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FIBROPTIC BRONCHOSCOPY; DIAGNOSTIC OUTCOME AND COMPLICATIONS IN PATIENTS WITH HILAR AND PARAHILAR LUNG OPACITIES



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ABSTRACT... maz1238@yahoo.com. One of the common indications for fiberoptic bronchoscopy in clinical practice is patients presenting with radiological hilar and parahilar mass lesions. The study was aimed at better understanding of disease pattern on fiberoptic bronchoscopy in such patients. **Objectives:** To determine frequency of various diseases confirmed on fiberoptic bronchoscopies conducted for hilar and parahilar radiological opacities. Determine the frequency of complications during fiberoptic bronchoscopy. **Design:** Descriptive study. **Place and Duration of Study:** This study was conducted at Military Hospital Rawalpindi from June 2002 to Dec 2002, which is a tertiary care hospital for armed forces. **Materials & Methods:** Sixty patients undergoing fiberoptic bronchoscopy for hilar and parahilar opacities were included in the study. Endobronchial biopsies, bronchial washing and brushing were performed for histopathological and cytological analysis. **Results:** The most frequent finding on Bronchoscopy was an endobronchial mass lesion in 41 (68.3%) cases followed by inflammatory changes in 5(8.4%) and external compression in 7(12%) cases. No endobronchial mass was seen in 7(12%) patients. Diagnostic yield was highest in patients in whom a mass lesion was seen on bronchoscopy, yielding a diagnosis in 97.5% of cases. Bronchogenic carcinoma was the most common diagnosis (87.8%) in such cases with squamous cell carcinoma as the most frequent subtype 24 (58.5%). The diagnostic yield was low when either inflammatory changes, external compression or normal bronchial findings were observed on bronchoscopy. Overall Histopathological and cytological examination of the biopsies showed bronchogenic carcinoma in 40(65%) cases, squamous cell in 28(70%) cases, small cell in 10 (25%) cases and adenocarcinoma in 2(5%) cases, squamous metaplasia in 3(5%), non-specific inflammation in 7(10%), chronic non-caseating granulomatous inflammation in 2(3.3%) and caseating granuloma (tuberculosis) in 1(1.7%) case. No large cell or undifferentiated carcinoma was seen in this study. No histological diagnosis could be made in 8(14%) cases. Major bleed occurred in one (1.6%) case who had a highly vascular tumor bleeding on biopsy. Minor bleed was seen in 3(5%) cases and marked fall in O₂ saturation was noted in 2(3.3%) patients. No complications were observed in 54(90%) patients. **Conclusion:** Fiberoptic bronchoscopy is a high yield diagnostic procedure in hilar and parahilar lung shadows and is completely safe and is highly recommended in all such cases as most will have malignant tumors requiring histological diagnosis. Tuberculosis is an uncommon diagnosis in such patients. Complications of the procedure are few and mostly minor .

Key words: Fiberoptic bronchoscopy, hilar, parahilar, diagnosis, complications.

INTRODUCTION

Since its introduction in 1968 by Ikeda and colleagues¹, fiberoptic bronchoscope has become an increasingly important diagnostic and therapeutic tool in respiratory diseases. The fiberoptic bronchoscope has since undergone several modifications and presently it is available for application even in neonates. In current practice, the fiberoptic bronchoscopy is employed in the majority of bronchoscopic procedures. Various diagnostic techniques like endobronchial biopsy, bronchial washing and bronchial brushing are employed during fiberoptic bronchoscopy. Studies have confirmed that employing various techniques in combinations increases the diagnostic yield of fiberoptic bronchoscopy²⁻⁵.

It is a safe and minimally invasive procedure that has limited contraindications and few complications^{6,7}. It can be safely used in all age groups including the elderly⁸. Retrospective studies of fiberoptic bronchoscopy have found a major complication rate of 0.08-0.3%, a major complication having been defined as one considered to endanger life or requiring urgent therapeutic intervention⁹. Prospective studies report higher major complications rate of 1.7-5%¹⁰. The two most important complications of fiberoptic bronchoscopy are hemorrhage and pneumothorax, attributable mainly to biopsy procedures.

