisional (Video Laryngoscopic) and Final (Histopathological) Diagnosis Across Lesion Categories

VL demonstrated 100% sensitivity, specificity and overall accuracy for benign lesions. For malignant lesions, sensitivity was 90%, specificity 100% and accuracy 96%. For premalignant lesions, sensitivity and NPV were both 100%, but PPV was only 33%, reflecting a tendency to over-call premalignancy on visual assessment alone (Table 2).

Table 2: Diagnostic Accuracy of Video Laryngoscopy Against Final Clinicohistopathological Diagnosis

Lesion Category	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Accuracy (%)
Benign lesion/condition	100	100	100	100	100
Malignant lesions	90	100	100	95	96
Premalignant lesions	100	96	33	100	96

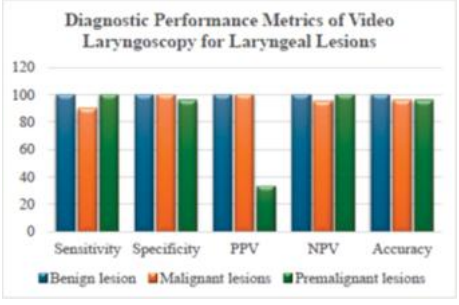

Figure 2 Diagnostic Performance Metrics of Video Laryngoscopy for Laryngeal Lesions

Final diagnosis was significantly associated with age (p=0.002) and sex (p=0.025): 80.6% of benign and 100% of premalignant lesions occurred in patients aged 19–60 years, whereas 55% of malignant lesions occurred in patients above 60 years; 95% of malignant lesions occurred in males (Table 3).

Table 3: Association of Age and Sex with Final Diagnosis (Fisher-Freeman-Halton Exact Test)

Variable	Benign, n (%)	Malignant, n (%)	Premalignant, n (%)	p-value
Age group				0.002
≤18 years	3 (8.3)	0 (0)	0 (0)	
19–60 years	29 (80.6)	9 (45.0)	1 (100)	
>60 years	4 (11.1)	11 (55.0)	0 (0)	
Sex				0.025
Male	24 (66.7)	19 (95.0)	1 (100)	
Female	12 (33.3)	1 (5.0)	0 (0)	

Regarding acceptability, 50.9% of patients found VL comfortable, 28.1% mildly uncomfortable and 21.1% uncomfortable; 63.2% showed good compliance; and 91.3% rated the procedure convenient or acceptable, with only 8.8% finding it inconvenient.

DISCUSSION

In this cohort, VL showed excellent diagnostic performance for benign and malignant laryngeal lesions, closely matching histopathology, but a markedly lower positive predictive value for premalignant change. This pattern mirrors earlier correlative work: Nerurkar and Garg, examining 720 patients undergoing rigid laryngoscopy, reported 100% accuracy for cysts, nodules, papillomas and ulcers, but only 30% and 50% accuracy for polyps and leukoplakia respectively, and cautioned that clinically benign-appearing lesions could still prove malignant on biopsy (Nerurkar and Garg (2011)). Deenadayal et al. similarly found videostroboscopy correlated better with intraoperative and histopathological findings (84% and 76%) than rigid (46%, 44%) or flexible (54%, 52%) laryngoscopy alone, reinforcing that visual grading systems vary considerably by lesion subtype (Deenadayal et al. (2016)). Coelho and Costantino likewise reported high concordance for epithelial lesions but lower accuracy for oedematous lesions on video laryngoscopy, consistent with the reduced specificity for premalignant change observed here (Coelho and Costantino (2016)). Chavan and Yewale reported 96% histopathological correlation for benign lesions, with occasional overlap between nodules and polyps, underscoring the value of routine tissue confirmation even for apparently benign disease (Chavan and Yewale (2017)); a similar case series by Sachdeva et al. found polyps and papillomas to be the commonest benign tumours, again diagnosed initially by laryngoscopy and confirmed histologically (Sachdeva et al. (2022)).

The strong association between malignancy and older age, and between malignancy and male sex, is consistent with the recognised epidemiology of laryngeal cancer, where cumulative tobacco and alcohol exposure and age-related mucosal change increase risk; this supports targeted, low-threshold VL-based screening in older male patients with persistent voice change. Notably, all premalignant lesions occurred in the 19–60-year group, suggesting this age band may represent a particularly useful window for early detection before progression to invasive disease, consistent with the rationale for VL-based screening in high-risk smokers and drinkers described by Arora et al (Arora et al. (2021)). High rates of patient-reported comfort, compliance and convenience support the feasibility of VL as a routine outpatient tool.

