

To Study the Ultrasound Guided Fine Needle Aspiration Cytology of Intra-Abdominal Liver Masses

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Abstract

FNAC being a safe OPD procedure can be used as an important diagnostic tool for any abdominal mass. The basic principle of an ultrasound guided FNAC is that, the rather complicated three-dimensional problem of hitting a small target is converted to a much simpler two dimensional imaging technique. Samples may be obtained from the deeper structures as the first step in the laboratory investigation, thereby, quickly satisfying the avidity of clinicians for a rapid diagnosis.

Material and Methods: This study involved eighty patients of clinically or sonologically diagnosed intra-abdominal mass lesions. Under the ultrasound guidance FNAC was performed and slides were stained with H and E, MGG and Papanicolaou stains.

Results: Majority of the intra-abdominal masses were malignant (75%). Liver was the commonest site (60%). Hepatocellular carcinoma was the commonest tumour. The ultrasound guidance helped to procure adequate material, the diagnostic yield being 94.6%.

Conclusion: USG guided FNAC of intra-abdominal lesions is a rapid, cost effective, accurate, non-invasive and a safe diagnostic procedure. It is a valuable tool in differentiating inflammatory, benign and malignant lesions and also assists in categorizing different malignant lesions.

Keywords: FNAC, USG, Intra-Abdominal Mass.

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Introduction

As documented earlier, the accurate diagnosis of abdominal masses is difficult and necessitates for a histopathological confirmation of diagnosis. There have been recent advances in the diagnostic modalities like percutaneous transhepatic cholangiography, endoscopic retrograde cholangio pancreatography (ERCP), ultrasound (US), computerized axial tomography (CAT) etc. But the accurate diagnosis of abdominal lumps is difficult and calls for a histopathological confirmation. All these investigatory techniques are expensive and may need a

hospital admission. So there are many advantages of FNAC of palpable intra-abdominal lumps over above mentioned diagnostic techniques, like it is an outdoor procedure necessitating neither patients preparation, nor specialized anesthesia. It eliminates hospital admission, is safe and almost painless [1] FNAC being a safe OPD procedure can be used as an important diagnostic tool for any abdominal mass. [2] The basic principle of an ultrasound guided FNAC is that, the rather complicated three-dimensional problem of hitting a small target is converted to a much simpler two

dimensional imaging technique. Samples may be obtained from the deeper structures as the first step in the laboratory investigation, thereby, quickly satisfying the avidity of clinicians for a rapid diagnosis. [3] Fine-needle aspiration cytology (FNAC) was performed on a large scale at Memorial Hospital, New York, during the 1930s, but during the ensuing years, it did not gain much popularity in United States. The technique was revisited again in Scandinavia during the 1950s and 1960s, where it was encouraged before spreading to other parts of the world. It had also a development in the United States, which contributed substantially to this technique in each and every aspect. [4] First evidence of fine-needle aspiration cytology (FNAC) as a technique for obtaining diagnostic material dates back to the 19th century when, at St Bartholomew's Hospital, London, aspiration was performed on a large mass in the liver by the surgeons Stanley and Earle [5] In 1912, a German haematologist, Hans Hirschfeld(1873-1944), reported the first needle aspiration biopsy by reporting the diagnosis of cutaneous lymphomas and other tumors with the use of needle aspiration biopsy and histological process of the acquired cellular material .In his paper named 'Über isoliertealeukämische Lymphadenose der Haut', he explained his technique in a very detailed way (translated in English): "One of the largest facial tumor is punctured. It is not possible to aspirate any fluid and so the blood drops emerging from the puncture are taken for dry preparation on a slide. Staining with May-Giemsa produced their picture..."[6] Leonard Stanley Dudgeon (1876-1938), a pathologist employed at St Thomas' Hospital in London and Professor of Pathology in University of London, was the first to scientifically justify the technique of needle biopsy. Dudgeon's intention was the need to establish a fast and safe diagnosis of histological preparations. He mounted tissue material from surgical biopsies to glass slides by using touching smears or

imprints [7]. Many authors have described the benefits of directed percutaneous fine needle aspiration of suspected mass lesions in abdomen and retroperitoneum and its contribution to the formulation of further patient management is stressed [8]

Material and Methods

This study involved 40 cases of clinically or ultrasonographically diagnosed abdominal masses, who were referred for FNAC to the Department of Pathology, VIMS, Ballari, Karnataka, India during the period from 2019-2021. A majority of the patients presented with a mass per abdomen and some with pain in the abdomen. Detailed clinical data including the clinical history, physical examination findings were noted. Reports of relevant investigations were recorded. The patients were subjected to a ultrasonographic evaluation to assess the origin of the mass and its relationship with the adjacent organs. A percutaneous FNAC of the mass was done under USG guidance, in the Department of Radiology. CT guidance was taken in some deep-seated lesions. A 10ml disposable plastic syringe and a 22gauge needle were used. Smears were prepared and fixed using 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.

