Original Article

Diagnostic Utility of Percutaneous FNAC in the Evaluation of Hepatic Masses

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Background : The clinical assessment and management of focal Hepatic Masses is a difficult task.The role of percutaneous liver Fine Needle Aspiration Cytology (FNAC) and cytological assessment is of utility and can enhance diagnostic value in such cases.

Objectives : The purpose of the study was to evaluate the cytological features of hepatic masses and to establish the diagnostic utility of hepatic FNAC in a limited resource set-up.

Materials and Methods : A retrospective study of 2 years duration was conducted in the Department of Pathology of a Tertiary Care Hospital which included 56 patients with clinically and radiologically detected Hepatic Masses. Cytohistopathological correlation was done in 20 cases.

Statistical analysis : The statistical values of correlation such as Sensitivity, Specificity, Positive Predictive Value (PPV), Negative Predictive Value (NPV) and Diagnostic efficacy were calculated using Epi info 7.0 statistical software.

Results : The number of male patients were more than females. The distribution of cyto-diagnoses cases were; Pyogenic Abscess (1 Case), Amoebic Liver Abscess (1 Case), Fungal Liver Abscess(2 Cases), Chronic Hepatitis (1 Case), Cirrhosis (1 Case), Hydatid Cyst (1 Case), Large Cell Dysplasia (3 Cases), Hepatic Adenoma (1 Case), Hepatocellular Carcinoma (30 Cases), Cholangiocarcinoma (1 Case), Metastatic Adenocarcinoma (9 Cases), Malignant Lymphoma (2 cases) and (1 case) each of metastatic deposits of Malignant melanoma, Neuroendocrine carcinoma and poorly differentiated carcinoma. Statistical analysis showed a Sensitivity-94%, Specificity-100%, PPV-100%, NPV-75% and Diagnostic efficacy was 95%.

Conclusion : FNAC is a quick,feasible and reliable procedure with high accuracy for cytological diagnoses of Hepatic Masses.

[*J Indian Med Assoc* 2023; **121(9):** 25-32]

Key words **: Fine Needle Aspiration Cytology (FNAC), Hepatic Masses, Diagnostic Efficacy.**

Liver lesions are frequently encountered in clinical scenarios and requires a variety of tests to understand their nature and plan management accordingly. While Liver Function Test's (LFT's) and Ultrasonography (USG) are the usual initial investigation modalities, the role of liver FNAC has proved to be useful in understanding the pathological process underlying these lesions. It is a simple, rapid and sensitive technique allowing the clinician to plan for the treatment by avoiding unnecessary surgical procedures[1]. The role of liver FNAC in a limited resource setup is useful where biopsy technique is not readily available. It can be employed as an outpatient procedure and therefore offers the clinician a faster diagnostic aid[2,3]. The advent of newer modalities of imaging such as Computed Tomography (CT) and USG have revolutionized the guided FNAC approach[4-6]. The procedure has limited application in identifying diffuse Liver Disorders, such as Hepatitis, Cirrhosis and Necrotic lesions as these are associated with reactive changes in hepatocytes mimicking malignancies and therefore it is very difficult to suggest an etiology based on FNAC alone unless correlated with clinical, biochemical, radiological and histopathological findings[7-10]. Hence the aim of the study was to utilise USG-guided Liver FNAC as an effective, economical procedure to identify the various Liver lesions.

Editor's Comment :

- The present study emphasizes the diagnostic utility of Liver FNAC as a cost effective procedure in a low resource setup by rendering rapid diagnosis. It reduces the reliance on liver biopsy.

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Received on : 24/07/2022

Accepted on : 21/01/2023

Materials and Methods

A retrospective study of image guided FNAC cases was conducted in the Department of Pathology of a Tertiary Care Hospital for a duration of 2 years after obtaining an approval from the Ethical Clearance Committee.

The study included a total of 56 cases.All of them underwent USG-guided FNAC with prior written consent.Patients presenting with clinical and radiological evidence of known contraindications such as haemangioma, hydatid cyst, massive ascites or deranged coagulation profile were excluded. The procedure was performed under aseptic conditions in the supine position by employing a 23-gauge 90 mm lumbar puncture needle fitted to a 10ml syringe.

