Image Guided Fine Needle Aspiration Cytology of Hepatic Lesions - Two Year Study in a Tertiary Health Care Centre in Kashmir Valley

Shaheena Parveen[1], Misbah Rashid[2], Kausar Sideeq[1], Ambreen Beigh[1], Fiza Parvez[1], Imza Feroz[1]

ABSTRACT

Introduction: Single and multiple mass lesions or diffuse enlargement of the liver that are suspected to be neoplastic in nature are targets of FNA. Study objectives were to assess the utility of image guided Fine Needle Aspiration Cytology in the diagnosis of hepatic lesions and to study the cytomorphological features of these lesions, organwise and to categorize them as inflammatory, benign and malignant.

Material and Methods: A prospective study of image guided percutaneous aspiration biopsy of hepatic lesions to evaluate its utility was undertaken during the period May 2012-May 2014 in the Department of Pathology (SKIMS), Srinagar, Kashmir.

Results: There were 119 cases with satisfactory cell sample in 94 cases (78.9%) In 25 cases (21%), the aspirates were inadequate. The main indication of FNAC was hepatomegaly with abnormal USG/CT findings. 6.38% were benign, 89.36% were malignant, 2.12% were suspicious for malignancy. Metastatic tumors were the commonest and constituted 89.28%.

Conclusion: Present findings have indicated clearly that FNA is an excellent method of confirming diagnosis of hepatic lesions.

Key words: Image guided,FNAC, Hepatic lesions

INTRODUCTION

Fine Needle Aspiration cytology (FNAC) is the study of cells obtained by vacuum.[1] It is a technique in which a fine needle is introduced into a mass, cellular material is aspirated, and a cytological diagnosis is rendered.[2] Growth of imaging methods and the speciality of interventional radiology has provided additional fuel to the expansion of aspiration biopsy and has in recent times shifted this biopsy method away from exclusively aspiration and toward microcore biopsies either alone or in combination with aspiration.[3]

The liver is involved by many non-neoplastic and neoplastic diseases. Evaluation and management of hepatic lesions is a common clinical problem and their appropriate clinical management depends on accurate diagnosis.[4] Single and multiple mass lesions or diffuse enlargement of the liver that are suspected to be neoplastic in nature are targets of FNA. Transabdominal fine needle aspiration of the liver is contraindicated in patients with bleeding diathesis and bowel distention. Intraabdominal hydatid cysts are generally regarded as a contraindication for liver FNA.[5] Complications include bleeding, peritonitis or needle tract tumor seeding. The procedure can be performed with sonographic or CT guidance and it is best to choose a path that interposes some normal liver between the capsule and the lesion to be sampled.[6] A 22- or 23-gauge, spinal-type needle, a syringe and a syringeholder or pistol are used to obtain cell samples from the liver lesion. Depending on the tumor location and size, the length of needle used can vary from 8 to 20 cm. Large series indicate the sensitivity of FNAB in the evaluation of masses to range from 88-93% with specificity of 100%.[3] Study objectives were to assess the utility of image guided Fine Needle Aspiration Cytology in the diagnosis of hepatic lesions and to study the cytomorphological features of these lesions, organwise and to categorize them as inflammatory, benign and malignant.

MATERIAL AND METHODS

We performed image guided FNAC in 119 cases of hepatic lesions. 22-guage needle or long spinal needle attached to 10 ml disposable syringe was used as the standard technique. Under aseptic conditions, the needle was introduced percutaneously during suspended respiration, into the lesion under USG/CT guidance. The aspirate was forcibly ejected onto a glass slide and stained by quick staining methods like Diff Quik in order to check for on-spot adequacy of the material aspirated. Whenever the material was found insufficient for definite diagnosis, the procedure was repeated. The slides were stained with May-Grünwald-Giemsa or fixed in 95% ethanol and stained by Papanicolaou's stain. Special stains like Gram stain / Ziehl-Neelson were done wherever required. Histopathological examination were done in those cases where feasible.

