ISSN: 0975-1556

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2022; 14(2); 265-271

Original Research Article

Role of Ultrasound Guided Fine Needle Aspiration Cytology in the Diagnosis of Space Occupying Lesions of Liver

Deepika Mishra[1], Sunil Choudhary[1], Neeraj Verma[1], Anita Meena[1], Sonu Dhayal[1]

[1]Department of Pathology, SMS medical college, Jaipur (Rajasthan)

Received: 03-12-2021 / Revised: 30-12-2021 / Accepted: 28-01-2022
Corresponding author: Dr. Sunil Choudhary
Conflict of interest: Nil

Abstract

Introduction: The liver is one of the most common sites for both neoplastic and non-neoplastic lesions. A diagnostic modality such as FNA, which offers accuracy without significant complications and which requires minimal intervention at low cost, warrants consideration early in the investigative sequence.

Aims and Objectives: To evaluate various space-occupying lesions encountered in the liver and to correlate radiology findings with the USG FNA diagnosis in liver lesions.

Materials and Methods: this was an observational study comprising of 130 cases of hepatic lesions diagnosed clinically or radiologically. FNAC was performed under ultrasound guidance. Smears were stained by May-Graunwald-Giemsa, hematoxylin and eosin (H&E) stains. ***Results*:** The mean age of the patient was 53.8 years with M: F ratio of 1.1:1. Out of 130 cases, 10 cases of liver abscess, 1 case each of diffuse parenchymal disease and regenerative nodule and 118 cases were neoplastic. Of these 118 cases, primary malignant lesions form 7 cases which were hepatocellular carcinoma. Secondaries found in 111 cases, majority (44.9%) of cases were metastatic adenocarcinoma. Discrepancies were found in 3cases of liver lesions between radiological and cytological diagnosis [Cohen kappa = 0.788 (95% CI – 0.618 – 0.958) indicates a significant correlation between radiological and cytological diagnosis].**Conclusion:** USG- guided FNAC is a quick, safe, simple, cost-effective and accurate method for diagnosing hepatic lesions. Early diagnosis by guided aspiration minimizes further ancillary investigations and decreases the length of hospital stay.

Keywords: Liver Biopsy, liver cancers, cytological diagnosis, metastatic adenocarcinoma, hepatocellular carcin.

Introduction

Liver is a principal organ for metabolism of body and it is acting as a drainage site for many organs of body[1]. Space occupying lesions (SOL) on liver occur quite often and can be caused by various diseases. The liver is one of the most common sites for both neoplastic and non-neoplastic lesions[2]. A diagnostic modality such as FNA, which offers accuracy without significant complications and which requires minimal intervention at low cost, warrants consideration early in the investigative sequence[3]. FNAC is a rapid, less invasive method that can be employed for pathological evaluation of

both benign and malignant hepatic lesions[4]. Ultrasonography (USG) or Computed tomography (CT) guided FNAs of liver lesions increase the accuracy of sampling for deep-seated lesions. The accuracy of FNAC is higher since multiple samples can be obtained and hence the chance of obtaining a representative sample is enhanced[5].

Study objectives:

The aims of our study were:

1. To categorise the lesions of the liver observed on fine-needle aspiration cytology into neoplastic and non-neoplastic.

2. To correlate the radiological observations with cytological findings.

Materials and Methods:

Study design and setting:

A descriptive type of observational study was carried out in the Department of Pathology, Sawai Man Singh Medical College, Jaipur (Rajasthan) after an institutional ethical committee approval. All patients coming to SMS hospital, Jaipur from May 2020 to April 2021 with SOL in liver on ultrasonography were subjected to USG guided FNAC. Relevant clinical and serological details were obtained for each patient. Patients with bleeding diathesis and highly vascular lesions were excluded from the study. FNAC was performed under USG with the help of a radiologist.

A disposable spinal needle (20/22 gauge), connected to a 10 ml syringe was used. In the case of multifocal lesions, the largest or most easily accessible lesion was selected. The slides were prepared bedside and fixed in absolute alcohol, for cytological evaluation. The smear was stained by May-Graunwald-Giemsa, hematoxylin and eosin (H&E) stains.

