ORIGINAL ARTICLE

To Evaluate the Role of Fine Needle Aspiration Cytology in the Diagnosis of Liver Malignancy including Hepatocellular Carcinoma

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ABSTRACT

Objective: To find out the role of FNA cytology in the diagnosis of liver malignancy especially hepatocellular carcinoma.

Material and methods: 35 female patients with age range 25-85 years who visited Gastroenterology Department of Sheikh Zayed Hospital Lahore were included in the study. The space occupying lesions of the liver of patients were diagnosed by ultrasonography. Fine needle aspiration (FNA) is used to perform liver biopsy by special needles of Menghini. About 1-2 ml specimen was collected from each patient under image guidance.

Results: It was observed that 77% cases (27 patients) were diagnosed as malignant. Eighteen patients had a space occupying lesion in the right lobe of liver, 05 had lesion in the left lobe and in 04 patients the lesion involved parts of both lobes.

Out of 27 malignant cases 70% cases were diagnosed as primary cancer of hepatic cell or HCC, 15% patients had Metastatic Adenocarcinoma, 7% had Metastatic Melanoma, while 4% showed Metastatic Spindle Cell Carcinoma and 4% cases were of Unclassified Carcinoma.

Conclusion: FNA cytology in case of space occupying lesions of liver can be relied upon to differentiate between benign and malignant lesions. The results improve considerably with availability of cell block along with relevant laboratory and ultrasound findings.

Key word: find needle aspirate, space occupying lesion, liver malignancy.

INTRODUCTION

Liver disease is the third most common cause of death among individuals between the ages of 25 and 59, and the seventh most common cause of all disease-related deaths. Among liver malignancies, the hepatocellular carcinoma (HCC) is the second most common tumor of liver worldwide and the third cause of cancer-related deaths. HCC has become the leading cause of death in patients with liver cirrhosis[1]. According to the American Liver Foundation, liver disease affects approximately 25 million (one in 10) Americans annually. Cirrhosis accounts for over 27,000 deaths each year. The incidence of HCC is increasing especially in Africa and South Asia. It predominantly affects older men[2].

Grossly, HCC is heterogenous in its appearance and morphology. The tumor may be present as a solitary mass of variable size, as multiple nodules mimicking metastatic malignancy or as a diffuse process. HCC is classified into well, moderately and poorly differentiated carcinoma. Among these, well differentiated hepatocellular carcinoma is the most difficult to diagnose on FNAC[3]. Moderately differentiated hepatocellular carcinoma is the least difficult to diagnose on smears because the cells have malignant characteristics as well as resemblance to liver cells. Groups of poorly differentiated malignant hepatocytes and dysplastic hepatocytes are helpful in diagnosis[4,2]. Poorly differentiated HCC is not difficult to interpret as malignant but categorization as HCC may be difficult. Recently it has been reported that the failure in tumor control is due to multiple immunomodulatory mechanisms employed by HCC to subvert the immune system[5].

Fine needle aspiration is an important tool for diagnosis and preoperative evaluation of solitary nodules of the liver. It provides a definitive diagnosis in most patients at low cost with minimal trauma. However, because of the nature of the diagnostic material and the presentation of the cells in a discohesive form with lack of tissue structure, false negative results can occur. Prior detailed clinical knowledge about the patient, procedures and methods of radiology in obtaining the aspirate specimen are extremely useful in the accurate interpretation of fine needle cytological specimens[6].

The major complication associated with FNAC of liver is prolonged internal bleeding. This fatality

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results because some liver tumors are supplied with a large number of blood vessels and thus may bleed excessively. Other complications from percutaneous liver biopsies include the leakage of bile or the introduction of air into the chest cavity. There is also a small chance that an infection may occur. Moderate pain is reported by 20% of patients, and 3% report pain severe enough to warrant intravenous pain relief. The risk that an internal organ such as the lung, gallbladder, or kidney might be punctured is decreased when using the ultrasound- or CT-guided procedure[7]. However another study[8] reported that tumour seeding after fine needle biopsy of a hepatocellular carcinoma is observed in 0.6 to 5.1% of cases.

MATERIAL AND METHODS

Thirty fivefemale patients with age range 25-85 years who visited Gastroenterology Department of Sheikh Zayed Hospital Lahore were included in the study. The space occupying lesions of the liver in these patients were diagnosed by ultrasonography. Patients with deep seated lesion, with lesion less than 1cm in diameter, patients with a history of bleeding, decreased platelet count and increased prothrombin time were excluded from the study.

Fine needle aspiration (FNA) is used to perform liver biopsy by special needles of Menghini. About 1-2 ml specimens was collected from each patients under image guidance. An hour or so before the biopsy, the patient was given a sedative to aid in relaxation. Aspirin and ibuprofen intakes were prohibited for at least a week before the biopsy. Both platelet count and prothrombin time were performed prior to the biopsy. Heavy meal was limited for a period of 4-6 hours before the biopsy. Vital signs including pulse rate, blood pressure temperature, and breathing rate were noted. Ultrasound was used to guide the needle to the target site of the biopsy. 1-2 ml of material was aspirated. A drop of aspirate was expressed on a microscopic slide. The specimen was spread evenly across the slide. About 6-7 slides were made. These were stained with Giemsa, H&E and Papanacoulau stain. The remaining material was placed in 10% formalin for cell block preparation. This tissue was processed and sectioned like a histological block. A letter of consent was taken.