Inclusion Criteria

All patients with intra-abdominal mass confirmed by radiological examination. It includes masses arising from the liver

Exclusion Criteria:

Patients with haemorrhagic diathesis. Patients with skin infection at the site of aspiration. Lesions arising from the abdominal wall, uterus , cervix, prostate and bone. Non co-operative patients.

Results

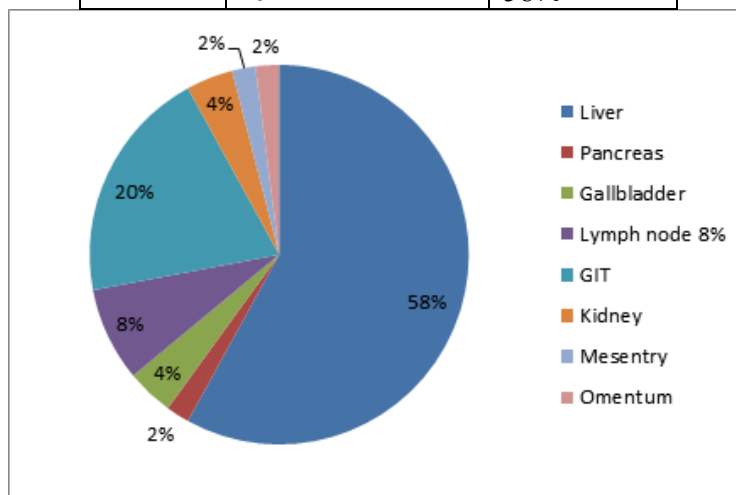
Fourty patients who underwent ultrasonographic guided fine needle aspiration cytology of abdomino-pelvic

masses have been analysed cytologically. A correlation between FNAC and radiology was done. The clinical data as per the proforma, USG findings and cytological

interpretation were reviewed for all the cases and the following observations were documented.

Table 1: Anatomical origin of abdominal masses.

Organ	Number of cases	Percentage
Liver	29	58%



Graph 1: Anatomical origin of abdominal masses

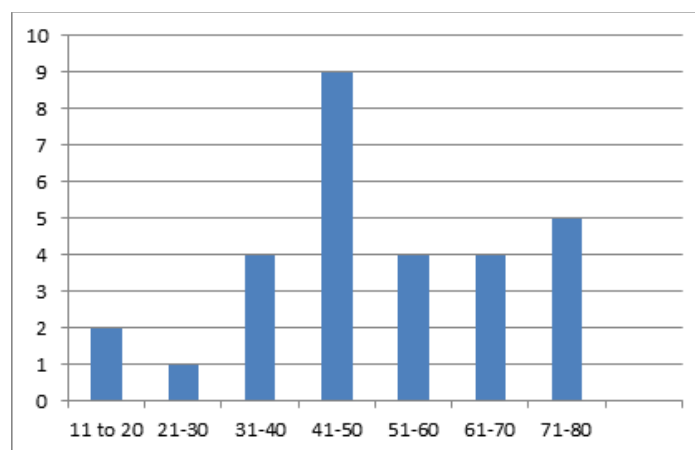
Commonest anatomical origin encountered was hepatic masses accounting for 29 cases (58%) followed by gastrointestinal masses constituting

Liver Masses

USG guided FNA of liver was done in 29 cases in the present study.

