Original Article

DOI: 10.21276/APALM.3135

Cytomorphological Study of Hepatic Lesions by FNAC

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ABSTRACT

Introduction: Fine Needle Aspiration Cytology (FNAC) is a simple, safe, very low-cost and rapid procedure for diagnostic purpose which makes surgical intervention and exploratory laparotomy unnecessary. The introduction of modern diagnostic imaging techniques, mainly ultrasonography (USG) and Computerized Tomography (CT), has enabled the detection and location of lesions in sites such as liver, which are not easily accessible to surgical biopsies.

Aim: To assess the utility of FNAC in the diagnosis of liver lesions. To study the cytomorphological features, age and sex distribution of liver lesions.

Materials and Methods: The study included 24 liver lesions which were detected clinically or radiologically. USG guided FNA was done in all cases. The smears were stained with Haematoxylin and eosin (H and E), May Grunwald Giemsa (MGG) and Papanicolaou's stains. A cyto-histopathological correlation was done wherever possible. From the residual material, additional slides and cell blocks were prepared. Special stains were used whenever required. In doubtful cases immunohistochemistry (IHC) was done on formalin-fixed paraffin cell blocks and immunocytochemistry on conventional smears wherever necessary and possible.

Results: All the lesions were found to be malignant. Out of 24 liver FNA cases, maximum lesions were seen in females and the affected age group for liver malignancies was 51-60 years. Out of 24 liver FNA cases, 20 cases were metastatic and 4 were primary cases. Among metastatic cases, maximum cases were of metastatic adenocarcinoma and the primary lesions of liver included all cases of hepatocellular carcinoma.

Conclusion: Fine needle aspiration cytology of liver is a simple, safe, repeatable and rapid diagnostic procedure. In case of hepatic lesions, it is of outmost advantage in recognizing the nature of lesion i.e., primary, and metastatic as well as in early diagnosis of lesion so that patient can be treated as early as possible.

Keywords: *FNAC, Hepatic, Liver, Lesions*

Introduction

Fine needle aspiration cytology (FNAC) involves aspiration of cells from a mass followed by cytologic examination of the smear.[1] Aspiration cytology helps in differentiating the benign versus the malignant neoplasms, cystic versus the solid lesions, or an abscess versus a neoplasm. The introduction of modern diagnostic imaging techniques, mainly ultrasonography (USG) and Computerized Tomography (CT), has enabled the detection and location of lesions in sites which are not easily accessible to surgical biopsies, besides offering vast opportunities for fine needle aspiration of the deeper structures. [2] The inclusion criteria included were only those liver cases were included in this study in which malignancy was suspected clinically. Exclusion criteria were Pediatric population.

The aim of the study was to assess the utility of FNAC in the diagnosis of hepatic lesions, to study the cytomorphological features, age and sex distribution of hepatic lesions and to determine the reliability of ultrasonography guided FNAC in distinguishing neoplastic from non-neoplastic hepatic mass lesions.

Thus, an attempt was made to study the cytomorphology of hepatic lesions by fine needle aspiration cytology by ultrasonography guided FNAC of indoor patients during the period from June 2017 to July 2019. The following study was ethically approved.

Materials and Methods

The present study was undertaken to evaluate cytomorphology in outdoor and indoor patients presenting with hepatic lesions. All the patients were carefully examined in supine position. The procedure in detail was explained to them, informed and written consent was taken. Detailed clinical data which included the patients' history, physical examination findings and reports of relevant investigations which were conducted (routine and special), were recorded.

A percutaneous FNAC of the mass was done under real-time USG guidance, in the Department of Radiology, at tertiary care hospital affiliated with medical college while taking absolute aseptic precautions, by the best route, as was suggested by the radiologist. A 10ml disposable plastic

syringe and a 22-gauge needle were used. For deep-seated lesions, a 20–22 gauge spinal needle of 9cm length was used.

Needling was concluded before or as soon as material appears at hub of the needle, material was then deposited and smeared on clean labelled glass slides. One to two slides were fixed in 95% ethyl alcohol, stained by routine Hematoxylin and Eosin (H&E) stain and Papanicolaou (PAP) stains, while one to two slides were air dried and stained with, May-Grunwald-Giemsa (MGG) stain. From the residual material, additional slides and cell block were prepared. Additional slides were stained as per requirement. Special stains were used whenever required.

In doubtful cases immunohistochemistry (IHC) was done on formalin-fixed paraffin cell blocks and immunocytochemistry on conventional smears wherever necessary and possible.

Cell blocks were prepared and results of FNAC and histological diagnosis from cell block were then correlated. Histopathological correlation was also carried out in patients who underwent surgical excision/biopsy of the lesion.

