Original Research Article

ASSESSMENT OF THE CLINICO RADIOLOGICAL FEATURES OF DIFFERENT THORACIC LESION AND THE EFFICACY OF CT/ USG GUIDED FNAC IN EVALUATION OF LUNG MASSES

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A B S T R A C T

Background: To evaluate the clinic radiological profile and the efficacy of CT/USG guided FNAC in evaluation and diagnosis of various thoracic/chest lesions.
Materials and Methods: The study is carried out in patients with thoracic lesions diagnosed by chest radiographs, CT or MRI scans done by the Department of Respiratory Medicine and other clinical departments of RMCH Bareilly.
Results: Non-small cell lung cancer (NSCLC) accounts for the majority (approximately 85 percent) of lung cancers with the remainder as mostly small cell lung cancer (SCLC). Out of these 50 cases, a total of 41 (82%) were malignant. In present study, malignancy rates were found to be significantly higher in patients aged >50 years (70.7%) as compared to majority of benign cases aged <50 years (55.5%). most of the cases presented with cough and breathlessness, followed by expectoration and chest pain. Smoking habit was found to be quite prevalent in malignant group (80.9%) as compared to benign group (22.2%) and showed a significant association with malignancy. Right side was more commonly involved as compared to left side, the FNAC procedure was guided by USG in 48/50 (96%) cases whereas in 2 cases it was guided by CT. primarily USG was used as the modality of choice for guiding the FNAC biopsy.
Conclusion: Guided FNAC is a useful modality for evaluation of chest masses. It was found to be a safe, relatively less complicated, adequate and reasonably accurate technique as observed in previous studies too.
Keywords: Clinico radiological features, chest lesion, efficacy of CT/ USG guided FNAC, lung masses.

INTRODUCTION

Soft tissue tumours and tumour-like lesions of the chest wall are uncommon. Common chest wall soft tissue tumours and mass-like lesions include peripheral nerve tumours, lipomas, liposarcomas, haemangiomas, elastofibromas, metastases, lymphoma and abscesses. Other lesions encountered include desmoid tumours and malignant fibrous histiocytoma. Lung cancer is the most common cancer worldwide. Non-small cell lung cancer (NSCLC) accounts for the majority (approximately 85 percent) of lung cancers with the remainder as mostly small cell lung cancer (SCLC) A vast spectrum of pathological lesions like neoplastic, inflammatory, congenital and various miscellaneous lesions may present as lung masses.

Radiologically CT/USG guided transthoracic needle biopsy has become an accepted technique in the assessment of pulmonary and mediastinal lesions. When successful, this method may obviate the need for more invasive diagnostic procedures such as mediastinoscopy, thoracoscopy, or exploratory thoracotomy. Sonography is used for guidance in

pulmonary, pleural or mediastinal lesions in contact with the chest wall and CT for those not approachable by sonography. CT has, among its advantages, clear depiction of anatomical details and access to any area of the body.

Aim: To evaluate the clinic radiological profile and the efficacy of CT/USG guided FNAC in evaluation and diagnosis of various thoracic lesions.

MATERIALS AND METHODS

The study is carried out in patients with thoracic lesions diagnosed by chest radiographs, CT or MRI scans done by the Department of Respiratory Medicine and other clinical departments of RMCH Bareilly.

Sampling.

A total sample size of 50 subjects was taken for carrying out the study.

Methods of Collection of Data

- Written informed consent was obtained from the patient before the procedure.
- The guided procedure was performed under the observation of an experienced radiologist using CT scan (GE 16 Slice Bright Light Machine) and USG (Philips Ultra Sonography Machine).
- All relevant clinical data was noted down with respect to clinical diagnosis, cytopathological findings, and duration of hospital stay for the procedure, complications and ultimately the final outcome. Correlation with histopathological diagnosis was done for evaluating diagnostic efficacy of FNAC
- All cytology and biopsy specimens were obtained and appropriately processed and determined as Benign or Malignant.
- Infective specimens and aspirated fluids were assessed microbiologically for the causative organism.

Inclusion Criteria

1. All the Patients with evident thoracic lesions determined on CT chest /USG chest and amenable for CT/USG guided thoracic interventions.

