Original Article

Cytological-Radiological Correlation of Image Guided FNAC of Hepatic Mass Lesions: Our Experience In Tertiary Care Centre

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Keywords: *Hepatocellular Carcinoma, FNAC, Image Guided, Metastasis*

ABSTRACT

Background: Fine needle aspiration cytology is of latest and extensively utilized in the diagnosis of lesions aided by image guidance, it is fast becoming an initial investigation of choice for various hepatic lesions. It is safe, less traumatic, quick and cost effective tool. The present study was undertaken to know the pathological spectrum of hepatic mass lesions and to correlate the cytoradiological findings.

Methods: The present study was conducted in a tertiary care centre of North India on 169 patients with hepatic lesions over a period of two years. Image guided FNAC was carried out and aspirates were examined, and compared with radiological diagnoses.

Results: Metastatic malignancies were more frequent (58%) than hepatocellular carcinoma (HCC). By cytology, the most common metastases was of adenocarcinoma (49.1%) followed by squamous cell carcinoma, small cell carcinoma and poorly differentiated carcinoma, malignant melanoma and lymphoma. HCV was seen to be associated with hepatocellular carcinoma in 31.3% cases. Multiple SOLs was more common finding in radiology for HCC than single SOL. Cytoradiological correlation was found to be 92% in the present study.

Conclusion: Present study thus concludes that image guided FNAC of hepatic lesions is a simple, safe, economically prudent technique associated with low morbidity and leading to quick and early diagnosis.

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Introduction

Liver is involved in many non-neoplastic and neoplastic diseases. The diagnosis of various hepatic mass lesions is a common clinical problem and their appropriate management depends on accurate diagnosis. [1]Despite recent improvement, radiological imaging does not always allow exact characterization of the lesions. Serological markers like alpha fetoprotein can be useful in narrowing the differential diagnosis when their levels are markedly elevated but a substantial number of patients unfortunately do not have high levels of these markers at the time of presentation. Therefore, a cytological diagnosis is often required to guide subsequent management. Fine needle aspiration cytology under image guidance has gained increasing acceptance as the diagnostic procedure of choice for patients with focal hepatic lesions. [2]

Material and Methods

The aim of present study is to know the pathological spectrum of hepatic mass lesions and to correlate the radiological findings and cytological findings obtained in image guided FNAC.

One hundred sixty nine patients with clinical, biochemical and radiological evidence of liver diseases and/or space occupying lesion (SOL) with normal prothrombin time were subjected to image guided FNAC over a period two years from January 2014 to December 2015. Ultrasound guidance was usually preferred for its simplicity, real-time monitoring and flexible needle placement. CT guidance was reserved for lesions that were not demonstrated by ultrasound. The patients with hemangioma and hydatid disease of liver diagnosed radiologically were excluded to prevent undue complications. Proper aseptic care was taken by cleaning the skin surface with povidone iodine before every FNAC. Aspiration was done using 21G, 88mmlong spinal needle attached to a 10mL disposable which was introduced into the lesion under radiological guidance. The cytological material obtained were smeared on clean glass slides, wet-fixed or air-dried and stained by Papanicolaou (Pap), May-Grunwald Giemsa (MGG), and haematoxylin and eosin stains. The slides were screened for adequacy of the material. The diagnoses rendered by full consensus by three experienced cytopathologists were taken as final. The radiological opinion of each individual lesion was also recorded. Both cytological and radiological opinions were tabulated and compared statistically.

Results

The diagnostic yield of image guided FNAC liver in our study was 96.4% , as the material was inadequate for interpretation in six cases (3.6%), where only benign looking hepatocytes along with blood and few inflammatory cells were seen.

Majority of the patients were in the age group between 4th to 7th decade (83.7%) with the age ranging from 22 to 87 years. No significant male or female preponderance was noted in this study as the M: F ratio of 1 : 1.13. (Table 1)

Non neoplastic lesions comprised minority of cases (9.6%) and included pyogenic abscess, fatty change , cirrhotic nodule and granulomatous hepatitis. The smears from pyogenic liver abscess predominantly showed neutrophils, necrotic cells and debris. The smears from the granulomatous hepatitis showed epitheloid cell collection with Langhan's type multinucleated giant cell. (Table 2)

