Original Research Article

Evaluation of Intra Thorasic Lesions by Image Guided Fine Needle Aspiration Cytology

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Abstract

Introduction: For diagnosing variousthorasic lesions ultrasound guided FNAC is a safe, radiation free, technically simple and cost effective method. CT guided FNAC is another commonly used method where lesion is difficult to access through ultrasound, but it is not radiation free and comparitively expensive also. Study aimed and evaluated the role of ultrasound guided percutaneous fine needle aspiration cytology in diagnosing various thorasic lesions. **Material and Methods**: An institutional based study was conducted in 24months duration involving lungs, pleura and mediastinum. A total 100 patients referred to ultrasound guided FNAC with suspected mass lesions. A detailed medical and surgical history, clinical examination was done. Routine investigations (CBC, BT, CT, PT and APTT) were done before the procedure. Written consent was taken from each patient. FNAC was done and five to seven smears were prepared, fixed and stained with H&E stain. **Result:** Out of 100 patients diagnostic material was obtained in 86 cases which were included out of 86 cases 80 cases (93.02%) from lung, 4 cases (4.65%) from pleural mass and 2 cases(2.32%) from mediastinum.The age of patients vary from 25 to 80 years. Most of the patients were in the age group of 50 to 70 years. The most common tumor was squamous cell carcinoma diagnosed i in 69 cases (80.23%), adenocarcinoma in 13 (15.11%) patients, small cell carcinoma in 2(1.32%) patients, poorly differentiated carcinoma in one (1.16%) patient and thymoma in one (1.16%) patient. 52 (60.46%) patients had history of smoking. **Conclusion:** Ultrasound guided FNAC is a simple, safe and highly sensitive and specific procedure with high diagnostic accuracy for diagnostic thorasiclesions. Diagnostic accuracy of cytology with FNAC was around 96.6%.

Keywords: fine needle aspiration cytology, lung tumors ,pleurallesions, mediastinalmass and diagnostic accuracy

Introduction

Thorasic cavity is the second largest hollow space of the body and site of various non neoplastic and neoplastic pathologies. Different radiological modalities have enabled the detection of these lesions,but may fail to distinguish between benign and malignant ones[1].A confirmed pathological diagnosis is therefore essential for patient management[2]. It was first used by martin and ellis as a diagnostic tool[3].Leyden in 1833 and manbriel in 1986 introduced the technique for the diagnosis of thorasic pathologies[4].Ultrasound guided transthorasic fine needle aspiration cytology is an effective method of obtaining material for cytological diagnosis of peripherally located lung lesions of variousetiologies. In the view of its high accuracy and lesser complication rates, it has gained popularity among the clinicians and radiologists[5]. During transthorasic ultrasonography needle can be guided into the lesion under direct visualisation and material can be aspirated from different sites of interest with in the lesion. More over the main complication of this procedure is pneumothorax which can be properly managed by pulmonologist. Tranthorasic fine needle aspiration cytology is regarded as the most effective of the cytological methods for diagnosis of lung cancer in particular peripherally located lesions including lung nodules of infective etiology. Cytology of peripheral pulmonary lesions using fine needle is the choice for establishing diagnosis which is simple and safe. Aspiration cytology of small and large peripheral lesions of lung and pleura may provide an early diagnosis, thus enabling effective intervention and increasing the potential surgical care[6]. Ultrasonography provide documentation of the needle in the mass lesion.Ultrasonography which is readily available in most centres is easy to perform and free from radiation,helps in the evaluation of pulmonary lesions and also the needle can be guided under vision and aspirates can be obtained from different sites of lesion[7].

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Material and Methods

This was a retrospective study of hundred patients who underwent image guided fine needle aspiration cytology of intrathorasic lesions from January2017 to December2019 in the department of pathology , Guntur Medical college. A detailed medical, surgical history and clinical examination was done.Routine investigations (CBC,BT, CT,PT and APTT) were done before the procedure. Plain and contrast CT of chest was done prior to USG guided FNAC. Written consent was taken from each patient. FNAC under USG guidance done in patients who are clinically suspected to have neoplasm as evidenced by pulmonary opacities or nodules adjacent to the chest wall or pleural disease. FNAC was done by 21-22 Guage needles under guidance of ultrasonography and 5 to 7 smears were prepared, fixed by placing them immediately into coplin jar containing 95% Ethyl alcohol and stained with H&E stain. Paraffin section was prepared in the remaining sample. Material collected for cytological and histological examination was analysed. FNAC diagnosis was correlated with paraffin report.

