

# EFFECTIVENESS OF IMAGE GUIDED FINE NEEDLE ASPIRATION CYTOLOGY IN CASES OF DEEP SEATED LESIONS

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## ABSTRACT

**Background:** Newer development in radiology has completely revolutionized the approach to percutaneous aspiration of space occupying deep seated lesions making it rapid, inexpensive, versatile and an adjunctive tool for evaluating internal organs.

**Aims & Objective:** The present study was conducted to evaluate the effectiveness of image guided fine needle aspiration cytology in cases of deep seated lesions.

**Material and Methods:** Total 169 aspirations performed from 161 cases in period of two years, 131 (77.51%) were under USG guidance and 38 (22.49%) were under CT guidance.

**Results:** Overall adequacy rate was 76.92% for guided aspirations. Adequacy rate in case of aspirations done by pathologist was much higher than clinicians with P value (with Yates correction) of < 0.05. The most common organ for aspiration was liver (30.18 %), followed by ovary (23.67 %). Guided aspirations were also done from various organs like lung, retroperitoneal lymph nodes, pancreas, stomach, gall bladder, kidney, mediastinum, pleura, suprarenal gland and abdominal wall with high adequacy rate and without complications though with smaller sample size. Cytological diagnosis was possible in 73% cases.

**Conclusion:** Guided aspiration is a simple, safe and cost effective screening test for deep seated lesions with a significant role in the detection of clinically unsuspected malignancy making it an investigation of choice for early confirmation or exclusion of pathology.

**KEY-WORDS:** Computed Tomography Scan; Deep Seated Lesions; Fine Needle Aspiration Cytology; Ultrasonography

## Introduction

Intra-abdominal and thoracic masses are an enigma in surgical pathology.<sup>[1]</sup> Lesions are demonstrated by radiological investigations, but may fail to allow malignant and benign lesions to be distinguished. On the other hand, a firm pathological diagnosis is essential both for treatment and staging of cancer.

Fine needle aspiration cytology (FNAC) is nowadays a widely used tool for the diagnosis of superficially palpable lesion as well as deep seated lesions of thorax and abdomen. The technique is relatively painless and reliable, produces speedy results and is cheap. In 1939, Blady carried out aspiration cytology using imaging techniques & in 1952, Lindblom and Edholm reported on Roentgen television the guided needle puncture examination of renal cysts and tumors.<sup>[2,3]</sup> Holm H

Pedersen JF used percutaneous needle biopsy under CT scan and USG guidance in 1975.<sup>[4]</sup> The techniques of image guided FNAC not only permits precise anatomic imaging and targeting of the lesions, but also allows the planning of a safe access route, with constant visualization of the needle tip during insertion, thereby reducing the risk of complications.<sup>[3]</sup> The advantage of USG over CT scan is that it is rapid, inexpensive, versatile, without radiation exposure, easily repeated when necessary & does not require injection of contrast medium.<sup>[5]</sup>

The aim of present study was to evaluate the effectiveness of image guided FNAC in case of deep seated lesions, which will avoid unnecessary hospitalization and other invasive diagnostic procedures as well as help clinician to decide the further management.

## Materials and Methods

The aspirations of deep seated lesions were performed from November 2008 to July 2010 under image guidance in 161 patients attending the tertiary level hospital. The study was conducted after obtaining ethical committee clearance of the same institute. FNAC was performed as per standard procedure after taking the informed consent of patients. Procedures were carried out under the guidance of USG & CT scan. Patients with fairly palpable or non-palpable swellings in the deeper viscera or deep compartments of the body were considered for study while patients with superficial well defined swellings, pulsatile swellings and swellings with surface ailments were excluded from the present study. Smears were prepared from materials obtained and fixed with 95% alcohol and were stained by the H & E and May Grunwald Giemsa stain. Prepared slides were examined under the microscope and were reported by experienced pathologists.

### Statistical Analysis

For categorical variables, proportions were compared using Fisher's exact test & chi-square test. A two-tailed P value with Yates correction of < 0.05 was considered significant. The odds based analysis was also done. The statistical analysis was done with the help of Epi Info™ version 7.0.8.3 software, CDC.

