

Autofluorescence Bronchoscopy: A Novel Technique to Unleash the Buried Crab

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ABSTRACT

Lung cancer is one of the most common cancers that causes death. Autofluorescence bronchoscopy is a recent technology which uses blue light to detect precancerous lesions that cannot be detected by conventional white light bronchoscopy. This is based on the principle that there is difference in emission of this light between premalignant and malignant tissue, that can be distinguished by a change in color emitted. Advantage of autofluorescence bronchoscopy is that it has excellent sensitivity in picking up abnormal tissues; therefore, early detection of cancers can be made, and appropriate treatment can be given, thereby increasing the survival. The major drawback of this procedure is that it lacks specificity.

Keywords: Autofluorescence bronchoscopy, Bronchoscopy, Lung cancer, Precancerous lesion.

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INTRODUCTION

Lung cancer is one of the most common cancers that causes death. Hence, early detection and treatment improve survival.¹ Bronchoscopy is the most common modality used to detect lung cancers. The main disadvantage with the conventional bronchoscopy is that it uses white light, which makes it difficult to identify early cancerous lesions even for experienced bronchoscopists. Reports suggest that only 29% of carcinoma *in situ* lesions have been identified by white light bronchoscopy even when performed by experienced pulmonologist.² Autofluorescence bronchoscopy is a recent technology which uses blue light to detect precancerous lesions. This is based on the principle that normal tissue and cancerous tissue have difference in intensity.³

DEFINITION

Autofluorescence bronchoscopy is a procedure wherein instead of white light like in traditional bronchoscopy, blue light through a specialized bronchoscope is used for illumination. The difference in emission of this light between premalignant and malignant tissue is distinguished by a change in color emitted. This is used to detect precancerous lesions, areas of dysplasia, small carcinomatous lesions, etc.⁴

PRINCIPLES

Tissues emit fluorescence when exposed to light of specific wavelength. Autofluorescence bronchoscopy uses light source of specific wavelength that is used to illuminate bronchial tissues via bronchoscope. The image is captured by a camera and transmitted to system where the image is processed and produces an image to endobronchial tissues. The autofluorescence bronchoscopy systems are very sensitive to detect abnormal tissues.⁵

INDICATION

- To screen high-risk patients.
- Patients with sputum atypia and normal imaging.

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- To inspect for tumors in other sites in patients with known cancerous lesions.
- To plan for treatment of early cancerous lesions.
- To look for clearance following surgical resection of tumors.⁴

CONTRAINDICATION

Contraindications to autofluorescence bronchoscopy are not different from routine bronchoscopy contraindications. They are severe hypoxia, recent myocardial infarction, bleeding diathesis, and hemodynamic abnormalities.⁶

PREOPERATIVE EVALUATION

A detailed history and physical examination should be done. Basic blood investigations and ECG should be done. Informed consent should be obtained from the patient and patient's attender. Patient should be kept nil per oral for 6–8 hours prior to procedure. IV line secured and should be intact.⁶

PROCEDURE

Autofluorescence bronchoscopy is performed by a bronchoscopist and assisted by two respiratory therapists. It is performed under

conscious sedation along with local anesthesia or general anesthesia in selective cases. First, the airway is inspected using conventional bronchoscope. Tissue specimens are not obtained at this point to avoid blurred images during the autofluorescence bronchoscopy. Then, the autofluorescence bronchoscopy is carried out like the normal bronchoscopy. Images of two different wavelengths (green and red) are captured and processed in system. The normal tissue appears green in color, and the abnormal tissue appears reddish in color. Postprocedure, the airway is inspected using conventional bronchoscope for any injury and any biopsies needed are done. Postprocedure, patient is started on orals after a period of observation. In the absence of any complications, they may be discharged. After uneventful recovery and in the absence of complications, the patient may be discharged on the same day.^{4,6}

COMPLICATIONS

Complications are similar to conventional bronchoscopy. They are bleeding, hypoxia, pneumothorax, and cardiac abnormalities like arrhythmias, and rarely can cause death.⁶

TRAINING REQUIREMENT

A bronchoscopist should have performed at least 20 autofluorescence bronchoscopies under supervision before performing individually. Trained bronchoscopist should perform a minimum of 10 autofluorescence bronchoscopies per year to maintain competency.⁴

ADVANTAGE

Advantage of autofluorescence bronchoscopy is that it has excellent sensitivity in picking up abnormal tissues.⁷

DISADVANTAGE

Disadvantage of autofluorescence bronchoscopy is that it has poor specificity.⁷

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