

Diagnostic Efficacy Of Bronchoscopy And Computed Tomography Guided Modalities In the Management of Bronchogenic Carcinoma In A Tertiary Care Hospital

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Abstract:

Introduction: Initial histopathological analysis of a pulmonary lesion is mandatory when ever a bronchogenic carcinoma is suspected in order to determine the diagnostic and management strategy. The 2 main methods to obtain adequate samples are flexible fiberoptic bronchoscopy and Computed Tomography (CT) guided biopsy.

Aims And Objectives: To determine the test performance characteristics of various modalities ie. Bronchoscopy guided, CT guided procedures for histopathological specimen and to determine the Type of cancer.

Materials And Methods: Bronchoscopy Guided- Bronchial washings, Bronchial brushings, Endobronchial biopsy, Trans bronchial needle aspiration and Fine Needle Aspiration Cytology (FNAC), CT Guided- Trans thoracic needle aspiration and Trans thoracic trucut biopsy. **Results:** Among bronchogenic carcinomas, majority were adenocarcinomas (47%) followed by squamous (31%) followed by carcinoid (13%) followed by small cell carcinomas (6%). The positive diagnostic yield for centrally situated carcinomas- Bronchial washings-37%, Bronchial brushings-61%, Transbronchial needle aspiration-65%, Bronchoscopy with forceps biopsy-74%. Over all -95% where as for peripherally situated carcinomas- Bronchial washings-10%, CT guided FNAC - 90%, CT guided Tru cut biopsy- 93%. **Conclusion:** The positive diagnostic yield of conventional flexible fibre optic bronchoscopy guided procedures was high for central lesions (endobronchial disease and mass situated near the hilum) and poor for peripheral mass lesions and the positive yield of CT guided trans thoracic needle aspiration and trucut biopsy was high for peripheral mass lesions but it had higher rate of pneumothorax than do bronchoscopic biopsies.

Keywords: Bronchogenic carcinoma, Flexible fiberoptic bronchoscopy, FNAC, CT guided biopsy.

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I. Introduction

Lung cancer is usually suspected in individuals who have an abnormal chest radiograph or have symptoms caused by either local or systemic effects of tumour. The method of diagnosis of lung cancer depends on the type of lung cancer (small cell cancer or non small cell lung cancer), the size and location of the primary tumour (central or peripheral), the presence of metastasis and the overall clinical status of the patient.

Aims and objectives:

- 1) To determine the test performance characteristics of various modalities ie. Bronchoscopy guided, CT guided procedures for histopathological specimen and to determine the Type of cancer.
- 2) To determine the positive diagnostic yield of Bronchoscopy guided- Bronchial washings, Bronchial brushings, Endobronchial biopsy, Trans bronchial needle aspiration, FNAC and CT guided- Trans thoracic needle aspiration and Trans thoracic Needle Biopsy.

II. Materials And Methods

This was a prospective observational study performed in Department of Respiratory Medicine, Maharajah Institute Of Medical Sciences, Andhra Pradesh during June 2016 to February 2018 with a sample size of 32. Among them 27 were male and 5 were female.

Study Design: Prospective observational study

Study Location: The study was done in a tertiary care teaching hospital in Department of Respiratory Medicine at Maharajah Institute Of Medical Sciences, Andhra Pradesh, India.

Sample size: 32

Materials:

- 1) Routine Blood Investigations, Bleeding time, Clotting time, Serum creatinine.
- 2) Serology for HIV, HBSAG, HCV.
- 3) ECG
- 4) Chest x ray
- 5) HRCT and CECT chest
- 6) Flexible Fiberoptic Bronchoscopy
- 7) Bronchial washings, Brushings, Biopsy, Trans bronchial needle aspiration
- 8) CT guided FNAC and Trucut biopsy

Methods:

Bronchoscopy and CT chest were done in all patients of suspected mass lesion or collapse or unresolving pneumonia on chest x ray. We collected BAL for all patients, Bronchial brushings, Endobronchial biopsy, FNAC for endobronchial lesions, TBNA for extrinsic compression of bronchus for relevant patients and Trans thoracic needle aspiration and trucut biopsy for relevant cases. The specimens were sent for cytological and histopathological tests for diagnosis and type of lung cancer.

