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Image guided fine needle aspiration cytology study of Liver lesions

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ABSTRACT

Background: Image guided fine needle aspiration cytology (FNAC) is a rapid, accurate and safe diagnostic procedure that can be used in various neoplastic and nonneoplastic
diseases of the liver.

Objectives: This study undertaken to emphasise the utility of image guidance in FNAC diagnosis of liver lesions and to categorise the various hepatic lesion and also to correlate clinical features, radiological findings and laboratory investigations with cytological diagnosis.

Methods: The present study includes 55 Liver FNAC cases studied over a 5-year period (June 2011- July 2016).After detailed clinical details and examination patient is subjected to radiological(USG or CT) examination.Patients with liver lesions were subjected to guided FNAC.Various parameters like age,sex,biochemical investigations, radiological diagnosis and cytological diagnosis correlated.

Results: A total of 55 Liver FNAC cases were collected over 5 years. The mean age was 56.79 years and the male to female ratio was 1.6:1. Out of 55 cases 11 were non neoplastic lesions and rest 44 cases were neoplastic lesions.Primary tumors of Liver were 24 and 20 cases were metastatic tumors.

Conclusions: In present study FNAC helped to distinguish non-neoplastic from neoplastic lesions, and categorize different lesions & differentiate primary from metastatic tumors.

KEYWORDS: Fine needle aspiration, Cytology, Liver lesions

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INTRODUCTION

Background

Fine needle aspiration cytology(FNAC) is of latest and extensively utilized in the diagnosis of lesions aided by image guidance, it is becoming an initial investigation of choice for various hepatic lesions[1].Inflammatory lesions and diffuse liver diseases may mimic mass like lesions or appear as non homogeneous lesions on radiographs. Such lesions can also be sampled by FNA to rule out neoplasms and differentiate it from other diagnosis[2]. Diagnostic sensitivity of FNA in malignancy is usually around 90%. The differential diagnosis of hepatic mass lesions includes primary liver tumors, benign or malignant, metastatic deposits, congenital and acquired cysts, abscesses and granulomas[3]. The main indication of doing liver FNA include single or multiplenodular lesions as demonstrated by palpation, USG or Computed Tomography(CT scan) · Thus this study helps us to emphasise the utility of image guidance in FNAC and to study the various cytological features of the liver lesions.

MATERIALS AND METHOD

A total of 55 cases studied from June 2011 to June 2016, three year retrospective and two year prospective study in the Department of Pathology, MR Medical College, Gulbarga. After detailed clinical details and examination, patient is subjected to radiological (USG or CT) examination. Patients with liver lesions were subjected to guided FNAC. Various parameters like age, sex, biochemical investigations, radiological diagnosis and cytological diagnosis correlated.

FNAC is done after applying negative pressure. The specimen is expressed on to a clean glass slide and spread. Two dry smears were made and 2 smears were fixed in alcohol 95%. Excess specimen was fixed in formalin and preserved for cellblock. Alcohol fixed smears were stained with PAP/H&E and dry slides were stained with MGG stain

RESULTS

Table – 1: FNAC diagnosis in 9 cases of non neoplastic lesions (n=9)

Diagnosis	No of Cases	Percentage

Pyogenic Liver abscess	4	44.45%
Diffuse parenchymatous lesion	2	22.23%
Hydatid Cyst	1	11.11%
Cystic lesion	1	11.11%
Total	9	100

Table -2: Cytological diagnosis of Neoplastic lesions(n=46)

Diagnosis	**No of cases**	**Percentage**
Benign- Hemangioma	2	4.35%
Hepatic Adenoma	01	2.17%
Malignant- Hepatoblastoma	01	2.17%
Hepatocellular carcinoma	22	47.83%
Metastatic tumours	20	43.48%
Total	46	100

Table - 3: Relation between Hepatocellular Carcinoma and HbsAg Positivity

No of HCC	No of cases where HbsAg done	HbsAg positive cases	HbsAg Negative cases	Percentage of HbsAg Positivity
22	14	9	5	64.28%

