Journal of Cardiovascular Disease Research

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE7, 2024

Comparison of Video Laryngoscopy(Rigid Telescope-70 Degrees) Guided Biopsy and Direct Laryngoscopic Biopsy for Laryngopharyngeal lesions

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Abstract

Background: Accurate diagnosis of laryngopharyngeal lesions is critical for effective treatment planning. While direct laryngoscopic biopsy (DLB) has been the traditional method, video laryngoscopic-guided biopsy (VLB) offers a less invasive alternative with potential benefits in visualization and patient comfort. This study aims to compare the diagnostic accuracy, patients outcome and procedural efficiency of VLB and DLB.

Methods: A retrospective cohort study was conducted on 100 patients who underwent laryngeal biopsy between January 2022 and June 2023. Fifty patients underwent VLB, and fifty underwent DLB. Data on diagnostic yield, complication rates, procedure duration, and patient-reported outcomes were collected and analyzed.

Results: VLB demonstrated comparable diagnostic accuracy to DLB (94% vs. 96%, p=0.42). VLB had significantly lower complication rates (2% vs. 10%, p=0.03) and shorter procedure times (mean: 20 minutes vs. 35 minutes, p<0.01). Patients reported higher satisfaction with VLB, citing less discomfort and faster recovery.

Conclusions: Video laryngoscopic-guided biopsy is a viable alternative to direct laryngoscopic biopsy, offering similar diagnostic accuracy with reduced complications and improved patient comfort. VLB may be considered a preferred method for the biopsy of laryngopharyngeal lesions in appropriate clinical settings.

Keywords: Video laryngoscopy, Direct laryngoscopy, Biopsy, Laryngopharyngeal lesions, Diagnostic accuracy, Patient outcome

1. INTRODUCTION

Laryngopharyngeal lesions encompass a wide range of disease processes that include inflammatory disorders, local manifestations of systemic disease, benign lesions and primary malignancies.They present significant diagnostic challenges due to their anatomical location

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE7, 2024

and varied clinical presentation. Accurate and timely diagnosis of suspicious lesions is essential for guiding appropriate treatment strategies, which can significantly impact patient outcomes and prognosis.[1]

The larynx and lower pharynx are potentially challenging areas to assess and traditionally, direct laryngoscopic biopsy (DLB) under general anaesthesia has been the gold standard for obtaining tissue samples. This procedure requires operating room (OR) and OR personnel ,general anaesthesia.[2] The consistent ability to gain access to the anatomic site without patient movement and definite extension of disease along mucosal surfaces that may not be apparent during awake examination are benefits of this approach. Complications arising from instrumentation, procedure, anaesthesia and postoperative period do occur especially in high risk patients with comorbid conditions apart from patients missing work and comparatively expensive procedure.[3]

In recent years, video laryngoscopic-guided biopsy (VLB) has emerged as a less invasive alternative, utilizing advanced imaging technology to enhance visualization of the laryngeal structures.[4] VLB offers potential benefits, including reduced procedural time, lower complication rates, and increased patient comfort, without compromising diagnostic accuracy and also decreases delay between clinical presentation and diagnosis which further affects the treatment . Despite these advantages, the adoption of VLB in clinical practice has been gradual, and direct comparisons with DLB remain limited.[5]

This study aims to fill this gap by systematically comparing the diagnostic accuracy, patient outcomes, and procedural efficiency of VLB and DLB. By evaluating these parameters in a cohort of patients who underwent biopsy for suspected laryngeal lesions, we seek to determine whether VLB can serve as a reliable and preferable alternative to DLB in routine clinical settings. The findings from this study could provide valuable insights for clinicians in selecting the most appropriate biopsy method, ultimately improving patient care and resource utilization in otolaryngology.

2. MATERIALS AND METHODS

Study Design

This retrospective cohort study included patients who underwent laryngeal biopsy at Government General Hospital, Kurnool, between January 2022 and June 2023. The study protocol was approved by the institutional review board, and informed consent was obtained from all patients.

