

**Original article:**

## **Study of Image Guided FNAC in Intra-abdominal Mass Lesions at tertiary care hospital, Jamnagar, Gujarat, India**

**Dr. Suva Chetal M**

Shri M. P. Shah Medical College Campus, Jamnagar, Gujarat, India, Pin-361008.

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**Abstract:**

**Context:** “Diagnostic procedure should not worsen the disease state as being minimally invasive”, FNAC of abdominal lesion is really a medical boon to mankind.

**Aims:** To evaluate diagnostic accuracy of FNAC & the utility of FNAC as simple, rapid & minimally invasive diagnostic procedure.

**Methods and Material:** This was a prospective study & was approved by institutional ethics committee in Jamnagar, India. The present study comprises of 100 patients in whom FNAC were carried out. After taking written consent of patients, FNAC was carried out in Radiology Department & smears were prepared from aspirates. These prepared smears were fixed, stained & examined.

**Results:** Mean age being 55 years with Male to Female ratio was 0.88:1. Commonest organ aspirated was liver (62%). Of the 100 cases, 86 were diagnosed as neoplastic lesions (78 malignant and 08 benign) followed by non-neoplastic 11 and 03 aspirates were inadequate. Out of 64 cases in which we have histopathological confirmation was available cytodiagnosis was compatible in 60 cases and 04 cases were incompatible. So the diagnostic accuracy of FNAC was 93.75%.

**Conclusions:** It offers the advantage of rapid diagnosis so save the valuable time for the patient with a minimum of surgical intervention and with the help of radiological guidance diagnostic accuracy of FNAC of deep seated lesions may dramatically increases when interpreted by experienced cyto-pathologists.

**Key-words:** FNAC, Intra-abdominal lesions, India, Jamnagar

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**Introduction:**

FNAC is simple, rapid, cost effective, requires little additional resources and carries insignificant morbidity. “Aspiration biopsy is as good as combined intelligence of clinician and pathologist makes it”.(1) Since last 30 yrs several roentgenologic techniques have been developed that have completely revolutionized the approach of percutaneous aspiration of previously inaccessible lesions like intra-abdominal lesions. Constant interaction among imaging and cytopathology department ensures the most accurate diagnostic yield. At times it may not be possible to give specific diagnosis, but cytological

patterns will suggest some clue and help in further planning for the benefit of patients.(2)

**Aims & Objectives:** The present study is undertaken with following aims and objectives.

1. To evaluate the utility of FNAC as simple, rapid & minimally invasive diagnostic procedure.
2. To evaluate diagnostic accuracy of FNAC with the help of radiological guidance for abdominal lesions.
3. To evaluate utility of FNAC for the diagnosis of abdominal lesion, staging of malignancy & detection of metastasis.

**Material and Methods:**

This is a prospective study & approved by institutional ethics committee which was comprises

of 100 patients with abdominal mass lesion in whom fine needle aspiration cytology was carried out at Department of Pathology and Department of Radiology, during the period from January 2014 to August 2015. Relevant details of clinical history, physical examination and radiological findings were obtained in each case. Most of the procedure were done under USG guidance, some deep seated lesion were done under CT guidance.

Patients were explained about the procedure and written consent was taken. In most cases anterior approach was carried out in supine position. Posterior approach was carried out in some cases of kidney and retroperitoneal lesions. The procedure

was carried out in USG or CT section of radiology department. FNAC was carried out and smears were prepared from aspirates. These prepared smears were fixed with cytofix (50% ethyl alcohol+50% diethyl ether) and stained with hematoxylin and eosin and Papanicolaou stain. Whenever required Leishman's stain, periodic acid-schiff and mucicarmine stain was also used.

**Results:**

Of the 100 cases, 97 cases were USG guided, 3 were CT guided. Of the 100 cases, 3 aspirates were inadequate. So the overall success rate of procedure was 97%. The following observation was made in this study.

**AGE :**

Table – 1  
Age distribution of patients (n=100 cases)

Age (in years)	Male	Female	Total
0-9	0	0	0
10-19	2	0	2
20-29	0	3	3
30-39	2	7	9
40-49	6	9	15
50-59	15	19	34
60-69	15	7	22
70-79	5	7	12
80-89	2	1	3
Total	47	53	100

Wide age distribution has been included from 10 to 89 years. Highest number of aspiration was noted in 4th, 5th & 6th decade (table 1).

**GENDER :**

Table – 2  
Gender distribution of patients (n=100)

Gender	No. of patients	Percentage(%)
Male	47	47%
Female	53	53%
Total	100	100%

The M: F ratio was 0.88:1 (table 2).