This study is limited by its single-centre design, potential selection bias toward symptomatic patients, small pediatric representation, and lack of formal inter-observer variability assessment; these should be addressed through larger, multicentre studies incorporating adjunctive modalities such as narrow-band imaging.

CONCLUSION

Video laryngoscopy is a highly accurate and well-tolerated tool for diagnosing benign and malignant laryngeal lesions, with diagnostic indices closely approximating histopathology. Its lower positive predictive value for premalignant lesions indicates that visual impression alone is insufficient in this subgroup, and routine histopathological confirmation should be pursued for all suspicious lesions. Given its safety, patient acceptability and diagnostic value, VL merits wider integration into routine outpatient ENT practice for early detection and surveillance of laryngeal disease.

Figure 3 Hopkins 70° telescope for video laryngoscopy

Figure 4 Normal appearance of the larynx on video laryngoscopy

Figure 5 Supraglottic carcinoma

Figure 6 Right vocal cord polyp

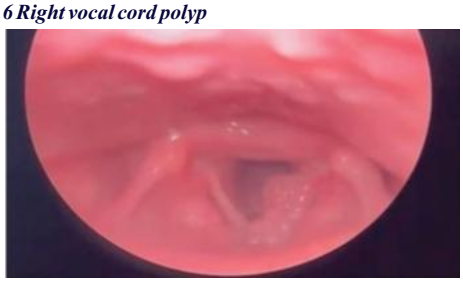

Figure 7 Carcinoma of the Left Glottis

Figure 8 Left Vocal Cord Cyst

Abbreviations

- **VL** – Video Laryngoscopy
- **ENT** – Ear, Nose and Throat
- **PPV** – Positive Predictive Value
- **NPV** – Negative Predictive Value
- **SD** – Standard Deviation
- **HP** – Histopathology / Histopathological
- **SCC** – Squamous Cell Carcinoma
- **NBI** – Narrow-Band Imaging

Ethical Considerations

The study was conducted in accordance with the principles of the Declaration of Helsinki (2013 revision) and after approval from the Institutional Ethics Committee. Written informed consent was obtained from all participants prior to enrolment and video laryngoscopy. For participants below 18 years of age, informed consent was obtained from a parent or legal guardian. Patient confidentiality was maintained, and no personally identifying information is included in the manuscript or figures. Video-laryngoscopic images were used for academic and research purposes with appropriate consent.

Conflict of Interest and Funding

The authors declare no conflict of interest. This research received no specific funding.

Acknowledgements

The authors thank the nursing and paramedical staff of the ENT Department and the paediatric surgery team for their support.

REFERENCES

1. Arora, S., Sharma, J. K., Sikka, K., & Yadav, R. (2021). Video laryngoscopy as a screening tool for laryngeal changes in chronic smokers and alcoholics. *International Journal of Research in Surgical and Medical Sciences, 7*(2), 45–49.
2. Aziz, M. F., Dillman, D., Fu, R., & Brambrink, A. M. (2012). Comparative effectiveness of the C-MAC video laryngoscope versus direct laryngoscopy in the setting of the predicted difficult airway. *Anesthesiology, 116*(3), 629–636.
3. Chavan, S. S., & Yewale, A. G. (2017). Clinicopathological profile of patients with benign laryngeal lesions. *MedPulse International Journal of ENT, 3*(3), 26–28.
4. Coelho, D. H., & Costantino, T. G. (2016). Evaluation of video laryngoscopy for diagnosis of laryngeal lesions: Correlation with histopathology. *Journal of Voice, 30*(6), 755–760.
5. Deenadayal, D. S., Naeem, N., Kumar, B. N., & Bommakanti, V. (2016). Correlations between videostroboscopy and constant light examination with intraoperative findings and histopathology—Our experience. *International Journal of Otolaryngology and Head & Neck Surgery, 5*(6), 215–222.
6. Doyle, D. J. (2015). The GlideScope video laryngoscope: A narrative review. *Anaesthesia, 70*(4), 409–416.
7. Kanerva, M., Numminen, J., Kullaa, A., & Rautiainen, M. (2022). Interpretable computer vision to detect and classify structural laryngeal lesions. *Laryngoscope Investigative Otolaryngology, 7*(5), 1190–1196.
8. Nerurkar, N. K., & Garg, S. (2011). Correlation between rigid laryngoscopy and histopathology of laryngeal lesions at our voice clinic. *International Journal of Phonosurgery and Laryngology, 1*(1), 29–31.
9. Sachdeva, K., Goyal, A., Yadav, S. P. S., Chanda, R., & Puri, M. (2022). Clinicopathological profile of benign tumors of the larynx. *Indian Journal of Otolaryngology and Head & Neck Surgery, 74*(Suppl 2), 2363–2369.