



ORIGINAL RESEARCH PAPER

Pulmonary Medicine

THE UTILITY OF TRANSBRONCHIAL NEEDLE ASPIRATION AND CONVENTIONAL DIAGNOSTIC PROCEDURES IN THE DIAGNOSIS OF BRONCHOGENIC CARCINOMA

KEY WORDS: TBNA, CDP, EML, Bronchial Carcinoma.

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ABSTRACT

Background: Lung tumours often present as masses or nodules situated beyond the range of even new-generation fibreoptic bronchoscopes. The aim of this study to compare diagnostic yield of TBNA with CDP for diagnosis of Bronchogenic carcinoma. **Subjects and Methods:** The study was carried out and data were gathered in a prospective fashion and all the data were reviewed retrospectively. All the suspected patients were diagnosed on the basis of clinical, radiological and video bronchoscopic examination (CDP+TBNA); and further diagnosis was confirmed on the basis of histological and / or cytological examination. **Results:** In the present study, after TBNA & CDP, the overall diagnostic yield for carcinoma was 93%. CDP was diagnostic in 100% cases of EML and only 70% in SPD. TBNA provided an additional diagnostic yield of 30% in Cases of SPD where CDP was not possible for taking samples, which is seen to be statistically significant (p = 0.02). **Conclusion:** We conclude that TBNA is a safe procedure that should be routinely used to increase diagnostic yield in patients with EML or SPD.

INTRODUCTION

Lung Cancer is the leading cause of cancer deaths worldwide. The disease is more common in men than women, although this difference has become smaller. Recently, mortality rates have been falling in men of all ages. Although the incidence of the disease continuous to claim in the older age.[1] The incidence of the lung cancer is globally increasing 0.5% each year as a result of tobacco consumption rates.[2] Lung cancer is responsible for 12.8% of cancers and 17.8% of cancer related deaths worldwide.[3] In recent past, an increasing trend in the incidence of primary lung cancer has been reported from various parts in India.[4] Early diagnosis and treatment of the tumor is the only hope of cure at current state of knowledge.[5]

Lung tumours often present as masses or nodules situated beyond the range of even new-generation fibreoptic bronchoscopes. The low diagnostic yield of the standard combination of bronchial washing, bronchial brushing and endobronchial biopsy in these abnormalities often requires the use of higher risk procedures. In order to improve the yield of bronchoscopy for diagnosis of mediastinal masses and nodules the transbronchial needle aspiration (TBNA) technique is being employed in several centres.[7-9] TBNA has been shown to be useful in the diagnosis of primary pulmonary lesions.[9-12] in addition to its use as a staging procedure in patients with lung cancer and mediastinal adenopathy.[11]

The aim of this study to compare diagnostic yield of TBNA with CDP for diagnosis of Bronchogenic carcinoma.

SUBJECTS AND METHODS

The study was carried out and data were gathered in a prospective fashion and all the data were reviewed retrospectively. Patients came to the Respiratory Medicine OPD and Indoor of GBH General Hospital, attached to American international institute of medical science, Udaipur, Rajasthan. Study was carried out from January 2021 to june 2023 with suspicion of bronchogenic carcinoma were registered for the study.

A detailed clinical history with complete physical examination was carried out in all the patients including the symptoms, duration of illness, smoking history; as per Performa given.

All the suspected patients were diagnosed on the basis of

clinical, radiological and video bronchoscopic examination (CDP+TBNA); and further diagnosis was confirmed on the basis of histological and / or cytological examination.

Inclusion Criteria

Patients found to have endobronchial disease, hilar or mediastinal lymph nodes (Mediastinal masses and adenopathy) on Chest X-Ray or computed tomography. Patients found to have EML or SPD during routine fiberoptic bronchoscopy has been entered in the study.

Exclusion Criteria

- Patients with pre-existing known malignancy.
- Patients in whom bronchoscopy was contraindicated were excluded from the study.

Samples were collected from all patients bronchial washings (BW), brush biopsy (BB), EBB, and TBNA. The procedural sequence between EBB and TBNA was randomly allocated to either of the two sequences:

- (1) BW and TBNA, or
- (2) BW, EBB, BB and TBNA

Sample Collection

Following specimen has been collected:

Bronchial Washing: This was the first sample collection before endobronchial biopsy or bronchial brushing with instillation of normal saline(0.9% NaCl solution), when growth was visualize, the bronchoscope was fixed in close proximity and 10 to 15 ml normal saline was introduced through the internal channel of the bronchoscope. The material was immediately be sucked out again and has been collected in a sterile specimen TRAP bottle to be placed in the suction pathway and bronchoscope.