Exclusion Criteria

1. Non cooperative patients incapable of adequate breath-holding.
2. Bleeding diathesis.
3. Patients at high risk for pneumothorax or haemothorax due to inaccessible location of the lesions.

Statistical Tools Employed

The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 15.0 statistical Analysis Software. The values were represented in Number (%) and Mean±SD.

RESULTS

The present study was conducted on 50 patients who presented with thoracic mass lesions located in lungs. The patients were evaluated for the suitable imaging technique for guided FNAC with initial evaluation for sonography guided FNAC. Only those cases in which sonographic guidance was not possible were taken up for CT guided FNAC. The lesions were then assigned to benign and malignant categories on the basis of FNAC findings

Non-small cell lung cancer (NSCLC) accounts for the majority (approximately 85 percent) of lung cancers with the remainder as mostly small cell lung cancer (SCLC). Out of these 50 cases, a total of 41 (82%) were malignant. In present study, malignancy rates were found to be significantly higher in patients aged >50 years (70.7%) as compared to majority of benign cases aged <50 years (55.5%). Most of the cases presented with cough and breathlessness, followed by expectoration and chest pain. Smoking habit was found to be quite prevalent in malignant group (80.9%) as compared to benign group (22.2%) and showed a significant association with malignancy. Right side was more commonly involved as compared to left side.The FNAC procedure was guided by USG in 48/50 (96%) cases, whereas in 2 cases it was guided by CT. Primarily USG was used as the modality of choice for guiding the FNAC biopsy.

Table 1: Distribution of Lesions in Study Population

Lesion type	Number of patients	Percentage
Benign	9	18.0
Malignant	41	82.0
Total	50	100.0

Table 2: Comparison of Age of Cases with Benign and Malignant Lesions

Age Group	Total number of cases	Benign (n=9)		Malignant (n=41)	
		No.	%	No.	%
<40	4	3	33.33	1	2.44
41-50	11	2	22.22	9	21.95
51-60	20	2	22.22	18	43.90
61-70	13	2	22.22	11	26.83
>70	2	0	0.00	2	4.88

χ^2=10.172 (df=4); p=0.038

Table 3: Comparison of Gender of Cases with Benign and Malignant Lesions

Gender	Total number of cases	Benign (n=9)		Malignant (n=41)	
		No.	%	No.	%
Female	8	2	22.22	6	14.63
Male	42	7	77.78	35	85.37

Table 4: Comparison of Presenting Symptoms of Cases with Benign and Malignant Lesions

Presenting symptom	Total number of cases	Benign (n=9)		Malignant (n=41)		Statistical significance	
		No.	%	No.	%	x^2	p
Cough	41	7	77.78	34	82.93	0.133	0.716
Expectoration	39	7	77.78	32	78.05	0.000	0.986
Breathlessness	41	5	55.56	36	87.80	5.200	0.023
Chest Pain	29	7	77.78	22	53.66	1.762	0.184
Hemoptysis	12	1	11.11	11	26.83	1.000	0.317
Fever	10	4	44.44	6	14.63	4.099	0.043
Loss of weight and appetite	14	1	11.11	13	31.71	1.553	0.213

Table 5: Comparison of Exposure to Biomass Smoke and Habit of Smoking in Cases with Benign and Malignant Lesions

	Total number of cases	Benign (n=9)		Malignant (n=41)		Statistical significance	
		No.	%	No.	%	x^2	p
Exposure to Biomass Smoke	8	2	22.22	6	14.63	–	0.623*
Passive smoking	0	0	0.00	0	0.00	–	–
Habit of smoking	35	2	22.22	33	80.49	–	0.002*

Table 6: Comparison of Side of Lesion in Cases with Benign and Malignant Lesions

Side of Lesion	Total number of cases	Benign (n=9)		Malignant (n=41)	
		No.	%	No.	%
Right	35	9	100.00	26	63.41
Left	15	0	0.00	15	36.59

Table 7: Comparison of Provisional Diagnosis in Cases with Benign and Malignant Lesions

