

USG and CT-guided cytomorphological profile of FNAC in deep-seated lesions

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ABSTRACT

Introduction: Ultrasound and computed tomography-guided fine needle aspiration cytology play an important role in the diagnosis of deep-seated lesions such as intra-abdominal and intrathoracic diseases.

Objective: To evaluate the efficacy of ultrasound (USG) and computed tomography (CT)-guided FNAC in the diagnosis of abdominal and intrathoracic lesions for one year, from January 2021 to December 2021.

Materials And Methods: The study included 58 intra-abdominal and 45 intrathoracic lesions. Cytological findings were correlated to clinical and radiographic data to arrive at a definitive diagnosis.

Results: Fine needle aspiration cytology was performed at various anatomical sites: liver (24 patients), colon (9 patients), gallbladder (5 patients), ovary (6 cases), spleen (3 cases), mesentery (3 cases), omentum (3 cases), cecum (2 cases), pancreas (1 case), subhepatic lesions (1 case), lung (43 cases), mediastinum (2 cases). The most common intra-abdominal disease was metastatic adenocarcinoma of the liver (14 patients), and the most common intrathoracic disease was lung adenocarcinoma (18 patients).

Conclusion: Ultrasound and computed tomography-guided fine needle cytology is an excellent method for deep diagnosis in the abdominal and thoracic cavity.

KEYWORDS: cytomorphological profile, deep-seated lesions, FNAC, USG guided, Intra-abdominal, Intra-thoracic

INTRODUCTION

Fine Needle Aspiration Cytology (FNAC) is a well-known method for diagnosing neoplastic and non-neoplastic diseases. Adequate Sampling is very important for a correct diagnosis. It is easy to obtain adequate material to detect superficially palpable lesions. However, it is difficult to obtain necessary and sufficient samples from deep-seated lesions. With the development of radiological imaging

techniques, the sensitivity of detecting deep non-palpable lesions has been greatly improved. [1] Imaging techniques cannot always distinguish between malignant and benign lesions. [2] An accurate tissue diagnosis is essential for the correct diagnosis, staging, and treatment of cancers. [3] The low complication rate associated with the procedure is an added advantage, allowing FNAC to be performed as an outpatient procedure. It is also a suitable method if the patient is debilitated or has multiple lesions. [4] Complications such as anaemia, sepsis, biliary peritonitis, acute pancreatitis, and pneumothorax have been reported. [2] Needle-track tumour implantations after FNAC procedures have been reported, but survival outcomes in these patients have not been studied in detail. [5, 6] Another concern is that previous FNAC may cause local tissue changes that may complicate histological diagnosis. [7] The aim of our study is to evaluate the utility of ultrasound (USG) and computed tomography (CT) guided FNAC in the diagnosis of abdominal and intrathoracic lesions.

MATERIALS AND METHODS

A one-year retrospective cross-sectional observational study was done from January 2021 to December 2021 at Micron Diagnostic & Imaging, Berhampore, Murshidabad, West Bengal. A total of 1411 FNACs were performed during this time. Of these, FNACs with USG and CT were done in 132 cases. FNACs were performed in 112 of 132 patients for intra-abdominal and intrathoracic lesions.

Inclusion criteria: CT and USG-guided FNAC aspirations from various anatomical sites such as the liver, intra-abdominal lymph nodes, gallbladder, ovary, spleen, cecum, mesentery, omentum, stomach, subhepatic region, pancreas, and pulmonary mediastinum.

Exclusion criteria: Cases with inadequate aspirate were excluded.

Air-dried and alcohol-fixed smears were used for Leishman-Giemsa and Pap staining, respectively. Clinical history and reports of other relevant investigations were taken from the patients. The diagnosis of FNAC is correlated

to clinical and radiological data. The unusual diagnoses were reviewed by multiple pathologists to arrive at a final cytological diagnosis. Data analysis was done using Microsoft Excel.

