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Original Research Article.

Evaluation of Clinico-Radiological Association with CT Guided FNAC of Various Lung Lesions: A Hospital Based Study

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ABSTRACT

Introduction: Fine-needle aspiration cytology (FNAC) is a basic, fast, trustworthy strategy for the diagnosis of lung lesions, specially with the guide of computed axial tomography (CAT) scan. The present study was planned to assess clinicoradiological correlation with CT guided FNAC of different lung lesions.

Materials and Methods: The study was conducted in the Department of Radiodiagnosis S.P. Medical College Bikaner. The ethical approval for the study was obtained from the ethical committee of the college before initiating the study. One hundred patients having signs and symptoms of respiratory illness and confirmation of lung lesions by chest radiographs and CT scan were included in the study. An examination was made between the cytological determination and likely conclusion made on premise of clinical and radiological components.

Results: Consolidation was present in 58 patients; space occupying lesion (SOL) was present in 56 patients; collapse of lung was present in 45 patients; cavity was present in 31 patients; Pleural effusion was present in 30 patients; Hydropneumothorax / Lung Abscess was present in 4 patients; and Solitary Pulmonary nodule (SPN) was present in 0 patients. Consolidation was present in 58 (58%) of the patients which include 30 (78.9 %) patients of tuberculosis and 13 (36.1%) of malignancy. Space occupying lesion was present in 56 (56%) of the patients which include 15 (39.5%) patients of tuberculosis and 34 (94.4%) patients of malignancy. Pleural effusion was present in 30 (30%) of the patients which include 2 (5.3%) patients of tuberculosis and 17 (47.2%) patients of malignancy.

Conclusion: CT guided FNAC is an uncomplicated, secure and unfailing procedure with high diagnostic efficiency. The complications of the procedure being rare are most commonly peri-regional hemorrhage and chest pain.

Keywords: Clinico-Radiology, CT Guided FNAC, Lung Lesion.

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INTRODUCTION

Fine-needle aspiration cytology (FNAC) is a generally protected, fast, reliable strategy for the diagnosis of lung lesions, especially with the guide of computed axial tomography (CAT) scan. FNAC recognizes benign and malignant lesions as well as aides in tumor writing of lung cancer, so start of particular treatment like chemotherapy or surgery is conceivable immediately. FNAC was first utilized by Martin and Ellis as an analytic instrument.[1] Leyden in 1883 and Menbriel in 1986 presented the procedure as symptomatic lung puncture for identification of malignancy and infections.[2] Now, after about three decades, FNAC of lung lesions has increased overall acknowledgment, as it has additionally upgraded the demonstrative convenience of clinical cytology in lung and mediastinal growth diagnosis.[3] FNAC has for quite some time been utilized for the non-surgical affirmation of essential and in addition metastatic thoracic injuries. The uncommon preferred standpoint of FNAC incorporates recognition of those tumor sorts like little cell carcinoma, lymphomas more fittingly treated by chemotherapy as opposed to surgery. Various writings upheld that CT-guided FNAC is a precise and delicate method for diagnosing danger of the thorax.[4,5] This system is practically least difficult non-agent strategy as contrasted and biopsy for finding of aspiratory mass, exceeds the single major uncommon intricacy of pneumothorax.[5] So, the present study was planned to assess clinico radiological correlation with CT guided FNAC of different lung lesions.

MATERIALS AND METHODS

The study was conducted in the Department of Radiodiagnosis, S. P. Medical College, Bikaner. The ethical approval for the study was obtained from the ethical committee of the college before

initiating the study. One hundred patients having signs and symptoms of respiratory illness and confirmation of lung lesions by chest radiographs and CT scan were included in the study. A written informed consent was obtained from each patient after explaining them the plan of study.

Following the clearing up of pros and cons of the FNAC procedure, CT guided FNAC of pulmonary lesions was carried out for each case in the presence of radiologists and chest physician. The skin surface was cleaned with povidone iodine, and afterward 21 G-88 mm long spinal needle was presented through percutaneous/transthoracic approach limiting the correct position by CT examine after the estimation of the site and edge of passage of the needle, course of the needle, and the separation between the skin and sore on the CT check monitor.[6]

Following arrangement of the needle, a CT filter cut was taken to find out whether the tip of the needle was inside the mass. The suction was acquired by forward and backward and pivoting developments of the needle inside the injuries and five smears were arranged promptly from the specimen in the CT filter room.

Air-dried smears were stained with Leishman-Giemsa (L and G) stain. An examination was made between the cytological determination and likely conclusion made on premise of clinical and radiological components and the outcomes were assessed toward the finish of study.