The stains employed to assess the cytological features were air-dried Giemsa, alcohol based Papanicolaou and Haematoxylin and Eosin (H&E). Histopathological correlation was obtained in 20 cases by liver biopsy and cell block along with FNAC.Clinical correlation was done with laboratory investigations such as (LFT's), Hepatitis B and C viral markers, HIV antibody and tumor markers like Alfa-fetoprotein (AFP) and USG findings.

The statistical analysis was done using Epi info 7.0 statistical software to analyse the data and diagnostic efficacy obtained by Sensitivity, Specificity, Positive predictive value and Negative predictive values.

Results

In the present study, male patients were 36 (64.28%) and female patients 20 (35.71%) with a male to female ratio of 1.8:1.The age of the patients were in the range of 5 months to 80 years with a mean age of 55.2 years. The youngest patient was 5 months old and was diagnosed as Pyogenic Liver Abscess and the oldest was 80 years old and diagnosed as moderately differentiated Hepatocellular Carcinoma (HCC).

The commonest mode of presentation was pain abdomen in the right Hypochondrium. Other main clinical features were mass per abdomen, Jaundice, Anorexia, Fever, Easy Fatiguability and Respiratory Symptoms. Majority of clinical diagnosis for Space Occupying Lesions (SOL's) was HCC. Serological studies included viral markers for Hepatitis B,C and HIV. Hepatitis B surface antigen (HBs Ag) and anti HCV antibody positivity was seen in 6 cases each of HCC respectively and 1 case of fungal abscess was positive for HIV antibody. AFP values were available in 6 cases of clinically suspected HCC. The patients had high values of AFP minimally increased by 2 to 4 folds.

Radiological imaging was done in all the cases. USG findings revealed solitary masses in 45 cases (80.35%) and diffuse masses in 11 (19.64%). Solitary masses were around 45 in number out of which 30 were diagnosed as HCC. Right lobe had around 30 (66.7%) whereas left lobe had 15 (33.33%) masses respectively. Maximum (SOL's) observed showed hyper-echogenicity present in 43 cases (76.78%). Heterogenous echotexture was observed in 6 cases (10.71%) (Fig 1).

CT scan was done in two patients which showed multiple well defined hyperdense lesions and hypodense lesions in another patient. Cyto-radiological correlation of hepatic masses was seen in 94% cases (Fig 2).

