

# Vocal cord biopsy under local anesthesia, with flexible bronchoscope as an outpatient procedure, by “inside-out” technique

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## ABSTRACT

**Background:** Pulmonologists commonly need to take biopsies of laryngeal lesions, either found incidentally while doing bronchoscopy for other indications or while investigating patients for hoarseness of voice and cough. Biopsy of laryngeal lesions has been conventionally done under general anesthesia to provide adequate samples and minimize risks and patient discomfort. Of late, these biopsies have been done as outpatient procedures, by flexible endoscopes, under local anesthesia. However, vocal cord biopsies are often challenging due to poor patient compliance. We have tested an innovative method, which we have called the “inside-out” method, to circumvent this problem. **Objectives:** We aimed to analyze the feasibility, yield, and the safety of the “inside-out” technique for taking vocal cord biopsies as an outpatient procedure in awake patients. **Material and Methods:** This was a prospective observational study. Data of 38 patients with vocal cord lesions in whom the above technique was employed were analyzed. **Results:** The procedure had a diagnostic yield of 78.9% with a sensitivity of 96.7% and a specificity of 100% for detecting malignancy or dysplasia. There were no major complications. **Conclusions:** The “inside-out” technique was found to be feasible and safe and with a high yield.

**KEY WORDS:** “Inside-out” technique, vocal cord biopsy, Vocal cord lesion

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## INTRODUCTION

Pulmonologists commonly need to take biopsies of laryngeal lesions found incidentally while doing bronchoscopy for other indications, while investigating patients for hoarseness of voice and cough, and sometimes when referred by colleagues due to difficulties with general anesthesia or other technical difficulties. Biopsy of laryngeal lesions

has been conventionally done under general anesthesia to provide adequate samples and minimize risks and patient discomfort. However, this may incur additional cost, inconvenience, and sometimes additional risk due to comorbid conditions. Office-based/outpatient laryngeal biopsies with flexible endoscopy (LBFEs) have been shown to be safe, feasible, cost effective, and easy to perform besides reducing diagnostic delay.<sup>[1-4]</sup>

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We have been performing LBFEs under local anesthesia in awake patients, done as outpatient procedures, with patients returning home the same day. In our experience, of all the laryngeal lesions, vocal cord biopsies in awake patients were frequently more challenging while attempting the procedure from the front. This meant approaching the lesion directly with the forceps, keeping the tip of the endoscope in the oropharynx below the epiglottis. The procedure was frequently rendered difficult and sometimes impossible due to the patient choking, coughing, or swallowing as the forceps touched the false/true cords. We have devised an innovative “inside-out” method to overcome this problem. We have tested this method over the last 2 years and submit a report of 38 patients along with stepwise details of the procedure.

## MATERIALS AND METHODS

The study was undertaken after getting clearance by the ethical and scientific committee of the hospital. Only patients with vocal cord lesions were selected for this study, whereas those with lesions of the pharynx, epiglottis, and aryepiglottic folds were excluded. Patients who had significant respiratory distress or with very narrow glottic chinks in whom LBFEs was considered unsafe were also excluded.

Selected patients were asked to report to the bronchoscopy suite after 4 h of fasting. Informed consent was taken. The patient was asked to lie supine for the procedure. He or she was explained in detail about the steps of the procedure, to ensure his cooperation.

The pharynx and larynx were sprayed with 3–4 puffs of 10% lignocaine spray. Direct laryngoscopy was done with an Olympus 190 series video bronchoscope with a 5.8-mm outer diameter and a 2.8-mm working channel. After visualizing the vocal cords and the anterior and posterior commissures and surrounding structures, two 2–3-ml aliquots of 2% lignocaine solution were sprayed on the cords through the working channel of the bronchoscope. No sedation was used.

The mobility of the vocal cords was checked, and the position of the lesion on the cords was noted. The bronchoscope was gently negotiated into the trachea through the diseased cords taking care not to force the tip or to traumatize the cords in the process. The subglottic region was examined, and any extension of the lesion to this area was noted. A quick examination of the tracheobronchial tree was done using 3–4, 2 ml aliquots of 2% lignocaine solution in a “spray-as-you-go” technique. Any other lesion in the airways was noted. The bronchoscope tip was brought back into the trachea and the biopsy forceps was passed into the working channel till the jaws could be seen clearly. The forceps was opened and the jaws rotated till they were parallel to the position of the lesion on the vocal cords. The forceps with opened jaws was pulled back into the working channel till only

the open jaws remained outside. The bronchoscope with the forceps together were gradually retracted till the cords were reached. The patient was given instructions to breathe very gently and try not to cough. As the jaws of the forceps came alongside the lesion, the tip of the bronchoscope was angulated slightly toward it to facilitate the biopsy under direct vision [Figures 1-5 and Video 1]. The same procedure was repeated for subsequent biopsies, by reinserting the bronchoscope into the trachea and bringing it “inside-out” with the open forceps as described above. Lignocaine with adrenaline solution was instilled between biopsies, to minimize bleeding and allow adequate visualization.

