To study the yield and histopathological profile of CT guided FNAC in clinically suspected cases of lung malignancy

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Abstract:
Aims & Objectives: To know the yield of CT guided FNAC and histopathological profile in suspected clinco-radiological cases of malignancy.
Materials And Methods: This is a prospective study done from July 2015 to Jun 2016 in clinico-radiological suspected patients of malignancy placed peripherally.CT guided FNAC was done under all aseptic conditions and aspirate was sent for histopathological evaluation.
Results: Out of 50 cases of suspected mass lesion, 36 were males (74%) and rest 14 were females(36%) with ratio 2.8: 1. The smoking pattern was 72% with maximum in males(70%) and minimum females (2%). The histopathological diagnosis was made in 44 cases with higher incidence of malignant lesion. Among malignant lesions(39), squamous cell carcinoma (32%) commonest followed by adenocarcinoma (18%), small cell carcinoma (6 %), large cell carcinoma (2%),poorly differentiated carcinoma (12%).Tubercular granuloma(6%) commonest in benign lesion.FNAC provided 90% sensitivity and 100% specificity in diagnosis. Complications encountered during FNAC were pneumothorax (6%); minor hemoptysis (2%) apart from minor complications like local pain and ecchymosis.
Conclusions: CT guided FNAC is a simple,safe, reliable outdoor procedure with patient acceptance and high diagnostic accuracy for the diagnosis in suspected cases of malignancy .
Keywords: CT guided FNAC, lung mass , histopathology

I. Introduction

Lung tumor is the most common malignancy among males followed by GI malignancy. In females the malignancy of genital organs are the most common followed by breast. In females the lung malignancy is less frequent.

Smoking is the strongest of the associated factor to cause lung cancer along with chemical exposure to follow. Although not clearly understood genetic susceptibility may be an important factor. Tp53 and KRAS mutant gene are found to be an important association (1).

CT serves as a dual role in the patient suspected to have a lung carcinoma based on the plain chest radiograph. Initially, it may substantially facilitate the diagnostic evaluation, by providing more precise characterization of the size, contour, extent and tissue composition of suspicious lesion.It has more to offer for lesions, which are indeterminate on CT evaluation; transthoracic fine needle biopsy can be performed on such lesions using CT guidance. It is the only well-established procedure, which tells about the histological nature of all types of lung masses. Such histological diagnosis is not only required for small operable cases but also for inoperable cases in which palliative treatment is imperative. Bronchoscopy, Bronchioalveolar lavage (BAL), bronchoscopic biopsy should be reserved for cases in which involvement of major airway, vocal cords and carina is suspected or in cases where CT evaluation detects fourth to sixth order CT bronchus sign.

With this background the present study was undertaken to establish the role of CT in comprehensive evaluation of lung masses, especially in our set-up and to study the efficacy and safety of CT guided fine needle aspiration cytology.

II. Materials And Methods

This was a prospective study done from July 2015 to Jun 2016 in Dept. of Respiratory Medicine in Mahatma Gandhi Medical College & Hospital, Jaipur in clinic-radiological suspected patients of malignancy. FNAC was done in 50 eligible cases.

The inclusion criteria of this study were patients with radiological mass lesions placed peripherally.Written informed consent was taken. The accessibility of the lesions was studied by performing the

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routine CT scan of the thorax. An access route was decided which would traverse the least amount of aerated lung; the minimal number of pleural surfaces; ribs; avoid major blood vessels, heart and other vital structures. Accordingly, the patient was positioned in the supine, prone or oblique position.

The biopsy procedure was preceded by the usual drills of part preparation, asepsis and draping. The patient was instructed not to move during the procedure. Local anaesthesia, in the form of 2% xylocaine was given upto the parietal pleura. With the patient holding breath in full inspiration, a fine needle was inserted to the exact predetermined depth with appropriate angulation. The needle used is 22G. Spinocaine or Lumbar Puncture needle. A check scan was performed to confirm the needle position. Care was taken to handle the needle to avoid pleural tear.The stylet was quickly removed and a 20cc syringe was attached to the needle hub. Vigorous suction along with to and fro movement of the syringe-needle assembly were made.