Observation and Results

The present study is a prospective study carried out at the Department of Pathology at tertiary care hospital affiliated with medical college for period of year June 2017 to July 2019.

A total of 24 indoor and outdoor cases of FNAC of liver were performed during the study period. The cases were reviewed with aspect to age, sex, site and cytologic type. Correlation with clinical data and other investigations was done and discussed wherever possible.

The patients' main complaints were pain in right upper quadrant of abdomen, anorexia, weight loss, abdominal mass and hepatomegaly. Some also presented with ascites, abdominal distension, pruritus, jaundice and fever. Time period of complaints varied from one week to six months.

In present study, no major complications were observed, however there was complaint of mild pain and discomfort at the puncture site for short duration.

The 24 cases of liver FNA were reviewed with aspect to nature of lesion, age, sex and cytologic type as follows:

Out of 24 liver FNA cases, maximum lesions were seen in the age group of 51 to 60 years with 8 cases (33.4%) followed by age group of 61 to 70 years with 6 cases (25%). Out of 14 metastatic adenocarcinoma cases of liver FNA, maximum cases were seen in age group of 51-60 years with 6 cases (42.8%). Out of 4 hepatocellular carcinoma cases of liver FNA, maximum cases were seen in age group of 61 to 70 years with 2 cases (50%).

Out of 24 liver FNA cases, maximum lesions were seen in the female i.e., 14 cases (58.4%) and males were affected in 10 cases (41.6%). Hence, the male to female ratio was 1:1.4. Out of 14 metastatic adenocarcinoma cases of liver FNA, maximum cases 10 (42%) were seen in females and 4 cases (17%) were seen in males. Out of 4 hepatocellular Carcinoma cases of liver FNA, maximum cases 3 (12.3%) were seen in males. Thus, the most common age group involved in liver FNAC lesions was 51-60 years and maximum cases were seen in females.

In the present study, out of 24 liver FNA cases, 20 cases (83.4%) were metastatic whereas 4 cases (16.6%) were primary.

In the present study, out of 24 liver FNA cases, majority were metastatic lesions. Among metastatic lesions, 14 cases (58.3%) were of metastatic adenocarcinoma, 1 case (4.1%) was of Metastatic Poorly Differentiated Carcinoma, 1 case (4.1%) was of Metastatic small round cell neoplasm , 1 case (4.1%) was of Carcinoma favouring adenocarcinoma with focal squamous differentiation, 1 case (4.1%) was of Metastatic Carcinoma probably Undifferentiated Carcinoma, 1 case (4.1%) was of Metastatic malignancy: Possibilities are a) Renal cell carcinoma b) Metastatic neuroendocrine tumour and 1 case (4.1%) was of Metastatic Carcinoma with squamous differentiation. Out of 4 (16.7%) primary lesions of liver all 4 cases (16.7%) were of primary hepatocellular carcinoma.

Immunohistochemistry was performed on one cell block which helped in complete and accurate diagnosis of the lesion and its details are as follows: USG guided FNAC done from a 32-year-old female from liver mass showed features of adenocarcinoma. Immunohistochemistry, Hep-Par performed on cell block was negative, thus indicating that the adenocarcinoma was metastatic.

Discussion

Most of the intra-abdominal masses are deep-seated and hence the idea of their size, shape and extent of the lesion could not be made out. Therefore various imaging modalities like USG and CT can be used as a guide for needle aspiration. [3]

The most common site of aspiration was liver in the present study. This was comparable with the studies carried out by Sanjay Kumar Nigam et al. [4](2014), Dr. Suva Chetal M

Table 1: Distribution of all liver FNAC lesions according to age.

Lesion	Age Group								Total
	0 to 10	11 to 20	21 to 30	31 to 40	41 to 50	51 to 60	61 to 70	71 & onwards	
Metastatic Adenocarcinoma			1	2	2	6	2	1	14
Hepatocellular Carcinoma				1		1	2		4
Metastatic Poorly Differentiated Carcinoma								1	1
Metastatic small round cell neoplasm				1					1
Carcinoma favoring adenocarcinoma with focal squamous differentiation							1		1
Metastatic Carcinoma probably Undifferentiated Carcinoma				1					1
Metastatic malignancy: a) Renal cell carcinoma b) Metastatic neuroendocrine Tumour							1		1
Metastatic Carcinoma with squamous differentiation						1			1
Total	-	-	1	5	2	8	6	2	24
Percentage (%)	-	-	4.1	20.9	8.3	33.4	25	8.3	100

Table 2: Distribution of all liver FNAC lesions according to sex.