Table – 4 : Cytological features of HCC

Cytologic feature(n=22)	**No of cases**	**Percentage**
Hypercellularity	21	95.45%
Patterns Trabecular	10	45.45
Acinar	03	13.63
Traversing endothelium	04	18.18
Endothelial cells	05	22.72
Bile stasis	15	68.18
Intracytoplasmic inclusion	10	45.45
Pleomorphism	19	86.36
Increased N:C ratio	19	86.36
Multiple nuclei	03	13.63
Atypical naked nuclei	10	45.45
Intranuclear vacuolations	16	72.72
Macro nucleoli	13	59.09
Multiple nucleoli	08	36.36

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

Cytological diagnosis	**Gatphoh et al[5] n=202**	**Balani S et al n=52[7]**	**Lekha M B et al[6] (n=60)**	**Present study n=55**
Non neoplastic	102(50.4%)	2(3.85%%)	6(10%)	9(16.36%)
Malignant	100(49.5%)	50(96.15%%)	53(89.33%)	46(83.64%)
Suspicious of carcinoma	-	-	1(1.66%)	-

A total number of 55 cases of Liver lesions were cytologically analysed. Cell block/ needle core biopsy were available for 20 cases to correlate histopathologically. Thus correlation between radiological study and FNAC , between FNAC and Histopathology were established. Radiology findings revealed solitary mass in majority of cases 33(60%) and located in right lobe.

Out of 57 cases,2 cases had inadequate aspirate therefore 2 cases were excluded from the study.

The age of the patients ranged from 4days to 75 years with a mean age of 56.79 years. The majority were male patients in 60 to 70 years of age group (Graph 1). Males accounted for 34 cases (61.81%) and females 21cases (38.18%) with a male to female ratio of 1.6:1(Graph 2)

The biochemical parameters analysed which included serum bilirubin, SGOT/SGPT levels and alkaline phosphate (ALP) levels. The serum bilirubin was elevated in 26.53% cases.(51.02%) cases had elevated liver enzymes, while only 16% of the cases showed marked rise in liver enzymes.

In current study of 55 cases liver lesions are mainly classified as neoplastic and non neoplastic lesions. Most common lesion encountered is neoplastic lesions 46 cases(83.64%) followed by 9(16.36%)cases of non neoplastic lesions.

There were 2(22.23%) cases of Diffuse parenchymatous lesion in which smear showed loss of cohesion of cells and increased proliferation of Kupffer cells , and also there is 1 case of fatty liver where hepatocytes showed increased number of vacuoles(Table 1).

One elderly lady presented with right hypochondriac pain, USG showed big well circumscribed lesion impression given as Hepatoma?. Further FNAC was advised for this patient, in which smear showed lamellar membrane and scattered refractile Hooklets in the background of Hepatocytes (Fig 1). It was accidentally diagnosed as Hydatid Cyst. If the diagnosis is established clinically, an aspiration is contraindicated because spillage of the cyst contents may result in dissemination or anaphylactic shock.

Present study encountered 46 cases of neoplastic lesions(Table 2). Most common neoplastic tumours were Hepato cellular carcinoma (22). Among 44 cases of neoplastic lesions 2 (4.35%)cases of Hemangiomas where aspirate was hemorrhagic and only showed scattered hepatocytes and endothelial cells. 1 case of Hepatic adenoma was diagnosed with help of imaging findings (Fig 2). Mass was removed and Diagnosis of Hepatic adenoma was confirmed histopathologically.

