

Analysis of 404 Cases of Radiologically Guided Fine Needle Aspiration Cytology (FNAC) of Space Occupying Lesions of Liver

Naila Raza, Shafiqe Ahmed, Bilquis A Suleman Nasir Chughtai, Shahila Jaleel, Ejaz Waris
Department of Histopathology and Department of Radiology, Shaikh Zayed Hospital, Lahore

ABSTRACT

Radiologically guided Fine needle aspiration cytology (FNAC) is a valuable technique for diagnosing benign and malignant space occupying masses of liver. It is a cost effective and safe method that can differentiate benign and malignant lesions accurately. The objective of this study was to analyze 404 cases of radiologically guided fine needle aspiration cytology of space occupying lesions of liver. The study was conducted at Histopathology Department SZFPGMI in collaboration with the Radiology Department. The aspirates were done by senior radiologist in Radiology Department. Most of the aspirates were from males. Five cases were considered inadequate, there were more malignant cases (295 cases) as compared to benign lesions (99 cases). Metastatic lesions were more common as compared to hepatocellular carcinoma (HCC), however, the ratio of metastatic adenocarcinoma and primary HCC was almost equal. Thus radiologically guided FNAC is the simple, quick and complication free procedure for diagnosing space occupying lesions of liver.

Key words: Fine needle aspiration cytology, hepatocellular carcinoma.

INTRODUCTION

Fine needle aspiration is often used as a very effective method of obtaining tissue for diagnosis. This method was first described in liver as early as 1895. Now a days this procedure is widely practiced and is cost effective and safe method that can be employed to differentiate benign from malignant processes with accuracy as high as 96%¹

The most common indication of hepatic fine needle aspiration is a focal mass lesion, but diffuse diseases can also be diagnosed by this technique with reasonable accuracy.

MATERIALS AND METHODS

Radiologically guided FNA of abdominal masses was carried out on 404 admitted patients at Shaikh Zayed Hospital, Lahore with clinically suspected hepatic masses and those detected earlier

on sonographic and other screening techniques. Patients of all ages and both sexes were included. Those patients were also considered who had suspicion of hepatic masses and patients with known malignancy to confirm metastasis/recurrences. Relevant clinical information regarding size of lesion, number of lesions and serologic studies e.g. alpha fetoprotein levels were obtained. Before carrying out the aspiration, bleeding profile was assessed in every patient. This included platelet count, prothrombin time (PT), and activated partial thromboplastin time (APTT). Those patients with significantly abnormal values and feared of being more prone to bleed were given fresh frozen plasma few hours before the procedure. Therefore, every patient included in this study had platelet count, PT and APTT almost within normal range, when the aspiration was done. The consent was taken and procedure was explained to the patient.

Most procedures were done in lateral lying position and some in supine position. The shortest

distance to target was usually selected to improve the accuracy of the needle placement. The skin was prepared with an iodine solution and surgical spirit and was allowed to dry. The infiltration of the skin and subcutaneous tissue including organ capsule with local anesthetic was then performed. The transducer was covered with sterile gel for localizing the lesion. Ultrasound was performed. A 21 to 23 G lumbar puncture needle was placed in the lesion and visualized. The patient was asked to hold the breath during needle placement and later was asked to take shallow breaths. The needle was introduced deep until the consistency of mass was felt. When the needle entered the mass/tumor, there was usually some resistance, or a feeling of grittiness. All this procedure was constantly monitored by the ultrasound transducer. Simultaneous rotation with back and forth movement of the needle under real time guidance was required to ensure that the needle retained entirely in the lesion. Then the stylet was removed and 10 ml syringe was attached to the needle. Negative pressure was created by retracting the piston. The needle was then moved to and fro and in various directions of the lesion to get enough material while still keeping the negative pressure. The suction was then released to prevent aspiration of specimen into the syringe and avoiding fragmentation of the cells.

The needle with the syringe was then removed, moderate amount of fresh blood, along with tissue fragments suitable for micro-histological evaluation after formalin fixation was obtained, there by increasing the diagnostic yield.

When the aspiration was completed the patient was reassured, the needle site was covered with gauze piece and gentle pressure was applied to minimize any bleeding risk. Smears were prepared immediately. The number of slides prepared ranged from four to eight in most of the cases. One smear for PAP staining and another smear for H&E staining were fixed in 95% ethyl alcohol. The residual material was secured for clot preparation. It was transferred into 10% formalin and was processed as a biopsy material. At the same time the adequacy of aspirate was judged by looking for tiny tissue fragments on the unstained spread smears. If there was a fear of inadequate aspirate, a second

pass in the lesion was made to obtain adequate material.