Some of the advantages over the rigid bronchoscope include increased visual range, minimal discomfort to the patient, biopsy of previously inaccessible tumor and general anesthesia is not required¹¹.

The two most important determinants of the need for bronchoscope are clinical parameters and chest roentgenographic abnormalities. Chest radiographic abnormalities that require diagnostic bronchoscopy include mass lesions (solid or cavitating), hilar opacities, unresolving pneumonia, peripheral pulmonary opacities, collapse, hemidiaphragmatic paralysis, recurrent pulmonary infiltrates and diffuse parenchymal lung disease¹².

Absolute contraindications to bronchoscopy are limited and consist primarily of ongoing, life-threatening

arrhythmias or refractory hypoxemia. A number of relative contraindications can be listed, with most relating to increased risk of bleeding associated with tissue biopsy.

- Life threatening arrhythmias.
- Refractory Hypoxia.
- Poor ability to cooperate with procedure.
- Recent myocardial infarction or unstable angina.
- Tracheal Obstruction.
- Serum creatinine >3
- Platelets <50,000
- Uncorrected coagulopathy
- Superior vena caval obstruction.
- Pulmonary hypertension
- Unstable neck.
- Cervical spine immobility.

However most of these contraindications are relative and bronchoscopy can be performed with necessary precaution.

MATERIAL AND METHODS

This was a descriptive study to determine the outcome of fiberoptic bronchoscopies in patients with hilar and parahilar lung shadows.

This study was conducted at Military Hospital Rawalpindi from June 2002 to Dec 2002, which is a tertiary care hospital for armed forces. All necessary investigations were carried out at Armed Forces Institute of Pathology and AM College and radiological facilities obtained from radiology department MH Rawalpindi.

An informed consent was taken from patients included in the study. Sixty consecutive patients were included in the study who underwent fiberoptic bronchoscopy for hilar and parahilar lung shadows. Patients of either sex, over 18 years of age having hilar and parahilar lung shadows, requiring diagnostic fiberoptic bronchoscopy were included.

CLINICAL EVALUATION

Patients fulfilling the criteria for study were evaluated clinically. Patient particulars including age, sex, residence

were noted. A detailed history including smoking and occupational history, indication for fiberoptic bronchoscopy, relevant clinical findings, chest x-ray, CT scan and other relevant investigations were recorded.

BRONCOSCOPIC FINDINGS/DIAGNOSTIC PROCEDURES

Bronchoscopies were performed in bronchoscopy unit under all necessary precautions. Monitoring and support of patients undergoing bronchoscopy was guided by the specifics of the individual situation but some general guidelines were followed¹³. Preoperative preparation included an appropriate review of systems and physical examination, optimization of preoperative medical conditions, discussion of the procedure and sedation or anesthesia, and premedication where warranted. However, routine use of antisialogogues was not employed as it has failed to show any benefit¹⁴. Patient satisfaction was enhanced by a detailed explanation of the procedure, attention to comfort and relief of anxiety. Patients refrained from eating and drinking for 6 hours prior to examination to reduce the risk of aspiration.

All accessible tracheobronchial tree was inspected by bronchoscopy and any endobronchial abnormality detected and its location was recorded. All patients underwent endobronchial biopsy, bronchial brushings and bronchial washing. A minimum of four biopsies were taken from each patient. Any complications observed

during the procedure were also recorded. Following investigations were also carried out :