Observations and Results:

USG FNAC was performed in 130 cases. The age of the patients ranged from 18 to 80 years with a mean age of 53.8 (±13.28) years. The maximum number of cases were in between 50-59 years of age. Males accounted for 52.3 % of cases and females 47.7 % cases. The commonest mode of presentation was pain abdomen in the right hypochondrium (73.08 %).

Out of 130 cases, solitary mass in 46 cases (35.4 %), multifocal lesion in 83 cases (63.8%) & diffuse parenchymal lesion in 1 (0.8%) case. Aspirates were haemorrhagic in 113 (86.9 %), followed by greyish white in 10 (7.7 %) and purulent in 7 (5.3%) cases. Serology done in all 130 cases, SGOT/SGPT was increased in 77 (59.2%) cases, Alpha-feto protein in 60 (46.1%) cases, Alakaline phosphatase in 70 (53.8%) cases.

Cytologically, liver lesions were categorized into Non-neoplastic lesions (9.2%) and neoplastic lesions (90.8%).

Table 1: Distribution of Non-Neoplastic cases

Non-Neoplastic cases	No. of Cases
Liver abscess	10
Diffuse parenchymal disease	1
Regenerative nodule	1
Total	12

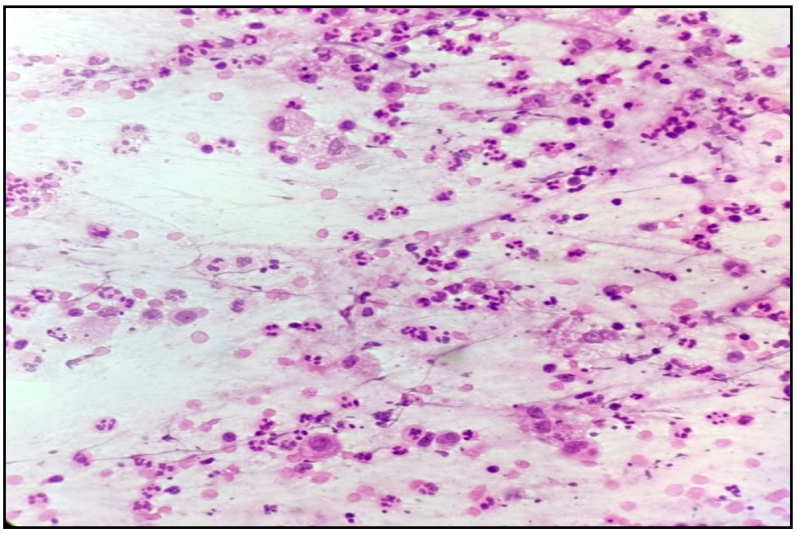

Figure 1: Liver abscess -showing plenty of neutrophils with necrotic cells and cellular debris. Few macrophages, reactive fibroblasts and degenerating hepatocytes in a proteinaceous background.

The smear from liver abscess showed plenty of neutrophils, accompanied by necrotic cells and cellular debris. The smear from diffuse parenchymal disease showed hepatocytes arranged in sheets, clusters and cords. Some of them hepatocytes show anisonucleosis and binucleation. the smears from regenerative nodules showed regenerating hepatocytes with presence of bile duct epithelium.

Table 2: Distribution of Neoplastic cases

Neoplastic cases	No. of cases
Primary (HCC)	7
Secondary malignancies	111
Total	118

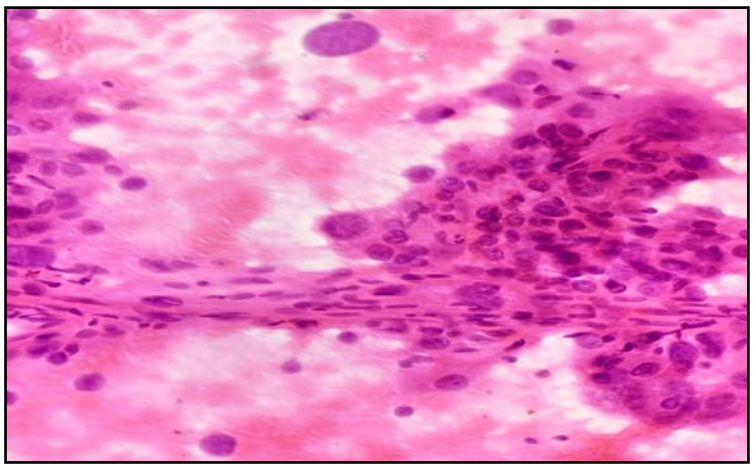

Figure 2: Hepatocellular carcinoma - showing nucleoli, abundant cytoplasm transversing blood vessels with well-differentiated tumor cells abundant