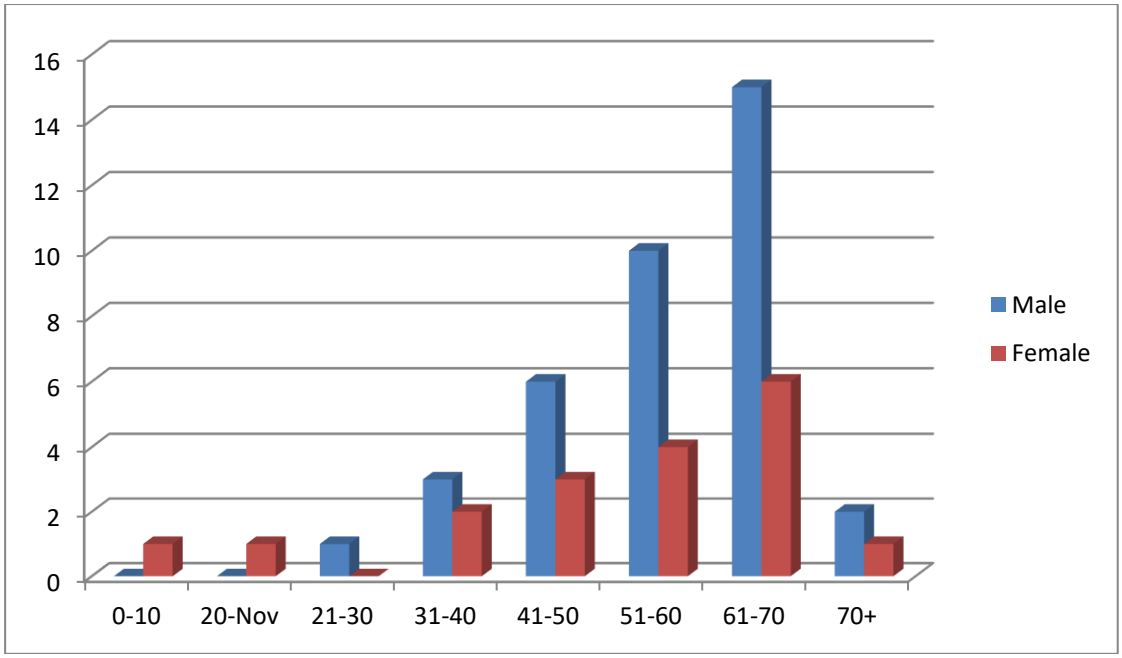
Among 22 cases of hepatocellular carcinoma 9 out of 14 shows HbsAg positive(Table 3). 4 cases were well differentiated hepatocellular carcinoma(WDHCC), smear showed increased cellularity with cells resembling normal hepatocytes. The tumor cells are arranged in thick trabecular, acinar, transgressing arborising pattern and often show peripherally wrapped endothelial cells. Also good number of naked nuclei is noted.

09 cases of moderately differentiated hepatocellular carcinoma(MDHCC) also had many features of WDHCC. It was found that endothelial rimming or transgressing of cell clusters, eccentric nuclei, multinucleation, multiple nucleoli and macro nucleoli were more associated with this type of HCC(Fig 4). Many atypical naked nuclei enclosing prominent nucleoli were also present. 9 cases were diagnosed as poorly differentiated hepatocellular carcinoma (PDHCC) showed cells in sheets, small groups and singles. Transgressing endothelium was seen. Anisocytosis, anisonucleosis, irregular nuclear chromatin, hyperchromatic, multiple nuclei, macronuclei and bare atypical nuclei were seen. Inflammation, necrosis and giant cells were seen(Table 4).

