Original Article

Flexible bronchoscopy-guided vocal cord biopsy under conscious sedation: An option to surgical biopsy in special situations

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ABSTRACT

Introduction: Vocal cord (VC) biopsies are usually performed with rigid laryngoscopy under general anesthesia (GA). In patients with comorbidities such as cardiovascular or pulmonary disease, the risk of GA is high, with morbidity and potential mortality. We describe VC biopsy (VCB) in such a high-risk cohort, done safely and successfully with flexible bronchoscopy-VCB (FB-VCB) and conscious sedation. Methods: FB-VCB was done in two groups of patients – the first at high risk for GA due to comorbidities and the second group where VC lesions were found incidentally in the course of FB done for other reasons. FB was done with local anesthesia and conscious sedation, and the VC lesion was identified. Flexible forceps were introduced through the working channel of the bronchoscope, and the lesions were carefully sampled. Results: FB-VCB was performed in 15 patients (14 males and 1 female) with a mean age of 60.7 ± 12.1 years. Of these 15 patients, 6 patients were poor candidates for GA due to comorbidities and 9 patients had incidental VC lesions found during bronchoscopy. A diagnosis was made in 14/15 (93.3%) patients. Complications included a mild ooze and hoarseness of voice for a few days, which did not require any intervention. Conclusion: We report one of the few series of patients with VC biopsies done with FB (FB-VCB) under conscious sedation, without significant complications. It is safe and useful in high-risk patients who are poor candidates for GA, with a good diagnostic yield.

KEY WORDS: Biopsy, bronchoscopy, interventional pulmonology, pathology, vocal cords

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INTRODUCTION

Vocal cord biopsy (VCB) is usually performed by otorhinolaryngologists with rigid laryngoscopy under general anesthesia (GA). Complications can range from nausea and vomiting to life-threatening cardiovascular, renal, and pulmonary complications.[1] In patients who are poor candidates for GA, commonly due to lung or heart disease, the procedure is high risk and can be fatal. In such situations, other minimally invasive procedures can be useful. Flexible bronchoscopy (FB) gives excellent visualization of the vocal cord (VC) and can be done under local anesthesia and conscious sedation, and tools such as small forceps (1.2—1.7 mm) can be used to take biopsies from the VC lesion. In another clinical situation, while doing FB for other indications, an incidental VC lesion is seen, and the question arises as to whether a flexible forceps biopsy can be done safely and effectively. In both situations, there are scant data on the feasibility, safety, and efficacy of FB-guided biopsies of VC lesions (FB-VCB). We...
report a series of patients, where in specific situations as mentioned above, FB-VCB was done safely and effectively.

**METHODS**

This is a retrospective study, over 6 years, of patients who had FB-VCB done. The Local Ethics Committee approved the study protocol. A patient consent waiver was allowed, as this was a retrospective study, however, an informed procedural consent was obtained from all the study patients.

FB-VCB patients were classified into two categories: (a) patients at high risk for GA due to comorbidities and unwilling for surgical biopsy and (b) in the course of routine bronchoscopy done for respiratory indications, VC lesions [Figures 1 and 2] were seen and they were sampled concomitantly. Fifteen patients who met these criteria were included in this study.

The procedure was done with local anesthesia and conscious sedation (intravenous midazolam and fentanyl), as per the standard FB protocols.[2] The FB was passed through the oral route, and the VC with the lesion was seen. FB forceps were introduced through the working channel of the bronchoscope. The lesions were sampled with the forceps and sent for histopathology. Hemostasis was achieved using ice-saline and dilute epinephrine (1:10,000) as needed.[3]

**RESULTS**

Over 6 years, a total of 15 patients met the criteria outlined above. There were 14 male and 1 female with a mean age of 60.7 ± 12.1 years. Of the 15 patients, 6 patients were poor candidates for GA due to multiple comorbidities [Table 1], and in 9 patients VC lesions were found incidentally during bronchoscopy, and FB-VCB was done. Precautions taken during the procedure included adequate sedation to facilitate the procedure, as greater precision and steadiness are needed to sample from the VC. In addition, an experienced operator did the procedure, to ensure safety and adequate sampling. In 7 patients, lesions were sampled from the right VC and in 9 patients from the left VC and sent for histopathology. Adequate material leading to an accurate diagnosis was obtained in 14/15 patients [Table 2].