RESULTS

It was observed that 77% cases were diagnosed as malignant. Eighteen patients had a space occupying lesion in the right lobe of liver, 05 had lesion in the left lobe and in 04 patients the lesion involved parts of both lobes.

Distribution of malignant tumor was tabulated (Table 1). It was observed that 70% cases were diagnosed the cancer of hepatic cell or HCC (polygonal cell with central nuclei, endothelial cell were wrapped around the groups of malignant cells. Cytoplasm was granular and had an eosinophilic staining). 15% patients had Metastatic Adenocarcinoma (columner cells with polar nuclei and acinar formation, mucin was also seen in some cases), 7% cases had Metastatic Melanoma (predominance of single cells, eccentric nuclei, pale peripheral cytoplasm with round nuclei and prominent nucleoli), while 4% showed Metastatic Spindle cell carcinoma and 4% showed Unclassified Carcinoma.

Comparison between cytological and histological diagnosis in malignant space occupying lesions of liver was done (Table 2). Out of 27 malignant cases, 19 were diagnosed as primary liver tumor on histology. All of these were hepatocellular carcinoma. Cytology on the same cases showed HCC in 17 cases while the remaining two cases were diagnosed as Metastatic Adenocarcinoma. Histology revealed four cases of Metastatic Adenocarcinoma. Cytology diagnosed six cases as Metastatic Adenocarcinoma (two out of these, in fact, poorly differentiated HCC). Out of two cases of Malignant Malinoma, one was correctly diagnosed by cytology where as the other was diagnose as Unclassified Malignant neoplasm on cytology.

Table 1: Distribution of malignant tumors in liver

Tumor	=n	%age
Hepatocellular carcinoma	19	70
Metastatic adenocarcinoma	04	15
Metastatic melanoma	02	7
Metastatic spindle cell carcinoma	01	4.0
Un classified	01	4.0

Table 2: Comparison between cytological and histological diagnosis in malignant space occupying lesion of liver in detecting malignancy

Types	Cytology	Histology
Hepatocellular carcinoma	17	19
Metastatic adenocarcinoma	06	04
Metastatic melanoma	01	02

DISCUSSION

Rapid and accurate tissue diagnosis for a deep-seated malignancy would allow treating physicians to provide disease-specific interventions and help patients make early informed management decisions. Providing on-site tissue diagnosis for fine needle aspirate samples obtained under ultrasound guidance would help develop such efficient patient

management issues. Fine needle aspiration is being used as a routine diagnostic tool for the diagnosis of lesions accessible to aspiration. It is cheap, less invasive and a fast method of diagnosis as compared to open biopsy or needle core biopsy[9].

The study was done to assess the diagnostic accuracy of cytological examination and also to see whether cytology could predict the results of micro histology of space occupying lesions of liver. All cases were classified into benign and malignant on both cytology and histology. Definitive diagnosis was not given in benign lesions. However an attempt to classify malignant lesions was made. Our study observed that cytology appears to be a fairly reliable tool to predict or exclude malignancy (diagnostic yield of 98-100%). Only two malignant cases were reported as benign on cytology. This meant 3.7% false negative result. Our study is in accord with a number of studies which reported the predictive values on cytology to be 85-96%[10,11]. Some studies[11,12] reported that optimal diagnostic results are achieved by combining cytological with histological assessment. The rates of inadequate specimen preparation for cytology and histology were 0% and 13.4%, the false-negative rates of malignancy were 11.7% for cytology and 16% for histology. However recently it is reported that sonographic screening for hepatocellular carcinoma in the growing population of patients with liver disease is strongly recommended[13].

Present study made a distribution of malignant tumors. It was observed that 70% cases were diagnosed as cancer of hepatic cell or HCC. 15% patients had Metastatic Adeno carcinoma, 7% had Metastatic Melanoma, while 4% showed Metastatic Spindle cell carcinoma and 4% Unclassified Carcinoma. The most likely reason for this was that in the absence of tissue architecture, clear distinction between benign and malignant was not possible I.e. the tumors were not differentiated enough to be classified correctly or classified at all. Although the features of malignancy were readily appreciated on cytology but classification of tumor was either incorrect or not possible. Our study is in accord with the studies which observed that many metastatic malignancies present little problem in diagnosis on cytology, however in some cases the differential diagnosis of metastatic adenoarcinoma with HCC is difficult[2,14].

Number of studies reveal that metastatic disease is more common than primary cancer of liver[15,16]. Studies stated that Metastatic Adenocarcinoma is the most prevalent liver tumor (common primary sites being GIT, lung, breast and kidney). However in our study HCC outnumbered metastatic lesions, ratio being 4.5:1. The possible reason for this disparity could be associated with high incidence of cirrhosis in our country. A study[17] on 118 cases of HCC showed that 70.33 had underlying cirrhosis.

CONCLUSION

FNA cytology in case of space occupying lesions of liver can be relied upon to differentiate between benign and malignant cases. The results improve considerably with availability of cell block and complete clinical information along with relevant laboratory and ultrasound findings.

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