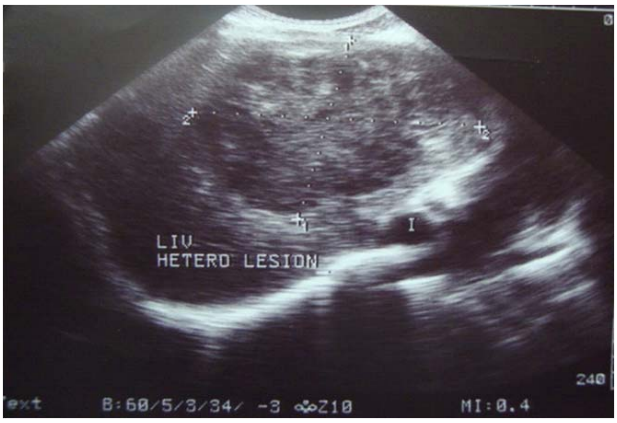

Fig 1 — USG liver showing well defined heteroechoic lesion in left lobe

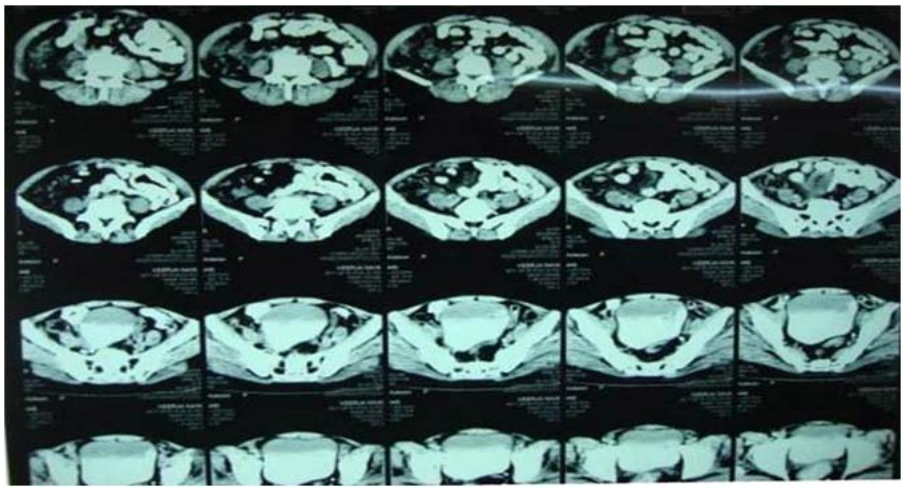

Fig 2 — CT liver showing multiple enhancing focal hepatic lesions suggestive of metastasis

Cytological evaluation of the smears obtained from FNAC of Hepatic Masses was done and were categorized into: Non-neoplastic, pre-neoplastic and neoplastic lesions (Table 1).

Out of 7 cases categorized as non-neoplastic lesions,4 were of infectious etiology which included 1 case each of Pyogenic and Amoebic Liver Abscess (3.56%). Two cases of fungal liver abscesses (3.56%)were also seen. Other lesions included 1 case of chronic hepatitis (1.78%),1 case of Hepatic Cirrhosis (1.78%) and 1 solitary case of Hydatid Cyst (1.78%). In the pre-malignant category, 3 cases of large cell dysplasia (5.35%) were obtained.In the neoplastic category, 1 case of benign hepatic adenoma(1.78%) was diagnosed cytologically. There were 31 cases (55.35%) of primary hepatic malignancy and 14 cases (25%) cases of metastatic malignancies. HCC was the most common and predominant neoplastic lesion numbering to 30(53.57%) from around 46 neoplastic liver lesions. Among them 21(70%) were males and 9(30%) were females with a male to female ratio of 2.3:1. Majority of the cases were in the 50-60 years age group.

Cytologically, HCC was graded into well differentiated HCC (13), Moderately differentiated HCC (12) and Poorly differentiated HCC (5). Histopathological correlation was obtained in 9 cases.

The most consistent cytological findings in HCC were increased nuclear-cytoplasmic ratio, pleomorphism, hyperchromasia, macro nucleoli, bare nuclei,intracytoplasmic bile and trabecular pattern of arrangement followed by traversing blood vessels, peripheral endothelial rimming, hypercellularity and intracytoplasmic inclusions. The least common findings were multinucleation, intranuclear inclusions, bile duct epithelium and tumor giant cells (Table 2).

Our study also revealed a case of Cholangio Carcinoma (CC)(1.78%) and cellular features included occasional clusters of atypical cells exhibiting hyperdense nuclei with scant cytoplasm along with a few foci of fibrosis which was confirmed by liver biopsy.

Metastatic Tumors constituted 14 (25%) among 56 cases and metastatic adenocarcinoma (9 cases) was the commonest type (16.07%). Known primary sites of adenocarcinoma were: Colon and rectum (1), Ovary (1), Breast (1), Pancreas (1) and unknown primary (5). Cytological features revealed dense chromatin and increased nuclear-cytoplasmic ratio followed by hypercellularity, benign hepatocytes, eccentric nucleus, pleomorphism, vacuolated cytoplasm, conspicuous nucleoli and inflammatory cells. In all the previously known cases of primary adenocarcinoma, the cytological features were simulating the primary tumor and even the radiological investigations like USG and CT features confirmed the primary in respective cases. Histopathological correlation was obtained in 3 cases of metastatic adenocarcinoma.

Metastatic tumors included 2 cases of (3.57%) malignant lymphomas and one case each of (5.34%) of metastatic malignant melanoma, metastatic neuroendocrine carcinoma and metastatic poorly differentiated carcinoma. Histopathological correlation was done in 1 case each of malignant lymphoma and metastatic malignant melanoma.