STATISTICAL ANALYSIS

Microsoft office 2007 was used for the analysis. Descriptive statistics like mean and percentages were used for the analysis.

RESULTS

FNA of liver masses was performed in 119 patients of whom 64 were males (53.7%) and 55 were females (46.2%) (table 1). Satisfactory cell sample was obtained in 94 patients (78.9%). In the remaining 25 cases (21%), aspirate was acellular and material was not satisfactory to be given a definitive

[1]Senior Resident, [2]Post Graduate Scholar, Sher I Kashmir Institute of Medical Sciences, Srinagar, Kashmir, India

Corresponding author: Shaheena Parveen, H. No-9, Lane-1, Al-Fazal Colony, Peerbagh, Srinagar, Kashmir

How to cite this article: Shaheena Parveen, Misbah Rashid, Kausar Sideeq, Ambreen Beigh, Fiza Parvez, Imza Feroz. Image guided fine needle aspiration cytology of hepatic lesions - two year study in a tertiary health care centre in Kashmir Valley. International Journal of Contemporary Medical Research 2018;5(3):C7-C10.

Age group	No.of males	No.of females
1-10	0	1
11-20	0	0
21-30	1	2
31-40	7	5
41-50	9	10
51-60	24	17
61-70	16	16
71-80	6	4
>80	1	0
Total	64	55

Table-1: Age wise distribution of hepatic lesions

Cytological category	No.of patients
Inadequate	25
Normal	2
Benign	6
Malignant	84
Suspicious for malignancy	2
Total	119

Table-2: Cytological categorization of hepatic lesions

	Hepatic lesion	No. of cases	Percent
A	**Benign**		
1.	Normal	2	2.12
2.	Abscess	4	4.25
3.	Cirrhosis	1	1.06
4.	Granulomatous	1	1.06
B.	**Primary hepatic malignancy**		
1.	Hepatocellular carcinoma	8	8.51
2.	Hepatoblastoma	1	1.06
C.	**Metastatic lesions**		
1.	Adenocarcinoma	64	68.08
2.	Neuroendocrine	5	5.31
3.	Squamous cell carcinoma	2	2.12
4.	?adenoca/pleo.sarcoma	1	1.06
5.	?HCC/adenoca	1	1.06
6.	NHL	1	1.06
7.	Medullary carcinoma thyroid	1	1.06
D.	**Suspicious for malignancy**	**2**	**2.12**
	Total	94	100

HCC = Hepatocellular carcinoma; adenoca = Adenocarcinoma; pleo= pleomorphic; NHL=Non Hodgkin Lymphoma

Table-3: Incidence of various types of liver aspirates

diagnosis. Non-neoplastic (benign) lesions were found in six patients (5.04%) and neoplastic lesions were identified in 86 patients (72.2%) (table 2). Nine patients had primary hepatic malignancy, eight (8%) of whom were diagnosed as having hepatocellular carcinoma and one patient as hepatoblastoma (1%). 75 patients (79.7%) had secondaries in liver. Two patients were diagnosed as suspicious for malignancy as the aspirates from these patients yielded only few degenerated atypical cells in a necro-inflammatory background. 64 patients (68%) had metastatic deposits of adenocarcinoma whose primary site of malignancy were located in colon, gall bladder, stomach, pancreas, lungs, ovary, breast and jejunum.

DISCUSSION

Image guided FNAC is a rapid, accurate, economical and a safe diagnostic procedure that can be used in various neoplastic and non-neoplastic diseases. As a diagnosis is rapidly available on FNAC, the appropriate medical or surgical therapies can be started earlier, thus avoiding unnecessary, expensive and often invasive diagnostic procedure.[7] The aforesaid factors reduce or eliminate the surgical morbidity and mortality as well as the hospitalization, thereby benefitting the patients as well as the health care system.

Majority of the patients in our study belonged to the age range of 50-70 years with male predominance. The malignant lesions were also common between 50-70years. All the 119 patients in this study had moderate hepatomegaly and 58 had in addition abdominal pain. Other clinical features in order of frequency were loss of appetite, jaundice, nausea and vomiting, ascites and productive cough. Neoplastic lesions outnumbered non neoplastic lesions in this study, the reason being that image guided FNAC was usually done in patients who were clinically suspected of having a malignant lesion.

