Evaluation of Space Occupying Lesions in Liver by Ultrasonogram Guided Fine Needle Aspiration Cytology in a Tertiary Care Hospital

Md. Naushad Ali[1], Rehana Parvin[2], Md. Shakhawat Hossain[3], Jimma Hossain[4], Abu Hena Md. Shohel Rana[5], Md. Shafiul Alam[6]

1. Associate Professor
Department of Gastroenterology
Rangpur Medical College
2. Junior Consultant
Department of Radiology and Imaging
Rangpur Medical College Hospital
3. Assistant Professor
Department of Gastroenterology
Rangpur Medical College
4. Associate Professor
Department of Gastroenterology
Rangpur Medical College
5. Assistant Professor
Department of Gastroenterology
Pabna Medical College
6. Associate Professor
Department of Medicine
Rangpur Medical College

Correspondence to:
Md. Naushad Ali
Associate Professor
Department of Gastroenterology
Rangpur Medical College, Rangpur
Mobile: +8801716017718
Email: dr.naushadali74@gmail.com

Abstract

Background:

The differential diagnoses of space occupying lesions (SOL) of the liver are wide. It ranges from infectious or inflammatory processes to benign and malignant liver lesions which include primary and metastatic tumors. As the clinical, biochemical and imaging modalities have limitations in the accurate diagnosis, US guided fine needle aspiration cytology places an important role in the categorization of liver SOL.

Objective:

To evaluate the etiology of the different space occupying lesions of liver diagnosed on US guided FNAC presenting at a tertiary level hospital.

Methods:

This prospective study was conducted in the Department of Gastroenterology of Rangpur Medical College Hospital from Jan 2021 to Dec 2021 over a period of one year. A total of 52 patients with space occupying lesion (SOL) of the liver mass were included in this study. FNAC was carried out under the guidance of ultrasonography for each patient. Results of all patients were collected and tabulated. Statistical analysis was performed on tabulated data.

Results:

Mean age of the patients was 54.13 ± 10.57 years with the range of 30-85 years. The majority of the patients were between the ages of 41 and 60. Males (82.7%) were predominant than females (17.3%). The majority of the patients were engaged in agricultural work. HBsAg was found in 8(15.4 %) of the patients, and Anti HCV was found in 1(1.9 %). The majority of SOL (44.2 %) were hepatocellular carcinoma, followed by metastatic adenocarcinoma (17.3%), adenocarcinoma (11.5%), malignant cell (9.6%), inflammatory lesion (5.8%), chronic granulomatous inflammation (3.8%), metastatic carcinoma (3.8%), hepatic SOL (1.9%), and CLD (1.9%).

Conclusion:

Most common SOL of liver was hepatocellular carcinoma and adenocarcinoma.

Keywords: Space occupying lesions (SOL) of the liver, Ultrasonogram guided FNAC, Hepatocellular carcinoma.

Introduction:

Liver diseases are a widespread public health issue around the world. A variety of diseases, including metabolic, infectious, and neoplastic diseases, can affect the liver. Liver diseases are classified into two types: diffuse and focal lesions. Primary liver tumors (benign and malignant), metastatic deposits, congenital and acquired cysts, and abscesses are the differential diagnoses for focal lesions.[1] Clinically and biochemically, these diseases are suspected. Appropriate treatment is dependent on accurate diagnosis, but lesion evaluation is a common clinical problem.[2] Imaging techniques and serological markers can help narrow down the differential diagnosis. Radiologically, they appear as either diffuse involvement or focal lesions, and they are also known as Space Occupying Lesions (SOLs). Fine needle aspiration cytology (FNAC) is

most commonly used to diagnose malignant focal lesions, both primary and secondary. When radiology is inconclusive, FNAC is used to rule out neoplasm from an inflammatory lesion.[3-5] Fine Needle Aspiration Cytology (FNAC) has been shown to be a highly effective methods of obtaining tissue for diagnosis from a wide range of body sites, including superficial and deep lesions. It was first used in the liver in 1985. FNAC is a quick, low-cost, and minimally invasive technique for diagnosing liver SOLs with few complications.[6] FNAC guided by ultrasonography (USG) is an accurate methods for determining a definite tissue diagnosis in focal liver lesions.[7] Occasional inflammatory lesions or diffuse liver diseases may mimic mass like lesions or appear as non-homogenous regions on radiographs. Such lesions can also be well sampled by FNA to rule out neoplasm from differential diagnosis.[8] According to literature, the diagnostic accuracy of FNAC for liver lesion is greater than 85% and in malignant lesion its sensitivity is around 90%(67-100%).[9] The aim of the present study was to evaluate the different liver SOLs diagnosed on FNAC presenting at our hospital.