Cytohistological correlation was done in 20/56 cases. In 4 non-neoplastic lesions, cytological diagnoses were concordant with histopathology. One discordant case (diagnosed as cirrhosis on cytology)

Table 1 — *Final cytological diagnosis in 56 patients*

Cytological Diagnosis	No of cases (n=56)	Percentage (%)
Non-neoplastic lesions	7	12.5
Pyogenic liver abscess	1	1.78
Amoebic liver abscess	1	1.78
Fungal liver abscess	2	3.57
Chronic hepatitis	1	1.78
Cirrhosis	1	1.78
Hydatid cyst	1	1.78
Pre-neoplastic lesions	3	5.35
Large cell dysplasia	3	5.35
Neoplastic lesions	46	82.14
Benign		
Hepatic adenoma	1	1.78
Neoplastic		
Hepatocellular carcinoma	30	53.57
Cholangiocarcinoma	1	1.78
Metastatic adenocarcinoma	9	16.07
Malignant lymphoma	2	3.57
Metastatic malignant melanoma	1	1.78
Metastatic neuroendocrine carcinoma	1	1.78
Metastatic poorly differentiated carcinoma	1	1.78
Total	56 (n)	100

Table 2 — *Cytological features of hepatocellular carcinoma in the present study*

Cytological features	HCC(n=30)(%)
Hypercellularity	18(60%)
Trabecular pattern	20(66.7%)
Peripheral endothelium rimming	18(60%)
Transgressing endothelium	20(66.7%)
Intracytoplasmic inclusions	17(56.7%)
Intracytoplasmic bile	22(73.3%)
Bile duct epithelium	5(16.6%)
Pleomorphism	27(90%)
Increased N/C ratio	30(100%)
Hyperchromasia	27(90%)
Intranuclear inclusions	6(20%)
Multiple nuclei	6(20%)
Bare nuclei	24(80%)
Macro nucleoli	24(80%)
Tumor giant cells	3(10%)

was later on confirmed as HCC on histopathology. All malignant neoplasms were accurately diagnosed cytologically. Remaining 16 neoplastic lesions diagnosed cytologically were concordant with histopathology. The statistical values of USG-guided FNAC in the diagnosis of liver SOL's were sensitivity and specificity of 94% and 100% respectively, with a positive predictive value of 100% and negative predictive value of 75% and overall diagnostic efficacy of 95%.

Discussion

FNAC is widely practiced, quick, precise, cost-effective and efficient method that can be employed to differentiate benign from malignant lesions of the liver by offering a definite diagnosis. SOL's of the liver include cysts and abscesses of infectious etiologyas well as tumors of benign and malignant nature. This group is frequently targeted by FNAC performed under imaging guidance USG or CT[11-14]. Numerous studies have reported sensitivity in the range of 67% to 100% and accuracy rates upto 96%[9,15,16]. Severe complications like bleeding, biliary peritonitis, pneumothorax and sepsis are hardly encountered. The risk of malignancy spreading along the needle tract is insignificant and the incidence of needle track seeding in a recent study involving primary liver tumors was 0.6% when compared to wide bore biopsies which may depend on diameter of the needle used[17,16]. Cell block preparation from residual material can be an useful adjunct to smears employed by the cytopathologist for establishing a more definitive diagnosis in hepatic lesions.Multiple sections can be obtained and if required special stains and techniques such as Immuno-histochemistry (IHC) can be performed with increased sensitivity and specificity for malignant lesions in conjunction with conventional smears which can be further improved if interpretation of aspirates is done in the context of clinical, radiological and biochemical investigations[11,18,19].

Conventional LFT's of patients diagnosed as primary HCC in present study did not reveal significant values for a non-neoplastic, neoplastic or malignant lesion. Similar observations have been observed by Rastogi, *et al* who concluded that the biochemical parameters of liver enzymology studies are not enough to identify the disease process within SOL's of liver[20]. Abnormal LFT values were documented in a study involving 130 Hepatic lesions[3].

HCC Is mostly associated with viral Hepatitis caused by HBV and HCV. Hepatitis B surface antigen (HBs Ag) and anti HCV antibody positivity was seen in 6 cases each of HCC. In studies done by *Manik,* et al, Jha, *et al* and Sultana, *et al*, HBs Ag positivity was predominantly seen in HCC patients and concluded that HBV infection is the leading cause of HCC contrary to our findings[10,3,11].

