

# Study of Ultra Sound Guided FNAC of Liver Lesions

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## ABSTRACT

**Introduction:** Mass lesions of liver are generally evaluated by Fine needle aspiration and it is especially useful in the investigation of non-neoplastic and neoplastic mass lesions of the liver. Aim of present study was to denote accuracy of ultra sound guided fine needle aspiration cytomorphological study in diagnosing the liver lesions.

**Material and Methods:** Patients who have been admitted during a period between 2014 to 2016 with suspected liver diseases were subjected to ultrasound guided FNAC and cytological assessment.

**Results:** Fine needle aspirations of liver were performed on 58 patients. Out of which 46 were suspected by malignant lesions and 12 of non-neoplastic lesions. Of the 46 aspirations performed on patients with suspected malignancy, 36 were diagnosed as positive (78.26%). Among other 12 non-neoplastic lesions only 7 were diagnosed positive under cytological examination by FNAC (58.33%). This could be due to more yield of material in malignant lesions than non neoplastic lesions of liver.

**Conclusions:** In most of the cases Cytomorphological study of Hepatic masses by fine needle aspiration yields an accurate diagnosis but in some cases correlation with other investigations and ancillary studies are required for definitive diagnosis.

**Keywords:** Aspiration Cytology, Diagnosis, Diseases of Liver, Ultrasound

## INTRODUCTION

The liver is probably the most common target of abdominal deep organ FNA biopsy. The major indication for FNA of the liver is the evaluation of a hepatic mass.<sup>1</sup> FNA biopsy, is especially useful in the investigation of non-neoplastic and especially neoplastic mass lesions of the liver.<sup>2</sup> In the literature, the sensitivity of FNA biopsy of liver neoplasms ranges from 92 to 96%.<sup>3</sup> Although most large series of hepatic aspirates have emphasized the value of FNA biopsy in the workup of metastatic carcinoma, a number of reports have also demonstrated the accuracy of the procedure for the diagnosis of primary Hepatocellular carcinoma.<sup>4</sup>

Advantages of FNA, are that the mass can be sampled in several different planes and multiple needle punctures can be performed during the aspiration biopsy procedure. In addition, aspiration cytology allows an immediate interpretation of the material so that adequacy of a specimen can be determined and additional material can be obtained if needed for ancillary diagnostic studies.<sup>5</sup>

Aim of present study was to denote fine needle aspiration cytology was a rapid and inexpensive procedure. It was very accurate in diagnosing liver lesions when aspiration was

done under radiological guidance.

## MATERIAL AND METHODS

All patients with mass lesions of liver are referred to pathology department for Fine needle aspiration during a period between 2014 to 2016 for cytological assessment with radiological correlation. Investigations done before procedure were platelet count and plasma prothrombin time to know patient's with bleeding tendencies. Under ultrasonography guidance fine needle aspiration was performed on patients diagnosed for nodular or diffuse firm lesions of liver. Materials used for the procedure were cotton and rectified spirit, disposable needles(22-Gauge),disposable Syringes,slides,diamond pencil,coplin jars with fixatives.

Procedure of aspiration, the patient was placed in a supine position. After cleaning with spirit needle was introduced into the lesion and to and fro movements done in various directions. A negative pressure is applied to aspirate material. After getting material needle was withdrawn and material was pushed on cleaned slides and smears were prepared. These smears are fixed in fixative present in coplin jar. If necessary repeat aspiration was done to get sufficient material for diagnosis.

The slides were fixed in fixative nearly half an hour and subsequently stained with various stains like Hemotoxylin and eosin and other special stains like Papanicolaou, Geimsa, Periodic acid schiff and Reticulin stains if necessary. Stained smears were observed under binocular light microscope for cytological features.

## STATISTICAL ANALYSIS

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

## RESULTS

From 2014-2016, the fine needle aspirations of liver were performed on 58 patients. 39 were males and 19 females. Highest number of 18 cases was observed between 50-60 years. Only 4 cases were observed below 20 years. Radio logically 46 cases were suspected as malignant 12 cases were suspected as non neoplastic lesions (Figure-1)

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Among radiologically suspected 46 malignant cases 36 were diagnosed cytologically as positive for malignancy. Various morphological types were 26 cases of Hepatocellular carcinoma (Figure-2), one case of hepatoblastoma and 9 cases of secondary deposits (Figure 3,4)

Among radiologically diagnosed 12 non neoplastic lesions, 7 cases were cytologically proved and consist of 5 cases of abscess and 2 cases of cholestatic hepatitis.