Inclusion criteria:

- 1) Patients who had mass lesion or collapse or unresolving pneumonia on chest x-ray or clinically.
- 2) Patients who were willing for the study.
- 3) Patients who were hemodynamically stable and fit for bronchoscopy procedure.

Exclusion criteria:

- 1) Patients who do not give consent.
- 2) HIV, HBsag, HCV positive patients were excluded.
- 3) Patients with very severe breathlessness were excluded.
- 4) Recent myocardial infarction.
- 5) Blood dyscrasias
- 6) Poor general condition
- 7) Known lung carcinoma.

Images:



Figure 1: Bronchoscopic image showing left lower lobe bronchus with mass.

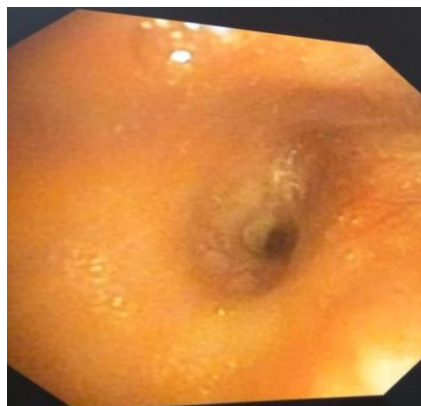


Figure 2: Bronchoscopic image showing extrinsic compression of right upper lobe and intermediate bronchus.



Figure 3: CT image showing heterogeneously enhancing mass in the right lower lobe.

III. Results

Among 32 patients, 27 were male and 5 were female showing a strong male predominance. 17 tumours were central in location for which Bronchoscopic biopsy was done and 15 were peripherally situated for which CT guided biopsy was done. Out of 32 patients, 15(47%) were histopathologically diagnosed as adeno carcinoma, 10(31%) were squamous, 4(13%) were carcinoid, 2(6%) were small cell carcinoma, 1(3%) was inconclusive. For centrally situated carcinomas the positive diagnostic yield of Bronchial washings was 37 %, Endo bronchial Needle aspiration was 80%, Bronchial brushings was 61%, Trans bronchial needle aspiration was 65%, Bronchoscopy with forceps biopsy was 74% and Over all diagnostic yield was 95% with fiberoptic bronchoscopy guided procedures. For Peripherally Situated Carcinomas, the positive diagnostic yield of Bronchial washings was 10%, CT guided FNAC was 90% and CT guided Tru cut biopsy was 93%.

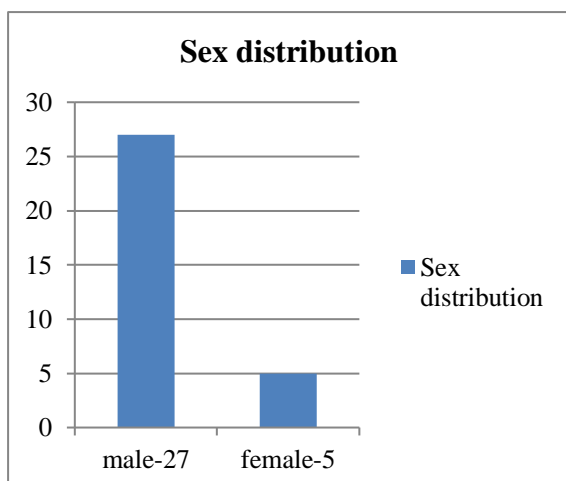


Table 1 showing sex distribution of lungcancer

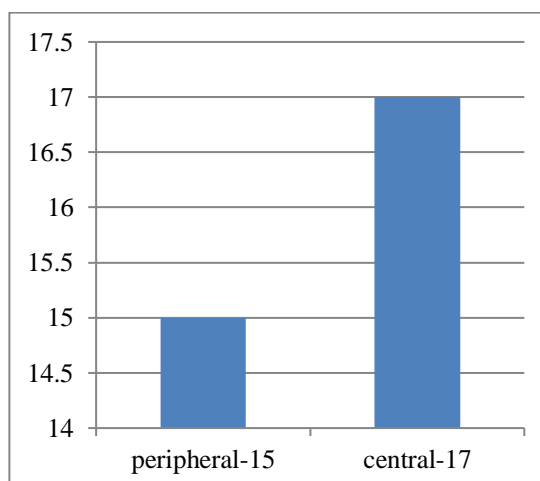


Table 2 showing location of lung cancer.