AFP values were available in 6 cases of clinically suspected HCC. The patients had high values of AFP increased by 2-4 folds with similar findings reported by Rastogi, *et al*[20]. Positive AFP levels was found to be insignificant in the study conducted by Manik, *et al*[10]. With this we concluded that majority of HCC cases present with significant elevation of AFP thus ruling out the need for liver biopsy.

USG can detect the majority of HCC's when used in combination with FNAC thereby increasing the sensitivity[21]. USG findings revealed solitary masses in 45 cases (80.35%) and diffuse masses in 11 (19.64%). Solitary masses around 30 in number were diagnosed as HCC. Right lobe had around 19 (63.3%) whereas left lobe had 11 (36.6%) masses respectively. All metastatic lesions presented as multifocal lesions radiologically in our study. Similar radiological findings were obtained in the studies by Jha, *et al*, Giriyan, *et al* and Roy, *et al*[3,14,21].

Cyto-radiological correlation in our study was established in 94% cases as compared to 92% in a study done by Khanna, *et al*[2]. Discordance was noted in 3 (5.35%) cases in our study which included 2 non-neoplastic lesions and 1 pre-neoplastic lesion. A case of hydatid cyst was accidentally aspirated which was clinically and radiologically suspected as pyogenic liver abscess and a case of cirrhosis diagnosed on cytology which showed radiological features simulating it but the lesion was subjected to liver biopsy as few atypical cells were seen on smears.1 case of large cell dysplasia was biopsied and diagnosed as cavernous hemangioma as excess blood was aspirated even on the second attempt. The same was reported by other researchers where USG diagnosed lesions did not correlate with cytology and liver biopsy was done for definite diagnosis[9,23].

In the present study 7 cases (12.5%) were categorized as non-neoplastic lesions. The most common non-neoplastic lesion were abscesses (7.12%, 4 cases) followed by diffuse parenchymal lesions (3.56%, 2 cases) and a solitary case of hydatid cyst (1.78%,1 case). Pre-malignant category included 3 cases of large cell dysplasia (5.35%,3 cases). Our findings were consistent with the studies done by Jha K*, et al*, Rastogi*, et al*, Sawke, *et al* and Shruthi, *et al*[3,20,6,13].

In our study one case of pyogenic liver abscess was diagnosed and was seen to have plenty of

neutrophils and necrotic celldebris. Few mononuclear cells and degenerating hepatocytes were present. In a case of amoebic liver abscess, smears prepared from the centrifuged sediment showed trophozoites of Entamoeba Histolytica in a background of necrotic cellular debris, degenerating hepatocytes and mixed inflammatory cells. Mallikarjuna, *et al* and Nasit, *et al* reported similar findings[9,23]. These cases were diagnosed cytologically thus validating our results that FNAC can serve a dual purpose of therapeutic as well as diagnostic procedure where serum anti amoebic antibodies are not available[9]. Biopsy of pyogenic abscess was diagnosed as granulomatous hepatitis as sampling error was responsible and amoebic liver abscess showed only necrosis and no malignancy.

Two cases of Fungal Liver Abscesses due to Aspergillosis and Candida were diagnosed cytologically in both immuno-compromised patients. Smears showed slender hyphae and budding spores of Aspergillosis. Smears showed pseudo hyphae and budding yeast forms of Candida. Subsequent microbiologic and cultural studies also confirmed the cytological findings in both the cases. FNAC thus is a rapid, sensitive and important method of diagnosing fungal infections which may be lifesaving in immuno-compromised patients. Similar findings were seen in Jha, *et al* study and in individual case reports done by Vairani, *et al* and Menachery, *et al*[3,24,25]. Chronic hepatitiswas diagnosed in one case with hepatocytes showing predominantly reactive cellular changes. Soudah et al reported similar cytological features on FNAC and opined that its utility lies in pointing out the etiology, but not convincingly in viral diseases of the Liver[7].

