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Original Research Article

Role of Ultrasound Guided Fine Needle Aspiration Cytology in Mass Lesions of Liver

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Abstract:

Background: In our country, liver problems are very common. The diagnosis of liver diseases that appear as a mass lesion might be difficult. Numerous benign and malignant tumors can involve the liver. Accurate diagnosis is essential to managing these lesions. These lesions, especially the malignant ones, can be accurately diagnosed by image guided fine needle aspiration cytology.

Methods: This prospective study conducted at Department of Pathology, JLNMCH, Bhagalpur, Bihar from November 2022 to April 2023. Total 52 cases of liver lesions included in this study period. Diagnosis was made based on cytological findings and was correlated with biopsy wherever required.

Results: 43 of the 52 liver lesions were malignant, 5 were benign, and 4 aspirates were insufficient for a proper diagnosis. There were 15 occurrences of primary hepatocellular carcinomas (HCC), while the majority of malignant lesions (26 cases) were metastatic carcinomas. Two instances had characteristics that made it impossible to distinguish between metastasis and HCC.

Conclusion: The diagnosis of liver lesions can be made quickly, cheaply, and accurately using fine needle aspiration cytology.

Keywords: FNAC, Liver Lesions, Ultrasound

Introduction

Numerous neoplastic and non-neoplastic lesions exhibit liver involvement, and the lesions are simple to access using fine needle aspiration cytology (FNAC). Accurate diagnosis is necessary for appropriate clinical therapy, and FNAC can aid in case evaluation. It is crucial to classify the type of lesions, whether they are primary or metastatic, and to note any metastatic likely sites of primary lesions.[1] In order to strike the target lesion precisely, the technique requires radiological guidance.

The primary study of choice for various hepatic lesions is now radiology guided FNAC[2], which can yield a conclusive diagnosis in the majority of patients with little discomfort and little chance of consequences. [3]

Differential diagnoses for liver lesions might include a wide range of lesions, such as primary tumors, metastases, abscesses, distinct congenital cysts, and granulomas. The most frequent site of metastasis for solid tumors is the liver, which is also one of the leading causes of death in adults. [4-5] The current study objectives are to identify the range of liver lesions and define their cytomorphological characteristics.

Material and Methods

52 cases of liver lesions were included in this prospective observational study a 6-months period (November 2022 to April 2023) at the Pathology Department of Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar. From the departmental records, data were obtained and assessed. Every patient's PT/INR was examined before to FNAC, along with detailed clinical information on their current symptoms, a history of any known primary or pre-existing liver diseases, a personal history, and laboratory results.

Used a 23 G lumbar puncture needle connected to a 10 ml syringe and aspiration method to perform FNAC while taking all necessary aseptic precautions. An experienced cytopathology technician prepared the smears. Giemsa and

Papanicolaou stains were used to stain slides, and cytology was used to determine the diagnosis.

Radiological correlation was done wherever required.

Serum Alfa- fetoprotein levels and HBsAg status was also evaluated whenever needed.

Results

In this study, there were 52 cases of liver lesions, of which 43 were classified as malignant, and just five as benign. The original hepatocellular carcinomas (26 instances), secondary hepatocellular carcinomas (15 cases), and poorly differentiated carcinomas (two cases) were the most prevalent tumor types among the malignant patients. Lung metastases to the liver most frequently (8 cases), followed by the gall bladder (4 cases), breast (4 cases), ovary (2 cases), lower gastro-intestinal tract (2 cases), and one case each of peri-ampullary carcinoma, pancreas, adrenal cortical carcinoma, and oral cavity squamous carcinoma. There were two occurrences of metastatic cancer whose origins were unknown.

There were five cases identified as benign, including two hemangiomas, two abscesses (one liver abscess and one amoebic abscess), and one reactive hyperplasia. The diagnosis was established by comparing the pathological, radiological, and clinical results.