Age

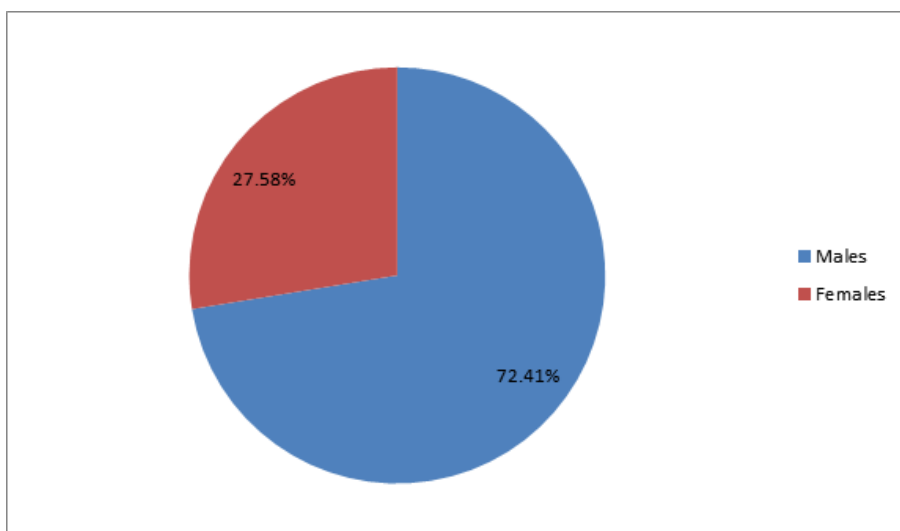
Age group of patients referred for FNA of liver ranged from 16 years to 78 years. 09 cases (51.7%) were in the age group of 41-50 years.



Graph 2: Age distribution of liver masses

Sex

Among the liver aspirates 21 cases (72.41%) were males and 08(27.58%) were females. Male to female ratio was 2.62:1. (Table 3)



Graph 3: Sex distribution of liver masses

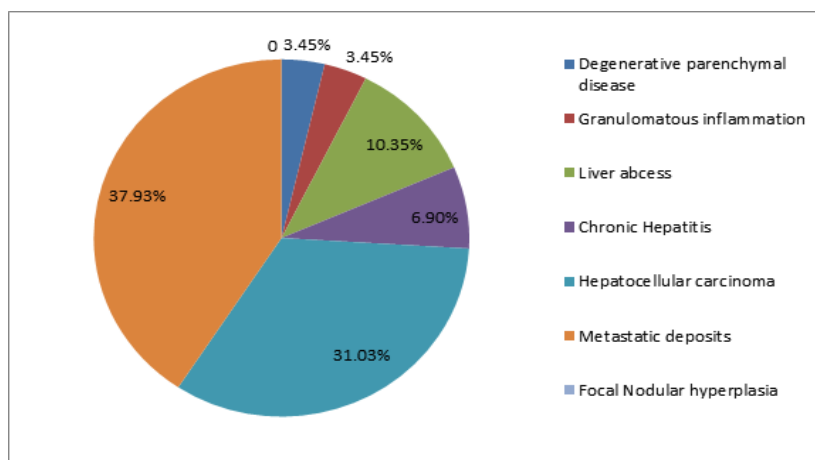
Among the liver aspirates 21 cases (72.41%) were males and 08(27.58%) were females. Male to female ratio was 2.62:1. (Graph 5)

Cytology

In the present study, the liver lesions were

categorized into non-neoplastic and neoplastic lesions.

Out of 29 cases, neoplastic lesions comprising 22 cases (75.86%) were more common than the non-neoplastic lesions which constituted 7 cases (24.14%).



Graph 4 : Cytological diagnosis of Liver FNAC

Table 2: FNAC diagnosis in 29 cases of liver lesions

Diagnosis	No. of cases	Percentage (%)
<i>Non-neoplastic lesions</i>		
Degenerative parenchymal disease	01	3.45%
Granulomatous Inflammation	01	3.45%
Liver abscess	03	10.35%
Chronic Hepatitis	02	6.90%
<i>Neoplastic lesions</i>		
Hepatocellular carcinoma	09	31.03%
Metastatic deposits	11	37.93%
Focal Nodular Hyperplasia	02	6.89%
Total	29	100

Non-Neoplastic Lesions

The present study encountered 07(24.13%) non-neoplastic lesions out of 29 cases.

