

Profile of Liver Fine Needle Aspiration in Tertiary Care Hospital

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ABSTRACT

Objective: This retrospective study was planned to evaluate role of fine needle aspiration cytology (FNAC) in space occupying lesions of liver as first line investigation to differentiate benign from malignant pathologies, primary vs secondary malignancies and establishing exact diagnosis.

Materials and methods: A total number of 81 ultrasonography (USG)-guided FNA liver were performed in Postgraduate Institute of Medical Sciences (PGIMS), Rohtak from June 2010 to May 2011. Wet fixed and air dried smears were stained with Papanicolaou and May-Grunwald-Giemsa respectively.

Results: Age ranged from 19 to 86 years. Sixty-seven out of 81 cases were conclusive. Four out of 67 were benign. Out of remaining 63 malignant, six were primary lesions including four cases of hepatocellular carcinoma, one of Burkitt's lymphoma and one of cholangiocarcinoma. Secondary metastatic lesions were 44 including metastasis from malignant melanoma, squamous cell carcinoma and leiomyosarcoma.

Conclusion: USG-guided FNAC is very useful tool in establishing diagnosis of hepatic lesions as the procedure is simple, safe and minimally invasive.

Keywords: Ultrasonography-guided FNAC, First line of investigation, Simple, Safe, Minimally invasive.

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INTRODUCTION

Ultrasonography-guided fine needle aspiration cytology (FNAC) has now been emerged as a very simple, safe, inexpensive, minimally invasive and rapid method for cytopathological evaluation of liver lesions. It has replaced conventional large needle core biopsies in diagnosis of focal liver lesions. The main advantage of it is the possibility of multiple passes, which increases the chances of obtaining adequate viable cells, especially in necrotic tumors.¹ USG-guided FNAC is primarily employed to differentiate benign from malignant pathologies, primary vs secondary malignancies and establishing the exact diagnosis and their correlation with clinical presentation and radiological imaging investigations wherever possible. The main indication of FNAC of liver are single or multiple nodular lesions, demonstrated clinically by palpation or radiologically on computer tomography (CT) or USG. There

are only few contraindications to this procedure which are hemorrhagic diathesis and various vascular lesions.²⁻⁴ The aim of our study is to evaluate the role of USG-guided FNAC as a first line of investigation to establish the exact and early diagnosis of space occupying lesions of liver and also to study the cytomorphological features of various lesions with histopathology whenever possible.

MATERIALS AND METHODS

A total number of all 81 USG-guided FNAC were performed on liver lesions diagnosed clinically or radiologically, with normal range of prothrombin time index at PGIMS, Rohtak over a period of 1 year from June 2010 to May 2011. Aspirates were obtained with a 21 or 22 gauge needle attached to a 20 ml syringe and smears were made as quickly as possible. Some smears were air dried for May-Grunwald-Giemsa. One smear was wet fixed in 95% alcohol for Papanicolaou or hematoxylin and eosin (H&E). The blood clots fixed in 10% neutral buffered formalin were also used for histopathology. These were processed in automatic tissue processor and H&E staining was done. Cytological diagnosis were made and confirmed on histopathology and with immunohistochemical (IHC) staining wherever possible.

RESULTS

A total of 81 cases were aspirated during this duration of 1 year and studied. Age group ranged from 19 to 86 years with maximum cases lying in between 41 and 75 years. Male to female ratio was nearly normal. The patient's main complaints were pain in right upper quadrant of abdomen, anorexia, weight loss, abdominal mass and hepatosplenomegaly. Some also presented with ascites, abdominal distension, pruritus, jaundice and fever. Time period of complaints varied from 7 days to 7 months. After screening smears, results were categorized as benign aspirates, malignant aspirates, suspicious of malignancy and nonrepresentative (Table 1). Thus finally, 67 cases were conclusive giving a diagnostic yield of 82.7%. Out of these 67 cases, four (6%) patients were having benign lesions with three (4.5%) of them have abscess (Fig. 1) and one (1.5%) was diagnosed for liver cell dysplasia (Fig. 2). Six (9%) cases were primary malignant lesions which constitutes hepatocellular carcinoma (HCC; 6%) (Fig. 3), Burkitt's

lymphoma (1.5%) (Figs 4 and 5) and cholangiocarcinoma (1.5%). Secondary metastatic lesions compose 65.7% of cases and adenocarcinoma (32.8%) was the commonest type. A total of 28.4% were categorized as poorly differentiated carcinoma. Metastasis from malignant melanoma (1.5%) (Fig. 6), squamous cell carcinoma (1.5%), and leiomyosarcoma (1.5%), were also diagnosed and confirmed on IHC (Table 2). Patients were followed for clinical history and radiological details to know primary site of secondaries in liver. Primary was known in 35 (61.4%) cases and unknown in remaining 22 (38.6%) cases. Maximum metastasis was from gut and gall bladder

carcinoma. Primary was also located in pancreas, breast, lung, penile, endometrium, adrenal mass and melanoma (Fig. 7).