RESULT

From January 2021 to December 2021, 132 (10.81%) out of a total of 1411 FNACs were done under radiological guidance. Out of those 103 cases were included in this study as the rest were either aspirates from other sites or inadequate samples for reporting.

Site	No.	Percentage
Intra-abdominal	58	56.3%
Intra-thoracic	45	43.7%
Total	103	100

Table 1: Site wise Categorisation of deep-seated lesions

Site	Neoplastic	No.
Liver	Hepatocellular carcinoma	4
	Adenocarcinoma metastasis	14
	SCC metastasis	1
	Poorly diff. carcinoma	1
	Metastatic ca adeno	2
Lymph node	NHL	2
	HL	1
Gall bladder	Adenocarcinoma	1
	Poorly diff. carcinoma	1
Ovary	Dermoid cyst	1
	Malignant surface epithelial tumor	3
Spleen	Adenocarcinoma Mets	1
	NHL	1
Omentum	Metastatic adenocarcinoma	1
Caecum	Adenocarcinoma	1
Pancreas	Adenocarcinoma	1
Stomach	adenocarcinoma	1

Table 2: Cytological diagnosis of Neoplastic intra-abdominal lesions

There were 45 intrathoracic and 58 cases of intraperitoneal disease, including 14 and 21 non-neoplastic diseases

Site	Non-neoplastic	No.	Neoplastic	No.
Lung (n=43)	Abscess	4	Adenocarcinoma	18
	Nonspecific inflammation	4	Squamous cell carcinoma	9
	Granulomatous lesion	3	Small cell carcinoma	2
	Fungal lesion	1		
	Bronchogenic cyst	1		
	Encysted effusion	1		
Mediastinum (n=2)			Thymoma	1
			SCC	1

Table 3: Cytological Diagnosis of Intra-thoracic lesions

and 31 and 37 neoplastic diseases. Most of the malignant cases in both intra-abdominal and intra-thoracic lesions were seen in the age group of 51 - 70 years. Tables 1, 2 and 3 show the cytological diagnosis of intrathoracic and intraperitoneal lesions. In intrathoracic lesions, non-small cell carcinoma (27 cases) was the most common diagnosis in this study, comprising of lung adenocarcinoma (17.5%) is followed by lung squamous cell carcinoma (8.7%). (Figure 2) Two cases of small tumours were diagnosed. Non-neoplastic lung lesions include abscesses, nonspecific inflammatory lesions, and granulomatous lesions.

Metastatic adenocarcinoma (13.53%) is the most common malignancy in intraabdominal lesions, followed by hepatocellular carcinoma (3.88%). Figure 1

DISCUSSION

The lesions in intra-abdominal and intrathoracic cavity are relatively inaccessible and unsafe for FNAC without image guidance. Image-guided FNAC has facilitated the easy collection of cellular material with greater accuracy.^[8] Inaccessible areas can now be safely sampled on an day care basis under image guidance to procure cellular materials yields. Sampling accuracy can be very high when pathologists and radiologists jointly perform the procedure. Immediate evaluation of the sample by an onsite cytopathologist and further evaluation to perform additional needle passes, if necessary, increases the adequacy rate of the procedure.^[9]

The liver and lungs were the common sites for FNAC in this study as shown in the tables which is comparable to the studies done by Sheikh et al^[10] and Adhikari RC.^[11] The liver was also the most common site of aspiration performed in the abdomen in a study done by J Nobrega et al.^[8]