Table 1: Distribution of Liver Lesions

Diagnosis	Diagnosis Breakup	No. of cases	Percentage
Benign (5 cases)	Hemangioma	2	3.85%
	Abscess	2	3.85%
	Reactive hyperplasia	1	1.92%
	Metastatic carcinoma	26	50.0%
Malignant (43 cases)	Hepatocellular carcinoma	15	28.85%
	Poorly differentiated carcinoma	2	3.85%
Inadequate (4 cases)		4	7.69%
Total		52	100.0%

Table 2: Site of primaries in cases of metastatic adenocarcinoma

Site of Primary	No. of cases	Percentage
Lung	8	30.77%
Gall bladder	4	15.38%
Breast	4	15.38%
Ovary	2	7.69%
Lower gastrointestinal tract	2	7.69%
Peri-ampullary	1	3.85%
Pancreas	1	3.85%
Adrenal cortical carcinoma	1	3.85%
Oral cavity squamous carcinoma	1	3.85%
Malignancy of unknown origin	2	7.69%
Total	26	100.0%

Discussion

Radiological guidance is required for accurate localization when using FNAC to diagnose focal lesions. Numerous studies have been conducted to show how effective FNAC is for diagnosing liver lesions. [6-10]

FNAC is a simple, minimally invasive procedure with a low likelihood of complications.

Only a small percentage of patients, particularly those with bleeding disorders, should not have liver FNAC, and patients should be evaluated for any bleeding disorders by measuring their PT/INR. Abdominal pain, weight loss, anorexia, and very rarely abdominal masses are the symptoms of hepatic mass lesions. Only a small percentage of instances may be asymptomatic, and the mass lesion may be discovered by chance or during the metastatic workup for any known primary. 43 malignant lesions (82.7%) were found in our investigation, which is consistent with many other studies published in the literature. [11-15]

In order to properly treat these two lesions, it is crucial to distinguish between primary hepatocellular carcinoma (HCC) and metastatic adenocarcinomas. Based on cytomorphological characteristics, FNAC can be quite accurate in discriminating between primary HCC and metastases. Cytology can distinguish between HCC and metastasis with the exception of a small number of cases of poorly differentiated HCC. In this study, HCC was identified based on the appearance of neoplastic polygonal cell clusters and trabeculae with tiny capillaries piercing the

clusters. Cells displayed scattered bare nuclei and macronucleoli with inclusions (Figure 1, observed in all 15 cases). Cytoplasmic pigments were found in 7 out of 15 cases.

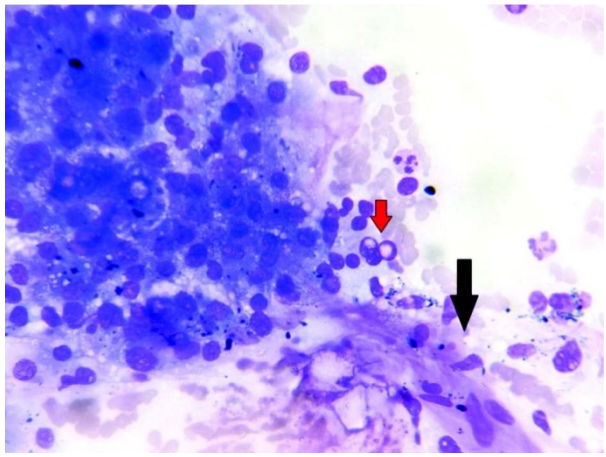

Figure 1: Giemsa stained smears show transgressing capillary (black arrow), intranuclear inclusions (small arrow) and nucleoli (400x)

Figure 2 shows the cytomorphological characteristics of metastatic adenocarcinoma, which are all closely cohesive clusters of cancerous cells with a high nuclear-cytoplasmic ratio, hyperchromatic nuclei, and sparse cytoplasm. Gl and intracytoplasmic mucin development were also seen.

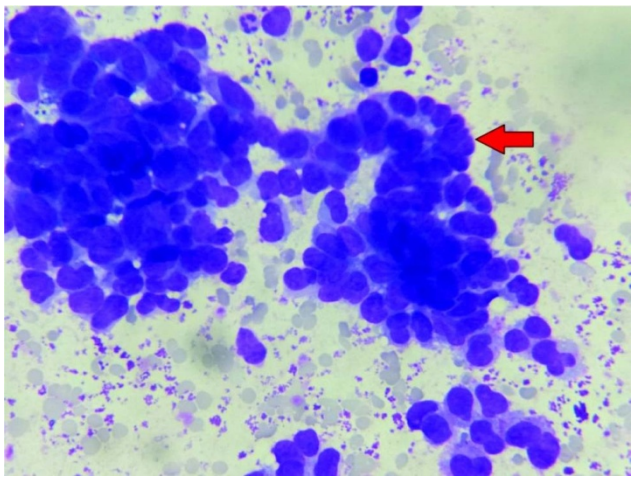

Figure 2: Giemsa stained smears show a carcinoma cells in tightly packed clusters with high N:C ratio and focal glandular arrangement (arrow) (400x).