Provisional Diagnosis	Total number of cases	Benign (n=9)		Malignant (n=41)	
		No.	%	No.	%
Benign	14	9	100.00	5	12.20
Malignant	36	0	0.00	36	87.80

Table 8: Comparison of Cytological Diagnosis in Cases with Benign Lesions

Cytological diagnosis	No.	%
Chr. non-specific inflammation	4	44.44
Abscess	1	11.11
Granulomatous lesion	2	22.22
TB	2	22.22

Table 9: Comparison of Cytological Diagnosis in Cases with Malignant Lesions

Cytological diagnosis	No.	%
AdenoCa	5	12.20
Sq Cell Ca	11	26.83
Small cell Ca	7	17.07
Large cell Ca	2	4.88
Poorly differentiated Ca	5	12.20
Atypical cell	8	19.51
Metastatic Ca	3	7.32

Table 10: Complications during guided procedure

Provisional Diagnosis	Total number of cases	Percentage
Pain at puncture site	14	28
Pneumothorax	2	4
Hemoptysis	1	2
No complication	33	66

Table 11: Comparison of Sampling Technique/Adequacy in Cases with Benign and Malignant Lesions

	Total number of cases	Benign (n=9)		Malignant (n=41)		Statistical significance	
		No.	%	No.	%	x^2	p
Sampling Technique							
USG guided	48	9	100.00	39	95.12	0.457	0.499

CT guided	2	0	0.00	2	4.88		
Adequacy of Sample							
Adequate	46	9	100.00	37	90.24	0.954	0.329
Inadequate	4	0	0.00	4	9.76		

DISCUSSION

Non-small cell lung cancer (NSCLC) accounts for the majority (approximately 85 percent) of lung cancers with the remainder as mostly small cell lung cancer (SCLC). Computed tomography (CT)-guided fine needle aspiration cytology (FNAC) of suspicious lung masses is a widely accepted and simple diagnostic method of relatively low cost.[1]

In present study, an attempt was made to evaluate the efficacy of CT/USG guided FNAC in evaluation and diagnosis of various chest lesions.A total of 50 cases with suspicious chest lesions were enrolled in the study. Out of these 50 cases, a total of 41 (82%) were malignant. Thus malignancy rate in suspicious lesions undergoing guided FNAC evaluation was 82%. The malignancy rate in different case series has been reported to vary.

In present study, malignancy rates were found to be significantly higher in patients aged >50 years (70.7%) as compared to majority of benign cases aged <50 years (55.5%).

In a study by Rocha et al2. (1994) of the 1698 cases of lung cancer, only 50 (2.98%) were aged less than 40 years. In present study too, we observed only 2.44% of malignant cases to be less than 40 years of age.

Male to female ratio in our study population was 5.25:1. The gender ratio in present study is similar to that reported by different studies where guided FNAC was carried out.

In present study, most of the cases presented with cough and breathlessness, followed by expectoration and chest pain. Hemoptysis, fever and loss of weight/appetite were some of the less common clinical presentations.

Clinical features like hemoptysis and loss of appetite/weight loss were higher in malignant group as compared to benign group yet this difference was not significant statistically (p>0.05).

In present study, smoking habit was found to be quite prevalent in malignant group (80.9%) as compared to benign group (22.2%) and showed a significant association with malignancy. Smoking is one of the major reasons for lung cancer and most of the epidemiological studies have shown a high associated risk.[3,4,5]

In present study, right side was more commonly involved as compared to left side. Interestingly, in benign group all the cases had involvement of right side whereas in malignant group 36.59% cases had involvement of left side too.

In present study, the FNAC procedure was guided by USG in 48/50 (96%) cases whereas in 2 cases it was guided by CT. Computed tomography provides a relatively better localization of lesions in proximity with soft-tissue structures. In a study by Ghosh et al.

(2013) 6 both USG guided as well as CT guided FNAC was performed depending on the situation.

In present study, primarily USG was used as the modality of choice for guiding the FNAC biopsy and results obtained thereby were close to those obtained by Ghosh et al. (2013),[6] for USG assessment. Mondalet al. (2013),[7] reported an adequacy rate of 95.4% for CT guided tomography.