The procedure was well tolerated, and there were no significant complications. Minor issues included minimal ooze and mild hoarseness of voice for few days, expected with any VC sampling, which did not require any intervention. All the patients were followed clinically, with otorhinolaryngology and oncology consultation as needed. No delayed complications were noted. All procedures were

**Table 1: Comorbidities in patients where general anesthesia was high risk**

| Risk factors for GA | Number of patients |
|---------------------|--------------------|
| CHF/LVD with low EF (<35%) | 3 |
| CAD with recent MI | 2 |
| CAD with HTN, deemed high risk by cardiology for GA | 1 |
| Total | 6 |

CHF: Congestive heart failure, LVD: Left ventricular dysfunction, EF: Ejection fraction, CAD: Coronary artery disease, MI: Myocardial infarct, HTN: Hypertension, GA: General anesthesia

**Table 2: Diagnoses in flexible bronchoscopy-vocal cord biopsy patients**

| Diagnosis                  | Number of patients |
|----------------------------|--------------------|
| Dysplasia                  | 2 |
| Vocal cord nodule          | 3 |
| Squamous cell carcinoma    | 2 |
| Vocal cord polyp           | 3 |
| Chronic inflammation       | 2 |
| Dyskeratosis               | 1 |
| Squamous metaplasia        | 1 |
| Nondiagnostic              | 1 |
| Total                      | 15 |

![Figure 1: Flexible bronchoscopy-guided biopsy of the right vocal cord lesion using bronchoscopic forceps](image1.jpg)

![Figure 2: Flexible bronchoscopy-guided biopsy of the left vocal cord lesion using bronchoscopic forceps](image2.jpg)
done on an outpatient (day care) basis, as per the standard bronchoscopy protocols with appropriate monitoring and reassessment before discharge.

**DISCUSSION**

VC biopsies are generally done under rigid laryngoscopy, with GA. Complications include those related to GA itself, such as myocardial infarction, arrhythmia, thromboembolism, cardiac arrest, heart failure, atelectasis, aspiration, and bronchospasm\(^1\) or related to rigid laryngoscopy itself, such as injury to the upper airway structures or the VCs, and infection. In high-risk patients with cardiopulmonary comorbidities, these GA-related complications are more likely to happen and can be life-threatening. In such a situation, safer options can be explored to make a diagnosis, and FB-VCB is one such modality.

The cases with significant comorbidities mentioned above [Table 1] were initially seen by an otorhinolaryngologist, and referred after appropriate risk assessment, with provider and patient concurrence for a safer FB-VCB. The other cases where incidental VC lesions were noted and biopsied were referred to an otorhinolaryngologist or oncologist for opinion, with videos of the procedure and histopathology reports.

FB offers significant advantages over rigid laryngoscopy in high-risk cases, when safety is a major issue. It is done as an outpatient procedure with local anesthesia and conscious sedation and is well tolerated. Upper airway evaluation is an integral part of FB, and with incidentally noted VC lesions, carefully done bronchoscopic sampling by skilled operators can avoid a second procedure under GA. Although flexible laryngoscopy has reported as a VC sampling tool, in cases with comorbidities, this may be challenging, as patient compliance is needed.\(^4\) In our study, the planned VC biopsies were referred by ear, nose, and throat specialists due to technical difficulties anticipated due to comorbidities and need for patient cooperation. The incidentally detected lesions obviously benefitted from FB-VCB, to avoid a second procedure.

However, FB-VCB has certain limitations. An experienced operator is required to sample the VC lesions with a bronchoscope, to fulfill the combined aims of obtaining adequate tissue without causing VC damage. A higher level of steadiness, precision, and skill is needed, as spontaneous respiratory excursions have to be taken into account, and the cough reflex is also intact. Other limitations of this report include the retrospective nature of the study, with a limited number of patients in the series reflecting a single-center experience. In addition, the theoretical possibility of the biopsy material being inferior to rigid laryngoscopic biopsies is there, but our diagnostic yield with FB-VCB was 93.3%.

We believe that careful patient selection is needed for FB-VCB. It is a substitute procedure for patients who are at high risk for GA and hence are not candidates for rigid laryngoscopy. Our study also shows that incidental VC lesions noted during FB done for other pulmonary indications can be safely and adequately biopsied by experienced operators. We propose that experienced operators may try to take VC biopsies to avoid a second procedure, reserving rigid laryngoscopy under GA when biopsies are not satisfactory. It is important to record the procedure carefully with a video, to be shared with otorhinolaryngology specialists on consultation.

**CONCLUSION**

FB-VCB offers an option for VCB in the right clinical context as mentioned above. It is safe, with the distinct advantage of conscious sedation, and a good diagnostic yield in this series. Patients with VC lesions who are poor candidates for GA should be considered for FB-VCB as an alternative. Incidentally detected VC lesions may also be biopsied by an experienced operator, followed by appropriate otorhinolaryngology consultation.

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**Conflicts of interest**
There are no conflicts of interest.

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