Lesion	Sex				Total	
	Male		Female			
	No. of cases	Percentage (%)	No. of cases	Percentage (%)	No. of cases	Percentage (%)
Metastatic Adenocarcinoma	4	17	10	42	14	59
Hepatocellular Carcinoma	3	12.3	1	4.1	4	16.4
Metastatic Poorly Differentiated Carcinoma	1	4.1	-	-	1	4.1
Metastatic small round cell neoplasm	-	-	1	4.1	1	4.1
Carcinoma favoring adenocarcinoma with focal squamous differentiation	1	4.1	-	-	1	4.1
Metastatic Carcinoma probably Undifferentiated Carcinoma	-	-	1	4.1	1	4.1
Metastatic malignancy: a) Renal cell carcinoma b) Metastatic neuroendocrine Tumour	1	4.1	-	-	1	4.1
Metastatic Carcinoma with squamous differentiation	-	-	1	4.1	1	4.1
Total	10	41.6	14	58.4	24	100

Table 3: Distribution of all liver FNAC lesions according to nature of lesion

Nature of Lesion	No. of Cases	Percentage (%)
Primary	4	16.6
Metastatic	20	83.4
Total	24	100

Table 4 : Distribution of all liver FNAC lesions according to cytologic type.

Nature of lesion	Type of lesion	No. of cases	Percentage (%)
Metastatic	1) Metastatic Adenocarcinoma	14	58.3
	2) Metastatic Poorly Differentiated Carcinoma	1	4.1
	3) Metastatic small round cell neoplasm	1	4.1
	4) Carcinoma favoring adenocarcinoma with focal squamous differentiation	1	4.1
	5) Metastatic Carcinoma probably Undifferentiated Carcinoma	1	4.1
	6) Metastatic malignancy: a) Renal cell carcinoma b) Metastatic neuroendocrine Tumour	1	4.1
	7) Metastatic Carcinoma with squamous differentiation	1	4.1
Primary	1) Hepatocellular Carcinoma	4	16.7
	Total	24	100

Table 5: Comparative study of age-wise distribution of FNAC of Liver lesions.

Study Series	Age Range
Sudha P. Meena et al. [10](2016)	23-90 years
Jayasree K et al.[11] (2017)	6-75 years
Verma N et al. [12](2017)	22-76 years
Present study	25-75 years

Table 6: Comparative study of FNAC of Liver lesions.

Study Lesion	Asghar F et al [13] (2010)	Barbhuiya, et al [4]	Verma N et al. [12] (2017)	Present study
Metastatic adenocarcinoma	33.3	61.7%	86%	58.3%
Hepatocellular Carcinoma	55.5	8.9%	8.7%	16.7%
Other secondaries	11.2	29.4%	5.3%	24.6%
Total	100%	100%	100%	100%