## Results

A total 169 FNAC of deep seated lesions were done under image guidance. Amongst which, 75 (46%) patients were males and 86 (54%) patients were females. Patients age ranged from 10-80 years with a maximum no of cases (26.70%) in 41-50 year age group. 131 (77.51%) aspirations were done under USG and 38 (22.49%) aspirations were done under CT guidance. The various results pertaining to the study are shown in figure 1. Aspirations were done from various anatomic regions and organs such as liver, lung, lymph node, ovary, kidney, GIT, pancreas, gall bladder, mediastinum, suprarenal, paraspinal & inguinal region. As shown in table 1, liver was the commonest organ, constituting 30%, followed by

ovary constituting 24%. During the study, significant complication was not observed in any guided FNAC procedure.

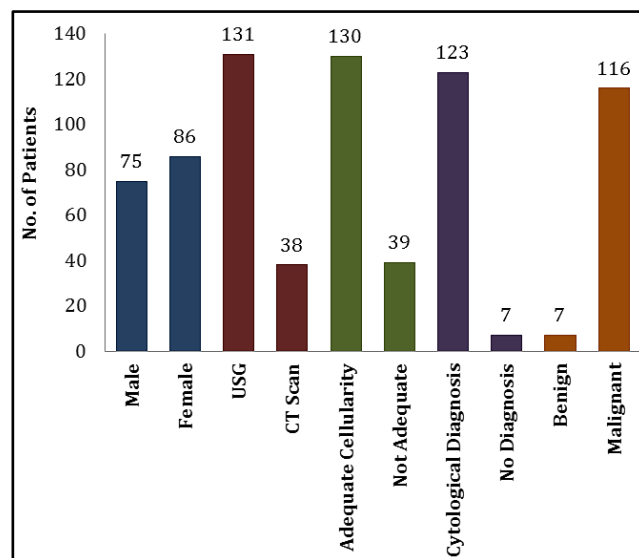


Figure-1: Various Results of 169 Image Guided Aspirations

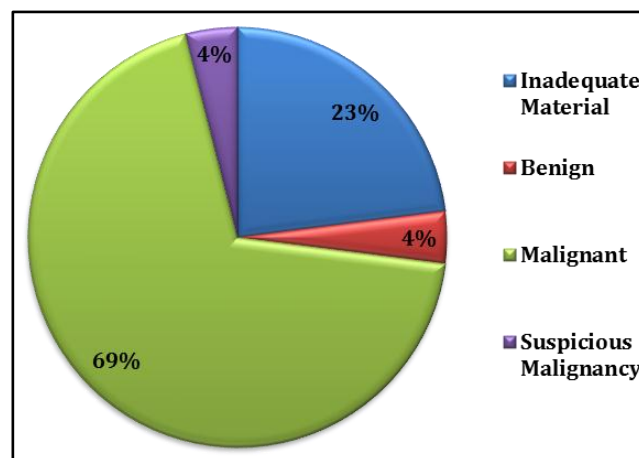


Figure-2: Nature of Lesions in 169 Image Guided Aspirations

Table-1: Organ wise Distribution of 169 FNAC Procedures

Organ	No of Aspiration	%
Liver	51	30.18
Ovary	40	23.67
Lung	32	18.93
Retroperitoneal Lymph Node	7	4.14
Gall Bladder Fossa	5	2.96
Stomach	5	2.96
Mediastinum	4	2.37
Pancreas	4	2.37
Anterior Abdominal Wall	2	1.18
Kidney	2	1.18
Pleura	2	1.18
Inguinal Region	1	0.59
Para Spinal	1	0.59
Suprarenal	1	0.59
Not Specified	12	7.10
Total	169	100.00

Out of 169 aspirations, in 39 (23.07 %) cases material was inadequate. Out of 130 remaining cases, in 123 (72.78 %) cases cytological diagnosis was possible. 116 (68.63%) cases were malignant and seven (04.14%) cases were benign.

Malignant lesions diagnosed by FNAC were primary & secondary neoplasm of liver, adenocarcinoma of various organs, sarcoma, neuroendocrine carcinoma, non-hodgkin's lymphoma, anaplastic carcinoma, mixed germ cell tumor, small cell carcinoma, squamous cell carcinoma, large cell carcinoma, acinic cell carcinoma, Ewing's sarcoma, adrenocortical tumor, renal cell carcinoma, seminoma and various surface epithelial carcinomas of ovary. Benign lesions diagnosed in the study were serous cystadenoma, thymoma and angioliopoma. Non neoplastic lesions included were abscess and tuberculous inflammation.