In our study, we concluded that FNAC in cirrhotic nodules are only helpful in detecting fibrosis. Similar findings were seen in the study done by Soudah, *et al* and Geramizadeh, *et al*[7,8]. In our case cytologically diagnosed as cirrhosis, biopsy was done and concluded as HCC due to presence of a few atypical cells. Mallikarjuna, *et al* reported a similar case[9]. Aspiration of a radiologically suspected pyogenic liver abscess case showed scoleces, scattered hooklets and hyaline fragments which was confirmed as hydatid cyst on histopathology. Swamy MC, *et al* and Mahajan, *et al* both concluded that definite diagnosis of hydatid disease of liver should involve a combination of imaging, microbiology, and cytology, as reliance on a single diagnostic modality cannot conclusively confirm the presence of hydatid disease[9,26].

3 cases of large cell dysplasia were reported in our study which were consistent with the findings seen in the studies done by Jha, *et al* and Sultana, *et al*[3,11]. Biopsy in one case of liver cell dysplasia was diagnosed as cavernous hemangioma as repeated aspirations yielded only blood. Similar findings were seen in studies done by Guy, *et al* and Nasit, *et al* who concluded that the most frequent spindle-cell lesion of the liver is hemangioma and radiological correlation is necessary[27] (Fig 3).

In the present study, a single case of liver cell adenoma (1.78%) was diagnosed cytologically along with radiological correlation in a young female patient with a past history of treatment with oral contraceptives. Proper placement of the needle and sampling within the lesion is suggested by Nasit, *et al* to get adequate yield and avoid diagnostic confusion with focal nodular hyperplasia[23]. Similar findings were

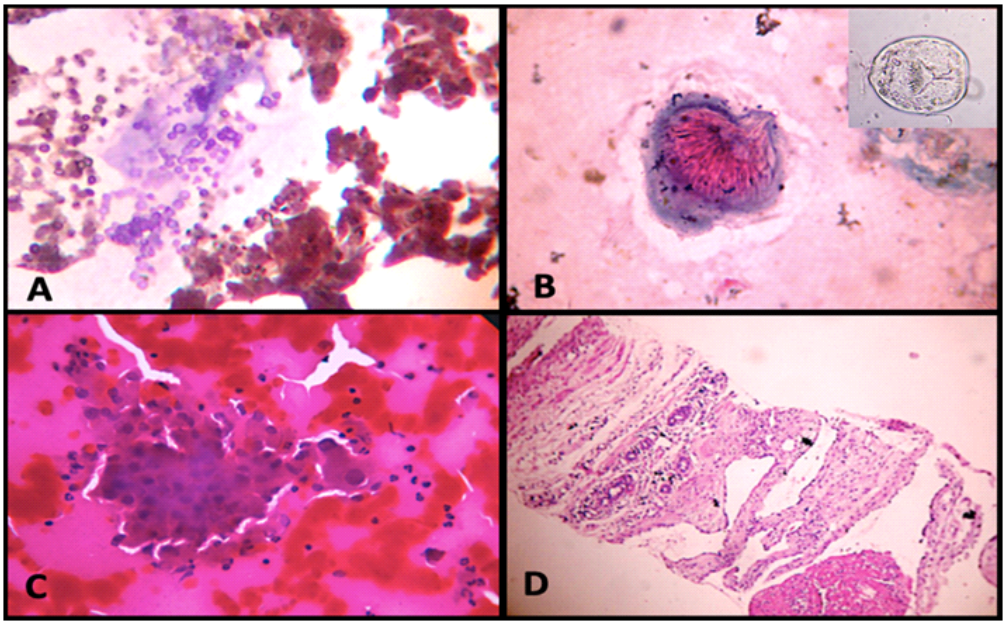

Fig 3 — (A) FNAC of Fungal Liver Abscess – Aspergillus hyphae and spores Pap stain (X 400). (B) FNAC of Hydatid Cyst- Scolex of E Granulosus Pap stain (X 400) along with wet preparation showing intact scolex (inset). (C) FNAC of Large cell dysplasia on H&E stain (X 400) and (D) Cavernous hemangioma (Tru-cut biopsy) H&E stain (X 400).
Pap - Papanicolau stain; H&E - Hematoxylin and Eosin

seen in the study conducted by Jha, *et al* and Nasit, *et al*[8,23].

