

# INDICATIONS AND COMPLICATIONS OF BRONCHOSCOPY: AN EXPERIENCE OF 100 CASES IN A TERTIARY CARE HOSPITAL

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## ABSTRACT

**Objective:** To enlist the frequency of indications and complications of flexible fiberoptic bronchoscopy in a tertiary care hospital.

**Material and Methods:** A total of 100 patients admitted to Chest and medical units of Lady Reading hospital Peshawar who needed bronchoscopy were selected irrespective of their age, sex, occupation. All patients in whom bronchoscopy was indicated were included in the study. After detailed clinical history with thorough physical examination and relevant investigations, Bronchoscopy was performed with Olympus fiberoptic bronchoscope. Relevant data were recorded for analysis.

**Results:** Out of 100 patients, 64 (64%) were male, and 36 (36%) were female. Majority of patients (55%) were above 50 years of age. In 60% patients, there was radiographic abnormality on chest X-ray and C.T scan. In 25 (25%), the indication was unexplained hemoptysis and 2 (2%) patients had hoarseness. Another 13 (13%) patients were bronchoscoped to see Acid Fast Bacilli in bronchial wash. These patients were suspected to have Tuberculosis but sputum smears were reported negative on repeated examinations.

Complications which occurred in these patients included Pneumothorax (1%), hemorrhage (1%), hypoxemia (4%), Atrial tachycardia (3%), bronchospasm (2%), and post-bronchoscopy fever (2%). These complications were managed accordingly and all patients recovered without any serious consequences.

**Conclusions:** Most of the indications for Bronchoscopy in this hospital are diagnostic rather than therapeutic. Most common indications include radiographic abnormalities, hemoptysis, hoarseness and for isolation of ABF.

**Key words:** Bronchoscopy, Diagnostic Indications, Radiographic Abnormalities, Hemoptysis, Hoarseness, Tuberculosis, FOB.

## INTRODUCTION

Fiberoptic Bronchoscopy (FOB) has widespread diagnostic and therapeutic indications. Complications are not rare and they do occur. Since its introduction, in 1964 by Ikeda, the flexible fiberoptic bronchoscope has substantially advanced the diagnostic and therapeutic possibilities in pulmonary medicine and has replaced the rigid or open tube bronchoscope in many situations.<sup>1</sup> The principal advantages of flexible fiberoptic bronchoscopy include a more extensive view of the tracheobronchial tree, ease of performance, and no requirement for general anesthesia. A bronchoscope with an outside diameter of approximately 5.0 mm and an inside

working channels diameter of 2.0 mm appears to have the widest application. Patient preparation for elective bronchoscopy includes fasting prior to procedure, informed consent, careful sedation in some cases, and topical anesthesia.<sup>2</sup>

Flexible bronchoscopy is safe in the hands of an experienced operator but certain complications do occur and rare fatalities have been recorded with major complication rate between 0.08-0.03% and mortality rate between 0.01-0.04 percent. Complications include hypoxemia, cardiac arrhythmias, cardiac ischemia bronchospasm, pneumothorax, hemorrhage and fever etc.<sup>3</sup>

## INDICATIONS OF BRONCHOSCOPY

INDICATION	NO OF PATIENTS (n=100)	PERCENTAGE
Opacity/Opacities on Chest X-ray	60	60%
Haemoptysis	25	25%
Hoarseness	2	2%
To examine AFB in bronchial wash	13	13%

**TABLE 1**

Pneumothorax is very uncommon after bronchoscopy however a major pneumothorax requiring drainage occurred in 3.5% of those from whom transbronchial biopsy specimens were taken.

Cardiac ischemia and dysrhythmias during bronchoscopy can occur in patients with or without history of heart disease. The risk of arrhythmias is particularly likely during passage of bronchoscope through vocal cords. Bronchospasm, an unusual complication of bronchoscopy can occur in patient with or without history of asthma. The hemodynamically unstable patients are more prone to complications.<sup>4</sup>

Some of indications of fiberoptic bronchoscopy are, undiagnosed haemoptysis, persistent cough, persistent opacities on chest radiographs, recurrent or persistent pneumonias. It is also indicated in those patients who have strong clinical and radiological suspicion of tuberculosis but are sputum AFB negative.<sup>5</sup>

Some of the contraindications include totally uncooperative patients, hemodynamically unstable patients, any severe acute illness and those who refuse to undergo the procedure.<sup>6</sup>

This study was conducted in 2002-2004, which enrolled 100 patients booked for bronchoscopy from chest unit itself and from different medical units. The main aims of the study were to enlist the various indications and complications of fiberoptic bronchoscopy in our setup.