The specimen obtained by aspiration biopsy was quickly evacuated on glass slides and smears were prepared. The smear was quickly immersed in jar filled with 95% isopropyl alcohol.The specimen was transported to the laboratory.Immediately after the biopsy, the general condition of the patient was assessed and vitals were checked.

If no complications were detected the patient was allowed to leave the scan room and a chest X-ray was obtained after 1 hr. Any major or minor complicationswere recorded along with total procedure time.

III. Results

A total of 50 cases ,37 males (74%) and 13 females (26%) who presented with suspicious lung masses were evaluated by CT scan and underwent CT guided FNAC. The male-female ratio was 2.8:1. The age & sex distribution of patients revealed that maximum number of males belonged to the age range 61-80 years (36%) while most of the females belonged to the age group 41-60 years (10%) (Table -1a). Incidence of lung mass is found to be associated with smoking (72%) with 35(70%) being males while only 1(2%) of study females were smoker (Table-1b).

Out of 50 lesions,the histopathological diagnosis was made in 45 cases withhigher incidence of malignant lesion.FNAC provided 90 % sensitivity and 100% specificity in diagnosis. Among malignant lesions (39), squamous cell carcinoma (32%) commonest followed by adenocarcinoma (18%), small cell carcinoma (6 %), large cell carcinoma (2%),poorly differentiated carcinoma (12%) and tubercular granuloma (6%) commonest in benign lesion (Table 2). The range varied from 2 to 20 cm (Table 3a).Contour of the lesion was grouped into smooth in which the edges were well defined; lobulated where the edges showed undulations and irregular when spiculations or fraying were present in any part of the lesions. An association was observed between irregular contour and malignancy (Table. 3b).Complications encountered during FNAC were pneumothorax (16%); minor hemoptysis (2%) apart from minor complications like local pain and echymosis. All pneumothoraxes were minor and asymptomatic. None required any chest tube placement (Table- 4).

IV. Discussion

Lung masses whether asymptomatic or presenting with ominous symptoms have always been challenging entities for both clinicians and radiologists alike. In present study, 50 cases of thoracic mass placed peripherally were taken and subjected to CT guided FNAC.Male patients(74%) showed significant preponderance in our study compared to females(26%). Similar results on gender predominance seen by Shah S et al(2). Majority of patients were smoker(72%) in our study. It correlates with earlier studies (1).

Most of the patient's masses ranged between 4-8 cm in size (Table- No. 3a) which again is reflection of the amount of delay between the appearance of the disease and the first symptoms and ours being a tertiary level setup.This also reflect the lack of proper screening programme for early detection of lung cancer, or routine health checkup using plain chest x-ray in this region.

The 50 lesion assessed by CT were classified as smooth, lobulated or irregular, based on the contour or edge characteristics. The basis of such a classification was earlier studied by Siegelman et al(3), and more recently by Yamasthita et al(4). Though , contour in itself has poor specificity and predictive value for malignancy as many smooth marginated carcinomas do occur and been reported from time to time.

Histo-pathological diagnosis was made in 45 cases with higher incidence of malignant lesion .The majority of neoplasm were squamous cell carcinoma (32%) followed by adenocarcinoma. This order of frequency was also found in a study by Gouliamos AD et al(5). Out of the benign group, majority were tubercular infections, which reflects increased prevalence of tuberculosis in this part of the world.The reported accuracy in literature ranged from 64 – 97 %. The present study resulted in diagnostic accuracy of 90%. FNAC provided 90% sensitivity & 100% specificity in diagnosis comparable with Mohammed et al(6).

The complications associated with the procedure were noted and check scan were taken immediately after the procedure to detect the presence of pneumothorax. Both generic complications like ecchymosis, local bleeding, syndrome, syncope etc. and specific complications like pneumothorax, hemoptysis, hemorrhage etc. were noted. In the present study pneumothorax occurred in 3 cases. Hemoptysis occurred in 1 case which was

scanty in amount relieved on taking medication.The overall rate of complications was 8% in our study compared to Singh et al & Wallace et al(7,8). Pneumothorax occurred in 6% of cases.