Results

Out of 100 cases diagnostic material was obtained in 86 cases which included 80 (93.02%)cases from lung,4 (4.65%) cases from pleural mass and 2(2.32%) cases from mediastinum.The age of patients vary from 25 to 80 years. Most of the patients were in the age group 50 to 70 years. Males are commonly involved. Out of 86 cases males were 60 (69.76%) cases and 2(30.23%) were females. Among the lung lesions squamous cell carcinoma was most common type. It constitutes about 66 (82.50%)cases. The adenocarcinoma constitutes about 17(13.75%) cases and small cell carcinoma 2(2.5%) cases and poorly differentiated carcinoma 1(1.25%)cases. Among the pleural lesions 3(75%)are squamous cell carcinoma and 1(25%) was adenocarcinoma. In the mediastinal lesions 1(50%) was thymoma and other was inflammatory process(50%).Out of 86 cases,52 (60.46%) had history of smoking,42 (63.63%) patients of squamous cell carcinoma, 2 (11.76%) cases of adenocarcinoma and 1(50%) case of small cell carcinoma had history of smoking. Among the lung lesions 60(75%) cases were upper lobe lesions and 6(7.5%) cases were lower lobe lesions. Among upper lobe lesions 40 (66.66%) cases are from right side. In lower lobe lesions 4 (66.66%) cases are from left side.

Table 1:Gender Distribution of Cases

Gender	Frequency	Percentage
Males	66	76.74%
Females	20	23.25%
Total	86	

Table 2:Distribution of Patients in Various Age Groups

Age Group	Male	Female	Percentage
10-20	-	-	-
21-30	02	-	2.32%
31-40	-	-	-
41-50	02	-	2.32%
51-60	27	13	46.51%
61-70	24	12	53.48%
71-80	03	01	4.65%
	60	26	100%

Table 3:Frequency of Various Pathologies in the Patients

Diagnosis	Frequency	Percentage
Squamous cell carcinoma	69	80.23%
Adenocarcinoma	12	15.11%
Small cell carcinoma	2	2.30%
Undifferentiated carcinoma	1	1.16%
Thymoma	1	1.16%
Inflammatory	1	1.16%
Inconclusive	14	

Table 4:Type of Lesions Versus History of Smoking

Type of Lesion	Total No of Cases	History of Smoking
Squamous cell carcinoma	42	48.83%
Adenocarcinoma	2	2.32%
Small cell carcinoma	1	1.16%

Table 5:Shows Diagnostic Accuracy Histopathological Diagnosisversus Cytology

Histopathological Diagnosis	FNAC	Total Number of Patients	Percentage
Confirmed	80	80	
Not confirmed	6	6	

Table 6:Comparision BetweenFNAC Diagnosis and Histopathological Diagnosis

Histopathological Diagnosis	Cytology	Histology	Percentage
Squamous cell carcinoma	62	68	80.23%
Adenocarcinoma	12	12	15.11%
Small cell carcinoma	2	1	2.30%
Poorly 111differentiated carcinoma	1	1	1.16%
Thymoma	1	1	1.16%
Inflammatory lesion	1	1	1.16%
Inconclusive	6	-	

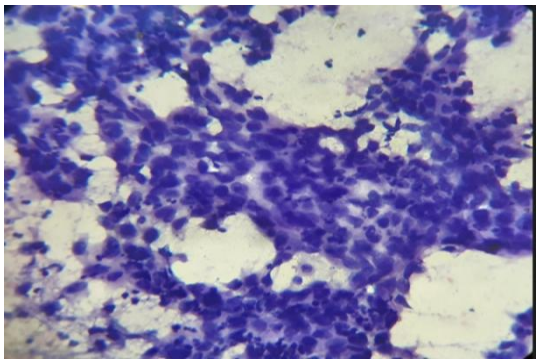

Fig 1:FNAC of squamous cell carcinoma showing pleomorphic epithelial cells with abundant cytoplasm and hyperchromatic nucleus(400x)