In benign lesions chronic non-specific inflammation (44.44%) was most common cytological diagnosis followed by Granulomatous lesion (22.22%), Tuberculosis (22.22%) and abscess (11.11%). Thus, FNAC findings for benign types were found to be 100% accurate. Similar to our study, Ahmed and Ahamad (2009). In another study, Ghosh et al. (2013) 6 also found chronic inflammatory lesions as the most common non-malignant finding (33.3%). Similar observations were also made by Senguptaet al. (2014),[8] too.

On comparing our results with the previous study, we observed the accuracy level in present study to be close to that obtained by Basnet et al. (2008,[9] who reported the accuracy of guided FNAC to be 82%. The sensitivity and specificity levels in present study (80.5% and 100%) are also in agreement with those obtained byBasnet et al. (2008),[9] (86% and 100%).

In present study, although complication rate was 34% and this rate was higher in benign group (44.44%) as compared to malignant group (31.71%) yet except for 3 cases (6%) – 2 (4%) pneumothorax and 1 (2%) hemoptysis, all the other cases with complications had pain at puncture site as the complication (28%) which could be considered as a nominal complication. The nature of complications i.e. Pneumothorax, hemoptysis and chest pain as observed in present study is similar to that reported by Basnet et al. (2008),[9] and Sahaet al. (2009),[10] both in nature as well as in magnitude.

CONCLUSION

The present study was carried out to evaluate and assess the efficacy of guided FNAC in evaluation of chest masses. For this purpose, a total of 50 patients with chest masses (histopathologically proven - 41 malignant and 9 benign) were enrolled in the study and were subjected to clincopathological and guided FNAC assessment.

On the basis of present study, the following conclusive findings have been made:

1. Proportion of patients with age >50 years was significantly higher in malignant group (75.6%) as compared to benign cases (44.4%).
2. Male to female ratio of study subjects was 5.25. Majority of patients in both benign (77.78%) as well as malignant (85.37%) group were males.

No significant association between age and malignancy was observed.

3. Most of the cases presented with cough and breathlessness (82% each), followed by expectoration (78%) and chest pain (58%). Hemoptysis (24%), fever (20%) and loss of weight/appetite (28%) were some of the less common clinical presentations.

4. A total of 8 (16%) patients had exposure to biomass smoke and 35 (70%) were smokers. Proportion of smokers was significantly higher in malignant (80.49%) as compared to benign (22.22%) group (p=0.002).

5. Right side was more commonly involved (70%) as compared to left side. Left side was involved in 36.59% of malignant as compared to none of the benign cases, thus showing a significant difference between two groups (p=0.013).

6. Provisional diagnosis based on radiological assessment was 87.8% sensitive and 100% specific for malignancy. It had an accuracy of 90%.

7. The sampling was adequate in 92% cases. In 8% cases, a repeat sampling was done.

8. FNAC diagnosis showed an absolute agreement for benign lesions.

9. Among benign lesions, chronic non-specific inflammation (44.44%) was most common cytological diagnosis followed by Granulomatous lesion (22.22%), Tuberculosis (22.22%) and abscess (11.11%).

10. FNAC diagnosis showed an absolute agreement with malignant lesions too when visualization of atypical cells was considered as malignancy.

11. In malignant lesions Squamous cell carcinoma (26.83%) was the most common finding, followed by Atypical cell (19.51%), Small cell carcinoma (17.07%) while least common cytological finding was Large cell carcinoma (4.88%).

12. When visualization of atypical cells was considered as indicator of benign lesions, then guided FNAC had a sensitivity, specificity, positive predictive, negative predictive and accuracy value of 80.5%, 100%, 100%, 52.9% and 84% respectively.

13. Complication rate was 34% and this rate was higher in benign group (44.44%) as compared to malignant group (31.71%). Among complications were pain at puncture site (28%), pneumothorax (4%) and hemoptysis (2%).

On the basis of present study, it can be concluded that guided FNAC is a useful modality for evaluation of chest masses. It was found to be a safe, relatively less complicated, adequate and reasonably accurate technique as observed in previous studies too.

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