Giemsa, H&E and Pap stained smears from each case were examined carefully and a diagnosis was made on these slides. Where available an H & E stained section of the prepared clot was also examined for reaching a final diagnosis. Different lesions, diagnosed in these cases were then analyzed.

RESULTS

In our study 280 were males and 124 were females. Age range was between 6-80 years. Maximum number of aspirates were done in third to fifth decade. Most of the malignant lesions were found in males.

All lesions were primarily divided into benign and malignant categories. Thus out of 404 cases five cases were inadequate, 104 cases were reported as benign lesions while 295 cases turned out to be malignant (Table 1). Out of the malignant aspirates 132 cases were diagnosed as primary hepatocellular carcinoma (Figs. 1-4), while 163 cases were labeled as metastatic deposits. A diagnosis of metastatic adenocarcinoma (Figs. 5-6) was made in 131 cases. The rest of the metastasis were primarily from malignant spindle cell tumors 8 cases (Fig. 7), undifferentiated tumors and oat cell tumor from lung (Fig. 8) being 5 cases each in addition to some cases from other sites (Table 2) (Fig. 9).

Table 1: Total number of aspirates (n= 404).

Aspirates	Number	Percent
Inadequate	5	1.2
Benign	104	25.8
Malignant	295	73.0
Total	404	100.0

Out of 104 benign aspirates majority of the cases were reported as non specific abscess (33 cases). The remaining cases were from liver with fatty change 31 cases, benign hepatocytes negative for malignant cells 23 cases (Fig. 10-11), liver with age changes 9 cases, granulomatous and

hemangioma and benign cysts 2 cases each, and one case each of hydatid cyst and adenoma with old hemorrhage (Table 3).

Table 2: Distribution of malignant lesions (n=295).

Malignant lesions	No.	Percent
HCC	132	45
Adenocarcinoma	131	44
Non Hodgkin lymphoma	3	1.0
Metastatic tumour from breast	1	0.3
Metastatic Undifferentiated carcinoma	5	1.6
Metastatic Sq cell carcinoma	3	1.0
Metastatic Spindle cell tumour	8	2.7
Metastatic Small round cell tumour	2	0.6
Metastasis from lung (oat cell carcinoma)	5	1.6
Metastatic Malignant melanoma	1	0.3
Metastatic Germ cell tumour	3	1
Metastatic Liposarcoma	1	0.3
Total	295	100.0

Table 3: Distribution of Benign lesions (n=104).

Benign lesions	No.	Percent
Liver abscess	33	31.7
Age related changes	9	8.6
Fatty change	31	30
Benign cysts	2	2
Adenoma with old haemorrhage	1	1
Granulomatous	2	2
Hydatid cyst	1	1
Hemangioma	2	2
Benign Hepatocytes	23	22

DISCUSSION

In the diagnostic workup of liver pathology the role of tissue examination is definite while the radiological and other laboratory investigations remains supportive.²

Fine needle aspiration cytology is economical, less invasive and fast method for diagnosis as compared to open biopsy or needle core biopsy. In addition to other advantages this radiologically guided technique takes only half an hour and can be employed as an outpatient procedure.

In our study radiologically guided FNAC revealed good yield, only 5 cases were non diagnostic or inadequate.



Fig. 1: Sonogram shows hyperechoic mass representing hepatocellular carcinoma.



Fig. 2: Ultrasound shows a heterogenous mass in the liver that corresponds to fibrolemlar carcinoma.

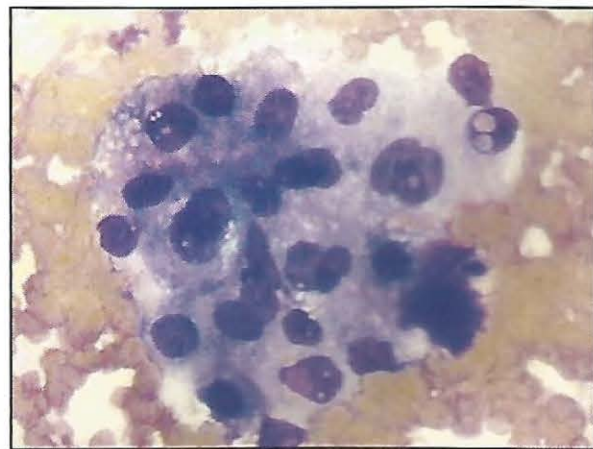


Fig. 3: HCC Sheet of pleomorphic malignant epithelial cells containing hyperchromatic nuclei and intranuclear vacuolations. Giemsa station x40.