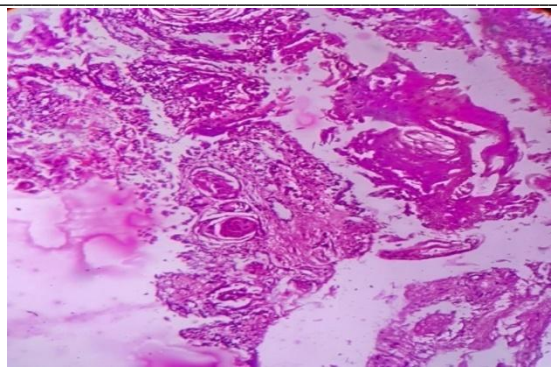

Fig 2:H&E-squamous cell carcinoma showing pearl formation

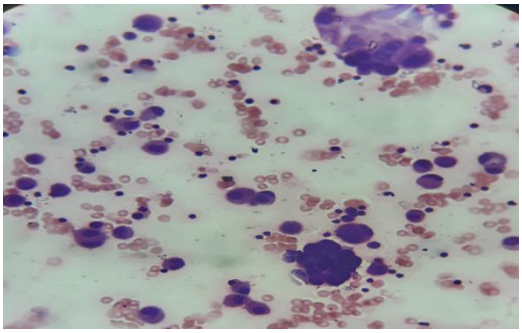

Fig 3: FNAC of Adenocarcinoma Showing epithelial cells arranged in glandular pattern and scattered individually (400x)

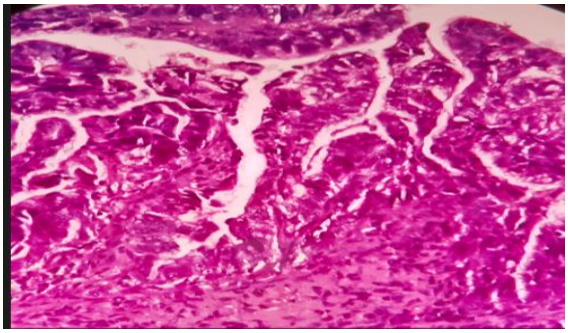

Fig 4: H&Eof Adenocarcinoma showing papillary arrangement(400x)

Discussion

FNAC is a sensitive method for lung cancer diagnosis.Peak age incidence in our patients was 51 to 70 years which is similar to that observed in other studies.In the present study male to female ratio was 6:1 which is similar to other studies. The male predominance is due to higher incidence of pulmonary disease in males because smoking habits and occupational hazards are more common in males.

In the present study accuracy of FNAC was 96.4% ,where on the diagnostic accuracy of FNAC of lung tumors range from 82.4% to 97% in the previous studies. Table 7 shows over all diagnostic accuracy and reliability of aspiration cytology in comparison to histopathology were studied by different authors,so results of our study were consistent with other studies done in different parts of world.

Table 7:Shows Comparitive Study done by Various Authors

Name of the Authors	Number of Cases	Diagnostic Accuracy
Dick et al 1974 [8]	227	78%
Ser get et al1976 [9]	350	83%
Lalli et al 1978 [10]	1223	88%
Flower and verncy 1979 [11]	287	87%
Khouri et al 1985 [12]	650	94%
Calhoun et al [13]	397	92%
Santaigo et al [14]	232	81%
Phillips et al [15]	221	82%
Mandol and pradhan 1991 [16]	135	97%
Present study	80/86	96.6%

Most common presenting compliants are cough and chest pain.In the present study similar report were reported in At sehirff M et al study and in study done by Robert D.Tarker[17,18].Right upper lobe 40(75%) and followed by right lower lobe 4 (5%) cases were effected which is in agreement with study of Van sonner berg that more than half of the parenchymal leisons involved upper lobe[19].In fine needle aspiration cytology diagnosed malignancies, cytopathological types encountered were squamous cell carcinoma is the most commonly seen malignancy. This was in concordance with previous studies as squamous cell carcinoma was the commonest malignancy in Indian sub-continent.