RESULTS

Table 1 shows type of lesions on chest X-Ray and number of patients having the different lesions who underwent CT guided FNAC. We observed that consolidation was present in 58 patients; space occupying lesion (SOL) was present in 56 patients; collapse of lung was present in 45 patients; cavity was present in 31 patients; Pleural effusion was present in 30 patients; Hydropneumothorax / Lung Abscess was present in 4 patients; and Solitary Pulmonary nodule (SPN) was present in 0 patients.

Table 2 shows correlation of chest X-Ray finding of the patients with final diagnosis on CT guided FNAC. Consolidation was present in 58 (58%) of the patients which include 30 (78.9%) patients of tuberculosis and 13 (36.1%) of malignancy. Space occupying lesion was present in 56 (56%) of the patients which include 15 (39.5%) patients of tuberculosis and 34 (94.4%) patients of malignancy. Pleural effusion was present in 30 (30%) of the patients which include 2 (5.3%) patients of tuberculosis and 17 (47.2%) patients of malignancy.

Table 3 shows diagnosis of the patients made on the basis of clinico radiological findings. 46 patients out of 100 were having clinico-radiological findings suggestive of benign disease. 54 patients out of 100 were having clinico-radiological findings suggestive of malignant disease.

Table 4 shows CT guided FNAC diagnosis of different pulmonary lesions. Cytological diagnosis on CT guided FNAC showed 54 (54%) patients out of 100 to have benign pathology and 36 (36%) patients to have malignant pathology while in 10 (10%) patients the result was inconclusive.

Table 5 shows validity parameters of CT guided FNAC. Diagnostic Accuracy was observed in 76% patients; Sensitivity was seen in 85.71% patients; Specificity was seen in 68.96% patients; Positive Predictive Value was seen in 66.67%; Negative Predictive Value was seen in 89.96% patients; True Positive results were seen in 36 patients; False Positive results were seen in 18 patients; True Negative results were seen in 40 patients; and False Negative results were seen in 6 patients.

Table 6 shows patients with complications of CT guided FNAC. 20 (20%) patients complained of pain at the puncture site, pneumothorax was present in 3 (3%) patients; and hemoptysis was present in 2 (2%) patients.

Table 1: Type of lesions on chest X ray and number of patients having the different lesions who underwent CT guided of FNAC

Type of Lesion on Chest Xray	n	%
Consolidation	58	58%
Space Occupying Lesion	56	56%
Collapse	45	45%
Cavity	31	31%
Pleural Effusion	30	30%
Hydropneumothorax	4	4%
Solitary Pulmonary Nodule	0	0%

Table 2: Correlation of chest X ray finding of the patients with final diagnosis on CT guided FNAC

Chest Xray Finding	Final Diagnosis On CT Guided FNAC				p value
	Inflammatory/ Infective	Tuberculosis	Malignancy	Inconclusive	
Consolidation	10 (62.5%)	30 (78.9%)	13 (36.1%)	5 (50%)	.006
Hydropn-eumothorax	1 (6.3%)	0	1 (2.8%)	2 (20%)	.260
Cavity	12 (75%)	18 (47.4%)	0	1 (10%)	<.001
Collapse	7 (43.8%)	12 (31.6%)	21 (58.3%)	5 (50%)	.226
Space Occupying Lesion (Sol)	3 (18.8%)	15 (39.5%)	34 (94.4%)	4 (40%)	<.001
Pleural Effusion	6 (37.5)	2 (5.3%)	17 (47.2%)	5 (50%)	<.001
Solitary Pulmonary nodule (Spn)	-	-	-	-	-

Table 3: Diagnosis of the patients made on basis of clinico radiological findings

Clinico-Radiological Diagnosis	n	%
Benign	46	46%
Malignant	54	54%

Table 4: CT guided FNAC diagnosis of different pulmonary lesions

Findings	n	%
Benign	54	54%
Malignant	36	36%
Inconclusive	10	10%

Table 5: Validity parameters of CT guided FNAC

	Validity Parameters of CT Guided FNAC
Diagnostic Accuracy	76%
Sensitivity	85.71%
Specificity	68.96%
Positive Predictive Value	66.67%
Negative Predictive Value	89.96%
True Positive	36
False Positive	18
True Negative	40
False Negative	6

Table 6: Patients with complications of CT guided FNAC

Type of Complication	n	%
Pain at the Puncture Site	20	20%
Pneumothorax	3	3%
Haemoptysis	2	2%
Perilesional Haemorrhage	-	-