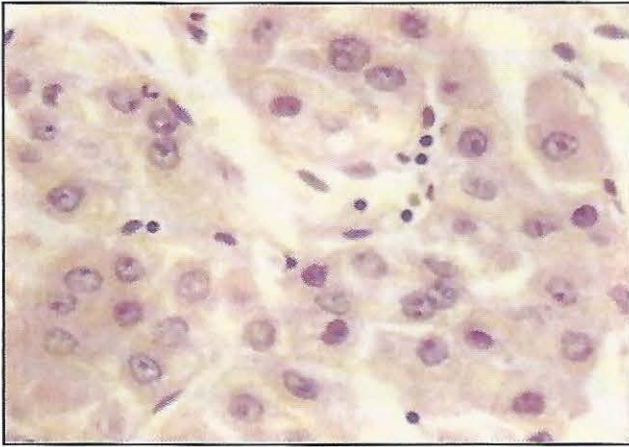


Fig. 4: Cell block preparation HCC. H&E stain x40.

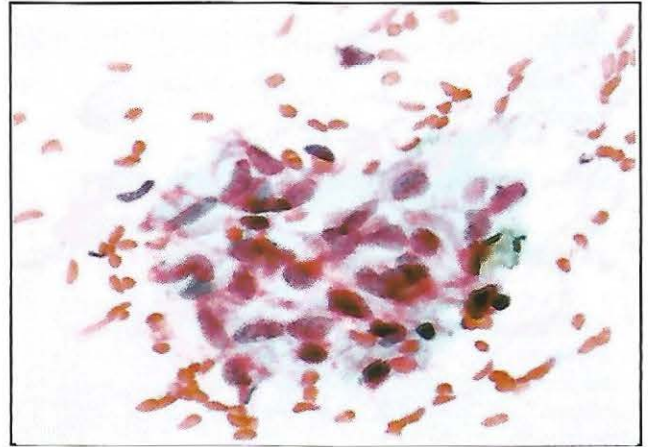


Fig. 7: FNAC Metastatic spindle cell lesion. Pap stain x40.

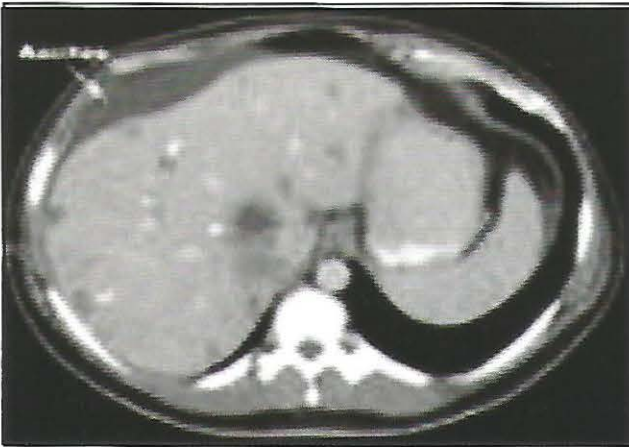


Fig. 5: CT scan Multiple hepatic lesions (metastasis).

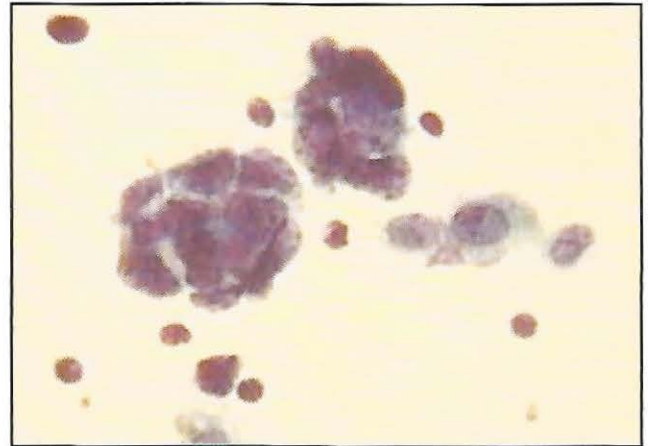


Fig. 8: Metastatic small cell carcinoma from lung, small cells with nuclear moulding. H&E stain x40.