Malignancy was the most common cytological diagnosis (88.7%). Metastatic tumors were the most common (58%) among the malignant liver lesions. Among the metastatic lesions, the most common was adenocarcinoma (49.1%), followed by squamous cell carcinoma (1.2%) small cell carcinoma (0.6%) one case each of malignant melanoma and lymphoma. The smears from the adenocarcinoma revealed hypercellularity with columnar to cuboidal cells arranged in monolayered sheets, palisade forms, acinar pattern and in singles having vacuolated or granular and eosinophilic cytoplasm.(fig.1) The cells showed altered N:C ratio, anisonucleosis with central or eccentrically placed nucleus and fine-coarse dispersed chromatin. Many showed benign hepatocytes in the background. Most of the metastatic adenocarcinoma were from gall bladder, followed by colon, ovary and breast. In metastatic squamous cell carcinoma, smears showed squamoid, tadpole-like and spindle-shaped cells with well-defined abundant keratinized cytoplasm and pleomorphic and hyperchromatic nuclei.(fig.2) Smears from small cell metastatic deposits showed mainly small monomorphic cells with finely granular nuclear chromatin, inconspicuous or absent nucleoli and scanty cytoplasm. Nuclear moulding and streaking were also noted. (fig 2) Metastatic melanoma showed large tumor cells with abundant cytoplasm, pleomorphic nuclei and prominent nucleoli, intranuclear cytoplasmic inclusions and melanin granules in the cytoplasm. Smears from metastatic non Hodgkin lymphoma showed dispersed monotonous cells with granular nuclear chromatin and scanty cytoplasm with presence of lymphoglandular bodies in the background. These diagnoses were made in correlation with clinical, radiological evidences of primary lesion. (Table 2).The commonest primary hepatic lesion was hepatocellular carcinoma (HCC) 51 (30.2%). Hepatocellular carcinoma was further differentiated into three grades, grade I (well differentiated) were 25% cases grade II (moderately differentiated) were 56.3% and grade III (poorly

differentiated) were 18.7% cases. The main cytological features in grade I- HCC were hypercellularity with broad trabeculae, endothelial rimming/transgression of vessels in the cell clusters, bare atypical nuclei, large polygonal cells with abundant eosinophilic granular cytoplasm, intracytoplasmic bile, increased nucleus to cytoplasm (N:C) ratio, central round nucleus and intranuclear inclusions. (fig 4) Grade II HCC had many features of Grade I HCC. Endothelial rimming or transgressing of cell clusters, eccentric nuclei, multinucleation, multiple nucleoli and macronucleoli were more associated with Grade II HCC. Grade III HCC showed cells in sheets, small groups and singles. Anisocytosis, anisonucleosis, irregular nuclear chromatin, hyperchromasia, multiple nuclei, macronucleoli and bare atypical nuclei were seen in all the patients.

HCC showed multifocal space occupying lesions (SOL) in 56.6% and single SOL was seen in 44.4 % cases where as among multiple SOLs, metastasis was the commonest (83.6%) cytological diagnosis. Hepatitis C positivity was associated with HCC in 31.3% cases. No hepatitis B case was seen during this study. On correlating cytological diagnosis with radiological findings the cytoradiological correlation was seen in 92 % cases. (Table 3).

Table 1: Demographic and Cyto-radiological details.

Subject	Subheading	Total Number
Age	<40 40-70 >70	15 128 26
Sex	Male Female	79 80
Radiological Diagnosis	Benign/Inflammatory HCC Metastasis	16 47 100
Cytological Diagnosis	Benign/Inflammatory HCC Metastasis	19 52 92

Table 2: Spectrum of lesions in the present study.

	Cytological diagnosis	Number	Percentage
Non neoplastic	Pyogenic abscess	6	3.6%
	Granulomatous hepatitis	3	1.8%
	Fatty change	4	2.4%
	Cirrhotic nodules	3	1.8%
Neoplastic	Benign		
	Hepatic adenoma	3	1.8%
	Malignant		
	primary		
	Hepatocellular Carcinoma	51	30.2%
	Cholangiocarcinoma	1	0.6%
	Metastatic		
	Adenocarcinoma	83	49.1%
	Small cell carcinoma	1	0.6%
	Squamous cell carcinoma	2	1.2%
	Malignant melanoma	1	0.6%
	Lymphoma	1	0.6%
	Poorly differentiated carcinoma	4	2.4%
Inadequate		6	3.6%
	Total	**169**	**100%**

Table 3. Radiological findings in cytologically diagnosed malignant liver masses.