DISCUSSION

FNAC is very useful procedure for the diagnosis of various hepatic lesions. It offers accuracy without major complications and minimal intervention at low cost.⁵ The patients main complaints were, pain abdomen right upper quadrant, anorexia, weight loss, abdominal mass and hepatosplenomegaly. Some also presented with ascites, abdominal distension, pruritus, jaundice and fever. Exact management of hepatic lesions is a common clinical problem and their appropriate management depends on accurate diagnosis.⁶ The differential diagnosis of hepatic mass lesions includes primary liver tumors, metastatic deposits, congenital and acquired cysts, abscesses and granulomas. On imaging techniques the appearances are often nonspecific. There is some overlap between radiological

Table 1: Cytological categorization of liver aspirates

Sl. no.	Liver aspirates	No. of cases	Percentage
1.	Benign aspirates	04	04.9
2.	Malignant aspirates	51	61.7
3.	Suspicious of malignancy	13	16
4.	Nonrepresentative	4	17.2
	Total	81	100

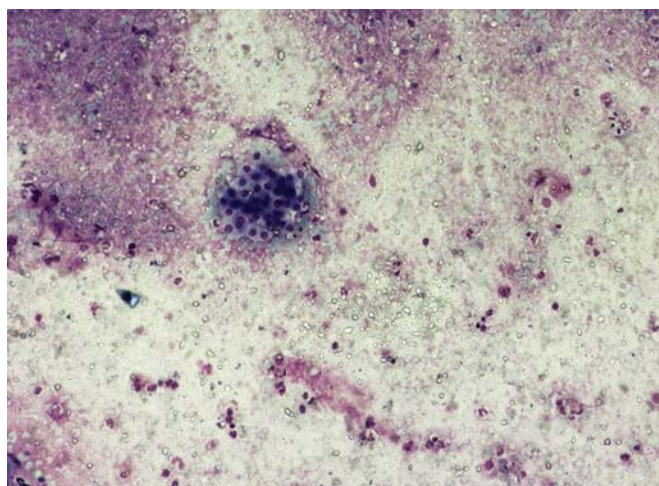


Fig. 1: A case of abscess hepatocytes and inflammatory cells at 200x

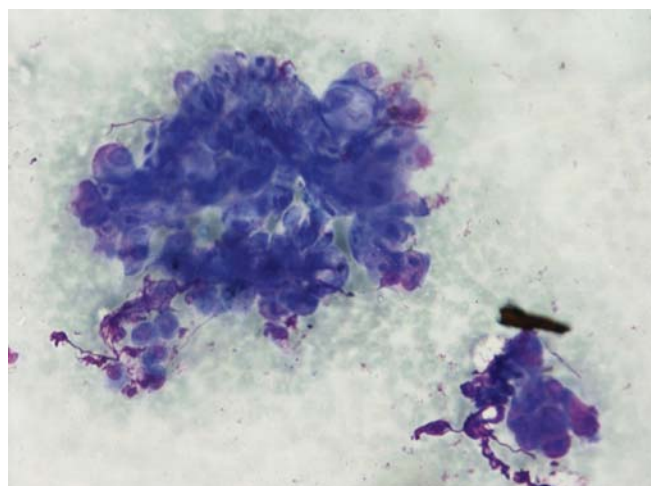


Fig. 3: A case of HCC showing malignant cells with macronucleoli at 400x

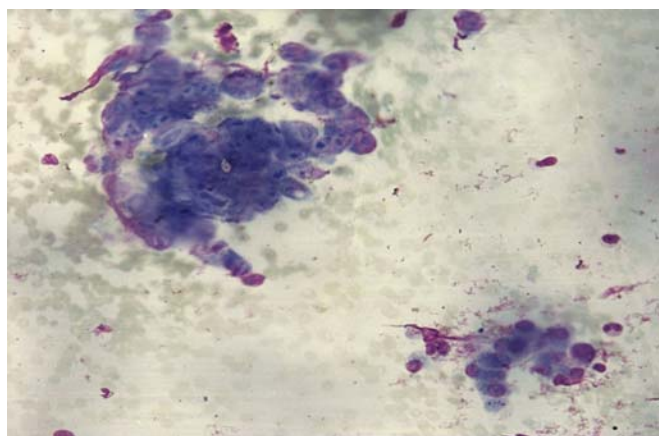


Fig. 2: A case of liver cell dysplasia showing high N/C ratio of hepatocytes at 400x