Three cases of liver abscess, 2 cases of chronic hepatitis, 1 case of each granulomatous inflammation and degenerative parenchymal disease were reported

Important cytological criteria useful in distinguishing HCC from non-neoplastic liver are increased nucleocytoplasmic ratio, arrangement of tumor cells in trabecular pattern and atypical naked hepatocytic nuclei. Other secondary criteria useful in differentiation are nuclear features i.e., irregularly granular chromatin, uniformly prominent and multiple nucleoli. [6,7]

Liver abscess

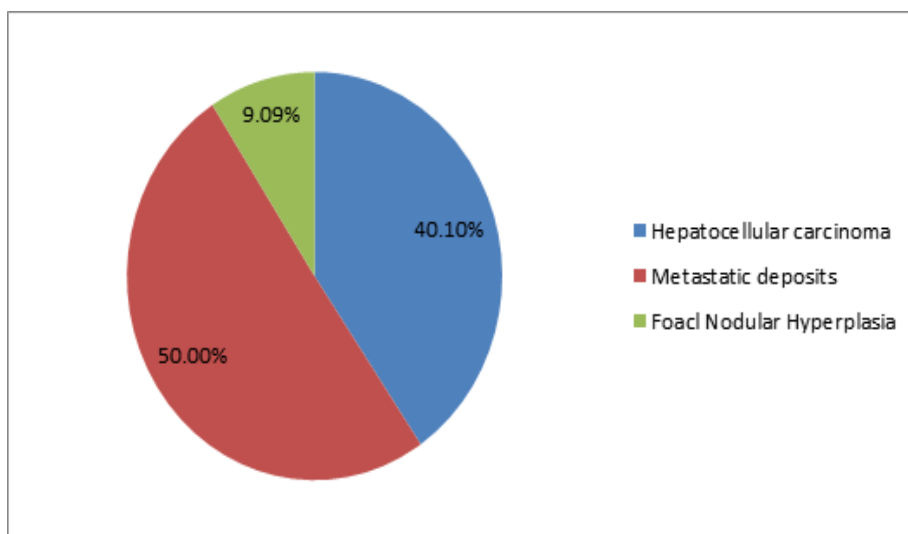
Cytological diagnosis of liver abscess was made in a 2 male patients and in one female patient who presented with abdominal pain

and fever. USG showed a single well defined hyperechoic lesion in all three patients.

USG guided aspirations yielded grey white material which showed numerous neutrophils, degenerated neutrophils, few macrophages, histiocytes, lymphocytes and cellular debris.

Granulomatous inflammation

One case of granulomatous hepatitis was diagnosed cytologically in a 38 year old female patient who presented with pain abdomen, fever and moderate hepatomegaly. USG depicted diffuse parenchymal involvement. The smears were moderately cellular and showed epithelioid histiocytes in small clusters and singles interspersed with foreign body and Langhan's type of giant cells. Occasional benign hepatocytes and bile duct epithelial cells were present against a background of hemorrhage.



Graph 5: Distribution of neoplastic liver lesions

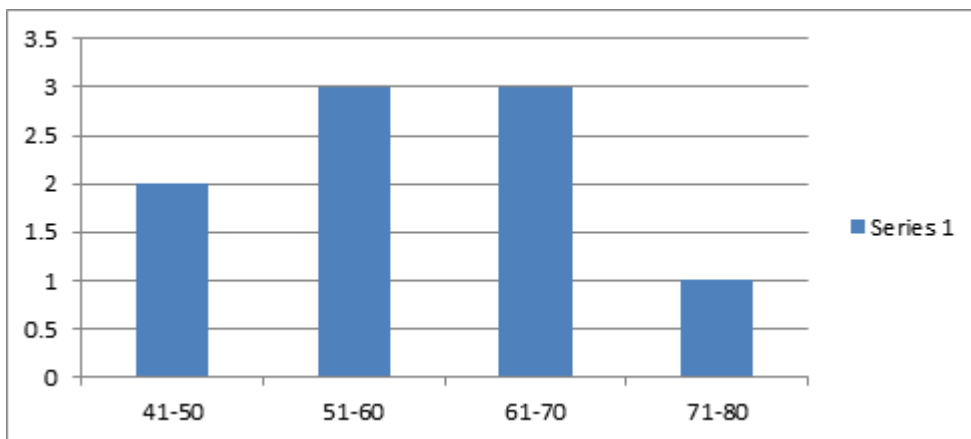
Table 3: Cytological diagnosis of neoplastic liver lesions

Diagnosis	No. of cases	Percentage (%)
Hepatocellular carcinoma	9	40.1%
Well differentiated HCC	2	
Moderately differentiated HCC	4	
Poorly differentiated HCC	3	
Metastatic carcinoma	11	50%
Focal Nodular Hyperplasia	2	9.09%
TOTAL	22	100

Hepatocellular Carcinoma

In the present study, 9 cases of HCC were diagnosed on cytologic examination. There were 7 males (77.77%) and 2 females

(22.22%) with a male to female ratio of 3.5:1. Most of the patients were in the 61-70 years age group. The age ranged between 50 to 78 years with a mean age of 64 years.