Radiology	Primary	Metastases
Single SOL	23	15
Multiple	29	77
Total	**52**	**92**

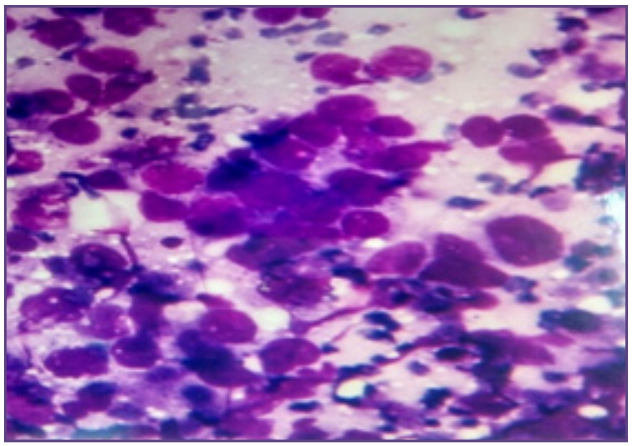

Fig. 1: Metastatic deposits of adenocarcinoma showing hyperchromatic pleomorphic cells forming acinar pattern.(MGG 400X).

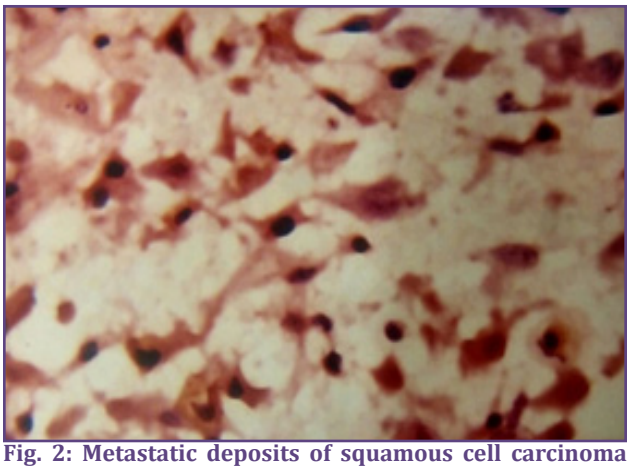

Fig. 2: Metastatic deposits of squamous cell carcinoma showing tadpole cells and neoplastic squamous cells with hyperchromatic enlarged nuclei and abundant keratinised cytoplasm.

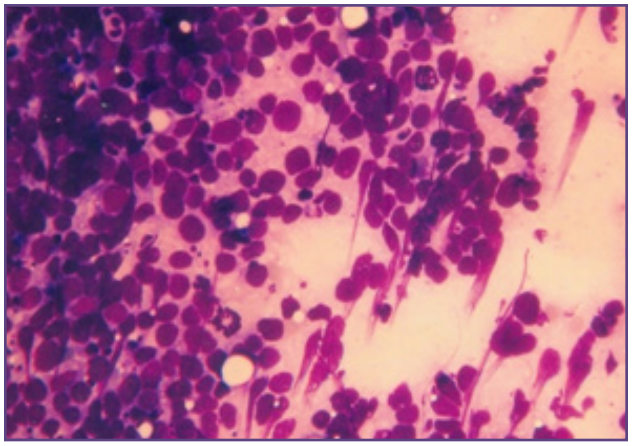

Fig. 3: Metastatic small cell carcinoma with sheets of small round cells showing nuclear moulding and nuclear streaking.(MGG 400X).

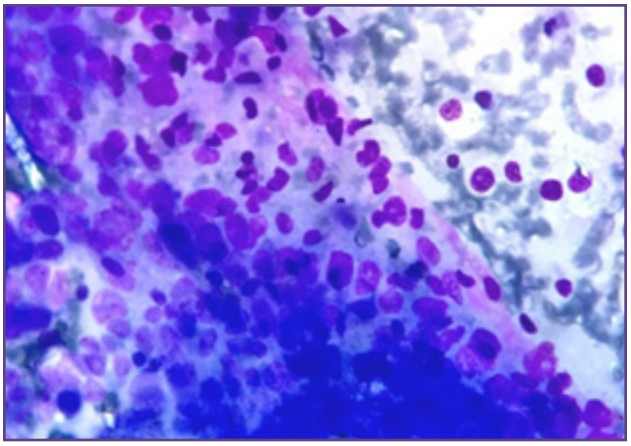

Fig. 4: Hepatocellular carcinoma showing neoplastic cells with nuclear psuedoinclusions along with endothelial rimming around the small group of cells.