Monitoring during the procedure was done with pulse oximetry and non invasive blood pressure measurement. An intravenous cannula was kept inserted for any drugs if necessary. Standard emergency drugs and emergency intubation equipment were always available in the endoscopy suite.

## RESULTS

Of the 38 patients who underwent vocal cord biopsy, 36 were male (94.7%) and 2 were females (5.3%). The “inside-out” technique could be successfully performed in all the patients. A total of 22 lesions were malignant, 6 were dysplastic, and 10 were reported benign. All the malignant lesions were squamous cell carcinoma on histology, of which the majority were moderately differentiated 19/22 (86%). Eight out of the ten benign lesions had a “nonspecific” diagnosis with only inflammatory changes and two had benign vocal cord nodules [Table 1].

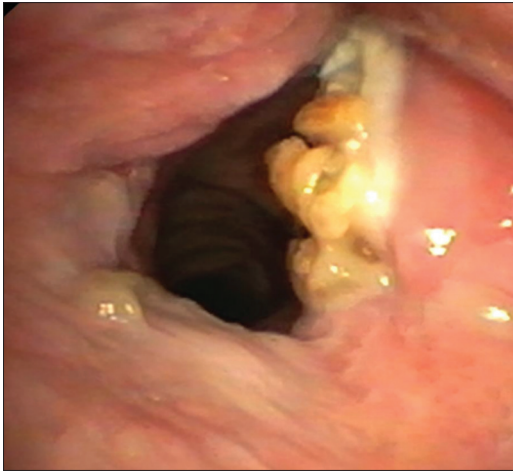
Of the eight patients with nonspecific diagnosis, two underwent microlaryngeal surgery with excision biopsy of the lesion and were found to have the same result. The other six patients were follow-up cases of treated glottic/supraglottic malignancies. Five of these were kept on regular follow-up and showed no evidence of recurrence. One patient who was a case of right vocal cord carcinoma, who had been treated for the same 5 years before this biopsy, was lost to follow-up for further evaluation.

Thus, the procedure had a diagnostic yield of 73.7%, a sensitivity of 96.5%, and a specificity of 100% for malignant or dysplastic vocal cord lesions.

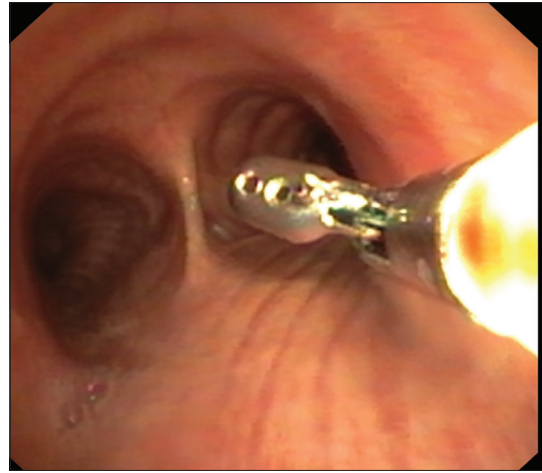
**Table 1: Etiology of vocal cord lesions proven on biopsy**

Final diagnosis of vocal cord lesions	Frequency
Well-differentiated SCC	2
Moderately differentiated SCC	19
Poorly differentiated SCC	1
High-grade dysplasia	3
Moderate-grade dysplasia	3
Vocal cord nodule	2
Inflammatory/necrotic/granulation (nonspecific)	8
Total	38

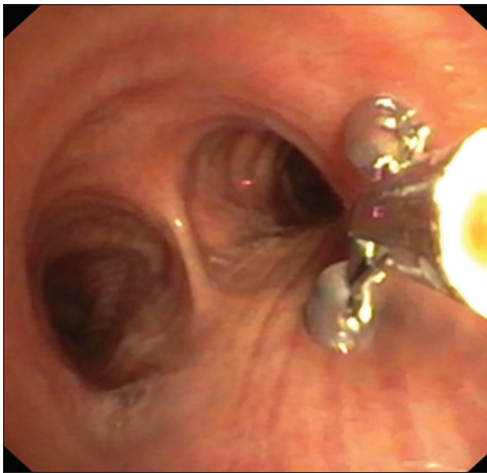
SCC: Squamous cell carcinoma



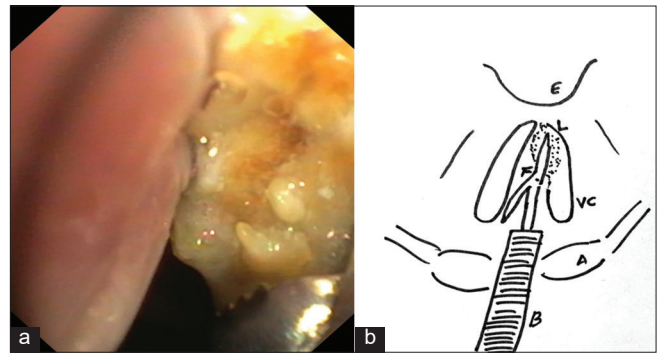
**Figure 1:** Right vocal cord lesion



**Figure 2:** Forceps extended into trachea out of working channel of bronchoscope, jaws of the forceps open at an angle to the lesion