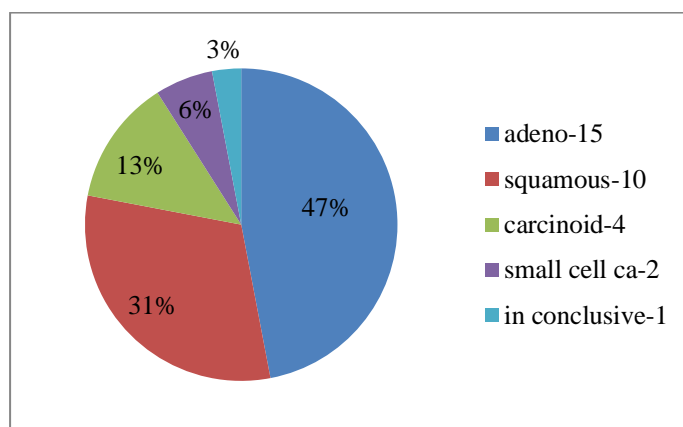


Table 3 showing Histopathological type of Bronchogenic carcinoma.

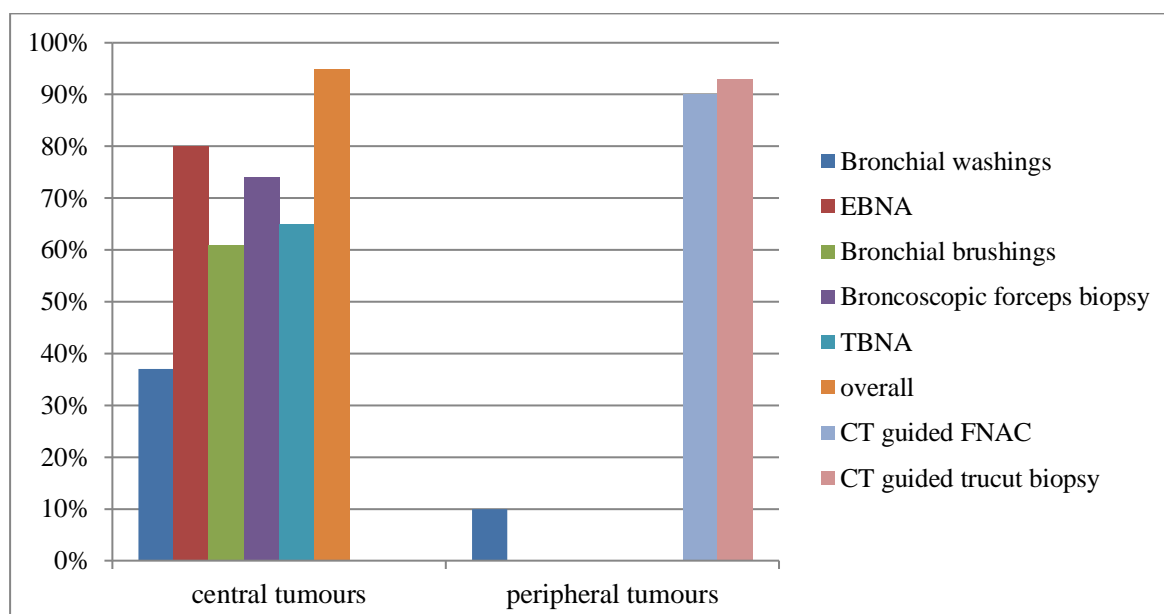


Table 4 showing positive diagnostic yield of Bronchoscopy and CT guided procedures.

Complications:

Hemoptysis

Decrease in oxygen saturation while performing bronchoscopy.

Pneumothorax while performing trucut biopsy for peripheral lesions.(2 patients got pneumothorax in CT guided peripheral trucut biopsy).