Two cases of squamous carcinoma (one from the oral cavity and the other from the gall bladder) showed keratinized malignant cells. There were three cases of small cell carcinoma (Figure 3) that had spread from the lung to the liver and showed fragmented cancer cells as well as a few clusters, hyperchromatic nuclei with coarse chromatin, and numerous mitotic patterns. Along with necrotic debris, focal nuclear moulding was also visible. Following assessment, lung mass lesions were found in all three instances. In two cases, malignant cells lacked any distinguishing characteristics of HCC or other carcinomas but did have scattered bare nuclei and cells with macronucleoli.

However, no additional HCC-suggestive characteristics were present, and radiographic assessment revealed no primary tumors. These were consequently classified as carcinomas with weak differentiation. Both times, there was no increase in AFP, and viral markers were negative. Following up failed in both circumstances. Lung metastasis was the most frequent primary location, followed by gallbladder, breast, ovary, and lower GI tract. A few uncommon locations, such as oral cavity squamous carcinoma and adrenal cortical carcinoma, were known to metastasis to the liver (Figure 4).

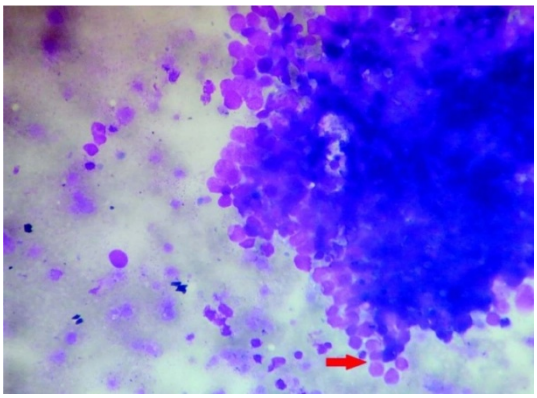

Figure 3: Giemsa stained smears show small round cells with hyperchromatic nuclei,, coarse chromatin and nuclear molding (arrow) (400x)

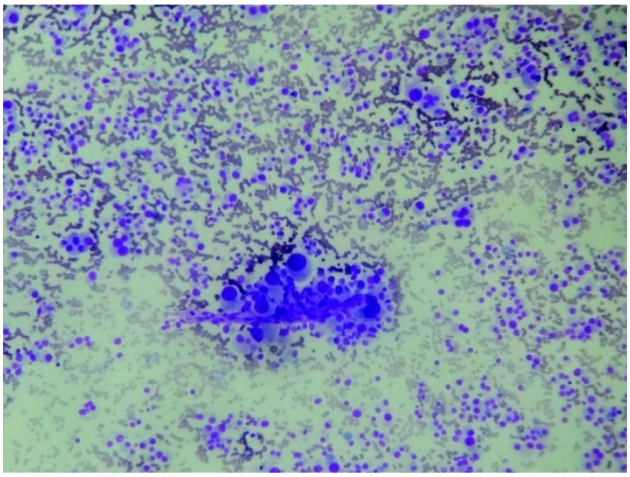

Figure 4: Giemsa stained smears showing carcinoma cells with many bizarre forms consistent with metastasis in a known case of adreno- cortical carcinoma (100x)

There were five cases that had benign diagnoses. Two cases displayed signs of an abscess, one of which had the typical appearance of anchovy sauce and the other of which had many neutrophils against a necrotic backdrop. Both were given medical care.

Hemangioma was identified in two cases based on cytological and radiographic characteristics. Hemorrhagic smears had a few dispersed capillary channels and endothelial cells. Based on radiological data, reactive hyperplasia was identified in one patient. Four patients could not be diagnosed because the smears showed signs of haemorrhage after multiple aspirations.

Conclusion

A quick, affordable, and effective diagnostic tool, FNAC can assist distinguish between benign and malignant instances and HCC from cases of metastatic carcinoma. Correlation with clinical, pathological, and radiological findings may help in making a more precise diagnosis of the lesion and reducing the need for a more invasive biopsy technique that carries a risk of hemorrhage.

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