Inclusion Criteria

- Patients aged 18 years and older.
- Patients presenting with suspected laryngopharyngeal lesions requiring biopsy.
- Patients with sufficient clinical and imaging data available for analysis

Exclusion Criteria

- Patients under 18 years of age.
- Patients with contraindications to laryngoscopy (e.g., severe airway obstruction, unstable cardiovascular status).
- Patients with known coagulopathies or on anticoagulant therapy that could not be managed peri-procedurally.
- Patients who underwent previous laryngopharyngeal biopsy within the past 6 months.
- Patients with incomplete medical records or follow-up data.

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE7, 2024

- Patients unable to provide informed consent due to cognitive or linguistic barriers.
- Patients with anatomical abnormalities preventing the use of video laryngoscopy.

Procedure

Patients with discrete suspicious appearing oropharyngeal, laryngeal and hypopharyngeal lesions such as leukoplakia, erythroplakia, papillomatosis, keratosis ,ulceration, ulceroproliferative growth involving the following sites were included in the study .All the patients were thoroughly investigated and taken up for procedure and whenever necessary more than one biopsy specimen was collected in order to sample different parts of lesion.

Location of biopsy sites: The primary sites were-base of tongue, vallecula ,aryepiglottic folds, interarytenoid region, false cords ,true cords , postcricoid region and pyriform fossa.

Patients were divided into two groups: those who underwent VLB and those who underwent DLB.

VLB was performed using a 70-degree,4mm Karl Storz rigid endoscope. After explaining the procedure and taking informed consent patient underwent the procedure .The patient is made to sit comfortably with adequate support to head.10 minutes prior to VLB,10 % lignocaine around 2-3 puffs was sprayed to the base of tongue, faucial pillars and pharyngeal wall. One puff of 10% lignocaine spray contains 10mg and 1ml contains 100mg of lignocaine .It's action starts within 90 seconds and lasts for a duration of 40 minutes approximately without gagging or causing discomfort to patient .Video laryngoscopy provided enhanced visualization of the laryngeal structures and biopsy was taken from desired site with the help of biopsy forceps and sent for histopathological examination. Patients were observed for 1 hour after undergoing the procedure.(figures 1,2) For VLB the duration of procedure included spraying of topical anaesthetic, obtaining tissue for biopsy and then until hemostasis was achieved.

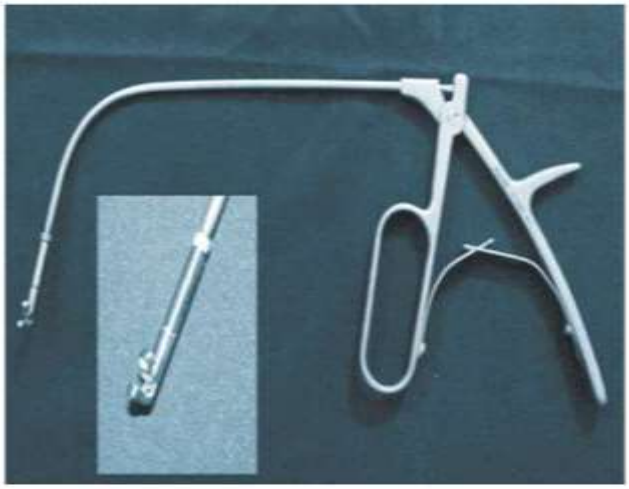

Figure 1:laryngeal biopsy forceps

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Figure 2:obtaining tissue by videolaryngoscopic biopsy(VLB)