Methods:

The prospective observational study was carried out in the Department of Gastroentarology of Rangpur Medical College Hospital from January 2021 to December 2022 over a period of one year. The patients with suspected space occupying lesions of the liver were enrolled and their preliminary clinical and personal data were recorded. All these patient underwent CBC, liver enzyme, bilirubin and ultrasonography of abdomen that illustrated the sonographic findings of hepatobiliary system. The study was approved by Institutional Ethics Committee for its performing details. A total of 52 cases were taken with following inclusion and exclusion criteria. Patients with radiologically diagnosed SOL in liver and suspected as a case of hepatic neoplasm were included in this study. This study excluded patients with bleeding disorders, a prolonged prothrombin time, a liver abscess, a cyst, or a haemangioma. Clinical data that was relevant to the case were recorded. Patients with a good coagulation profile who had a suspected hepatic neoplasm underwent ultrasound guided FNAC. FNAC was performed by an expert pathologist or radiologist in accordance with standard protocol, and USG guidance was provided by an expert radiologist. Several cytologic smears were prepared and fixed immediately in 95% alcohol. The smears were left in alcohol at least for 30 minutes at room temperature before staining. The residual material remaining after completion of cytological smears were fixed in 10% formalin and later processed to prepare paraffin embedded blocks. Papanicolaou stain was used to stain the produced smears. Hematoxyllin and eosin were used to stain cell blocks made from fixed sediment and bacterial agar. On the same day or the next day, a cytopathological analysis of the dyed slides of hepatic SOL was performed under a light microscope. Smears that were satisfactory had a sufficient number of representative cells from the target areas. The cytological diagnosis was compared using stained cell block sections.

Results:

Mean age of the patients was 54.13 ± 10.57 years with the range of 30-85 years. Most of the patients were within 41-60 years. Males (82.7%) were predominant than females (17.3%). Most of the patients were involved in agricultural work. (Table-I)

Table-I: Demographic profile of the study subjects (N=52)

Variable	Frequency (n)	Percentage (%)
Age (Years)		
≤40	6	11.5
41 - 50	16	30.8
51 - 60	16	30.8
>60	14	26.9
Mean ± SD (Min-max)	54.13 ± 10.57 (30 - 85)	
Gender		
Male	43	82.7
Female	9	17.3
Occupation		
Farmer	16	30.8
Agriculture	9	17.3
Teacher	3	5.8
Businessman	9	17.3
Housewife	8	15.4
Services	7	13.5

Jaundice was observed in 12(23.1%) patients, oedema in 14(26.9%) patients, lymph node was found in 10(19.2%) patients, stigma of CLD was found in 10(19.2%) patients. Enlarged liver was found in 17(32.7%) patients, epigastric lump in 1(1.9%) patients and hepatomegaly in 5(9.6%) patients (Table-II).

Table-II: Sign and symptoms of the study subjects (n=52)

Features	Frequency (n)	Percentage
Jaundice	12	23.1
Oedema	14	26.9
Lymph node	10	19.2
Stigma of CLD	10	19.2
Abdomen		
Liver enlarged	17	32.7
Epigastric lump	1	1.9
Hepatomegaly	5	9.6

HBsAg was present in 8(15.4%) patients and Anti HCV in 1(1.9%) patients. (Table-III)

Table-III: Virological etiology of the study subjects (N=52)

Virology	Frequency (n)	Percentage
HBsAg	8	15.4
Anti HCV	1	1.9

Most of the SOL were hepatocellular carcinoma (44.2%) followed by metastatic adenocarcinoma (17.3%), adenocarcinoma (11.5%), malignant cell (9.6%), inflammatory lesion (5.8%), chronic granulomatous inflammation (3.8%), metastatic carcinoma (3.8%), hepatic SOL (1.9%) and CLD (1.9%) (Table-IV).