DISCUSSION

Radiologically, space occupying lesion was present in (SOL) 56% of the patients and consolidation was present in 58% of the patients. The results were somewhat comparable to studies conducted by Jayashanker et al and Gangopadhyay et al.[7,8] Pleural effusion and cavitary lesion was seen in 30% and 31% of the patients, respectively. 30 (78.9%) out of 38 patients of tuberculosis were having consolidation as the predominant finding radiologically. 34 (94.4%) out of 36 patients of malignant pathology were having intra thoracic mass or some space occupying lesion as the chief finding radiologically. Among patients with malignant pathology, malignant pleural effusion was present in 9 (25%) and none of the patients was having cavitary lesion on radiology. Provisional diagnosis based as radiologic findings were 54 (54%) malignant and 46 (46%) cases benign. Cytological examination showed that 36 (36%) cases were malignant and 54(54%) cases were benign and in 10 (10%) cases result was inconclusive. The studies conducted by Basnet et al, Madan and Bannur, Jayashanker et aland Gangopadhyay et al showed that percentage of cases of malignant pathology were more as compared to benign pathology to the tune of 52%, 62.5%, 68.3% and 77.2% respectively diagnosed by CT guided FNAC which was contrast to our study in which malignant pathology was present in 36% of cases.[7-10] The reason for this can be due to greater number of tuberculosis cases forming the main bulk in our study which is a very common disease in this part of the country.

The prevalence of malignancy is significantly less than the 81.8% found in similar study done by Singh et al.[11] In our study prevalence of Squamous Cell carcinoma and Adeno Carcinoma is 45% and 10% respectively. In Singh et al it's 22% equal for both squamous cell carcinoma and Adeno carcinoma. Prevalence of small cell carcinoma was 3.45% in our study similar to 4% in the study by Singh et al.[11] Among benign lesions tuberculosis comprised 38% of our study compared to 33% of their study. In this study, bronchogenic carcinoma was found in 29 out of 36 cases (80.5%) clearly showing that bronchogenic carcinoma is the most common malignancy of lung. Among the bronchogenic carcinoma, squamous cell carcinoma -13/36 (36.11%), non-small cell carcinoma- 12/36 (33.3%), adenocarcinoma- 3/36 (8.3%), small cell carcinoma only 1 case was the count. This was consistent with other studies done by Basnet et al, Madan and Bannur and Jayashanker et al showing that squamous cell carcinoma is the most common type of malignancy in this part of the country and also the higher incidence of squamous cell carcinoma among our patients can be explained by the higher prevalence of smoking in our community but in an international study conducted by Tan et al incidence of adenocarcinoma was reported to be significantly higher than squamous cell carcinoma which is also the current global trend of bronchogenic carcinoma.[12]

In benign pathology, out of 54 cases, tuberculosis constituted 38 (70.4%), followed by lung abscess in 10 (18.5%) and pneumonia in 4 (7.4%) showing that tuberculosis form majority of the benign/infective cases.

It has been mentioned that diagnostic accuracy of CT guided FNAC is between 66 to 97 percent. The diagnostic accuracy of our study was 76%. Sensitivity, specificity, positive and negative predictive value for the diagnosis of malignancy of this study was 86%, 69%, 67%, 87%, respectively, The results were comparable to study performed by Basnet et al. All the patients tolerated the procedure well. Complaint of 20 (18%) patients was pain at the puncture site which lasted for few hours (3-6 hours) and subsided without medication. Pneumothorax developed after aspiration in only 3 (3%) patients and single episode of scanty haemoptysis in only 2 (2%) patients. Pneumothorex is significantly lower compared to 11.8% seen in Singh et al.[11] It is comparable to 2.7% and 3.1% seen in Gupta et al[13] Gouliamas et al.[14] Perilesional hemorrhage is comparable to vanSonnenberg et al.[15] In all 3 cases pneumothorax was noted within 10 minutes of the procedure and it was mild (less than one tenth of chest). None of them required chest tube insertion. The cases of haemoptysis also required no treatment. Our experience is similar to the study of Singh et al where fatal complications like tension pneumothorax, air embolism, endobronchial haemorrhage etc were absent. The complication rate depends on the distance of the lesion from pleura and lesion size. The more the amount of the lung tissue traversed by the needle the more was the complication rate and smaller the lesion the more was the complication rate. This was same as studied by Cox et al and Laurent et al.[5,16]

CONCLUSION

CT guided FNAC is an uncomplicated, secure and unfailing procedure with high diagnostic efficiency. The complications of the procedure being rare are most commonly peri-regional hemorrhage and chest pain.

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