DLB was conducted using a direct laryngoscope under general anesthesia after explaining the procedure and taking informed consent. Thorough hematological, cardiovascular and neurological evaluation of patient was done. Premedication was done with glycopyrrolate ,ondansetron and midazolam .Induction of GA was done with thiopentone sodium or propofol and maintenance with sevoflurane and vecuronium infusion .Position of patient-sniffing the air position or flexion of neck and extension of head . This was attained by making the patient to lie down in supine position with head raised 10cm above the body level using a head pillow . A rigid laryngoscope was introduce along the right side into oral cavity, later pushed to midline to visualize epiglottis , further pushed posterior to epiglottis to visualize larynx and hypopharynx(figure 3).Biopsy samples were obtained and sent for histopathological analysis. Afterwards, the patient was extubated and observed postoperatively. The duration of procedure for DLB was from patient handed over by anaesthetist after intubation, obtaining tissue biopsy and achieving adequate hemostasis and later handed over back to anesthetist.

Figure 3:Direct laryngoscopy biopsy

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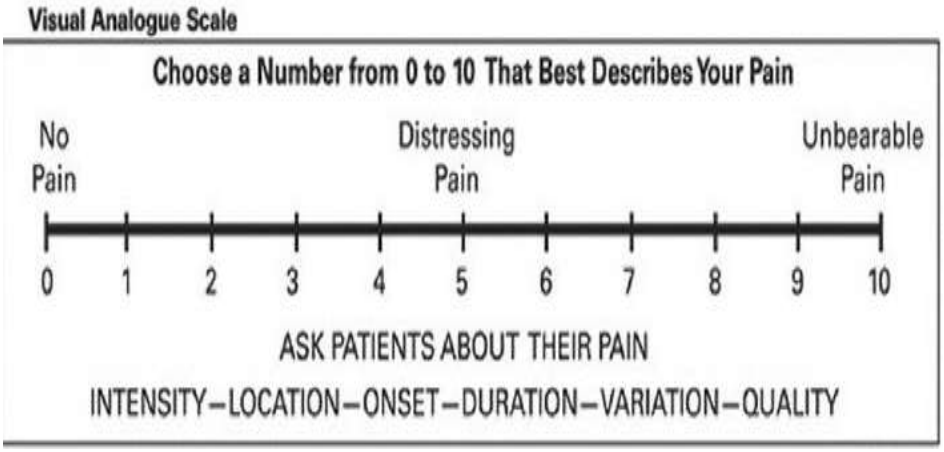

Figure 4:visual analog scale

Data Collection

Data on demographic characteristics, time from the date of initial consultation to date of tissue biopsy ,diagnostic yield ,procedure duration, complication rates and patient-reported outcomes were collected from medical records. Diagnostic yield was defined as the percentage of biopsies that provided a definitive diagnosis. Complications were recorded based on postoperative follow-up notes .Patient outcomes with respect to postoperative recovery time, pain and other complaints experienced was assessed by visual analog scale(figure 4),return to normal activity were assessed .Diagnostic workup time was defined as number of days between initial consultation and date of multidisciplinary treatment.

Statistical Analysis

Statistical analyses were performed using SPSS version 25.0. Continuous variables were compared using independent t-tests, while categorical variables were compared using chi-square tests. A p-value of <0.05 was considered statistically significant.

3. RESULTS

Patient Demographics

The study included 100 patients, with 50 in the VLB group and 50 in the DLB group.

The mean age of patients was 55.3 years with range of 20-82 years .Out of 100 included in the study 60%(n=60) were males and 40%(n=40) were females(figure 5). There were no significant differences in age, gender between the two groups (p>0.05).

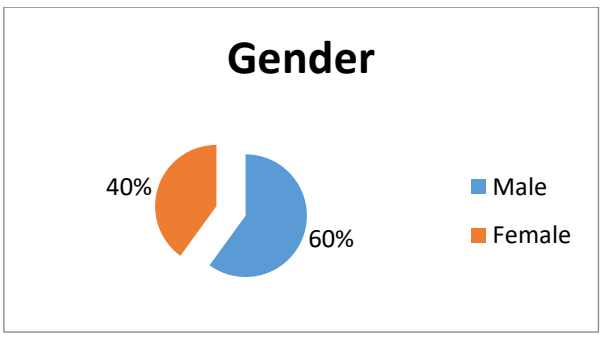

Figure 5:sex distribution

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Clinical Presentation

Clinical features were not mutually exclusive to two groups.The presenting complaints were dysphagia(35%),hoarseness (57 %),foreign body sensation in throat(6%),shortness of breath(2%).Some patients experienced multiple symptoms simultaneously.