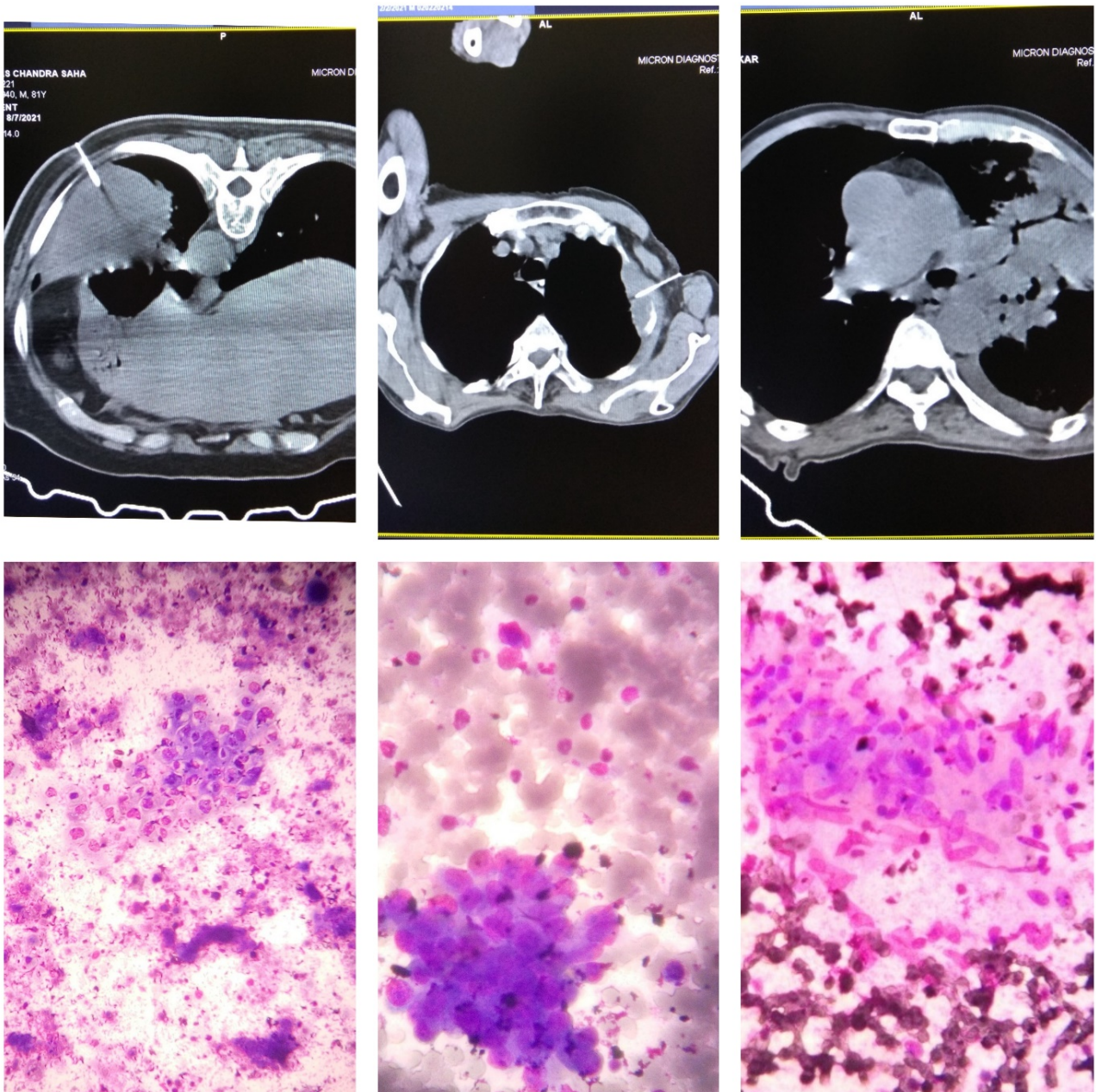


Figure 1: A: CT of left lower lobe lung mass. B: cytological features of squamous cell carcinoma .C: Left upper lobe mass lesion with erosion of ribs. D: Corresponding FNAC of C showing cytological features of adenocarcinoma(400X) E: left upper lobe cavitory lesion with corresponding FNAC microphotograph F: with features of granulomatous lesion suggestive of tuberculosis. (400X)