**SITE:**

Table – 3  
Specific site distribution (n=100)

Region	No. of cases	Percentage (%)
Right hypochondrium	64	64%
Left hypochondrium	01	1%
Right iliac	07	7%
Left iliac	10	10%
Right & left iliac	04	4%
Right lumbar	02	2%
Left lumbar	03	3%
Epigastrium	06	6%
Umbilicus	03	3%
Total	100	100%

Right hypochondrium was the most frequent site of aspiration which was followed by left iliac, right iliac, Epigastrium, umbilicus, left lumbar, right lumbar, left hypochondrium (table 3).

**ORGAN:**

Table – 4  
Organ wise distribution (n=100)

Organ	No. of patients	Percentage (%)
Liver	62	62%
Gall bladder	02	2%
Pancreas	03	3%
Large bowel	01	1%
Small bowel	02	2%
Stomach	03	3%
Kidney	02	2%
Adrenal gland	01	1%

Ovary	20	20%
Spleen	01	1%
Omentum	01	1%
Retroperitoneum	01	1%
Lymph node	01	1%
Total	100	100%

Maximum cases were noted in liver followed by ovary (table 4).

**NATURE OF LESIONS:**

Table – 5  
Nature of lesions (n=100)

Nature of lesion	No. of patients	Percentage (%)
Neoplastic	86	86%
Non neoplastic	11	11%
Inadequate	03	3%
Total	100	100%

Above table indicate that incidence of neoplastic lesions were higher, 3 aspirations were inadequate (table 5).

**BEHAVIOUR OF TUMOUR:**

Table – 6  
Behaviour of tumour (n=86)

Behaviour of tumour	No. of patients	Percentage (%)
Benign	08	9.30%
Malignant	78	90.70%
Total	86	100%

Malignant lesions were encountered more frequently. The malignant lesions were further classified into primary & secondary (table 6).

**MALIGNANCY:**

Table – 7  
Malignancy (n=78)

Malignancy	No. of patients	Percentage (%)
Primary	31	39.74
Secondary	47	60.26
Total	78	100%

Incidence of secondary malignancy was higher than primary (table 7).

Above tables indicate that malignant lesions were maximum in 4th, 5th and 6th decade. The cytological diagnosis was correlated with histopathology, radiology or clinical follow up.

**Correlation of cytodiagnosis with histopathological diagnosis:**

Table - 8

Correlation of cytodiagnosis with histopathological diagnosis ( n = 64 cases)

Cytodignosis	No. of cases	Compatible	Incompatible
Malignant lesion	57	56	1
Benign lesion	07	04	03
Total	64	60	04

According to table no. 8, there were 64 cases in which histological confirmation was done. Out of 64 cases 60 cases were compatible and 5 were incompatible.

Histopathological correlation was not available in 36 cases.

Discordance was observed in four cases (table 9).

Table – 9

Discordance

Cytological diagnosis	Histological diagnosis
Mucinous cystadenoma	Mucinous cystadenocarcinoma
2 cases of Serous cyst adenoma	Serous cystadenocarcinoma
Hepatocellular carcinoma	Metastatic adenocarcinoma

$$\begin{aligned}
 \text{Diagnostic Accuracy} &= \frac{\text{Total Compatible Cases}}{\text{Total Cases}} \times 100 \\
 &= \frac{60}{64} \times 100 \\
 &= \underline{\underline{93.75\%}}
 \end{aligned}$$

**Tables:**

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Table – 10

Inconsistent findings observed by other workers

Author	Year	Cytological diagnosis	Histological diagnosis
Shamshad et al.(20)	2006	Mucinous cystadenoma	Mucinous cystadenocarcinoma
Nazoora khan et al.(22)	2009	Serous cystadenoma	Serous cystadenocarcinoma
		Mucinous cystadenoma	Mucinous cystadenocarcinoma
Ghazala mehdi et al.(23)	2010	Teratoma	Immature teratoma
Sidhalingreddy et al.(21)	2011	Serous cystadenoma	Serous cystadenocarcinoma
		Mixed epithelial tumour	Brenner tumour
		Hepatocellular carcinoma	Cirrhosis

**Discussion:**

FNAC is a method where a very small quantity of tissue, fluid and cells are aspirated from a lesion for cytological examination. Although needle aspiration cytology had been performed

intermittently in the second half of the last century, but it was first popularized by Martin, Ellis and Stewart at Memorial Hospital for Cancer and Allied Diseases, New York in the 1930. The initial targets were palpable masses, particularly enlarged



lymph nodes and breast lump, but now FNAC of intraabdominal masses has become increasingly common.(3) Any intraabdominal or retroperitoneal masses can be aspirated with a USG guided FNAC is now widely accepted as a safe diagnostic procedure in various neoplastic and non neoplastic disorders(4),(5),(6),(7),(8),(9),(10),(11),(12),(13),(14), however Khanna et al.(15) performed FNAC without guidance in case of palpable masses. Some workers also performed FNAC with the help of computerized tomographic(16),(17),(18) or fluoroscopic guidance(11),(19). Sensitivity and specificity is found to be increased when FNAC is taken with help of radiological guidance and its advantage was emphasized. Various studies reviewed showed that, some authors performed FNAC in lesion of all abdominal organs while some limited to particular organ specific.