In the present study (82.14%) lesions were cytologically malignant followed by(12.5%) benign lesions and (5.35%) pre-neoplastic lesion. Most of the studies including Jha K, *et al*, Sawke, *et al* and Rastogi, *et al* reported similar findings[3,6,20].

In the present study, the key cytological features of HCC were macronucleoli, trabecular pattern of cells, hyperchromatic nuclei, increased nuclear-cytoplasmic ratio and pleomorphism. Wee A, *et al*, Balani S, Shruthi HY, *et al*, observed similar cytological features as noted in our study[28,15,13] (Table 3).

Cytological features of CC diagnosed in our study was similar to those described by Soudah, *et al* and Mallikarjuna, *et al*[7,9].

Metastatic tumors constituted (25%) and adenocarcinoma was the commonest type (16.07%). Primary sites of adenocarcinoma which could be ascertained were: Colon and Rectum (1), Ovary (1), Breast (1) and Pancreas (1). In the present study, the most common metastatic adenocarcinomas were of unknown primary origin (5 cases). Similar findings were seen in the studies conducted by Ali SR, *et al*, Giriyan S, *et al* and Garg, *et al*[8,14,12]. Cytological features of metastatic adenocarcinoma noted in our study were similar to those described by Shruthi and Garg, *et al*[13,12]. Histopathological correlation was done in 3 patients which confirmed the diagnosis.In the study done by Sahin, *et al*, majority of metastatic adenocarcinoma cases presented as acinar pattern while the key differentiating features between HCC and metastasis were uniform atypia, increased N/C ratio, hepatocytic appearance and atypical naked nuclei[29]. The findings of present study were in concordance with these observations. Further workup of the patients to determine the primary sites was not possible as they were referred to higher centres for further management.

Two cases of malignant lymphoma clinically diagnosed as NHL were seen in our study. The cytomorphological features were similar to those described by Collins, *et al*[30].

A case of lymphoma included by Jha, *et al* in their study was diagnosed as Diffuse large B cell lymphoma by flow cytometry[3]. However, this was not possible in our institute which is a major drawback.

Metastatic malignant melanoma showed similar cytological features when compared to De Las Casas, *et al* who have reported certain diagnostic criteria for liver metastasis of melanoma[31]. In the study conducted by Prosser, *et al*, metastatic neuro-endocrine tumors to the liver were subtyped on the basis of cytomorphology into round, spindle and polygonal cell types and further emphasized the need for using IHC in distinguishing the cell of origin in such tumors as diagnostic confusion in differentiating them from HCC[32]. However, in our study we observed a single case of metastatic neuro-endocrine tumor. A case of metastatic poorly differentiated carcinoma was cytologically similar as described by Mallikarjuna, *et al* who suggested IHC be utilized to differentiate Poorly differentiated HCC from other poorly differentiated carcinomas[9] (Fig 4).

Table 3 — *Comparison of cytological HCC features in the present study with other studies*

Cytological features	Wee A and Nilsson B (2003)[26]	Balani S (2013)[15]	Shruthi HY (2021)[13]	Present study
Macronucleoli	75.14	85.7	100.00	80.00
Trabecular pattern	88.57	65	100.00	66.7
Hyperchromatic nucleus	75.71	100	96.88	90.00
Increased N : C ratio	100	100	93.75	100.00
Pleomorphism	80.00	71.4	87.50	90.00
Traversing blood vessels	82.85	57.1	71.87	66.7
Endothelial rimming	35.71	35.7	65.62	60

The present study observed to have overall values of Specificity (100%), Sensitivity (94%), NPV (75%), PPV (100%) and Diagnostic efficacy (95%). The studies done by Kuo, *et al*,Ceyhan, *et al* and Okzara, *et al*, have mentioned similar values of above parameters for diagnosing SOL's of liver with FNAC[33,18,34]. These values were comparable with the observations of the present study. There are reports of Reddy, *et al* and Franca, *et al*, who have reported low NPV of 58.8% and 64% respectively which is a contrary observation to the studies reviewed for literature because of low false negative reporting[16,35]. Kuo, *et al*, who reported sensitivity of 78.4% which is low as compared to other published studies and present study[33]. The studies of Ceyhan, *et al*, Rastogi, *et al*, and Franca, *et al*, have reported PPV of 100% due to low false positive cases[18,20,35]. The present study also made similar observations.