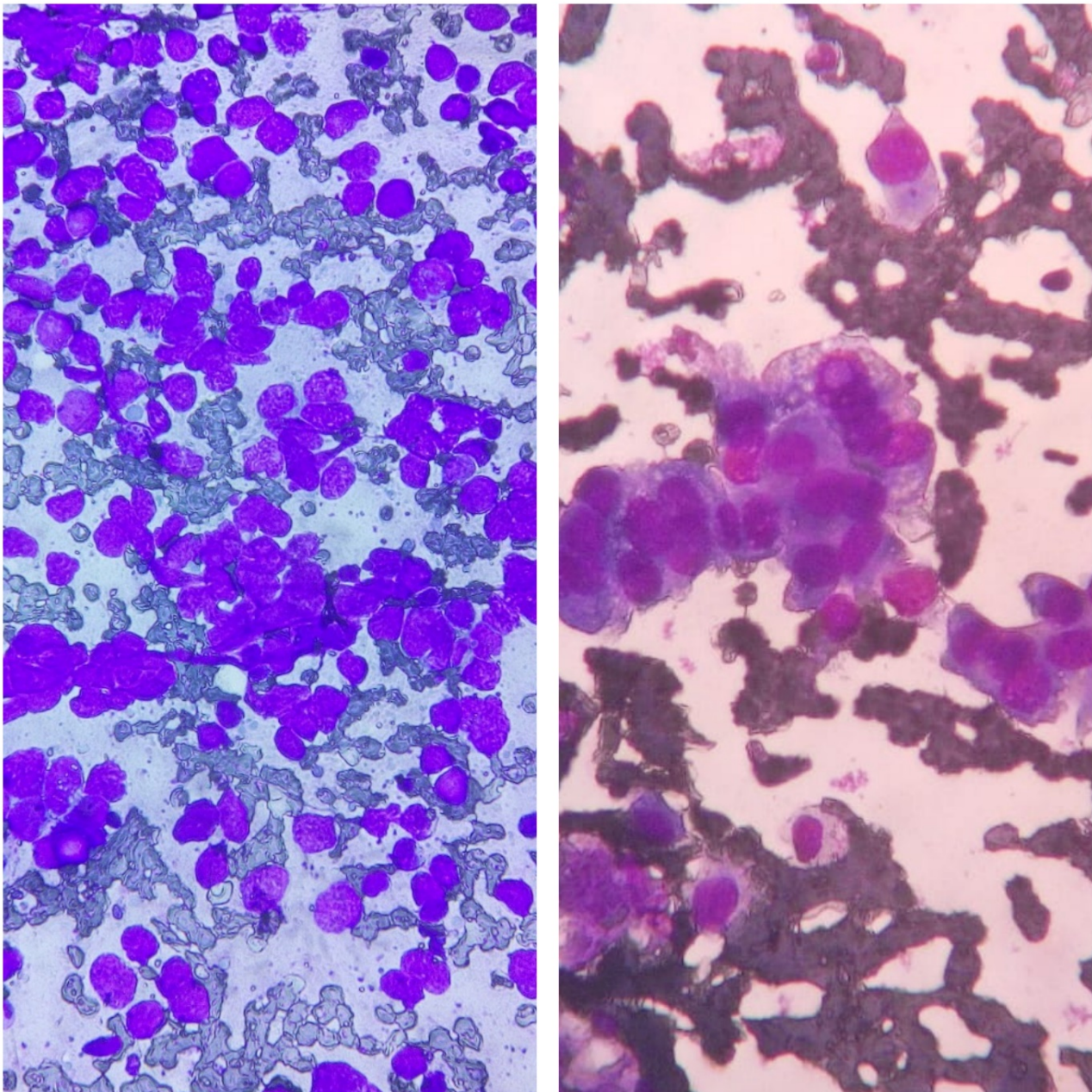


Figure 2: A : CT guided FNA with cytological features of small cell carcinoma lung from a middle aged smoker with a lung SOL B: USG guided FNA with cytological features of hepatocellular carcinoma from a solitary Liver SOL

The age range of our patients was 2.5-85 years. In the study by Tan KB et al ^[12], the age range was between 11 and 82 years. In our study, the age of the youngest person was only 2 years and 6 months to whom FNAC was done from an enlarged lymph node in the bowel wall and diagnosed to have non-Hodgkin lymphoma (NHL).