### MATERIAL AND METHODS

This was a hospital based observational and descriptive study. The study was carried out in the Department of Pulmonology, Lady Reading hospital Peshawar on 100 patients. The chest unit of this hospital has well equipped pulmonary function test laboratory and a dedicated bronchoscopy unit. It receives patients from whole of N.W.F.P. and also parts of Afghanistan.

Patients were selected irrespective of their age, sex, occupation. All patients in whom bronchoscopy was indicated were included in the study.

The following were excluded from the

study.

- a. Day case bronchoscopies (as follow up would have not been possible).
- b. Uncooperative patients and those who refused to under go the procedure.
- c. Those who were hemodynamically unstable and those who had any acute severe illness.

In all these patients, a detailed clinical history with thorough physical examination and relevant investigations were carried out. Bronchoscopy was performed with Olympus fibreoptic bronchoscope.

### RESULTS

A total of 100 patients were included in the study. Out of 100 patients, 64 (64%) were males and 36(36%) females (figure 1). Majority of the patients (55%) were above 50 years of age. 25% belonged to the age group 25-39 years and 15% were in the age group 15-24 years (figure 2).

The main indication of bronchoscopy among these 100 patients was an abnormal shadow on chest X-Ray and/or C.T thorax. In 60% patients there was radiographic abnormality. Twenty five patients (25%) had unexplained haemoptysis and in another 2 patients (2%) the indication was hoarseness of voice. Another 13(13%) patients were bronchoscoped to see AFB in the bronchial wash. These patients were suspected to have tuberculosis but sputum smears were negative for Acid Fast Bacilli (AFB) (table 1).

The rate of complications in these patients

### COMPLICATIONS OF BRONCHOSCOPY

Complication	No of Patient (n=100)	% age
Hypoxaemia	4	4%
Arrhythmias (Atrial tachycardia)	3	3%
Bronchospasm	2	02%
Fever	2	2%
Pneumothorax	1	1%
Haemorrhage	1	1%

**TABLE 2**

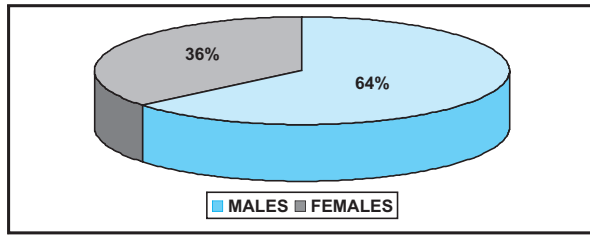


Fig. 1

were as follows: Pneumothorax developed in only one (1%) patient. It was about 10% and didn't require any chest intubation. Haemorrhage occurred in one (1%) patient which was not serious and was controlled. This occurred during transbronchial biopsy. Hypoxaemia developed in four (4%) patients during procedure. It was mild and no complication occurred. Atrial tachycardia occurred in 03 (3%) patients, bronchospasm in only 02 (2%) patients but these were without any serious complication. Post bronchoscopy fever occurred in only 2 (2%) patients (table 2).

## DISCUSSION

In this study conducted in 100 patients, the indications and complications of bronchoscopy were analyzed.

An abnormal chest x-ray was the most common indication for bronchoscopy which was done to know the underlying pathology causing the radiographic abnormality. In our study bronchoscopy was done in 60% of cases for abnormal chest radiographs. In Bokhari SNH series, the commonest indication for bronchoscopy was radiographic abnormality e.g. lobar collapse, hilar abnormality, and mass lesion.<sup>7</sup> The causes were TB, neoplasm and aspergilloma

Hemoptysis is considered to be an indication in 10-30% of bronchoscopies in major medical centers in Europe and United States.<sup>8</sup> Bronchoscopy is usually done to know the cause of bleeding and identify the site of bleeding and remove the clot if any. In our study bronchoscopy was done in 30 patients (30%) for haemoptysis. Bronchoscopy becomes necessary in patients with haemoptysis who are smokers and above 40 years of age, having shadows on chest radiograph. Bronchoscopy in such cases is done to exclude any possible malignancy. Mc Guiners G et al (1994) evaluated the cases of haemoptysis by bronchoscopy. Bronchoscopically examined airways were normal in 23% patients and focal

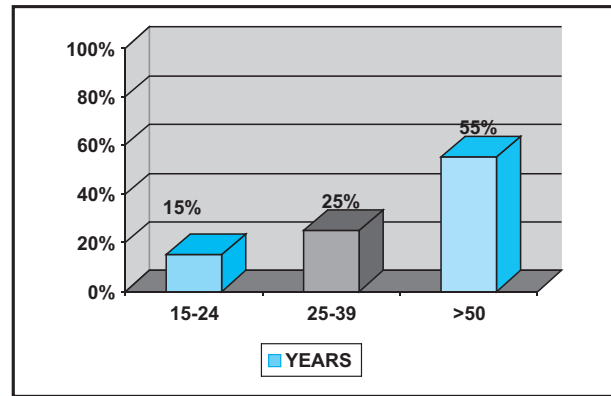


Fig. 2

endobronchial abnormality was found in 32%. The bleeding site was identified in 40% cases.<sup>9</sup>

In our study out of 30 cases focal endobronchial abnormality was found in only 2 cases and in the rest, no abnormality was found. Bleeding site was identified in 15 (50%) cases.