TBNA/EBNA:

- (A) To obtain adequate TBNA specimens three passes for endobronchial vascular lesions and two passes for mediastinal masses and adenopathy with the cytology needle (19 or 21-gauge; Length 15mm to 18mm) was performed. Both smear preparation and flushed aspirates was sent for cytology evaluation and ROSE was not be performed because of unavailability of facility in the hospital and limited resources.
- (B) For obtaining specimens from EML, the needle was directly inserted into the lesion, avoiding necrotic areas as practiced with other CDP.
- (C) For submucosal lesions, the needle was partially introduced at an angle of 45° into the bronchial wall,

whereas complete penetration through the wall was performed in the case of extrinsic compression from peribronchial disease⁷. The bronchoscopic findings has been correlated with the anatomic location of the peribronchial lesion on CT scans of the chest.

Bronchial Brushing:

The brushing was taken by Nylon brush-BC-9C, an area of suspected malignancy has been brushed 4 to 5 times; and smeared directly on glass slide, smears are immediately fixed in 70 % alcohol and stained by Papanicolau's/MGG stain method.

Bronchial biopsy:

When an endobronchial growth was seen or any abnormal area was seen on bronchoscopic examination, it was biopsied 3 to 4 times in order to provide an adequate material for histopathological examination with the help of biopsy forcep-FB-20C. Then the biopsy specimen was placed in 10% formalin vial and sent for histopathological examination.

Results of various specimens were compared - Cytologic analysis has been considered positive only when large numbers of definitely malignant cells was present.

The primary outcome measures of this study was to establish the diagnostic yield of TBNA and compare with CDP (combination of BW, BB, and EBB). Furthermore, we were analyze the impact on diagnostic yield from each of the individual procedures as well as on the basis of the nature of the lesion, ie, EML or SPD. We were also study whether presence of lesion in upper lobes and sequence of performing TBNA and EBB influence the diagnostic yield. Any procedure-related complications and damage to the bronchoscope was also be noticed.

RESULTS & DISCUSSION

The present study showed that the maximum number (70%) of patients were belonged to 50-60 years and above age group [Table 1].

Maximum aspiration for sampling were performed on the right side at 4R station (43.33%) followed by 4L (20%) and 13.33% from 7 and 11R stations. 10R was the least with only 6.66% cases. In this study TBNA needle aspiration was performed more on right side (67.75%) compared to other nodal station [Table 2].

In the present study, after TBNA & CDP, the overall diagnostic yield for carcinoma was 93% (28/30). 18 (60%) cases were confirmed as NSCLC followed by 8 (26.66%) cases of SCLC. 1 case (3.33%) each of NHL, TB, Anaplastic carcinoma and Nonspecific inflammation was also diagnosed in the study [Figure 1].

CDP was diagnostic in 100% cases of EML and only 70% in SPD. TBNA provided an additional diagnostic yield of 30% in Cases of SPD where CDP was not possible for taking samples, which is seen to be statistically significant (p = 0.02) [Table 3]. Overall diagnostic yield in the present study was 93%. TBNA was diagnostic in 87% and it was solely positive in 31% cases [Table 4].

Table 1: Age wise distribution

Years	Male	Female	Total	Percent
30 - 40	0	0	0	0%
41 - 50	7	2	9	30%
51 - 60	9	1	10	33.33%
> 60	10	1	11	36.66%
Total	26	4	30	-

Table 2: Site of Nodal / Mass TBNA (Station Wise)

Site of TBNA	No.	%
2R	1	3.33%

4R	13	43.33%
4L	6	20%
7	4	13.33%
10R	2	6.66%
11R	4	13.33%
Total	30	-

Table 3: Diagnostic yield from CDP versus CDP & TBNA

Condition (n=30)	CDP		CDP + TBNA		p Value
	No.	%	No.	%	
EML (n=14)	14	100%	14	100%	p < 0.05
SPD (n=20)	14	70%	20	100%	p = 0.02

Table 4: Diagnostic yield of TBNA, Washing, Brushing & EBB (n=28)

Procedure	Positive Cases	%
Bron. Wash (BW)	8/30	27
Bron. Brushing(BB)	14/30	47
EBB	9/15	60
TBNA	26/30	87
EBB+BW+BB	20	67
TBNA+BW+BB	28	93
TBNA+EBB+BW+BB	28	93