In our study, 20 cases were histopathologically correlated. 3 cases were diagnosed as non-neoplastic lesions on FNAC, which were confirmed histopathologically. One case diagnosed as cirrhosis on FNAC was reported as HCC on biopsy. Sampling error was the main reason for false-negative result in this case. Such limitation for erroneous diagnosis of false negative cases has been quoted in the studies of Mallikarjuna, *et al* and Ceyhan, *et al*[9,18].

16 cases reported as malignant on FNAC were concordant with the biopsy. With an efficacy rate as high as 95% for liver lesions, FNAC is an extremely useful procedure that facilitates rapid diagnosis and

prevents further surgical intervention in inoperable cases.

Limitation(s) :

The present study utilized FNAC as the primary diagnostic method for various hepatic lesions. A small sample size of patients our study is also not representative of the gamut of hepatic lesions commonly encountered during cytological examination. Further due to the advent of superior imaging techniques such as Fibro scan which measures Fibrosis and Steatosis thereby obviating the need for further invasive procedures. Use of ancillary techniques like IHC and flow cytometry were not possible in our institute.

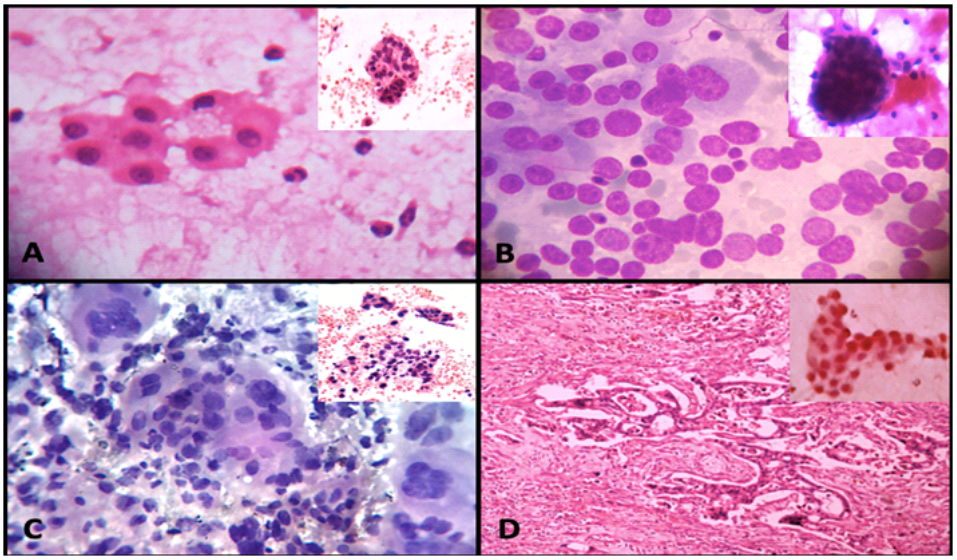

Fig 4 — (A) FNAC of Well differentiated HCC – Pseudo acinar pattern on H&E stain (X 400) and cell block (inset). (B) FNAC of Moderately differentiated HCC-Dispersed atypical naked nuclei on H&E stain (X 400) along with peripheral endothelial rimming (inset). (C) FNAC of Poorly differentiated HCC on Pap stain (X 400) and cell block (inset) (D) Cholangiocarcinoma (CC) HPE on H&E stain (X 400) and FNAC of Cholangiocarcinoma (CC) on Pap stain (X 400).
Pap - Papanicolau stain; H&E - Hematoxylin and Eosin

Conclusion

Image guided FNAC utilizing USG of hepatic masses is a reliable, rapid and cost effective procedure having reasonably high accuracy and good sensitivity and specificity. When used in conjunction with relevant tests such as LFT's, Serology and Serum tumor markers it can yield valuable information which can be used for early diagnosis and planning of rational therapeutic management of patients.

Conflict of interest : Nil.

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