Diagnostic Yield

The diagnostic yield was 94% for VLB and 96% for DLB (p=0.42). Both methods provided high diagnostic accuracy, with no significant difference between them.Both the procedures provided sufficient tissue for diagnosis

Procedure Duration:

The mean procedure time was significantly shorter for VLB compared to DLB .It was approximately 20 minutes for VLB and 35 minutes for DLB and was statistically significant ($p<0.01$).

Location of primary site for biopsy

The sites from which biopsy was taken was base of tongue(10%),vallecula(7%),aryepiglottic folds(13%),interarytenoid region(8%),false cords(11%),true vocal cords(27%),postcricoid region(2%) and pyriform fossa(22%).

Histological results

Definitive histological results were obtained by both methods and showed benign (26%),hyperplasia(14%),mild/moderate dysplasia(2%),severe dysplasia/carcinoma insitu(6%) and squamous cell carcinoma(52%)

Postoperative pain and complaints

In patients who underwent VLB there was relatively less pain and minimal or no procedure related complaints such as bleeding ,aspiration, transient vocal cord paresis.The patients recovered well after procedure and could return to normal activity earlier. Where as patients who underwent DLB experienced more pain comparatively and also anaesthetic related complications such as laryngospasm delayed recovery ,prolonged hospital stay and took more number of days to return to normal activity .The results with respect these parameters was statistically significant($p<0.05$).(table 1)

Diagnostic workup time and time to treatment

The median diagnostic workup time and time to treatment for VLB was 3 days whereas for DLB was longer with 15 days ,which was statistically significant($p<0.01$).

Table 1:Distribution according groups

Variables	VLB Group	DLB Group	P value
Minor bleeding	1 (2%)	3 (6%)	0.03
Transient vocal cord	0(0%)	2 (4%)	
Over all Complication rate	1(2%)	5 (10%)	
Diagnostic Yield	47(94%)	48(96%)	0.42
Duration of procedure	20±8.6	35±11.8	<0.01

4. DISCUSSION

The early diagnosis is crucial for improving treatment outcomes and prognosis in laryngopharyngeal lesions .It increases the survival and chance of preserving laryngeal function .Traditionally the biopsy of laryngopharyngeal lesions is performed under general

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anaesthesia .Technological advancements in types of endoscopes ,instrument miniaturization and topical anaesthetic techniques have led to a shift in laryngeal management from operating room to an office based setting. Video laryngoscopy allows for direct screening of oropharynx ,larynx and hypopharynx and biopsy can be performed with high clinical efficacy, increased patient safety and overall decreased cost to healthcare system. Without the need to schedule operating time, VLB can be performed more expeditiously, therefore decreasing delay between diagnosis and treatment[5].

Exposure to general anaesthesia and endotracheal intubation for DLB, is associated with risks such as bleeding ,sore throat, chipped tooth, delay in return to normal mental and physiological activity, malignant hyperthermia. Since many patients undergoing laryngopharyngeal biopsies may have already compromised ventilation and perfusion capacities ,they are already at a higher risk for general anaesthesia . Patients on anticoagulant medication are another potential high risk candidates for general anaesthesia. They have to stop the anticoagulant medication prior to surgery and switched to alternate like heparin .VLB can however be performed easily in such patients without stopping the anticoagulant medication.