Cytologically, HCC shows features such as hypercellularity (71.4%), trabecular pattern (57.1%), transgressing endothelium (85.7%), intranuclear inclusions (85.7%), bile duct epithelium (28.6%), pleomorphism (57.1%), increased nucleus: cytoplasmic ratio (71.4%), increased chromatin density (85.7%), irregular nuclear membrane (57.1%), vacuolated cytoplasm (57.1), multiple nuclei (57.1%), stripped nuclei (42.9%) and Multiple nuclei (57.1%).

Table 3: Distribution of secondary malignancies

Secondary Malignancies (Metastasis)	No. of cases
Metastatic Adenocarcinoma	53
Metastatic malignant epithelial neoplasm	39
Metastatic neuroendocrine tumor	4
Metastatic Squamous cell carcinoma	3
Metastatic malignant round cell neoplasm	3
Metastatic mixed germ cell tumor of ovary	1
Metastatic cholangiocarcinoma	1
Metastatic poorly differentiated malignant neoplasm	5
Malignant melanoma	2
Total	111

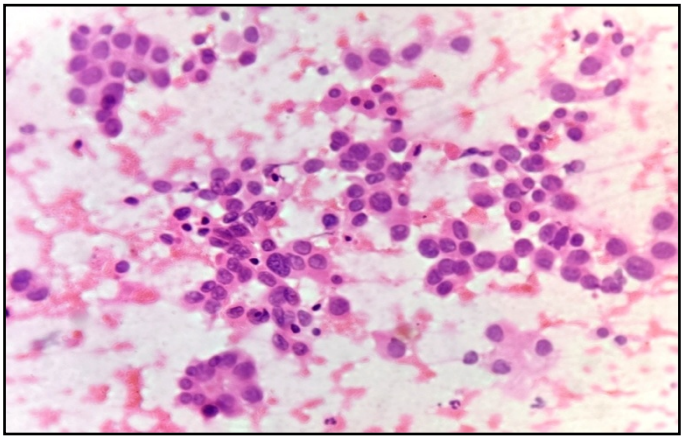

Figure 3: Metastatic Adenocarcinoma showing acinar pattern, clusters with eccentrically placed nucleus, finely dispersed chromatin and eosinophilic cytoplasm. Normal hepatocytes were also seen.

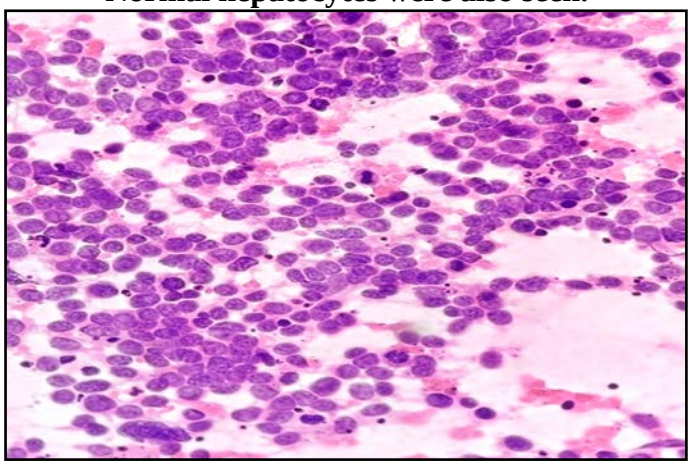

Figure 4: Metastatic Neuroendocrine Carcinoma showing monomorphic cells in clusters,singly scattered, stippled chromatin and reactive hepatocytes with bile pigment.