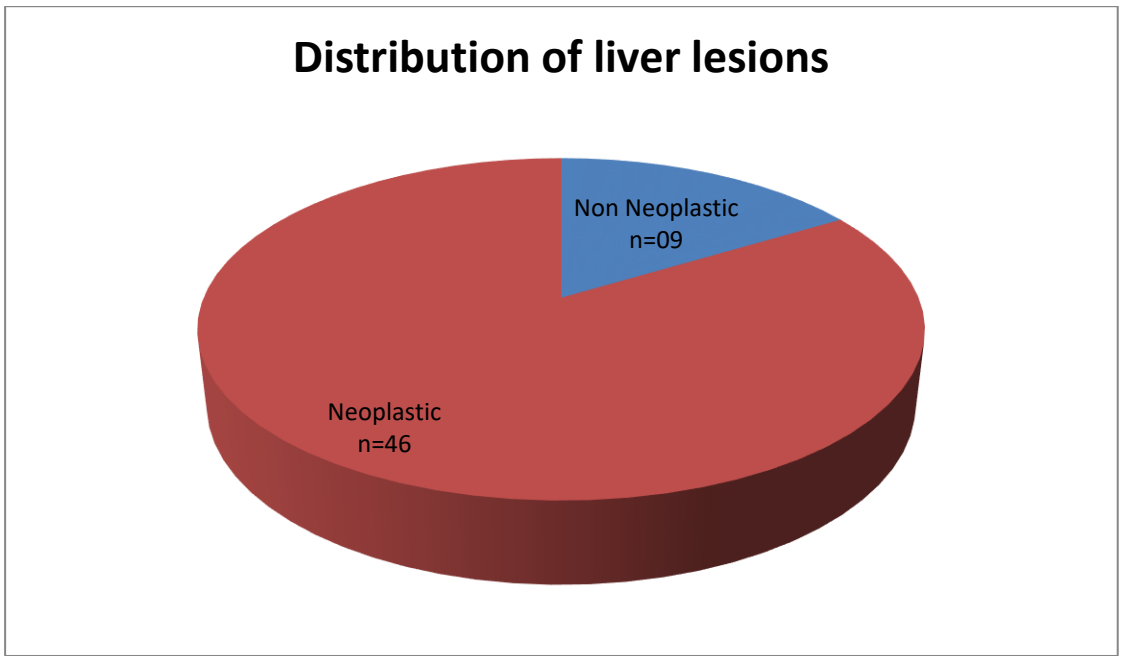
In our study 20 cases of metastatic adenocarcinoma were diagnosed. Based on clinical presentations, radiological findings and cell morphology we tried to suggest probable site of primary. Majority of the metastasis were from GIT 5 cases(25%) followed by pancreas 4cases(20%), 2(10%) cases each from genitourinary system and breast.

In 20 cases, the cytological diagnosis was correlated with core needle biopsy/cell block histopathological diagnosis (Fig 5). The histopathological diagnosis was taken as standard for comparison.

Graph 1: Age and Sex Distribution of Patients



Graph 2. Cytological diagnosis of Liver FNAC.



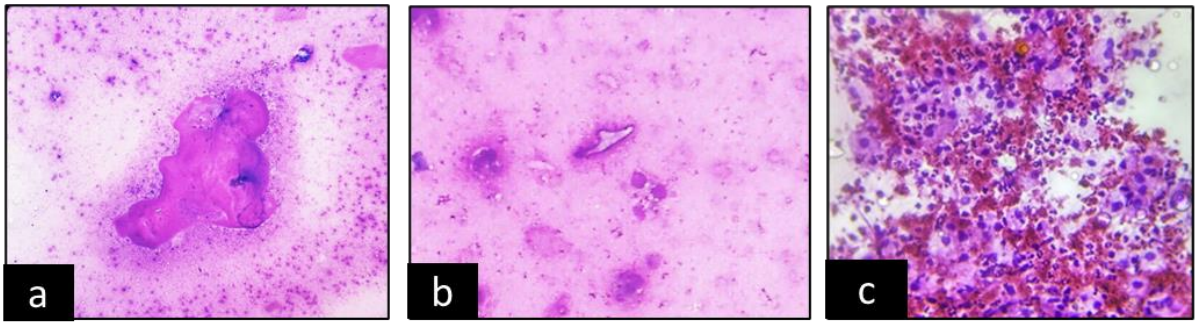
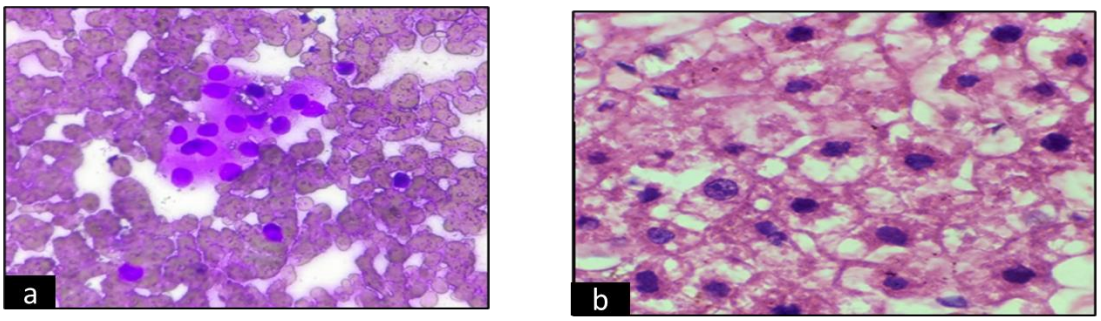