**Figure 3:** Forceps rotated to align the jaws parallel to the lesion on the cords



**Figure 4:** (a) Bronchoscope, with forceps with open jaws, withdrawn and aligned parallel to the lesion and full thickness biopsy taken. (b) (line drawing) - showing the same. Bronchoscope(B), Forceps(F), Vocal cord(VC), Lesion(L), Epiglottis(E), Arytenoids(A)

The “inside-out” technique was successfully performed in all the patients. There were no major complications encountered with the procedure. Minor bleeding was present in a few cases, which were controlled with local application of cold saline and/or lignocaine-adrenaline solution. All patients could be sent home on the same day after one hour of observation.

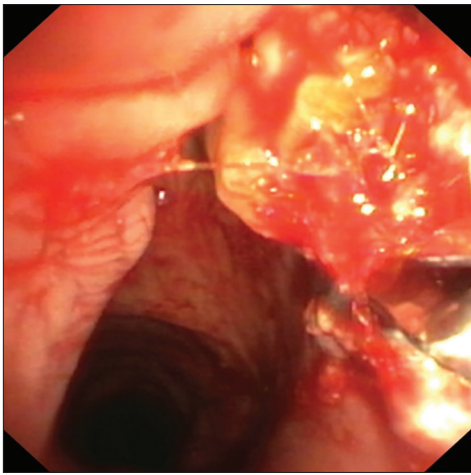
## DISCUSSION

Vocal cord biopsies have been traditionally performed under general anesthesia with a rigid laryngoscope. With the advent of the flexible endoscopes, more operators are attempting this procedure under local anesthesia as an outpatient procedure (LBFEs).

This study was undertaken to analyze the safety, feasibility, and consistency of yield obtained by an unconventional “inside-out” method for taking vocal cord biopsies in awake patients in an outpatient setting. The results indicate that this is a feasible and safe technique with minimal complications and rewarding yield.

Outpatient LBFEs have been described as safe and feasible for pharyngeal and laryngeal lesions by many operators.<sup>[1-4]</sup> Patients in respiratory distress or stridor due to narrow glottic openings are excluded from this approach and dealt with separately. In our experience of all the lesions of the pharynx and laryngeal region, biopsies of the vocal cords are most challenging when attempted in awake patients. Such patients tend to choke, swallow, or cough when biopsies are attempted by directly approaching the lesion from the front. This causes the vocal cords to move repeatedly making the lesion a very difficult target to grasp with the endoscopic forceps. Vocal cord biopsies have been done by approaching the lesion directly but require precision and a skilled operator.<sup>[5]</sup> To circumvent this problem, we devised the “inside-out” method. We found that retracting the bronchoscope with the open forceps from “inside” the trachea “out” to the cords, to biopsy the lesion, offers the following advantages:

1. The tracheobronchial tree, the subglottic region, and the undersurface of the cords are nicely anesthetized by the “spray-as-you-go” technique while performing an initial inspection of the airways. This makes the



**Figure 5:** Position of the forceps after taking the biopsy

patient less prone to coughing and choking and thus more compliant for biopsies

2. Avoidance of sedation helps in getting better cooperation from the patient in breathing gently and controlling his cough as the biopsy is being taken
3. As the bronchoscope is gradually retracted from within the trachea, it prevents the cords from closing or moving excessively till the biopsies are taken
4. Aligning the jaws of the forceps with the lesion, in the manner described above, ensures that large full-thickness biopsies can be taken under direct vision
5. Last but not least, this method allows full inspection of the subglottic region and the tracheobronchial tree for any concomitant lesion.

The yield achieved by this “inside-out” technique was excellent and the complications were minimal and easily tackled. We believe that it can be learned easily and performed effectively by anyone with basic skills of flexible laryngoscopy/bronchoscopy.

The limitations of this study are that it is observational and not a direct head-to-head comparison between the conventional approach and the “inside-out” technique. Second, although no patient complained after the procedure, no objective record of the patient’s acceptance of the procedure was made.

## CONCLUSIONS

Our experience with the technique described for vocal cord biopsies indicates that it is safe and feasible and has an excellent yield. We feel that this technique is not difficult to learn and can be adopted for taking vocal cord biopsies in selected patients in an outpatient setting.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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