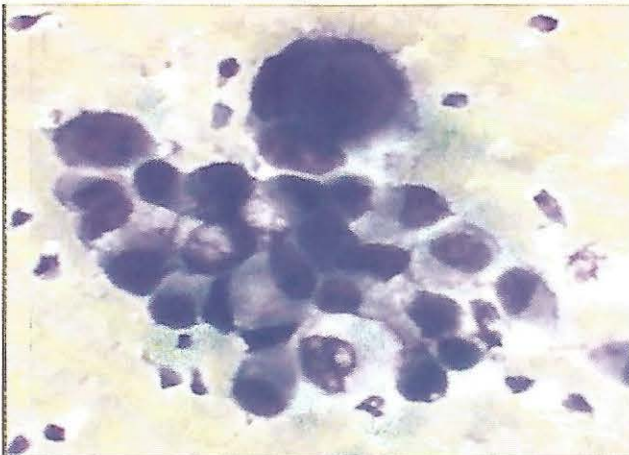


Fig. 6: FNAC Metastatic adenocarcinoma, sheet of pleomorphic malignant epithelial cells containing hyperchromatic nuclei and eosinophilic to vacuolated cytoplasm. Giemsa stain x40.

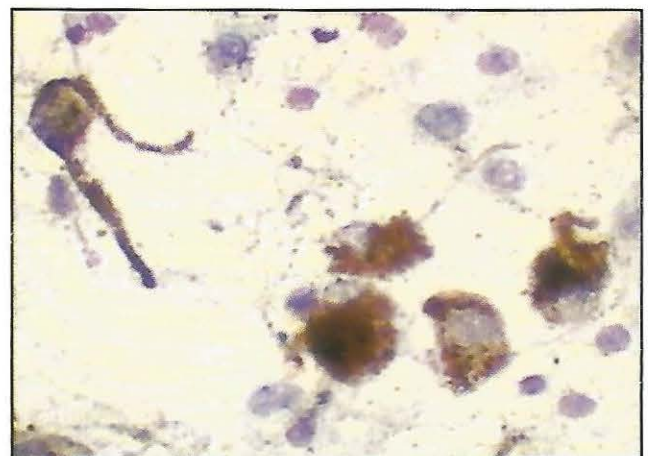


Fig. 9: Metastatic malignant melanoma; cells with hyperchromatic nuclei and melanin pigment in cytoplasm. Giemsa stain x40.



Fig. 10: Sonogram shows regenerative nodule.

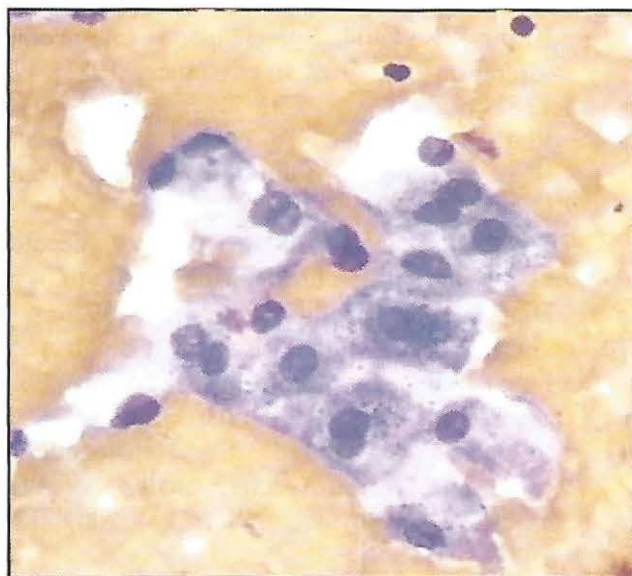


Fig.11: Cirrhotic regenerative nodule with benign hepatocytes. Giemsa stain x40.

In our study 104 cases were benign. Majority of the cases were liver abscesses. Similar results were obtained from other studies.^{2,3} Fatty change was found in 31 cases and clot preparation was very helpful in making the final diagnosis. In 23 cases only benign hepatocytes were found. Cirrhotic nodules also pose a problem as differentiation of a well differentiated HCC may be difficult from cirrhotic nodule. In these cases it becomes essential to give a correct diagnosis for better patient management.