In our study the commonest neoplastic lesions seen in liver were metastatic deposits followed by HCC (8.5%). Similar studies carried out by Sobha Rani et al[1], Bharti Jha et al.[8] Rasania A et al[9] Islam T et al[10] found metastatic deposits in liver to be the commonest lesion.

In this study, USG guided FNA in one patient with ill defined hypoechoic lesions yielded a few sheets of hepatocytes. These normal hepatocytes maybe from the adjacent area which were present as "en route" structures by FNA sampling route and the actual lesion might have been missed by the needle. A definitive diagnosis could not be given in this case and hence FNA was non-contributory. There were four cases of liver abscesses. USG guided FNA revealed dense acute inflammatory cell infiltrate with foci of necrosis along with some groups of benign hepatocytes and bile duct epithelium. Ziehl Nielson stain was negative for acid fast bacilli and all of the pyogenic abscesses grew enteric flora, with E.coli as the predominant organism. Wee et al[11] has concluded that in the management of liver abscesses there should be a clinical and radiological correlation with mandatory cytohistologic confirmation. Liver abscesses constituted 2% of hepatic masses in the studies conducted by R.C Adhikari et al[12] and Ruchika et al.[13]

A single case of cirrhosis liver was diagnosed in our study. Similar results were seen by Rasania A et al[9], R.C Adhikari et al[12] A.S Tuladhar et al[14], Chia Sing Ho et al.[15] Smears revealed poorly cohesive hepatocytes with degenerative and regenerative features along with a sheet of small cohesive bile duct cells. We used the diagnostic criteria proposed by Bita Giramizadeh et al[16] for cirrhosis. Five most important criteria in differentiating between a regenerative nodule and hepatocellular carcinoma are absence of large nucleoli, multiple nucleoli, broad cords, raised N/C ratio and irregular chromatin pattern in regenerative cirrhotic nodule. Our patient underwent liver biopsy and histopathological findings were in concordance with that of initial cytological diagnosis

of cirrhotic nodule.

A wide range of neoplasms and tumorlike lesions occur in the liver. However, in this study, benign neoplasms and tumor like lesions- focal nodular hyperplasia and inflammatory pseudotumor were not encountered.

Cytological diagnosis of HCC was made in 8 patients (8.5%) in our study. Three of these patients were Hepatitis B positive. USG guided aspiration was done in all the patients and smears revealed highly cellular smears with trabeculae, acinar and individually scattered cells having endothelial lining cells around the tumor clusters. Many stripped nuclei, moderate degree of pleomorphism and intranuclear inclusions were also noted; bile duct epithelium was absent in these smears. Other studies conducted in Indian Subcontinent show similar age and frequency distribution of HCC.[13,17,18] We followed the diagnostic criteria for hepatocellular carcinoma as used by Cohen M B et al[19]

A single case of hepatoblastoma was cytologically diagnosed in the present study. The patient in our study was a sixteen month old female who underwent USG guided FNAC. Smears from this patient were highly cellular and composed of a uniform population of small to intermediate round to oval cells arranged in trabeculae, cords and rosettes along with individually scattered cells; cells had scant to moderate amount of cytoplasm and spherical and slightly eccentrically placed nuclei with several small to inconspicuous nucleoli. We used the diagnostic criteria of hepatoblastoma given by Perez JS et al.[20]