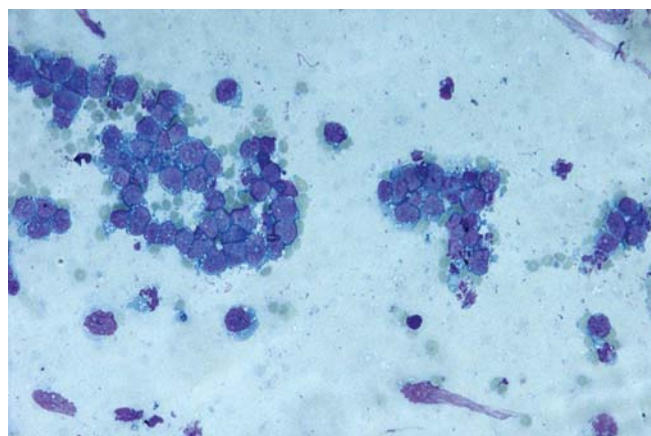


Fig. 4: A case of Burkitt's lymphoma showing cytoplasmic vacuolation of cells at 200x

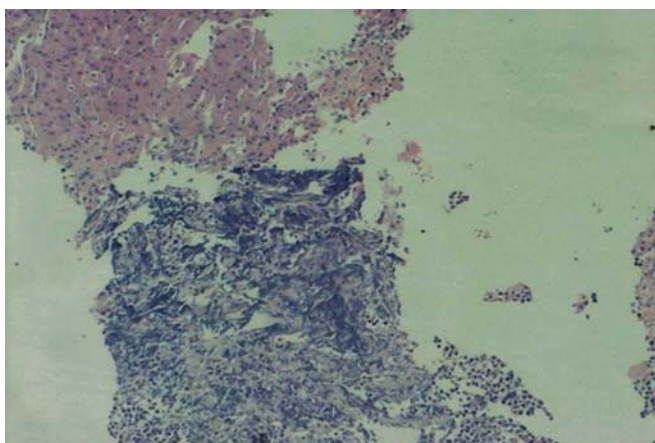


Fig. 5: Cell block preparation of Burkitt's lymphoma

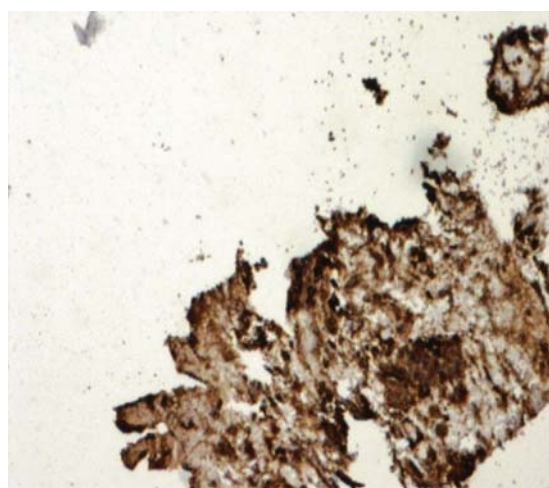


Fig. 6: HMB 45 staining of cell block preparation in malignant melanoma

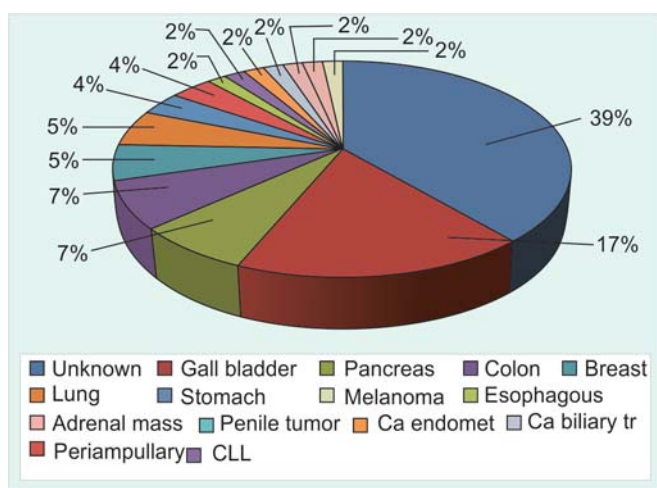


Fig. 7: Metastasis of various primaries to liver

features of liver abscesses, HCC and metastasis. Liver abscesses are impossible to differentiate from a neoplastic process radiologically.⁷ So, USG-guided FNA plays an important role which has been reported to be safe, useful and accurate technique for making cytological diagnosis of

hepatic masses.^{8,9} It is used mainly for diagnosing hepatic malignancies primary or metastatic.¹⁰ However, without histological structures it is difficult on FNAC to determine the characteristics and classification of lesion.¹¹ The use of cell blocks improved accuracy of detection of tumors as they have the benefit of providing multiple sections for immunocytochemistry. In addition IHC and special staining like PAS also helps in making diagnosis.¹² FNAC has replaced conventional core needle biopsy to a large extent in diagnosis of focal lesions as multiple passes can be given to the patient in outdoor department.³ It can be used as early investigation in diagnosis of hepatic lesions as concluded by results of our study which are also supported by study done by Ding et al.¹³