The present study was of 100 cases including various organs of abdomen. Of the 100 FNACs, 97 were USG guided and 3 CT guided. Of the out of 100 cases, 97 aspirates were adequate to reach upto cytological diagnosis. So overall success rate of study was 97%. Success rate of other studies like Khanna et al.(15) (1990) was 94.90%; Shamshad et al.(20) (2006) was 93.50% & Sidhalingreddy et al.(21) (2011) was 93.46%.

#### **AGE :**

Wide age distribution seen in various studies from 8 month in hepatoblastoma(19) to 85 years in case of clear cell type hepatocellular carcinoma.(16) In present study the age range was from 13 year in case of abscess to 84 years in case of mucinous cyst adenocarcinoma (Table 1).

#### **GENDER :**

Some of the workers have observed male predominance(74) while others observed female predominance.(20),(21) In present study, female predominance was observed (Table 2), which

remains variable due to inclusion of lesions of ovaries in female and diseases of liver.

#### **SITE AND ORGAN :**

In present study right hypochondrium was the most common site and liver was the commonest organ of aspiration followed by ovary (Table 3 and 4). Other studies like Nobregn and Santos(11) (1995) Stewart et al.(9) (2002); Shamshad et al.(20) (2006); Sidhalingreddy et al.(21) (2011) were also right hypochondrium was the most common site and liver was the commonest organ of aspiration.

#### **NATURE OF LESION :**

In present study most common nature of lesion is malignant of which most common were secondary malignancy (Table 5, 6 and 7). Other studies like Stewart et al.(9) (2002); Shamshad et al.(20) (2006); Sidhalingreddy et al.(21) (2011) were also malignant lesion was most common nature of lesion.

#### **ACCURACY RATE :**

Of the 100 cases histological confirmation was available in 64 cases. Diagnostic accuracy were calculated and found to be 93.75%. Diagnostic accuracy of other studies were Khanna et al.(15) (1990) – 84.60%; Khan et al.(3) (1996) – 94.00%; Shamshad et al.(20) (2006) – 95.70%; Sidhalingreddy et al.(21) (2011) – 96.50%.

Inadequate aspiration were due to tumour heterogeneity, vascularity, necrosis and fibrosis. An attempt was made to minimize interpretative error by developing good understanding with radiologist and clinicians. In present study no major discomfort were observed following FNAC except minimal discomfort at the time of needle puncture. Discordance were observed in four cases (table 9). One case of liver was cytologically diagnosed as hepatocellular carcinoma and case was correlated clinically (patient had no other evident primary) and radiologically (single lesion). Cells showed poor differentiation. Then patient had whole body

CT scan afterwards and primary was found in lung. Two cases of Ovary was diagnosed cytologically as benign serous cyst and histologically the case was diagnosed as serous cystadenocarcinoma. One case of ovary was

diagnosed as mucinous cyst adenoma on aspiration. It was histologically diagnosed as mucinous cyst adenocarcinoma. There was very low cellularity on aspiration and patient refused for repeat FNAC and went operative procedure.

Inconsistent findings observed by other workers mentioned in (table 10).

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		Mixed epithelial tumour	Brenner tumour
		Hepatocellular carcinoma	Cirrhosis

In present study similar discordance was observed in organs like ovary and liver.

**Conclusion:**

As a consequence to the aim of the study the following conclusions are made.

1. Fine needle aspiration cytology is a simple, inexpensive, safe, repeatable and rapid diagnostic procedure that has application in the evaluation of deep seated abdominal mass lesion.
2. It offers the advantage of rapid diagnosis with a minimum of surgical intervention. It is cost effective and save valuable time for the patient. It may replace surgical procedures in some cases, while in others it may help the surgeon in preoperative planning. It can be used as an adjunct to histopathological diagnosis.

3. With the help of radiological guidance diagnostic accuracy of FNAC of deep seated lesions may dramatically increase when interpreted by experienced cytopathologists working closely having good communication with radiologists and clinicians.
4. The accuracy of diagnosis can be enhanced and problems encountered regarding classification of tumours can be minimized by use of immunohistochemical techniques, tumour markers and electron microscopic examination of material obtained by FNAC.
5. The main utility of FNAC in abdominal mass lesion is whether it is benign or malignant. If malignant then it is primary or metastatic.

As we said in introduction that being lesion is really a medical boon to mankind. minimally invasive, FNAC of abdominal

**Acknowledgement:**

I express my tributes to all the patients, the centre of medical universe, around which all our work revolve and towards which all our efforts trend, who in spite of their sufferings volunteered to participate in this study and without which this work would have not been possible. I also acknowledge to the Pathology Department, Jamnagar, Gujarat, India for extending support for the study.

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