Discussion

FNAC is a sufficiently accurate, simple, rapid, safe and relatively painless and cost-effective technique, rendering it an attractive alternative to percutaneous biopsy. [3] Other points in favour of FNAC is that FNAC has high degree of sensitivity in cases of malignancy which is reported to be as high as 99.5% and 95.3% by various researchers. [4,5] Diagnosis is easier on FNAC in malignant hepatic lesions as compared to benign lesions as recent work done by Nasit et al reported remarkable difference between sensitivity of diagnosis of malignant (87.3%) and benign (40%) lesions. [6]

The diagnostic yield in our study was 98.4% which is high as compared to other researchers, as the study employed the technique of immediate cytological assessment by means of rapid staining procedures and joint presence of both radiologists and pathologists which is recommended

by various researchers. The reported diagnostic yields in other studies range from 83.4% -90.4%. [1,7]

Malignancy was the most common cytological diagnosis seen in 88.7% of cases. This corroborates with the work done by other researchers. [5,7] Metastatic deposits were seen more frequently (58%) as compared to HCC (30.2%) which was in concordance with the work done by other researchers. [7-10] In contrast to this, a study carried out in Pakistan reported HCC as the most common malignant lesion in liver (60.49%) because of high prevalence of Hepatitis B and C in the country. [5] Among the HCC cases on cytology, grade II was the commonest (56.3%). Other researchers also reported similar findings.[7,11] However, Tariq et al reported well differentiated HCC as the most common grade (44.9%). [5]

Although the most common presentation of HCC in imaging studies in most studies is a single SOL, the tumor may also form multiple smaller nodules or a dominant mass with satellite nodules, thus mimicking the more common metastatic cancer. In our study, 56% of the HCC cases presented as multiple lesions on radiology.

Hepatitis C positivity was seen in 31.3% cases of the HCC cases. No hepatitis B case was seen during this study. In contrast, many other studies reported 15.4% to 66.7% of Hepatitis B positivity in HCC cases.[11,12] Kaur et al reported a higher seropositivity of HCV in the blood donors of Amritsar as compared to that found in the studies from other parts of India. [13] Although imaging techniques have helped greatly with the early and accurate diagnosis, the appearances are often non-specific. There is some overlap between the radiologic features of liver abscesses, HCC and metastases.[11]

Cytoradiological correlation in our study was established in 92% cases. Discordance was noted in eight (4.7%) cases of HCC were diagnosed as metastatic deposits on radiology as these were multicentric HCC. The same was reported by other researchers where secondaries liver reported by radiology turned out to be HCC on FNAC.[9] Thus, the exclusion of metastases in these cases prevented further search for a primary, saving the patient from needless investigations. Two cases of hepatic adenoma and one case of pyogenic abscess were misdiagnosed as HCC on radiology. HCC can be small and focal, solitary and large, multifocal or diffuse, and infiltrating, thereby, mimicking benign lesions on one hand and metastases on the other, especially in imaging studies. [14] Tumors, primary or secondary, may undergo extensive necrosis, with the resultant radiologic image of the cavitary neoplasms mimicking abscesses; abscesses are accompanied by proliferative reactive changes, making radiologic differentiation from a neoplastic process almost impossible. In these situations FNAC plays an essential complementary role.[11]

Complications of hepatic FNAC are rare with about 0.5% minor complications, 0.05% major complications requiring surgery and less than 0.01% mortality.[15] In our study, complications were limited to hemorrhage in two cases .The present study thus concludes that Image-guided FNA in hepatic lesions is a simple, safe, and economically prudent technique associated with low morbidity, leading to quick diagnosis. Present study also concludes that it leads to fairly accurate diagnosis in conjunction with radiological guidance enabling direct visualization leading to greater degree of predicting true positive malignant cases. It should be used as a first line of investigation. Hence it helps in early diagnosis and has increased chance of effective intervention and formulating immediate effective management of hepatic lesions.

Funding
None

Competing Interests
None Declared

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