In this study, cytological diagnosis of metastatic adenocarcinoma in liver was made in 64 (68.08%) patients and it was the commonest lesion noted in our study. Similarly metastatic adenocarcinoma was found to be the predominant lesion in other studies.[1,12] The great majority of metastatic deposits of adenocarcinoma in liver can be explained by the fact that Gastrointestinal malignancies are the commonest malignancies in Kashmir valley followed by lung cancer in males and breast cancer in females. In the study conducted by Rasool TM et al[21] and M.A Wani et al[22], esophageal cancer is the most common cancer in Kashmir valley followed by cancers of Lung, Stomach, Colorectal, Breast, Non-Hodgkin's Lymphoma, Gastroesophageal junction, Ovary, Skin and Gallbladder. The metastatic deposits of adenocarcinoma in our study had already known primaries in colon, gall bladder, stomach, pancreas and others. In other patients, primaries were detected on further clinical follow up. Hence, in these patients the histopathological examination of primary tumor sites confirmed the nature of metastatic deposits in liver. In three patients the primaries remained unknown. Smears from these patients revealed cellular smears and highly pleomorphic cells with glandular formation, raised N:C ratio and prominent nucleoli, often macronucleoli; occasional tumor giant cells in a background of necrosis, benign hepatocytes and benign ductal epithelial cells

In our study, among hepatic lesions we also had 5.3% of metastatic deposits of neuroendocrine carcinoma (5 cases). Smears from the metastatic deposits of neuroendocrine carcinoma revealed tumor cells having a plasmacytoid configuration with eccentrically located oval nuclei, finely nuclear chromatin clumping, conspicuous nucleoli and granular cytoplasm; these cells occured singly and in small clusters or monolayered sheets. The primary sites of tumor in these patients were located in pancreas in three patients who underwent surgical resection subsequently. Histopathological analysis of the resected pancreatic mass confirmed the cytological diagnosis made for metastatic deposit in liver. Neuroendocrine tumors of pancreas generally run an indolent course and have better prognosis than those with pancreatic adenocarcinoma. However, pancreatic neuroendocrine tumors with metastasis have a poor prognosis.[23]

In this study, liver aspirates were unsatisfactory for cytological evaluation in 25 patients. When the lesions are excessively fibrotic and when they contain predominantly necrotic material, it is possible to have unsatisfactory aspirates. Histopathological study in hepatic lesions was possible in 2 cases which included one case each of metastatic adenocarcinoma and cirrhosis. Majority of our cases constituted metastatic deposits in liver (79.9%) and in most of them either the primary was already known or detected later on subsequent clinical follow up and henceforth, biopsy of liver masses for histopathological analysis was not indicated in these patients. In still others, like HCC and hepatoblastoma unresectability of the masses could not provide histopathological correlation. Similarly, liver biopsy was not indicated in the inflammatory lesions diagnosed in our study as treatment was given based on our diagnosis and patients were symptom free subsequently.

CONCLUSION

Present findings and those of others have indicated clearly that FNA is an excellent method of confirming diagnosis of hepatic lesions. A multidisciplinary team of cytopathologists, radiologists and clinicians are most beneficial. Also, application of various techniques like advanced imaging techniques, immunocytochemistry, immunologic analysis and electron microscopic study can considerably broaden the diagnostic spectrum and increase the diagnositic accuracy.

REFERENCES

1. Sobha Rani G, Faheem N, Sai Prasad B, Sudhakar Reddy E. Efficiency of ultrasound guided aspiration cytology in deep seated lesions-a diagnostic evaluation. Int J Med Health Sci. 2012;1:2-11.
2. Ameedee RG, Dhurandhar NR. Fine-needle aspiration biopsy. Laryngoscope 2001;111:1551-7.
3. MarluceBibbo, David Wilbur's Comprehensive Cytopathology 3rd ed 2009. Churchill Livingstone, Elsevier; chapter 20-21:pp579-606.
4. Bastian de Boer. Liver and spleen. OrellAnd Sterret's Fine Needle Aspiration Cytology. 5th ed 2012. Churchill Livingstone, Elsevier; chapter 10:pp 271-296.
5. Bondestam S. US guided FNA of mass lesions affecting the hepatobiliary tract. Acta RadiolDiagn. 1981; 22: 549.
6. G. Scott Gazelle, John R Haaga. Guided percutaneous

biopsy of intraabdominal lesions. AJR1989;153:929-935.