Fig 1(a,b)Hydatid cyst showing lamellar membrane and refractile hooklets.(c) Pyogenic liver abscess. [MGG 40x]



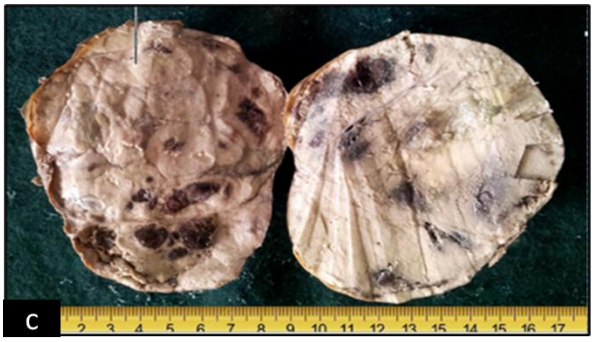


Fig 2. Hepatic adenoma a) Discohesive Hepatocytes with bland nuclei-MGG 40x **b)** Hepatocytes with bland nuclei and bubbly cytoplasm- H&E 40x **c)** Gross image of same case

Fig3 : Hepatoblastoma a) Cells in clusters with high N:C ratio (Giemsa -10x)
b) Gross -with areas of necrosis and haemorrhage
c) High N : C ratio cells fetal type, (H&E 40x)

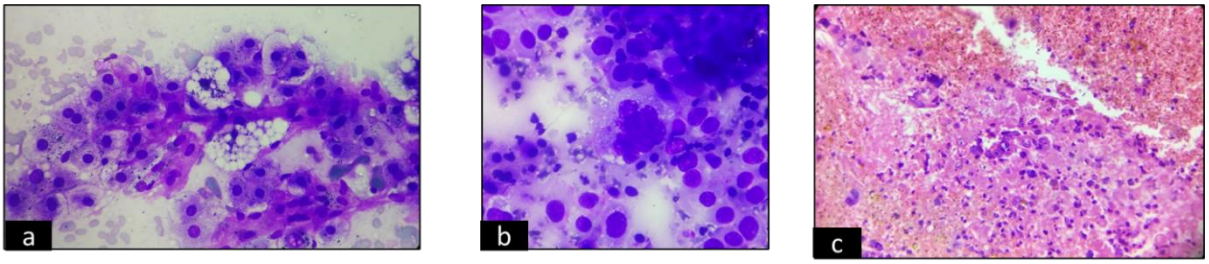


Fig.4- Hepatocellular carcinoma a) Traversing vessel.intra cytoplasmic vacuoles and bile pigment [H&E 40x]
b) Multinucleated giant cell [H & E 40x]
c)Cell block of same case with tumor cells [H&E 10x]