FNAC was considered in various studies as less useful in diagnosing localized benign lesions as compared to malignant lesions. Swamy et al¹⁴ concluded that FNAC can accurately distinguish non-neoplastic from neoplastic lesions and categorize different non-neoplastic and different primary from metastatic tumors. In our study we found that if accurate diagnostic cellularity can be obtained then it can be used as accessory tool in identification of benign and inflammatory disease of liver. In our study out of diagnostic aspirates, three cases of inflammatory lesions were diagnosed which shows inflammatory cells, necrosis with debris. Hepatocytes at periphery may show atypia. Abscess may simulate metastasis undergoing necrotizing degeneration.

Another HBsAg-positive female was diagnosed for liver cell dysplasia. Cytological features show loosely arranged small fragments of hepatocytes which were enlarged and

Table 2: Categorization of malignant and benign lesions (67 cases)

Sl. no.	Types	No. of cases	Percentage
1.	Non-neoplastic/ Inflammatory lesions		
	Abscess	03	04.5
2.	Benign tumors		
	Liver cell dysplasia	01	01.5
3.	Malignant tumors		
	a. Primary origin		
	HCC	04	06.0
	Burkitt's lymphoma	01	01.5
	Cholangiocarcinoma	01	01.5
	Total	06	09.0
	b. Secondary origin		
	Adenocarcinoma	22	32.8
	Poorly diff. carcinoma	19	28.4
	Squamous cell carcinoma	01	01.5
	Melanoma	01	01.5
	Leiomyosarcoma	01	01.5
	Total	44	65.7
4.	Suspicious of secondary malignancy	13	19.4

show marked variation in size and shape with prominent nucleoli, multi- and binucleated also.^{15,16}

Das et al¹⁷ reported role of USG-guided FNAC in diagnosis and classification of liver malignancies and concluded that FNAC played important role in diagnosis and classification of malignancies in liver.

Most common malignant lesion of primary origin was HCC in our study. Cytomorphologically it can be differentiated from other lesions of liver by the different features collectively like cellularity, acinar pattern, trabecular pattern, hyperchromasia, N/C ratio and cohesiveness of cells, nuclear shape and size, location, multinucleation, intranuclear inclusions, prominent nucleolus, amount of cytoplasm, vacuolation, bile production and hyaline bodies. The most important and helpful cytological features were the trabecular pattern, irregularly granular chromatin, multiple nucleoli and atypical naked nuclei as were described by Cohen et al.^{18,19}

A primary case of Burkitt's lymphoma was also diagnosed in 28 years HIV-positive male. FNAC revealed cells having round nuclei, granular nuclear chromatin, multiple nucleoli and moderate amount of vacuolated dense blue cytoplasm. Diagnosis was later confirmed on histopathology. IHC show tumor cells positive for LCA, CD20, CD10 and negative for Bcl2 and CD34. A case of cholangiocarcinoma was diagnosed and showed clusters of atypical cells resembling duct epithelium with desmoplastic stroma.

Among the metastatic lesions adenocarcinoma were the most common diagnosed secondaries which showed glandular or acinar pattern, intra- and extracytoplasmic mucin. These tumors mainly came from the GIT, gall bladder, breast, lung and prostate. The special stain PAS and mucicarmine were done for glycogen and mucin as discussed in various studies.^{4,6,10}

Metastasis from squamous cell carcinoma showed large cell with multiple nucleoli inconspicuous with abundant basophilic cytoplasm with keratinization in a background of inflammation and necrosis.

Metastasis from malignant melanoma showed cellular smears comprising of loose cohesive clusters and singly scattered atypical cells. These cells were highly pleomorphic with variable cytoplasm showing brown black pigment as discussed in study conducted by Voit et al.²⁰ Diagnosis was confirmed after cell block preparation which on immunohistochemical staining for HMB 45 and S100 was positive.

Cellular smears comprising of oval- to spindle-shaped cells having pale ill-defined cytoplasm and pleomorphic nuclei arranged in loose cohesive clusters and scattered singly were found in case of metastasis from leiomyosarcoma. Primary was found later on in gut and diagnosis was confirmed on histopathology.

CONCLUSION

USG-guided FNA of liver is being increasingly accepted as valuable ancillary diagnostic tool that differs minimum risk and least discomfort to patient sitting at the outpatient department. Early definite pathological diagnosis of primary benign and malignant liver lesions and for tumors metastasis to liver can be made by assistance of cell block preparation and use of IHC. So that early management of hepatic lesions can be done. Thus, currently USG-guided FNAC is becoming primarily most important and can be used as first line of investigation for definite and early diagnosis of liver lesions.

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