7. Hemalatha A.L., Sumana Sindhuram V., Sushma S.,Suma J.K, Anubha Aditya. Ultrasound guided FNAC of abdominal-pelvic masses-the pathologists perspective. Journal of Clinical and Diagnostic Research. 2013;2: 273-277.
8. Bharti Jha, Ritesh Shah, Jitendra Patel. Effectiveness of image guided fine needle aspiration cytology in cases of deep seated lesions. International Journal of Medical Science and Public Health. 2013;2: 2439-440.
9. Rasania A, Pandey CL, Joshi N. Evaluation of FNAC in diagnosis of hepatic lesion. Journal of Cytology 2007; 24: 51-54.
10. Islam T, Hossain F, Rumpa AP, NH Sikder, MA Bhuiyan, E Karim. Ultrasound guided fine needle aspiration cytology: a sensitive diagnostic tool for diagnosis of intra-abdominal lesions. Bangladesh Med Res Counc Bull. 2013; 39: 14-17.
11. Wee A, Nilsson B, Chan-Wilde C,I Yap. Fine needle aspiration biopsy of hepatocellular carcinoma. Some unusual features. Acta Cytol1991;35:661-670.
12. RC Adhikari, A Tuladhar, S Shrestha, S K Sharma. Deep-seated thoracic and abdominal lesions: usefulness of ultrasound guided fine needle aspiration cytology, a 3 year experience. Nepal Med Coll J 2010; 12: 20-25.
13. Ruchika S.B, Tanya, Hiremath S. S.Kumar Prakash, verma Nidhi,Sharma Juhi. A study of fine needle aspiration cytology of intra-abdominal masses in and around Davangere, karnataka. Journal of Advance Researches in Biological Sciences, 2013; 5: 290-293.
14. AS Tuladhar, RC Adhikari, S Shrestha,SK Sharma, S Pradhan, A Shreshtha, A Giri Tuladhar. Role of USG guided FNAC in diagnosis of abdominal and thoracic lesions. Nepal Med Coll J 2012; 14:271-274.
15. Chia-Sing Ho, Liang-Che Tao, Michael J. Mcloughlin. Percutaneous fine needle aspiration biopsy of intra-abdominal masses. CMA Journal. 1978; 119:1311-22.
16. Bita Geramizadeh, Najma Asadi, Seyed Ziyaodin Tabei. Cytologic Comparison between Malignant and Regenerative Nodules in the Background of Cirrhosis. Hepat Mon.2012;12:448-452.
17. Thomas B Kinney. Diagnosis of abdominal malignancy by radiologic fine needle aspiration biopsy-A Commentary. AJR 2008;191:1649-1651.
18. Robins DB. Fine needle aspiration of the pancreas. In quest for accuracy.ActaCytol. 1995;39:1.
19. Cohen MB, Haber MM, Holly EA, Ahn DK, Bottles K, Stoloff AC. Cytologic criteria to distinguish hepatocellular carcinoma from nonneoplastic liver. Am J ClinPathol. 1991;95:125-30.
20. Perez JS, Perez Guillermo M, Bernal AB. Hepatoblastoma: an attempt to apply histologic classification to aspirates obtained by fine needle aspiration cytology. Acta Cytol. 1994;38:175-82.
21. Rasool M.T, Lone M.M, M.L, Afroz F, Saqib Zaffar, M. Mohibul Haq. Cancer in Kashmir, India: Burden and pattern of disease. J Can ResTher. 2012;8:243-6.
22. MA Wani, FA Jan, NA Khan, KK Khurshid,SH Khan. Cancer trends in Kashmir; common types, site incidence and demographic profiles: National Cancer Registry 2000-2012. Indian.J.Cancer.2014;51:133-137.
23. Chang F, VU, Chandra A. endoscopic ultrasound-guided fine needle aspiration cytology of pancreatic neuroendocrine tumor: cytomorphological and immunocytochemical evaluation. Cytopathology. 2006;1:10-7.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 29-01-2018; **Accepted:** 19-03-2018; **Published:** 31-03-2018