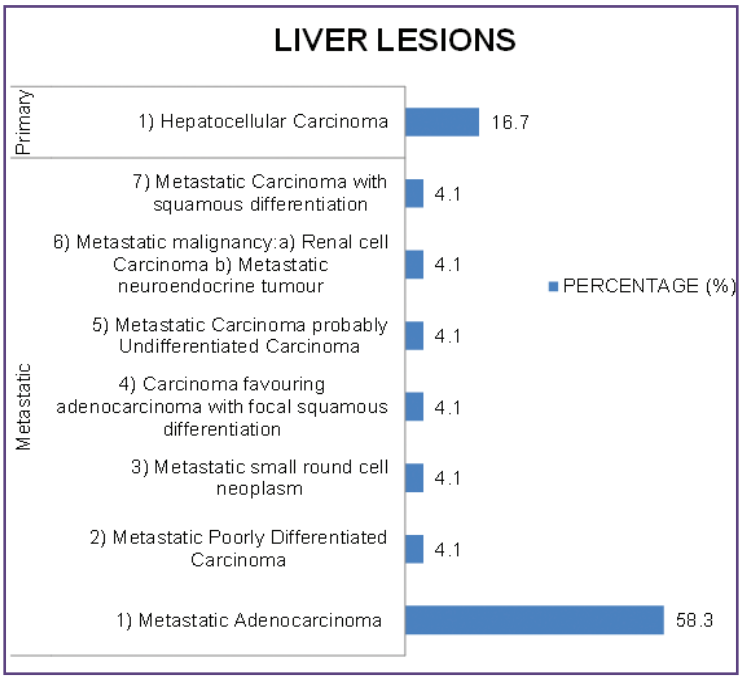

Fig. 1: Distribution of all liver FNAC lesions according to cytologic type

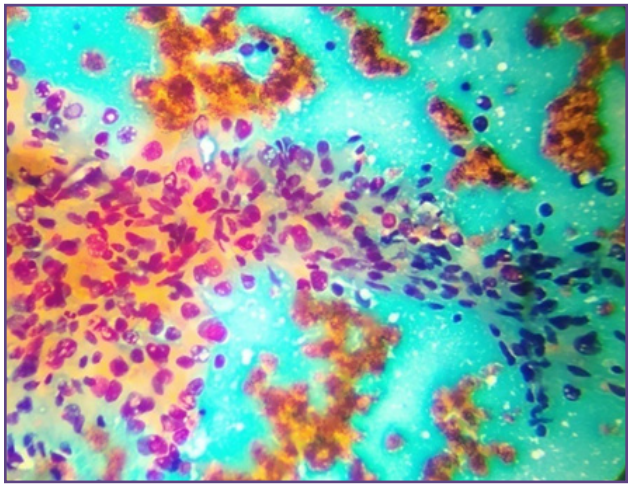

Fig. 2: HCC (PAP stain, 10x view) Showing transgressing capillaries.

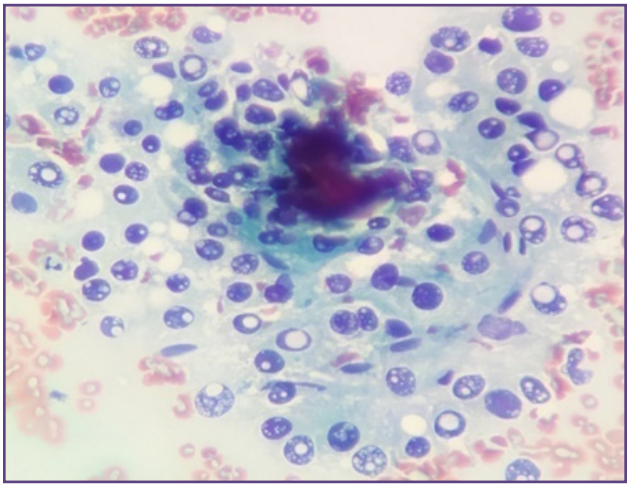

Fig. 3: HCC (PAP stain, 40x view) Showing intranuclear cytoplasmic inclusions

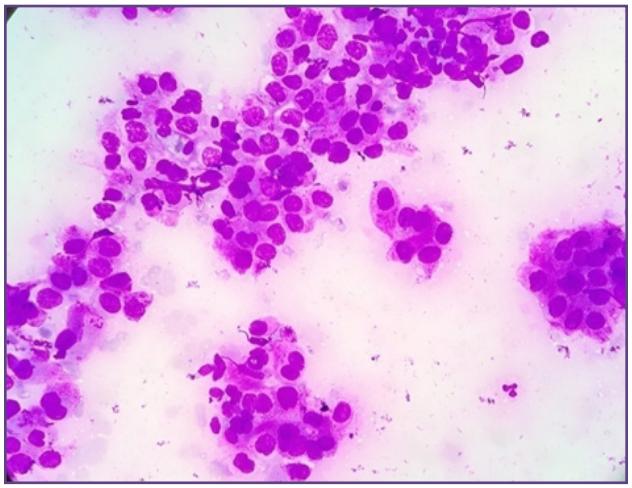

Fig. 4 :Metastatic Adenocarcinoma (MGG stain, 10x view) Showing acinar formations.

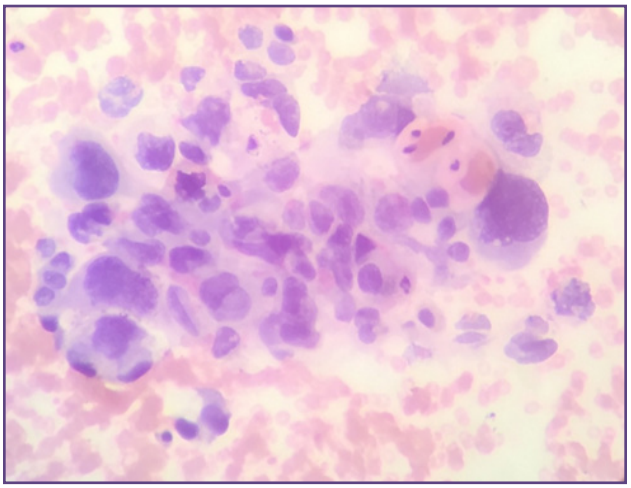

Fig. 5: Metastatic Poorly Differentiated Adenocarcinoma (H&E stain, 40x view).