When sputum examination shows malignant cells, bronchoscopy is performed to evaluate the reasons for positive sputum cytology and if carcinoma is detected, the site and extent is examined, and staging is done in order to know the ultimate prognosis of the disease.

In 15 patients FOB was done for collection of bronchial washing from the appropriate segment/lobe for AFB examination. The criteria for selecting these patients were those who were clinically suspected of having the disease but there was no solid evidence of active tuberculosis. In these patients although clinical and radiological evidence was suggestive of tuberculosis but repeated sputum smears examination did not show AFB, or patients were not producing sputum at all. In one local study, smears of bronchial washings were examined for AFB, 21 (42%) were positive for AFB while 29 (58%) were still negative. Bronchial washings were found to have better diagnostic yield of AFB on direct smears as compared to standard sputum smear examinations.<sup>10</sup>

Flexible bronchoscopy is an extremely safe procedure provided some basic precautions are taken. One study reported a mortality rate of 0.01% and a major complication rate of 0.08% in a series of 24521 procedures and another, a 0.02% mortality and 0.3 major complication rate in a series of 48000 cases.<sup>11</sup>

A more recent retrospective study of over 4000 cases, including 2000 lavages and 173 transbronchial biopsies showed no deaths and minor complication rates of 0.5% or 0.8% respectively.<sup>12</sup>

Flexible bronchoscopy with topical anesthesia has been shown to be safer than rigid bronchoscopy.<sup>13</sup> Complication rate relating specifically to the procedure of transbronchial biopsies are higher for example, in one study, pneumothorax occurred in 5% of cases and hemorrhages in 9%, which were usually mild.<sup>14</sup> In our study pneumothorax occurred in 01% of patient and mild hemorrhage occurred in 2 patients. These occurred while transbronchial biopsies were taken.

Milman reported pneumothorax occurring in 5.8% of cases in their series of 452 transbronchial lung biopsies. Half of them required intubation.<sup>15</sup>

Symptoms and signs of pneumothorax may be delayed after transbronchial biopsies but it is known that a pneumothorax developing more than one hour after a transbronchial biopsy is very uncommon.

A large study showed that profuse bleeding was more likely after transbronchial than endobronchial biopsy and no death was directly attributable to bleeding.<sup>16</sup>

Hypoxaemia has been shown to occur during bronchoscopy in several studies. In our study hypoxemia occurred in 02 patients. However oxygen supplementation was given and there was no complication.

Post bronchoscopy fever occurred in 2 patients in our study. The fever is thought to be caused by the release of pro-inflammatory cytokines from alveolar macrophages.<sup>17</sup> Blood cultures of all these patients were found to be negative. Bacteremia was thought to be rare after bronchoscopy but a recent study found a bacteremia rate of 6.5% during bronchoscopy.<sup>18</sup>

Arrhythmias and cardiac arrest have been described during fiberoptic bronchoscopy. A marked tachycardia during bronchoscopy was found in many patients in one study.<sup>19</sup> Another found that hypoxia at the end of the procedure correlated with the occurrence of major arrhythmias.<sup>20</sup> In our study, 4 patients developed atrial tachycardia. In two of these patients, there was associated hypoxia but in other 2 patients there was normal Oxygen saturation. However, the arrhythmia were self limiting and no complications occurred.

The main limitation of the study was that bronchoscopy was mainly done for diagnostic purposes. It could not be done for therapeutic purposes e.g. placement of endobronchial stents, laser therapy etc because of lack of equipment and expert staff. Similarly the findings of this study

correlated with other studies done both locally and internationally.<sup>21</sup> Although there are some minor differences in the frequency of complications but it most likely relates to the small sample size as compared to other studies mentioned here.

## CONCLUSION

Bronchoscopy is a safe procedure to diagnose bronchial carcinoma, unsuspected cases of pulmonary tuberculosis and unexplained lung lesions. The most important and main indications of FOB in this study are abnormal shadows on X-Rays and haemoptysis. Complications like pneumothorax and bleeding are mainly seen in transbronchial biopsies.

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