Table-IV: Spectrum of FNAC findings in Liver SOLs (n=52)

FNAC Report	Frequency (n)	Percentage
Metastatic adenocarcinoma	9	17.3
Inflammatorylesion	3	5.8
Hepatocellular carcinoma	23	44.2
Chronic granulomatous inflammation	2	3.8
Hepatic SOL	1	1.9
Adenocarcinoma	6	11.5
Metastatic carcinoma	2	3.8
Malignant cell	5	9.6
CLD	1	1.9

Discussion:

Mean age of the patients was 54.13 ± 10.57 years with a range of 30 to 85 years and the majority of the patients were between the ages of 41 and 60 in this study in this study. Half of the patients belonged to age 51-70 years and the mean age was found 53.0±15.0 years with range from 18 to 90 years.[10] Similar findings were also observed by Nasit et al.[3] in India and Nazir et al.[4] in Pakistan. Males (82.7%) were predominant than females (17.3%) in this study. Three fourth (75.0%) patients were male and (25.0%) patients were female.[10] Males predominance was also observed in other studies.[11-13] In Asia, males are more likely than females to be exposed to hepatitis due to socioeconomic factors and lifestyle choices. Males are more likely to have risk factors for HBV and Anti HCV in 1(1.9%) patients in this study. HBsAg was positive in 25.0% cases and Anti HCV was positive in 4.1% cases.[10] Hepatocellular carcinoma is the most common primary malignancy of the liver in adults. Liver is one of the most common sites for metastatic disease, accounting for 25% of all metastasis to solid organs.[15] Most of the SOL in this study were hepatocellular carcinoma (44.2%) followed by metastatic adenocarcinoma (17.3%), adenocarcinoma (11.5%), malignant cell (9.6%), inflammatory lesion (5.8%), chronic granulomatous inflammation (3.8%), metastatic carcinoma (3.8%), hepatic SOL (1.9%) and CLD (1.9%). Hepatocellular carcinoma was 29.8% and adenocarcinoma was 35.0% in the study of Rastogi et al.[12] Hepatocellular carcinoma was 20.0%, adenocarcinoma was 62.9% in the study of Dalsaniya et al.[11] In the study of Sultana et al, out of 48 Space Occupying Lesion of Liver the cytological diagnosis revealed the highest number of cases of hepatocellular carcinoma 22(45.8%), followed by metastatic carcinoma 13(27.1%), abscess 6(12.5%), hepatocellular dysplasia 3(6.3%) and negative for malignant cell 4(8.3%).[10] This study result also supported by Sukumaran et al.[16]

Conclusion:

SOL of liver is a common finding in ultrasonogram of the abdomen. Most common SOL of liver was hepatocellular carcinoma and adenocarcinoma.

Conflict of Interests:

The authors declare that there is no conflict of interests regarding the publication of this paper.

References:

1. Leiman G. Liver and Spleen. In: Ovell SR, Stennet GF, Whitaker D,eds. Fine needle aspiration cytology. 3rd ed. New Delhi: Churchil Livingstone; 2003; 293-316.
2. Swamy MC, Arathi C, Kodandaswamy C. Value of ultrasonography-guided fine needle aspiration cytology in the investigative sequence of hepatic lesions with an emphasis on hepatocellular carcinoma. J Cytol. 2011 Oct;28(4):178-84. doi: 10.4103/0970-9371. 86344.
3. Nasit JG, Patel V, Parikh B, Shah M, Davara K. Fine-needle aspiration cytology and biopsy in hepatic masses: a minimally invasive diagnostic approach. Clin Cancer Investig J. 2013;2(2):132. https://www. ccij-online.org/article.asp?issn=2278-0513; year=2013; volume=2; issue=2; spage=132; epage=142; aulast=Nasit [Accessed 26 January 2022].
4. Nazir RT, Sharif MA, Iqbal M, Amin MS. Diagnostic accuracy of fine needle aspiration cytology in hepatic tumours. J Coll Physicians Surg Pak. 2010 Jun;20(6):373-376.
5. Conrad R, Castelino-Prabhu S, Cobb C, Raza A. Cytopathologic diagnosis of liver mass lesions. J Gastrointest Oncol. 2013 Mar;4(1):53-61. doi: 10.3978/ j.issn. 2078-6891. 2012.020.
6. Boer BD. Liver and spleen. In: Orell SR, Sterret GF, Whitaker D,eds. Fine Needle Aspiration Cytology. 5thed. New Delhi: Churchill Living Stone; 2005. p. 271-296.
7. Das DK, Tripathi RP, Kumar N, Chachra KL, Sodhani P, Parkash S,et al. Role of guided fine needle aspiration cytology in diagnosis and classification of liver malignancies. Trop Gastroenterol. 1997 Jul-Sep;18(3):101-106.
8. Tsui WM, Cheng F, Lee Y. Fine needle aspiration cytology of liver tumors. Ann Contemporary Diag Pathol. 1998;2:79-93.
9. Pitman MB. Liver. In: Gray W, Kocjan G.eds. Diagnostic Cytopathology. 3rd ed. Philadelphia:Elsevir;2010. 287-317.
10. Sultana SS, Dewan RK, Ferdousi F, Sarker R, Jinnah SA, Jeba R, et al. Evaluation of Space Occupying Lesion of Liver by Fine Needle Aspiration Cytology and Cell Block Examination. Journal of Histopathology and Cytopathology. 2018;2(1):11-18. Error! Hyperlink reference not valid. uploads/ 2019/ 03/06_jhc_030_ salowa_ fnac_ liver.pdf. [Accessed 26 January 2022].
11. Dalsaniya SB, Shah MG, Patel TS, Gandhi JS, Jetly DH, Trivedi PP. Evaluation of liver space occupying lesions by fine needle aspiration cytology. International Journal of Current Research and Review. 2016;8(24):13-18. https://www.ijcrr.com/ uploads/ 136_pdf.pdf. [Accessed 26 January 2022].
12. Rastogi N, Bhake A, Agarwal D, Wankhede A. Ultrasound guided fine needle aspiration cytology of space occupying lesions of Liver. Int J Res Med Sci. 2019;7(1):192-198. https://www. researchgate.net/publication/329927914_Ultrasound_ guided_fine_ needle_ aspiration_cytology_of_space_occupying_lesions_of_liver. [Accessed 26 January 2022].
13. Sudhakar G, Devi KM. Study of ultra sound guided FNAC of liver lesions. International Journal of Contemporary Med Res. 2017;4(7):1621-1623. https://www.ijcmr.com/ uploads/ 7/7/4/6/77464738/ijcmr_1589.pdf. [Accessed 26 January 2022].
14. Mohmmed AA, Elsiddig S, Abdullhamid M, Gasim GI, Adam I. Ultrasound-guided fine needle aspiration cytology and cell block in the diagnosis of focal liver lesions at Khartoum Hospital, Sudan. Sudan Journal of Medical Sciences. 2012;7(3):183-187. https://www.ajol. Info/index.php/sjms/article/view/ 88589. [Accessed 26 January 2022].
15. Ahuja A, Gupta N, Srinivasan R, Kalra N, Chawla Y, Rajwanshi A. Differentiation of hepatocellular carcinoma from metastatic carcinoma of the liver-clinical and cytological features. Journal of Cytology. 2007 Jul 1;24(3):125. https://www.jcytol.org/ article.asp? issn=0970-9371;year=2007; volume=24; issue=3;spage=125;epage=129;aulast=Ahuja. [Accessed 26 January 2022].
16. Sukumaran RN, Katoor J, Sindhu NP, Venugopal MK. Cytomorphological Spectrum of Ultrasound Guided Fine Needle Aspiration Cytology of Liver Lesions, and the Role of Cell Block Preparation and Immunohistochemistry in the Diagnosis: An Analysis of 638 Consecutive Aspirations. JMSCR. 2008;6(4):875-881. doi: https://dx.doi.org/ 10. 18535/jmscr/v6i4.145