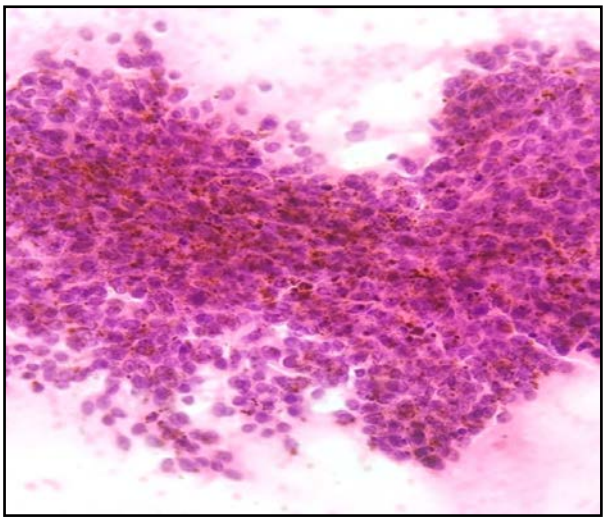

Figure 5: Metastatic Malignant melanoma -cellular smear show loosely cohesive clusters, cells having high N/C ratio, oval to spindloid nuclei.

The site of primary tumor was gallbladder adenocarcinoma in 18 cases followed by colorectal in 6 cases, 3 cases each in breast, pancreas, lung & ovary.

Out of 121 cases suggested as neoplastic on radiology, 118 cases were proved as neoplastic lesions (7 HCC & 111 metastatic malignancies) rest of 3 cases were diagnosed as nonneoplastic lesions (liver abscess) cytologically. It shows that radio-diagnosis and USG guided fine needle aspiration cytology had a significant association.

Discussion:

Ultrasonography-guided FNAC offers accuracy with the minimal intervention[10]. Although imaging techniques have helped greatly in diagnosing the majority of hepatic lesions there is some overlap between the radiologic features of liver abscesses, HCC and metastases[1]. In these situations, FNAC plays an essential role[11].

Hepatic diseases are common in our environment. It affects all age groups with peak age in the 5^{th} & 6^{th} decades of life[5]. In the present study, the age of the patients ranged from 18 to 80 years with a majority (31.5%) of them in the age group of 50-59 years. The mean age was 53.8 (SD ± 13.28) years which was similar to Lekha M.B. et al[6], Yasin SB et al[7] & Agarwal A et al[8]. M: F ratio was 1.1:1 showing slight male predominance. Similar to Yasin SB et al[7] & Agarwal A et al[8].

In the present study, the commonest mode of presentation was pain abdomen in the right hypochondrium (73.08 %) followed by loss of weight (32.31%). Yasin SB[7] reported pain abdomen as the presenting complaint in 86 out of 130 cases (66.2%), Franca et al[9] reported pain abdomen as the presenting complaint in 42 out of 62 cases (74%), mass per abdomen (58%) & loss of appetite (42%).

Lesions of liver were categorized into non-neoplastic and neoplastic lesions. Out of 130, 12 (9.2%) cases of non neoplastic lesions, 118 cases (90.8%) of neoplastic lesions. Lekha M.B. et al[6] reported that 6 (10%) cases out of 60 were nonneoplastic & 53(88.3%) neoplastic. Agarwal A et al[8] reported that 13 (8.9%) cases out of 146 were nonneoplastic & 133 (90.1%) neoplastic. Goel S et al (2014)[1] reported that 7 (2%) cases out of 360 were non neoplastic & 317(88%) neoplastic and 10% non diagnostic.

In the present study out of 130 cases, SGOT/SGPT was increased in 77 (59.2%)

cases, Alpha-feto protein in 60 (46.1%) cases, Alkaline phosphatase in 70 (53.8%) cases. Similarly, Goel S [1] reported that SGOT, SGPT was increased in 58% of cases & Alpha-feto protein was raised in 40% of cases.