In 9 cases age changes were found and

included degenerative changes but chromatin pattern was benign, although nuclear cytoplasmic ratio was altered. Other benign lesions aspirated were benign cysts, adenoma with haemorrhage, chronic granulomatous inflammation and hydatid cyst.

Literature reveals metastatic disease to be more common than primary cancers of liver and liver is one of the most frequent site of metastasis. Metastasis accounts for more than 9/10 malignancies in liver in western countries.⁷⁻¹⁰

In our series the incidence of metastatic disease was more common as compared to HCC similar to previous studies^{2,13}, however incidence of HCC is likely to increase due to increased incidence of Hepatitis B and Hepatitis C infection in our country with or without cirrhosis. In a study conducted in Lahore at Allama Iqbal Medical College the incidence of HCC was more⁴, while in another study conducted by Rehman and Murad HCC was again more common in cirrhotic patients¹¹.

The incidence of malignancy is more common in males as compared to females, this can be probably due to males having easy access to medical care due to our social setup.

Differentiation between metastatic adenocarcinoma and HCC was possible on the basis of following morphological features. HCC was diagnosed on the basis of sheets of polygonal cells with dense or granular cytoplasm, scattered intranuclear vacuoles and prominent pink nucleoli. Presence of endothelial cells and atypical bare nuclei and tumour giant cells were supportive diagnostic features. However in making the diagnosis of metastatic adenocarcinoma, presence of acinar pattern and papillary sheets was helpful. The individual cells were less pleomorphic contained regular nuclear membrane and thin vacuolated cytoplasm. The key features are columnar cells with polar nuclei, and acinar formation.⁵ Mucin production favours metastatic adenocarcinoma but does not exclude HCC.⁶ Multinucleated tumor giant cells, cytoplasmic hyaline and central sinusoidal pattern were selected as the 3 most predictive parameters for differentiation of reactive hepatocytes from HCC, while bile, centrally located nucleus in an atypical cell and inclusion were

selected as the 3 most predictive parameters for differentiation of metastatic carcinoma from HCC.

It has been noted that many metastatic malignancies e.g. small cell carcinoma of lung is characterized by small groups of epithelial cells containing hyperchromatic nuclei and nuclear moulding. Lymphoma is characterized by singly scattered immature lymphoid cells containing hyperchromatic nuclei with immature chromatin. Squamous cell carcinoma is also easy to diagnose with polygonal cells containing dense hyperchromatic nuclei with nucleoli and basophilic to eosinophilic cytoplasm.

Yolk sac tumor is common among the germ cell tumors of pediatric age group which presents a spectrum of cytomorphologic features having important differences with other germ cell neoplasm, e.g. embryonal carcinoma¹².

The neoplastic cells of ductal carcinoma of breast are generally round or oval of varying sizes and are seen singly or in clusters. The carcinoma cells possess fair amount of cytoplasm resembling HCC.

CONCLUSION

FNA can avoid a major surgical procedure and can be done as an outpatient procedure. It is mostly complication free, fairly quick and cost effective procedure. As metastasis is the most common malignancy found, clinical history serological results and radiological findings plus FNAC along with clot preparation, if available is very helpful in differentiating metastatic disease from primary HCC.

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The Authors:

Naila Raza,
Trainee Registrar
Department of Histopathology,
Shaikh Zayed Hospital,
Lahore

Radiologically Guided FNAC of Space Occupying Lesions of Liver

Shafique Ahmed,
Assistant Professor
Department of Radiology
Shaikh Zayed Hospital,
Lahore

Bilquis A Suleman
Professor
Department of Histopathology,
Shaikh Zayed Hospital,
Lahore

Nasir Chughtai,
Assistant Professor
Department of Histopathology,
Shaikh Zayed Hospital,
Lahore

Shahila Jaleel
Senior Demonstrator
Department of Histopathology,
Shaikh Zayed Hospital,
Lahore

Ejaz Waris
Senior Demonstrator
Department of Histopathology,
Shaikh Zayed Hospital,
Lahore

Address for Correspondence:

Naila Raza,
Trainee Registrar
Department of Histopathology,
Shaikh Zayed Hospital,
Lahore