Conclusion

Thorasic lesions are frequently encountered in chest disease and accurate aetiologic diagnosis of these lesions is important for subsequent management. Ultrasound can provide real time image guidance in which the nodule is most assessible and evident thus contribute high diagnostic yield of procedure, low cost and lack of radiation hazards of ultrasound also make the repeat examination convenient. So ultrasound guided FNAC of thorasic lesions is

simple, safe, quick, acceptable, early accessible, accurate and cost effective procedure without radiation. FNAC was first line of investigation technique for differential diagnosis of reactive hyperplasia, inflammatory conditions, granulomatous disorders, malignancy and in stratifying cases requiring further investigations surgical interventions and clinical follow up.

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References

1. BoisellePM,PartzEF,Vinning DJ,Weissleder R,Sheper JA,. Imaging of mediastinal lymphnodes:CT,MRI and FDG PET. Radiographics. 1998:1061-9.
2. Adhikari RC,Tuladhar A,Shrestha S,Sharma SK. Deep ceated thorasic and abdominal lesions:Usefulness of ultrasound guided fine needle aspiration cytology;a three experience.Nepal medical coll J. 2010;12:20-5.
3. MartinHE,EllisEB.Biopsy of needle puncture and aspiration.Ann surg.1930;92:169-8.
4. Shahs,ShuklaK,Patil P.Role of fine needle aspiration cytology in diagnosis of lung tumors.A study of 100 cases.Indian J.Pathol microbial. 2007;50:56-8.
5. ChenMF ,YangSP.The solitary pulmonary nodules. J Formosan Med Assoc.1981;80(1):830-8.
6. YVCJ,Yang PC,Chang DB.Evaluation of ultrasonically guided biopsies of mediastinal masses.Chest. 1990: 100(2):399-405.
7. Knudsen et al.Ultrasonographicallyguided fine needle aspiration biopsy of Intrathorasictumors. ActaRadiol. 1996;37(3pnl):327-3.
8. Dick R, Heard BE,HinsmKFW, Kerr TH, Pearson MC. Aspiration needle biopsy of thorasic lesions, an assessment of 227 biopsies BrI Dis chest. 1974;68:86-94.
9. Sergent EN,Turner AF,Gordonson J,Schwinn CP,Pashky O. Percutaneous pulmonary needle biopsy:report of 350 patients Anj Roentgenall. 1976; 122:958-68.
10. HalliAF,MC Cermack LJ,Zelch M,Reich NE,Belouich D. Aspiration biopsy of chest lesions. Radiology. 1978;127:35-40
11. Fluwercdr,Verney GT. Percutaneous needle biopsy of thorasic lesions. An evaluation of 300 biopsies elin Radiol. 1979;30:215-18.
12. KhouriNF,StifikFP,EzozanYS et al.Transthorasic needle aspiration biopsy of benign and malignant lung lesions.AIR. 1985; 144:281-88
13. Santaigo SM,Lehronem S, Williams AJ. Aspiration of lung biopsy with ultra thin needles. Respiration. 1986;50:97-101.
14. Calhoun P,Feldman PS,Amstrmg P.The clinical outcome of needle aspiration of lung when cancer is not diagnosed. Ann ThoracSurg. 1986;41:592-96.
15. Phillips J, Good Man B, Kelly V.Percutaneousthorasic aspiration needle biopsies, Pathology. 1982; 14:211-13.
16. Mindal,Pnadhan. Role of percutaneous FNAC in the detection of lung,pleura and Mediastinal tumors. A study of 162 cases. IJPM. 1991; 34(4):253-8
17. Atschritt M, Nachtegaele P, Voet D et al. Puncture of thorasic lesions under sonographic guidance.Thorax. 1982;37(2):503-6
18. Robert Berkow, Andrew J, Fletchet, B chir.Eds The Merck mannual,17th Ed NewJersy, 1992.
19. Vansonnenberg E, Casola G.HometalDifficult thorasic lesions. CT guided biopsy experience in 150 cases Radiology. 1988; 167 (2):457-6.

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