[5] (2016), Ratan Konjengbam et al. [6] 2017 and Glaxon et al. [7] (2018) where the most common site for FNAC was also liver. This was because patient symptomatically presents earlier in cases of liver masses with complains of abdominal pain and abdominal mass. In the present study, all the lesions were malignant. Similar observation was made by Philipose et al.[8] · Glaxon et al.[7] and Sobha Rani G et al. [9] (2012) and Sidhalingreddy et al. [10] (2011) where malignant lesions constituted the most common diagnostic category.

In the present study, among the liver lesions, the age of patients ranged from 25-75 years. Age distribution of the present study was comparable with Verma N et al. [12] (2017) study in which age range was 22-76 years, Jayasree K et al. [11] (2017) in which the age range was 6-75 years and Sudha P. Meena et al. [10] (2016) study in which the age range was 23-90 years.

Maximum cases were seen in age group 51 to 60 years. This was comparable with study done by Sudha P. Meena et al. [10] (2016) study were also the most common age group involved in hepatic lesions was 51-60 years.

In the present study, among liver FNAC lesions, the male to female ratio was 1:1.4. Sex distribution was comparable with study carried out by Verma N et al. [12] (2017) and Jayasree K et al. [11](2017) having male to female ratio of 1:1.4 and 1:1.5 respectively.

Among the liver lesions, the most common malignancy was metastasis to the liver, Among the metastasis to the liver, metastatic adenocarcinoma was found to be the most common. This is similar to observation of study done

Verma N et al. [12] (2017) and Barbhuiya, et al [4] (2014) where also the most common lesion of liver was metastatic adenocarcinoma. The present study was discordant with the study carried out by Asghar F et al [13] (2010) where hepatocellular carcinoma was the most commonly encountered lesion in liver.

In the present study, all the liver lesions were neoplastic malignant lesions. This is similar to study done by Sobha Rani G et al.[9] (2012) and Dr. Suva Chetal M [5] (2016). The most commonly encountered malignancy in liver was metastatic adenocarcinoma whose primary lesion was gall bladder carcinoma in majority of cases, in the present study.

In the present study, one case was reported as metastatic small round cell neoplasm of which FNAC was done from liver from a 40 year old female. We received trucut biopsy from cecal mass of the same patient which was diagnosed as Poorly differentiated malignant tumour and 3 possibilities which can be considered which are as follows: 1)Malignant round cell tumour (? Non-hodgkin's lymphoma) (2) Poorly differentiated Carcinoma (3) Small cell variant of Gastrointestinal stromal Tumour. Immunohistochemistry was not available at that time, so it was advised for conclusive diagnosis. However follow-up was not received.

In the present study, one FNA from liver in a 65 years old male showed metastatic malignancy likely possibility of: 1) Renal cell carcinoma (2) Metastatic neuroendocrine tumour. We received specimen of kidney in histopathology section, the microscopic and immunohistochemisty findings were helpful in diagnosing it as as urothelial carcinoma.

One case of FNA from liver in a 49 year old female was done. The smears showed epithelial cells in sheets, clusters and acinar pattern with cells showing mild to moderate pleomorphism. However, endothelial wrapping, transgressing capillaries and intracellular bile pigments were not seen. Usg suggested possibility of hepatic metastasis. It was diagnosed as metastatic adenocarcinoma, in support with radiological data. But not to rule out remote possibility of cholangiocarcinoma if clinically suspected . Cytologically it was difficult to distinguish between adenocarcinoma and cholangiocarcinoma as both show acinar formations and distinction generally requires immunostains.

FNAC is less useful in the diagnosis of localized benign lesions in the liver, including benign neoplasms. A specific tissue diagnosis is not usually possible. Nevertheless, FNAC may be helpful in excluding a malignant process, which cannot be readily distinguished from a benign lesion radiologically.

Conclusion

The clinicopathological evaluation of liver lesions is often challenging and remains an enigma, both to the clinician as well as the pathologist. Histopathology is the gold standard for pathological diagnosis, however FNAC is being increasingly used as the method is found to be rapid, sensitive, inexpensive and reliable with less morbidity to the patient. It can be done on an outpatient basis and is also suitable for debilitated patients. FNAC 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. Also, it has many advantages over Trucut and core biopsy as it neither requires special instrument for processing nor it causes significant trauma to the patient.

In inoperable cases of liver malignancy with contraindication for surgery, FNAC can help guiding radiotherapy. It can also be used to detect local recurrence and metastasis in post-operative and post radiation follow up. Overall role of FNAC in hepatic lesions is of great value and its use should be encouraged.

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Financial or other Competing Interests: None.

Date of Submission : 19/10/2021
Date of Final Revision : 12/12/2021
Date of Acceptance : 05/03/2022
Date of Publication : 31/03/2022