V. Conclusion:

CT guided FNAC is a simple & safe outdoor procedure. It has good patient acceptance .It has high diagnostic accuracy for the diagnosis in suspected cases of malignancy

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Table 1(a): Gender distribution according to age groups

Age group	No. of Males	No. of Females	Total No. (M+F)
0-20	2(4%)	0(0%)	2(4%)
21-40	2(4%)	2(4%)	4(8%)
41-60	14(28%)	5(10%)	19(38%)
61-80	18(36%)	3(6%)	21(42%)
>80	1(2%)	3(6%)	4(8%)
Total	37(74%)	13(26%)	50(100%)

Table 1(b): Association with smoking

Habit	Males	Females	Total
Smokers	35(70%)	1(2%)	**36(72%)**
Non-Smokers	2(4%)	12(24%)	**14(28%)**
Total	**37(74%)**	**13(26%)**	**50(100%)**

Table 2: Diagnosis on the basis of CT guided FNAC

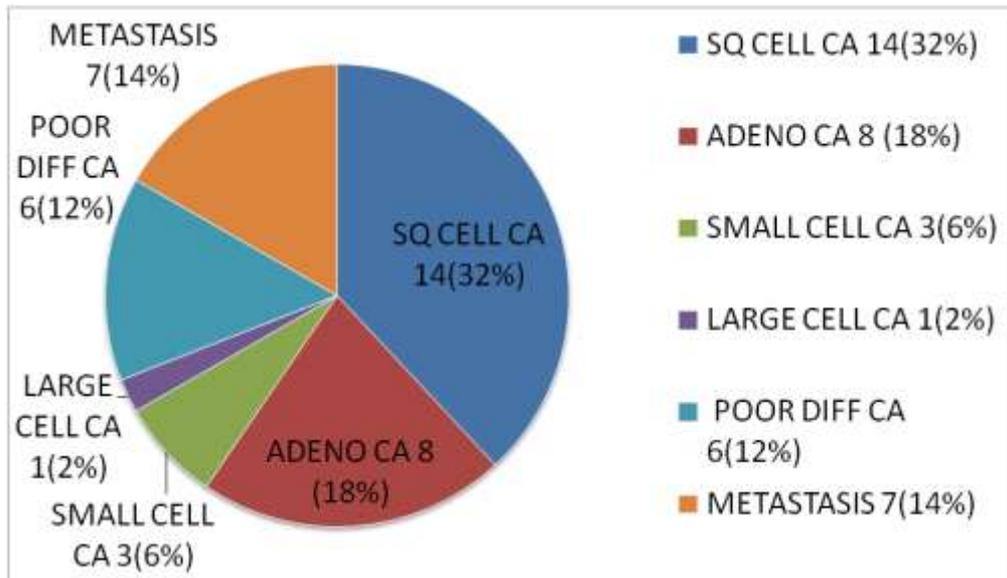| Malignant Pathology	Total No. of Cases	Benign Pathology	Total No. of Cases
Squamous Cell Ca(SCC)	14(32%)	Tubercular Granuloma	3(6%)
Poorly Diff. Ca(PDC)	6(12%)	Pneumonitis	2(4%)
Adenocarcinoma	8(18%)	Hamartoma	1(2%)
Small Cell Ca.	3(6%)		
Large Cell Ca(LCC)	1(2%)		
Metastasis	7(14%)		

Table 3(a): Morphological characteristics on the basis of sizeof the lesion in the study.

Size (cm)	Malignant	Benign	Total
2-4	9(18%)	2(4%)	11(22%)
4.1-6	13(26%)	3(6%)	16(32%)
6.1-8	12(24%)	1(2%)	13(26%)
8.1-10	4(8%)	1(2%)	5(10%)
>10	5(10%)	0(0%)	5(10%)
Total	**43(86%)**	**7(14%)**	**50(100%)**

Table 3(b): Morphological characteristics on the basis of contour in lesion in this study.

Contour	Malignant	Benign	Total
Smooth	16(32%)	7(14%)	23(46%)
Lobulated	6(12%)	0(0%0	6(12%)
Irregular	21(42%)	0(0%)	21(42%)
Total	**43(86%)**	**7(14%)**	**50(100%)**

Table 4: Complications associated with CT guided FNAC

Complication	No. of Patients	Percentage
Pneumothorax	3	6
Mild Hemoptysis	1	2
Hemorrhage	0	0