IV. Discussion

In the present study of 32 lung carcinomas, the male to female ratio was 5.4:1 which was comparable to Gaur DS et al.¹ with a male to female ratio of 3.6:1 and the study done by Lam WK et al.², a review of 480 cases on bronchogenic carcinoma showed male to female ratio of 1.9:1. Most of the patients were male, indicating strong male predisposition for lung cancers. In this study the most common amongst the bronchogenic carcinoma was adenocarcinoma(47%) followed by squamous cell carcinoma(31%). This is closely comparable with a study by Anupam Sharma et al³ in which adenocarcinomas accounted for 36.84% and squamous cell carcinomas accounted

for 42.11%. In other study by Pradeep kumar et al.⁴ squamous cell carcinomas were 60.6%, adenocarcinomas were 21.2%.

With the advent in bronchoscopy the evaluation of lung carcinoma has become very easy and quick. The different bronchoscopic guided modalities we used in the present study were lavage, washings, brush smear, transbronchial needle aspiration and biopsy. Cytological sampling by BAL relies mainly on cells exfoliated from malignant lesion in bronchial epithelium. Other than the bronchoscopic guided procedures we also used CT guided FNAC and biopsy for peripherally situated lung masses in this study. The main advantage with these procedures was they were time saving and were least risky⁵. The positive diagnostic yield overall for bronchoscopic procedures was 95% in this study. This is quite high in comparison to study by Boonsarnsuk V et al.⁶ The yield of endobronchial biopsy alone was 74% which is comparable with other studies⁷⁻⁹. In this study, for centrally situated carcinomas the positive diagnostic yield of Bronchial washings was 37 %, Endo bronchial needle aspiration was 80%, Bronchial brushings was 61%, Trans bronchial needle aspiration was 65%, Bronchoscopy with forceps biopsy was 74% and Over all diagnostic yield was 95% with fibreoptic bronchoscopy guided procedures. This is similar to study by Soler TV et al.¹⁰ in which the diagnostic yield of endobronchial biopsy 50/63 (79%), cytological brushing 18/63 (28.5%). In a study by David ASchenket al.¹¹ the diagnostic yield for sputum was 13 percent (10 of 75); brushings, 40 percent (34 of 84); washings, 29 percent (26 of 89); biopsy, 56 percent (42 of 75); and TBNA, 45 percent (41 of 91). The diagnostic yield of bronchoscopy for peripheral lesions depends on a number of factors including lesion size, the distance of the lesion from the hilum and on the relationship between the lesion and bronchus. The yield of bronchoscopy for lesions <3 cm varies from 14–50% compared with a diagnostic yield of 46–80% when the lesion is >3 cm¹²⁻¹⁴. For such peripherally situated lesions CT guided biopsy and FNAC were preferred¹⁵. In our study the sensitivity of CT guided FNAC and biopsy were 90% and 93% respectively.

In study by Gangopadhya et al.¹⁶ FNAC provided at least 96% sensitivity and 100% specificity in diagnosing lung tumours. With good sensitivity CT FNAC promises to be a convenient cytological technique that can be confidently utilized for the screening of doubtful cases and early diagnosis of lung cancer as it saves the time needed for the processing of the biopsy specimens.^{17,18} The only complication feared of is pneumothorax which is also manageable. 2 patients got pneumothorax in CT guided peripheral trucut biopsy in our study which was managed by intercostal drain insertion. The results of this study correlated with studies conducted by M.patricia Rivera et al.¹⁹ in which the overall sensitivity of flexible bronchoscopy for central endobronchial lesions is 88% and sensitivity of TTNA for the diagnosis of lung cancer was 90%. The present study results were suggestive that FNAC was almost as sensitive as biopsy. The limitations of this study were modern bronchoscopic tools like Endobronchial ultrasound and Electromagnetic navigation bronchoscope were not used and their sensitivities were not measured because of their unavailability in our institute.

V. Conclusion

The positive diagnostic yield of conventional flexible fibre optic bronchoscopy guided procedures was high for central lesions (endobronchial disease and mass situated near the hilum) and poor for peripheral mass lesions as the bronchoscope can reach only up to sub segmental bronchi. The positive yield of CT guided trans thoracic needle aspiration and trucut biopsy is high for peripheral mass lesions but it had higher rate of pneumothorax than do bronchoscopic biopsies. Among bronchogenic carcinomas, majority were adeno carcinomas followed by squamous followed by carcinoid followed by small cell carcinomas. CT guided FNAC was almost as sensitive as CT guided biopsy. So we want to conclude that with the advent of interventional procedures, the diagnostic efficacy of lung cancer has reached 96.8%.

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