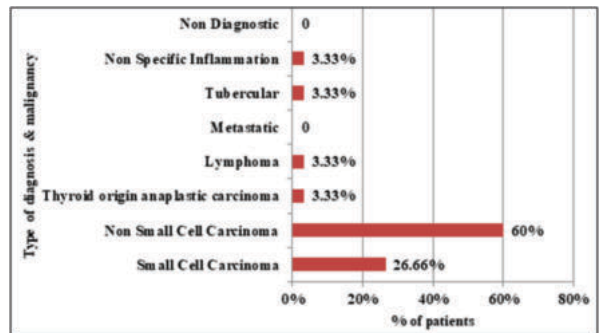


Figure 1: Types of Diagnosis and malignancy

DISCUSSION

In the present study, 70% patients were belonged to 50-60year and above age group. Out of that (n=30), 26 were male and only 4 were female. These findings were consistent with other study.

The average age was 58.07 year in the study has been quite similar to other study. The male: female ratio in present study M:F: 6.5:1 quite comparable to other studies (Narang et al 1977 and Malhotra et al 1986).

The overall diagnostic yield was increased with the use of TBNA technique. In bronchoscopic procedure in suspected cases of malignancy in various studies. In the present study, the additional diagnostic yield was increased from 67% to 93% (26%) which is very much similar to other studies i.e. Benan Caglayan et al (26%) and Ashok Dasgupta et al (20%) and it was higher to Thida Win et al (6%) and Frank Reichenberger et al (16%). This may be because of highly selective cases for procedure.

In cases of SPD, the additional diagnostic yield was increased from 70% to 100% (30%) which were similar to the studies of Ashok Dasgupta et al (31%) and Benan Caglayan et al (27%). This defines the use of TBNA increase the diagnostic yield of biopsy with minimal risk.

Bronchial washing (BW) was also performed in all 30 cases. A positive result was obtained in 8 (27%) cases and were never positive when any of the other procedures result were negative (Kvale et al, Ashok Dasgupta et al). Bronchial brushing (BB) was also used in all 30 cases with a positive results in 14(47%) cases. In 1(7%) case this was the only technique with a positive result.

The diagnostic yield of BW was 27% which was least in the present study. The similar result were also obtained in previous studies i.e. Ashok Dasgupta et al, (27%), Frank Reichenberger et al (22%), David A. Schenk et al, (29%) but the higher result was found in study of Thida Win et al (45%). In the present study BW did not positive when any of the other test results were negative while it was solely diagnostic in studies i.e. Frank Reichenberger et al (6%), Thida Win et al (4%).

The diagnostic yield of BB was 47% in the present study. This result is similar with the previous studies of Ashok Dasgupta et al 1999 (55%) and David A. Schenk et al 1987 (40%). The yield of BB was higher with the study of Frank Reichenberger et al, 1999(30%) and Thida Win et al 2003 (27%). The BB was solely diagnostic in 1(7%) case and it was consistent with other studies i.e. Ashok Dasgupta et al 1999 (6%) and Frank Reichenberger et al 1999 (10%) given as additional diagnosis.

The low diagnostic yield of EBB in Frank Reichenberger et al, study only 17% was because of more than 10 bronchoscopist had been introduced to bronchoscopy and the different diagnostic methods including handling, preparation was the fact and also stated that EBB was used very reluctantly in this study because many lesions were not accessible to the biopsy forceps. This discussion reveals that the training and expertise of bronchoscopist with preparation and handling of sample with or without ROSE significantly influenced the diagnostic yield of the procedure.

The TBNA was solely diagnostic in 31% (8/30) cases in the present study. Out of that 1 case has both EML & SPD finding. In 5 cases had SPD, 2 cases had only mediastinal lymphadenopathy and mass presentation without mucosal involvement.

Analysis of diagnostic yield from individual procedures and their combinations revealed several interesting facts. The best yield from any individual procedure was obtained with TBNA (87%), followed by EBB (60%), BB (47%) and BW (27%) In SPD, the yield from TBNA was far superior to the yield from any other individual procedure or their combination. Thus, use of TBNA alone or in combination with CDP would have diagnosed disease in all these patients

CONCLUSION

We conclude that the overall diagnostic yield of flexible bronchoscopy procedure is increased in patients with EML or SPD by the addition of TBNA. The TBNA is a safe procedure that should be routinely used to increase diagnostic yield in patients with EML or SPD. In cases of SPD, TBNA should be considered the procedure of choice.

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