In the present study, both benign and malignant lesions were most common in the age group of 51-70 years. The number of malignant lesions in the younger age group is lesser than the number of benign lesions in the same age

group. Mukherjee S et al. ^[13] found the maximum incidence of the malignant lesion in the age group of 40-70 years.

The most common malignancy encountered in the abdomen is metastatic adenocarcinoma to the liver, 14 cases (24.13%) followed by hepatocellular carcinoma of the liver, 4 cases (6.89%). The incidence of carcinoma gallbladder in our study was 2 cases (3.44%). In contrast to our findings, Zarger et al. ^[14] found the most common malignancy as carcinoma gallbladder followed by hepatocellular carcinoma (9.6%). RC Adhikari ^[11] found metastatic tumours

of the liver as the most common malignancy encountered in the abdomen (38.4%) followed by hepatocellular carcinoma (24.8%). Parajuli S et al. [2] showed most common malignancy encountered in the abdomen was hepatocellular carcinoma of the liver (22.6%) followed by metastatic carcinoma of the liver (13.2%) and carcinoma gallbladder was found in 5.7% of cases.

There was one case (1.72%) of pancreatic lesion in the present study. Sheikh et al. [12] found 6 (5%) pancreatic lesions in 120 cases. Whereas Parajuli S et al. [2] found 8 cases (15%) of the pancreatic lesion in their study.

Amongst the lungs lesions; non-small cell carcinoma (27 cases) was the most common diagnosis in the present study, similar to the findings by Mukherjee S et al. [13] and Parajuli S et al. [2]

Of the nine cases of intra-abdominal lymph nodes aspirated; 2 cases were diagnosed as granulomatous lesions suggestive of tuberculosis, 2 cases of suppurative lymphadenitis, 5 cases were diagnosed as malignant lesions; 2 metastatic adenocarcinomas and 2 Non-Hodgkin's lymphoma and one case of Hodgkin's lymphoma. Porter B et al. [15] found 58.9% inflammatory lesions and 41.7% malignant lesions. Similar findings were reported by Das and Pant. [16]

Apart from neoplastic lesions, many non-neoplastic lesions like granulomatous lesions (tuberculosis), pyogenic lesions, fungal lesions, etc. are also diagnosed. 36.20% of intra-abdominal and 31.11% of intra-thoracic non-neoplastic lesions were also diagnosed along with 63.80% of intra-abdominal and 68.89% of intra-thoracic neoplastic lesions.

Clinico-radiological parameters showed false negativity in four 4 (3.5%); 1 case of Non-Hodgkin's Lymphoma of the intraabdominal lymph node, two cases of squamous cell carcinoma, and one case of adenocarcinoma lung. Tan KB et al. [12] did a clinical-radiological correlation with FNAC in 114 patients. Eight benign cases (7%) proved to be malignant in clinical pathological follow-up.

USG and CT- guided FNAC is used as a routine procedure in the study of abdominal and thoracic lesions due to high sensitivity and specificity rate and very low complication rate. Barrios et al. and others [17-20] recommended that image-guided FNAC should be used as a routine procedure in the study of abdominal lesions and pulmonary lesions. [21]

CONCLUSION

In this study 63.80% and 68.89% of neoplastic lesions of the intra-abdominal and intra-thoracic cases respectively were diagnosed by this simple outpatient procedure without any major complication & with the lowest cost to the patient as compared to higher cost, morbidity, and lengthy hospital stay in surgical biopsies.

Limitation of the study : Due to the limited number of cases available in the limited study period, further study with larger samples is required for more accurate findings.

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