Graph 6: Age distribution of Hepatocellular carcinoma

Discussion

In recent years, FNA has emerged as a useful diagnostic technique. Nature of disease, experience and understanding of certain limitations determine its diagnostic utility. In this study, percutaneous aspiration biopsy cytology of intra-abdominal masses, were done and analyzed for their diagnostic utility. This study deals with FNA of intra-abdominal masses performed in 50 patients. In most of patients, abdominal mass was located in right hypochondrium (58%) and less frequent sites were suprapubic, right iliac fossa and hypogastrium. The diagnosis of intra-abdominal, deep lesions is a cumbersome procedure. These lesions present as palpable as well as deep nonpalpable masses. Their biological nature can be benign, malignant, or inflammatory. Many inflammatory conditions such as hepatic abscesses and

tuberculosis can be misleading many times. Imaging techniques do not always distinguish between benign and malignant lesions morphologically. A confirmed diagnosis is essential for management of malignancy. [9] Radiologically assisted cytology in various forms such as USG-guided and computed tomography-guided fine needle aspiration (FNA) is an effective way to obtain diagnostic material [10] With modern day techniques, complication rate is very low. The most common complications are pain, hemorrhage, nausea, and vomiting. With the benefit of less time consumption and cost effectiveness, these procedures are increasing in trend. [11] Radiologically assisted cytology of intra-abdominal lesions is in the favor of both patients and doctors. This procedure has facilitated easy collection of cellular material for rapid and accurate diagnosis.[12,13]

Table 4: Comparison of age and sex distribution of hepatic lesions by different studies and present study

Sl. No.	Authors	No. of cases	Age range/ Mean age	Male: Female
1	R Rajyalakshmi et al [13]	38	30-70 years	1.5:1
2	Mallikarjuna CM Swamy [12]	72	8 months -90 yrs	2:1
3	Talukder Si et al [14]	108	2-83 YRS	1.63:1

4	Tailor SB et al [15]	78	30-80 YRS	1.69:1
5	Present study	29	16-78years	1.7:1

Among the hepatic masses, majority of the cases were neoplastic constituting 22 cases (75.86%) and 7 cases were non-neoplastic lesions (24.31%). This was in tandem with other studies. [14-16]

Table 5: Comparison of the results of FNAC of various liver studies

Cytological Diagnosis	Rastogi N et al [18] (n=570)	Sawke n et al [17] (n=76)	Rosenblatt [16] et al (n=59)	Present study (n=29)
Non-neoplastic	10(17.6%)	6(8%)	12 (20.33%)	07(24.31)
Neoplastic	47(82.45%)	70(92%)	47 (79.66%)	22(75.86)
Suspicious of malignancy	-	-	-	-

In the present study, there were three cases of liver abscess. Liver abscesses constituted 2% of hepatic masses in the studies conducted by R.C Adhikari et al [5] and Ruchika et al. [6]

Necrotic hepatic neoplasms, primary or secondary, can mimic abscesses and vice-versa. Wee et al (1995) has concluded that in the management of liver abscesses there should be clinical and radiological correlation with mandatory cytohistologic confirmation. Cytological diagnosis of granulomatous inflammation was made in one case in the present study in which the smears showed epithelioid histiocytes in singles and small clusters interspersed with multinucleated giant cells and few benign hepatocytes. Caseous necrotic material or acid-fast bacilli were not seen in our case. Cytological diagnosis chronic hepatitis was made in two cases in this study. Smear studied showed reactive hepatocytes with degenerative/ regenerative features; cluster of bile ductal cells; fragment of fibrous tissue with spindle - shaped nuclei. [16-19]

Conclusion

USG guided FNAC is a rapid, economical, precise, non-invasive and a generally safe diagnostic procedure which can be used in diagnosing various abdominal masses, thereby avoiding uncalled for, expensive and often invasive diagnostic laparotomy

and other procedures. It is a highly accurate procedure which can be done on an out-patient basis there by avoiding admission and hospital stay. It can preempt a lengthy and an expensive workup in the search for a primary tumor. It has emerged as a reliable method which involves minimal/no risks and complications. USG guided FNAC, as the first line investigation, is not only useful in the diagnosis of deep seated, inaccessible and space-occupying lesions, but it also helps in choosing the appropriate management.

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