VLB can be performed as office based procedure with greater advantages such as biopsy can be obtained quickly at even first visit without waiting for surgery ,reducing patients anxiety .Performing procedure in an awake patient in sitting position ,controlled laryngeal function ,reduced risk of aspiration and adequate visualization of desired site and lesion are the added advantages .Digital endoscopic techniques enable possibility of recording images, more detailed reporting and comparison of images during follow up. Many of the risks associated with GA and DLB can be overcome by VLB.

This study demonstrates that video laryngoscope-guided biopsy (VLB) is a viable alternative to direct laryngoscope biopsy (DLB) for diagnosing laryngeal lesions. VLB offers comparable diagnostic accuracy with significantly lower complication rates and shorter procedure times. Additionally, patients reported higher satisfaction with VLB, highlighting its potential benefits in terms of patient comfort and recovery. Previous studies have shown variable success rates but a similar high tolerance of FEB. Naidu et al and Cohen and Benyamini reported in-office biopsies to be diagnostic in 64% and 68.8%, respectively. In the former study, 58% of the patients underwent additional biopsy under general anesthesia[1].

The mean duration of procedure was lower in VLB with 20 minutes in comparison to 35 minutes by DLB, which was statistically significant and supported by evidence from studies done previously. The procedure VLB was tolerated well by patients without significant procedure and anaesthestic related complications which were seen with DLB.DLB was associated with some procedural complications due to instrumentation and anaesthetic related such as laryngospasm and aspiration .The postoperative recovery period and return to normal activity was less with VLB and in some patients was done at the time of first consultation only as a daycare procedure .Whereas DLB was done only after thorough pre anaesthetic evaluation and as many patients presenting with suspicious laryngeal lesions have reduced ventilation and perfusion they were under high risk .Patients who underwent VLB experienced less pain and other complaints assessed on visual analog scale when compared to those who underwent DLB.

There were no complications, specifically no or minimal bleeding, even though continuation of anticoagulant use was allowed. Absence of major complications in office-based biopsies and surgery with continuation of anticoagulants, are in line with other reports in the literature[2,6]. We found a high level of success in establishing a definitive diagnosis after VLB under topical anaesthesia.

Another advantage is that patients, often with significant comorbidity, may be spared the risks of general anaesthesia by moving the diagnostic process to the outpatient setting. Moreover,

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this shift reduces costs. The average cost for a VLB under topical anaesthesia was nearly 90% less than the cost for a DLB in general anaesthesia. Multiple studies have shown significantly lowered costs of office-based biopsies compared to biopsies under general anaesthesia [(4)].The median diagnostic workup time and time to treatment was 3 days in VLB and this improved the outcome , prognosis of disease and efficiency of workup in head and neck cancers. Lippert et al found time to treatment was 24.2 days in successful FEB(flexible endoscopic biopsy) compared to 48.8 days when unsuccessful[(3)]. Our time to treatment was 27 days in DLB as compared to 14 days in VLB ($P < .0001$).

The enhanced visualization provided by video laryngoscopy may contribute to the high diagnostic yield observed in the VLB group. The reduced complication rates and shorter procedure times associated with VLB suggest that it may be a safer and more efficient option compared to DLB. These findings support the broader adoption of VLB in clinical practice, particularly for patients who may not tolerate general anesthesia well or have other risk factors.

Limitations:

This study is limited by its retrospective design and the potential for selection bias. Prospective, randomized controlled trials are needed to further validate these findings and establish standardized protocols for VLB.

5. CONCLUSIONS

Video laryngoscope-guided biopsy is a reliable and effective method for diagnosing laryngopharyngeal lesions, offering similar diagnostic accuracy to direct laryngoscope biopsy with the added benefits of reduced complications and improved patient comfort. VLB should be considered as a preferred biopsy method in appropriate clinical settings, contributing to better patient outcome and more efficient use of healthcare resources.

Acknowledgements

The authors would like to thank the staff at Department of ENT & HNS, GGH, Kurnool for their support and assistance in this study. Special thanks to the patients who participated in the study.

Conflicts of Interest

The authors declare no conflicts of interest related to this study.

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