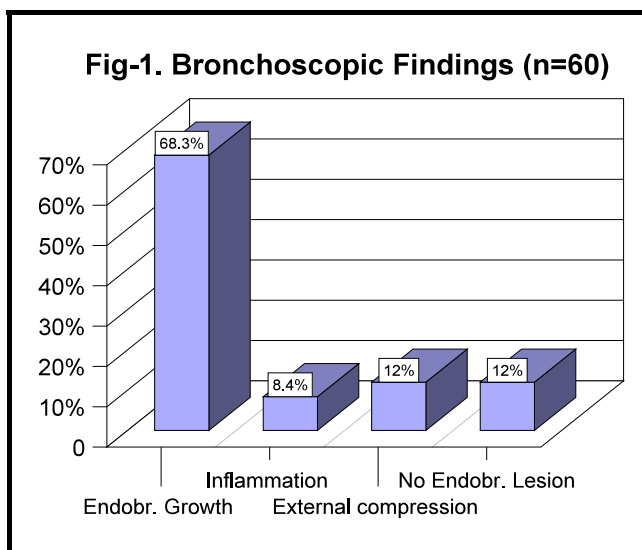
- Blood complete picture including hemoglobin, platelet count and erythrocytes sedimentation rate.
- Chest x-rays and CT scan if required.
- Bleeding time, prothrombin time, PTTK.
- Serum urea, creatinine and electrolytes.
- ECG
- Sputum for cytology and AFB examination.
- Arterial blood gases.

RESULTS

A total of sixty patients were studied who underwent diagnostic fiberoptic bronchoscopy for hilar and parahilar lung shadows. Out of the sixty patients 52 (87%) were male and 08(13%) were female. The mean age of the patients was 58.4 years with a range of 21 to 80 years. Fiberoptic bronchoscope was introduced successfully in all patients. Endobronchial lesions were noted and endobronchial biopsies, bronchial brushings and bronchial washings were taken. During endoscopy, endobronchial growth was observed in 41 (68.3%) cases, inflammatory changes were seen in 5 (8.4%) cases and seven (12%) patients had external compression effects. No endobronchial lesion was observed in 7 (12%) patients (table I)(Fig 1).

Table-I. Bronchoscopic findings in patients with hilar and parahilar lung shadows (n=60)

Bronchoscopic findings	No. Of cases	%age	Diagnosis	%age
Endobronchial Growth	41	68.3	Squamous cell Ca. =24 (58.5%) Small cell Ca =10(24.4%) Adenocarcinoma =2(4.9%) Non-specific inflammation =3(7%) No diagnosis =1(2.8%)	87.8
Inflammation	05	8.4	Squamous metaplasia =1 Non-specific inflammation =3 Caseating granuloma (Tuberculosis) =1	0
External Compression	07	12	Squamous cell Ca. =2 Squama metaplasia =1 Non-caseating granuloma =1 No diagnosis =3	28.6
No Endobronchial Lesion	07	12	Squamous cell Ca. =1 Non-caseating granuloma =1 Non-specific inflammation =1 No diagnosis =4	14.3



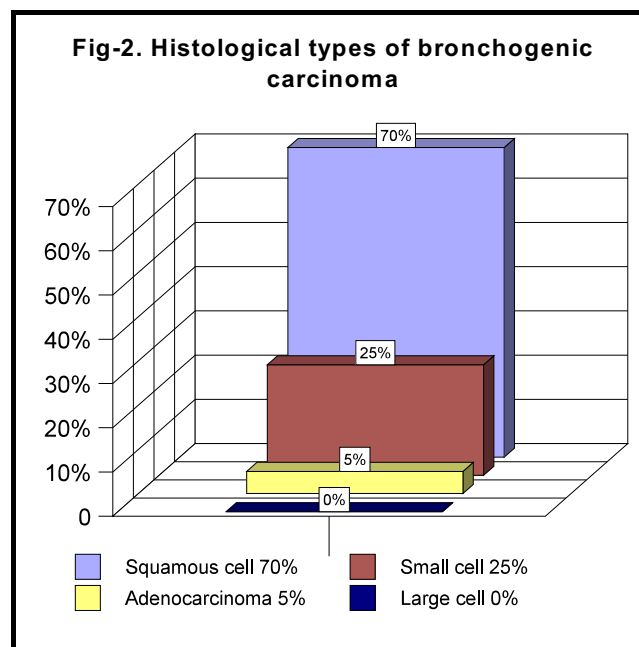
Histopathologically, bronchogenic carcinoma was the most frequent diagnosis occurring in 40(65%) patients. Squamous metaplasia was diagnosed in 3(5%) cases, Non-specific inflammation in 7(10%) cases, chronic granulomatous inflammation (non-caseating) in 2(3.3%) cases and caseating granuloma (tuberculosis) was the diagnosis in 1(1.7%) case. No diagnosis could be made in a total of 8(14%) cases (table II).