Out of 121 cases suggested as neoplastic on radiology, 118 cases were proved as neoplastic lesions (7 HCC & 111 metastatic malignancies) rest of 3 cases were diagnosed as nonneoplastic lesions (liver abscess) cytologically (Cohen kappa = 0.788 (95% CI – 0.618 – 0.958) – indicates a significant correlation between radiological and cytological diagnosis). Lekha M.B. et al[6] reported that five cases of solitary lesions described as abscess by ultrasonography were proved as such in cytology. 19 cases of multiple lesions suggested as HCC or metastasis by ultrasonography, proved to be metastasis in 10 cases and HCC in 9 cases by cytological examination. Correlation between radiodiagnosis and FNAC revealed a significant association ($p<0.05$). Agarwal A et al (2017)[15] reported that out of 6 cases that were diagnosed as benign on radiology, 5 were confirmed to be benign on FNAC while 1 case was given suspicious for malignancy. Out of 140 cases suggested as malignant on radiology, 124 cases were proved as metastatic malignancies, 4 cases as unclassified, 3 cases as HCC, 1 case as lymphoma, while & cases were diagnosed as negative for malignancy and 1 case as regenerative nodule on cytological examination. Correlation between radiodiagnosis and FNAC revealed a significant association ($p<0.05$).

Conclusion:

USG- guided FNAC is a quick, safe, simple, cost-effective and accurate method for diagnosing hepatic leions. Early diagnosis by guided aspiration minimizes further ancillary investigations and decreases the length of hospital stay. Although USG guided FNAC may or may not be superior to radiodiagnosis alone in the diagnosis of hepatic masses. The histological diagnosis remains the gold standard of any SOL in liver.

References:

1. Goel S, Hemrajani D, Sharma M. Ultrasound guided fine needle aspiration cytology (FNAC) in diagnosis of space occupying lesions (SOL) of liver. Journal of Evolution of Medical and Dental Sciences. 2014 Jul 7;3(27):7480– 7.
2. Arathi S, Giriyan S. Ultrasound Guided FNAC in Diagnosis of Space Occupying Lesions of Liver. IJPRP. 2017;6(2 (Part-2)):360–4.
3. Orell SR, Sterret GF. Fine needle aspiration cytology. 4th ed. New Delhi: Churchill Livingstone. 2005: 293–316.
4. Ali SR et al. Role of fine needle aspiration cytology in the diagnosis of hepatic lesions. Muller J Med Sci Res 2015; 6:125-8.
5. Nggada HA, Ahidjo A, Ajagi NA. Correlation between ultrasound findings and ultrasound guided FNAC in the diagnosis of hepatic lesions: A Nigerian tertiary hospital experience. International J Gastroenterol 2006; 5(2):1-7.
6. Lekha M.B, Prabhu DC, Nagarjappa AH. Ultrasound/computerized guided Fine Needle Aspiration Cytology of liver lesions.IPJ of diagnostic pathology. 2018;3(2):68-74.
7. Yasin B, Bashir N, Samoon N. Role of image guided fine needle aspiration cytology in diagnosis of hepatic lesions-study at a tertiary care centre of Kashmir valley. Asian Pacific Journal of Health Sciences. 2017 Jun 30; 4:198–205.
8. Agrarwal A, Khandelwal R, Singh SN, Pant, H and Ashish Kumar Gupta. Evaluation of guided gene needle aspiration cytology in the diagnosis of hepatic lesions. International Journal of

Biomedical Research. 2017:8(02): 75-80.

9. França AVC, Valério HMG, Trevisan M, Escanhoela C, Zucoloto S et al. Fine needle aspiration biopsy for improving the diagnostic accuracy of cut needle biopsy of focal liver lesions. Acta Cytol. 2003 Jun;47(3):332–6.
10. Rasania A, Pandey CL, Joshi N. Evaluation of FNAC in diagnosis of hepatic lesion. Journal of Cytology. 2007 Jan 1;24(1):51.
11. Wee A. Fine needle aspiration biopsy of the liver: Algorithmic approach and current issues in the diagnosis of hepatocellular carcinoma. Cytojournal. 2005 Jun 8; 2:7.
12. Gatphoh ED, Gaytri S, Babina S, Singh AM. Fine needle aspiration cytology of liver: a study of 202 cases. Indian J Med Sci. 2003 Jan;57(1):22–5.
13. Sugumar C, Sheeba D. A Study of Fine Needle Aspiration Cytology of Focal Liver Lesions. International j. ISSN. 2016; 2277-8179.