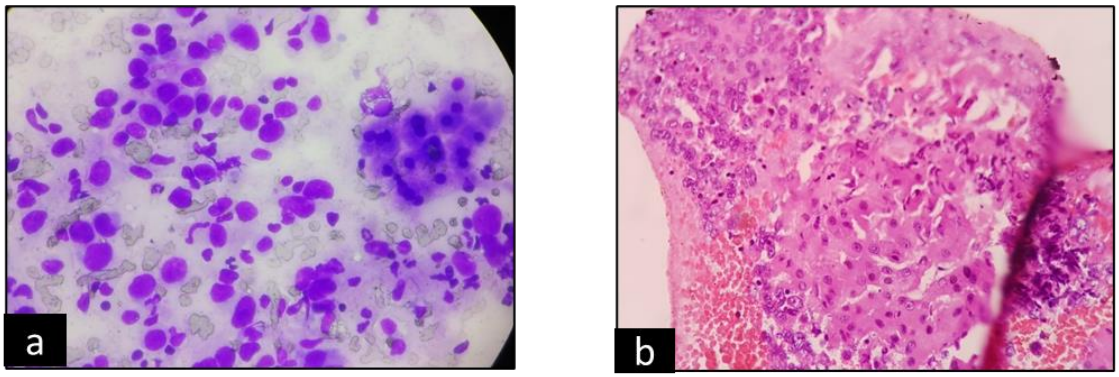


Fig 5 : (a) Poorly diff metastatic cells adjacent to normal hepatocytes.(Giemsa 40x) confirmed by cell block**(b)** H & E 10x

DISCUSSION

Guided FNAC provides, proper localisation of the lesion which helps to diagnosis of various neoplastic and nonneoplastic hepatic lesions. It is a minimal intervening procedure at low cost and without major complications. The only contraindications are suspected vascular lesions and marked haemorrhage. In this study no obvious complications occurred.

The age of the patients ranged from 4days to 75 years with a mean age of 56.79 years. In our study there was male preponderance, same was see in study done by other authors. Mean age found is 56.79 which correlated with Sapna Goel et al[30] study which showed mean age of 53.3.

In our study 9 cases (16.36%) of non-neoplastic lesions, 46 cases (83.34%) of neoplastic lesion. Similar findings of high incidence of malignant lesions were seen in study done by Lekha M B et al[6] and Balani S et al[7] (Table 5).

The features in fatty liver were consistent with the description of Leiman and Tao[65]. Hepatic steatosis is the most common finding in liver pathology and it generally involves the entire liver but may produce a circumscribed, nodular lesion first described as

FFC in the 1980s.

Present study encountered 46 cases of neoplastic lesions. In that 2(4.34%)cases were Hemangioma,1(2.17%) case of hepatic adenoma which proved in histopathological examination. And there were 22 (47.82%)cases of HCC which accounted maximum no of neoplastic lesions followed by 20(43.47%) cases of metastatic lesions and 1(2.17%)case of Hepatoblastoma(2.17%). In the study of Lekha M B et al[6] who encountered 53 (88.33%) malignant lesions out of 60 cases, 21 cases (35%) were primary tumours and 27 cases (50.94%) were metastatic tumours and 5 cases (5.43%) of unclassified malignancy. Majority of cases were metastasis 27 (50.94) followed by hepatocellular carcinoma 21 (39.62%) Diagnostic accuracy is 95% which is correlated with Nazir et al study where it showed 97.5% of diagnostic accuracy. With high diagnostic accuracy in our study proves guided FNAC helps to diagnosing Liver lesions.

CONCLUSION

Guided FNA paves the way forward to future with it being a simple, quick, safe, highly representative, cost-effective[1,2]. In present study FNAC helped to distinguish non-neoplastic from neoplastic lesions, and categorize different lesions & differentiate primary from metastatic tumours. Early diagnosis by guided aspiration minimizes further ancillary investigations and hence reduces the length of hospital stay[1.]

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CONFLICT OF INTEREST : None

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