The two tailed P value (with Yates correction) of present study was 0.0000014 along with odds ratio of 25.14 for adequacy rate of FNAC done by pathologists as compare to adequacy rate of FNAC done by clinicians.

## Discussion

In present study, 169 aspirations were done from 161 cases and the results were compared with various studies. The adequacy rate was 76.92% and out of these cases, in 94.62% cases definite diagnosis was made. Adequacy depended on the size, location, consistency of lesion, histological tumor type, vascularity and amount of necrosis present. The material aspirated was usually adequate in malignant lesion, in comparison to benign and non-neoplastic lesions, suggesting guided FNAC should routinely be done in deep seated lesions due to high adequacy rate and very low complication rate.

In present study, 13 aspirations were done by clinicians and 156 were done by pathologist. The adequacy rate in case of aspiration done by pathologist was much higher than clinicians with P value (with Yates correction) of 0.0000014 and odds ratio of 25.14, emphasizing the role of pathologist in image guided FNAC.

Out of 169 aspirates, cytological diagnosis of benign, malignant and suspicious of malignancy was given in 4%, 69% and 4% respectively & 23% aspirates had inadequate material for any diagnosis as shown in figure 2. The most common cytological diagnosis was malignant neoplasm (89.23%) and liver was the most common site for FNAC. The findings of present study are similar to the studies performed by R C Adhikari et al, Shamshad et al & Sidhaling reddy et al.<sup>16-81</sup>

The age distribution observed in present study ranged from 10 - 80 years reflecting that image guided FNAC of deep seated lesions can be done in wide range of age group including children without any major complications.

Though CT scan is more accurate for lesion localization, USG was used in more number of cases in present study. CT scan was used only in those cases, in which mass localization was not possible by USG and repeated USG guided FNAC failed to yield enough material. It was observed that except for a few lung lesions, all intra-abdominal and intra-thoracic lesions could be localized by USG satisfactorily and USG guided FNAC had yielded adequate material. In cases where repeat aspiration was needed USG guided FNAC was preferred to the CT guidance, because it was less time consuming, there was less chance of radiation exposure and it was possible to repeat without much discomfort to patient.

On considering distribution of cases as per organ involved or site of lesion, majority of the cases belonged to liver (51 cases) with adequate aspirates in 82.35 % cases similar to the study conducted by R C Adhikari et al and M Sheikh et al.<sup>16,91</sup> This was followed by 40 cases of ovary, where adequate aspirate was obtained in 80 % cases. In liver lesions, the most common diagnosis was metastatic carcinoma (39.21%) followed by primary hepatocellular carcinoma (27.45%). Of the ovarian lesions, most common diagnosis was surface epithelial tumors comprised of 65.52% of all cases.

In 32 cases of lung lesions, adequacy rate was 53.13%. Most common diagnosis was squamous cell carcinoma. In all lung cases, aspirations were done by clinician & not by pathologist. This could

be the reason for low adequacy rate in lung lesions. This emphasizes the role of pathologist for adequate yield.

Of the seven cases of retroperitoneal lymph nodes, most common diagnosis was lymphoma. As lymphoma can be cured with chemotherapy effectively, diagnosis by means of nonsurgical intervention like FNAC in such deep seated lesions, increases the importance of image guided FNAC. Guided FNAC was also done from various organs like pancreas, stomach, gall bladder, kidney, mediastinum, pleura, suprarenal gland & abdominal wall with high adequacy rate and minimal complications.

In 20 cases (1.18%) histopathological examination was possible. Low percentage of histological correlation can be explained on the basis that the expressed intent with FNAC was to diagnose deep seated lesions and in addition, patients advised for biopsy, had either not given consent for any surgical intervention or had failed for follow up. Most of patients diagnosed to have malignant tumour cytologically were directly referred to higher centre. In many cases, there after follow up of patients was not possible. Hence, histopathological confirmation was possible only in few cases.

## Conclusion

Imaging can easily and precisely visualize deep seated intra-abdominal and thoracic mass lesions and image guided FNAC can be regarded as the investigation of choice for early confirmation and exclusion of neoplastic diseases. It allows rapid morphological evaluation of doubtful lesions

without costlier invasive surgical intervention with sufficient diagnostic reliability.

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