Disease	Male	Female	Total	%age
Carcinoma	38	2	40	65
Squamous Metaplasia	3	0	3	5
Non-specific inflammation	9	1	7	10
Chronic Granulomatous Inflammation (non-caseating)	0	2	2	3.3
Tuberculosis (Caseating granuloma)	1	0	1	1.7
Not diagnosed	6	2	8	14

Out of 41 patients in whom a mass lesion was seen on bronchoscopy, definite diagnosis was made in 40(95.5%)

cases with 36(87.8%) cases diagnosed as bronchogenic carcinoma. Three had non specific inflammation and one case had no diagnosis. Those with endobronchial inflammation (5 cases), 3 were diagnosed as non-specific inflammation, one as tuberculosis and one squamous metaplasia. Histological diagnosis was made in 4 out of 7 (57%) cases with external compression effects with 2 patients diagnosed as squamous cell carcinoma, one as non-caseating granuloma and one squamous metaplasia. Histological diagnosis of patients with no endobronchial lesion was made in 2 out of 7 cases (28.6%) with one diagnoses as squamous cell carcinoma and one patient had non-caseating granuloma (table 1). Biopsies from patients with external compression and no endobronchial lesion on bronchoscopy were taken from the involved segments on CT scan and chest x-ray.

Out of the bronchogenic carcinoma, 28(70%) patients had squamous cell carcinoma, 10(25%) had small cell carcinoma and 2(5%) had adenocarcinoma. No large cell or undifferentiated carcinoma was seen in this study (Fig 2).



Bronchoscopy was very safe and only few complications were observed. One patient (1.7%) who had a very vascular tumor had a major bleed, which is define as

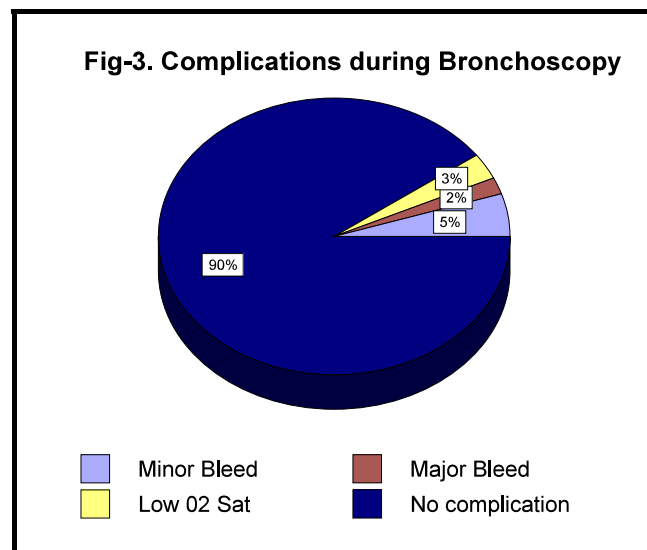
more than 50ml of blood loss. Three patients (5%) had minor bleed, defined as less than 50ml of blood loss. Two (3.3%) patients encountered marked fall in O2 saturation (Fig 3).

Majority of patients had a long history of smoking. Forty-one (68%) of the patients were smokers with a range of 1 to 80-pack year of smoking. Nineteen (32%) were lifetime nonsmokers including 5 females. (table III).

Table-III. Percentage of smokers

Diagnosis	Smokers	Non-Smokers	%age of smokers	Total
Bronchogenic carcinoma	35	5	87.5	40
Squamous metaplasia	2	1	66.7	3
Non-specific inflammation	4	3	57	7
Non-caseating granuloma	0	2	0	2
Caseating granuloma	0	1	0	1
Undiagnosed	4	4	50	8

Fig-3. Complications during Bronchoscopy



DISCUSSION

Our study was aimed at the diagnostic outcome and complications in patients undergoing fiberoptic bronchoscopy for hilar and parahilar radiological lung opacities. Fiberoptic bronchoscopy showed endobronchial mass lesion in 41(68.3%) cases out of which a definite diagnosis was made in 97.5% of the cases and 87.8% had bronchogenic carcinoma on histopathology. When compared with earlier local

studies, this study gave a higher success rate in bronchoscopically visible endobronchial tumour. A local study performed by Nadeem Rizvi, M. Husain, in which endobronchial mass lesion was observed in 46.6% of bronchoscopies out of which 79% proved positive for malignancy on histopathology¹⁵ and another study by Choudhry MK, Rasul S which reported endobronchial mass lesion in 61% of cases out of which 71% had a positive diagnosis for malignancy⁵. Our study, however, gave a relative lower yield compared to international data which reports 97% positivity on histopathology in endobronchial mass lesions¹⁶.

Fiberoptic bronchoscopy is, however, unrewarding in patients with external compression effects and those with no endobronchial lesion, giving diagnosis only in 57% and 28.6% of the cases respectively. This low positivity in external compressive effects was also reported by Nadeem Rizvi, M. Husain¹⁵ and Donald C, Zovala¹⁶.

Bronchogenic carcinoma was the most frequent diagnosis occurring in 40 (65%) cases. The most common histological type was squamous cell carcinoma seen in 28 (70%) cases followed by small cell carcinoma observed in 10 (25%) cases. Adenocarcinoma was

diagnosed in 2(5%) case while there was no case of large cell carcinoma. These reports are comparable to national and international reports, which also describe squamous cell as the most common type, followed by small cell carcinoma^{2,17-19}. Majority of carcinoma patients in our study were chronic smokers (87.5%), which is also supported by other studies^{5,20}.

Fibreoptic bronchoscopy is a very safe procedure and its complications are very infrequent. One patients (1.6%) in this study suffered a major bleed during bronchoscopy, which is defined as >50ml of blood loss. This patient had a highly vascular tumor, which bleed profusely on endobronchial biopsy. Minor bleed (<50ml) occurred in 3 (5%) patients. Two (3.3%) patients had a marked fall in O₂ saturation and bronchoscopy had to be discontinued, however biopsies were taken. Fifty-four (90%) patients did not experience any complication. This is comparable to studies performed elsewhere. A review of 4,000 bronchoscopies in a university hospital found that the frequency of complications was 1.3 percent⁶. In the same study, 6.8 percent of transbronchial biopsies resulted in significant bleeding. Another review of 3,096 bronchoscopies at the Cleveland Clinic reported a 1.9 percent rate of significant bleeding²¹. The 6.8% major bleed was higher in the study in university hospital⁶ because it involved only transbronchial lung biopsies, which are associated with the highest bleeding rate.

CONCLUSION

Fibreoptic bronchoscopy is a safe and useful diagnostic tool for diagnosing patients with hilar and parahilar lung opacities. Hilar and parahilar shadows turned out to be malignant in the majority of cases with squamous cell carcinoma heading the list, hence any patient with hilar or parahilar opacity should undergo bronchoscopic evaluation for a definite histologic diagnosis. Patients with only external compression effects or those with no endobronchial lesion, fibreoptic bronchoscopy is a low yield procedure. Tuberculosis is an uncommon diagnosis in patients with hilar or parahilar lung opacities. Fibreoptic bronchoscopy is very safe procedure with few complications, the majority being insignificant and minor. Major complications although infrequent do occur and bronchoscopist should be vigilant and well equipped to

overcome any complications. Careful preoperative evaluation, adequate preparation of the patient and skillful bronchoscopic techniques are required to minimize the risk of complications.

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