No conclusive opinions were possible in few cases because of inadequate material/not representative of lesions

## DISCUSSION

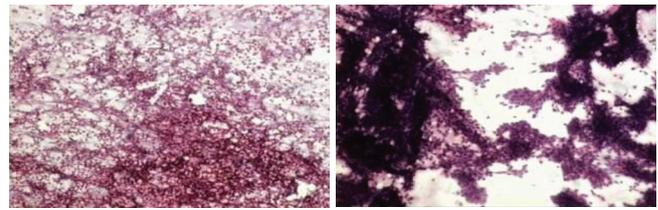
In 1939, Iverson and Roholm pioneered percutaneous liver core biopsy with a 2.0 mm (outside diameter) needle. Fine Needle Aspiration of this organ was established by Sodenstorm in 1966 with the examination of 500 cases. Lundquist, with 2,611 aspirates in 1971, and Brits with 1,105 in 1974 added to the increasing store of information.<sup>1,5</sup> Radiological techniques were frequently used in the diagnosis of liver diseases. But in the case of liver lesions combination of ultrasonography and fine needle aspiration yields accurate diagnosis and it has been used since the 1970 to diagnose liver lesions. In China this technique has become significant since the accuracy of differential diagnosis of both benign and malignant lesions could reach 88.8%.<sup>2,79</sup> 279 cases of liver lesions were studied by Dr. Edoute in 1976-1988 by non-ultrasonically guided aspiration biopsy with good accuracy.<sup>2,4,6</sup>

This term ABC was coined by Lowanger and colleagues and refers to specimen on slide. This ABC aroused most interest particularly in Scandinavia, where exfoliative cytology in U.S.<sup>5,6</sup> FNAC is relatively new technique which was known as far back as in 1833 and is an art that has been updated now.<sup>7,8</sup> The earliest case of FNAC was done in 1833 for a case of infected hydatid cyst at St. Bartholmen's hospital by Stanley and Earla. When the cyst was punctured there was a gush of fluid containing pus and cysts. The patient improved and needle biopsy had thus become an established method of diagnosis of abscess.<sup>3,7,9</sup>

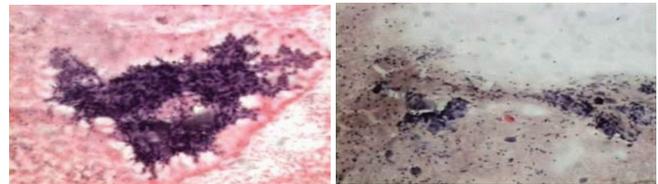
Aspiration is a diagnostic procedure was started by Ward in 1912 and followed by Gunthric (1921) for diagnosis of reticulosis. In 1926, Martin and Ellis began examining a series of 1400 palpable malignant tumours using a 18 gauge needle attached to a record syringe at New York Memorial Hospital.<sup>10,11</sup>

The era of FNAC developed in 1930's Ferguson described a technique for diagnosing prostatic tumours (1933).<sup>12</sup> Forster used CNS tumours (1931), Sharp et al in carcinoma lung (1931) and Klinger and Burch for endometrial tumours (1932). In 1950, there were papers on thyroid, salivary gland aspirates by Sodenstorm (1952). Since then, FNAC has been accepted as a diagnostic procedure in Scandinavian and American countries.<sup>13,14</sup>

A solitary liver mass found in a young woman with a history of taking oral contraceptives is most likely a liver cell adenoma. The cytological pattern must be correlated with clinical presentation and radiological findings. Cytology shows



**Figure-1:** Hepatic abscess showing numerous neutrophils (H and E X 40) of liver, **Figure-2:** Hepatocellular carcinoma showing sheets and individual tumour cells (H and E X40) of liver



**Figure-3:** Metastatic adenocarcinoma (H and E X 40) of liver; **Figure-4:** Metastatic squamous cell carcinoma (H and E X 40) of liver.

highly cellular smears from a clearly defined focal lesion. Monotonous cells resembling normal hepatocytes. Absence of bile duct epithelium.<sup>15,16</sup> Hepatocellular carcinoma is the most common primary hepatic malignant tumor and is one of the most frequent cancers seen worldwide. Hepatoma is especially common in China, Southeast Asia and the sub-saharan portions of Africa.<sup>17,18</sup>

In the United States, less than 3,000 new cases are diagnosed annually, with 90% of the patients, having underlying cirrhosis due to either alcoholism or hepatitis B or C viral infections.<sup>17,19</sup> Other entities associated with the development of Hepatocellular carcinoma include chemical carcinogens, mycotoxins, thorotrast, alpha-1-antitrypsin deficiency, hemochromatosis, and long term anabolic steroid abuse.<sup>20,21</sup> In the United States, hepatoma is generally seen in older male patients presenting with abdominal pain, right upper quadrant abdominal mass and weight loss.

A large single mass is generally present in the liver, although other presentations can occur including multiple small nodules simulating metastatic carcinoma or a diffuse process. Most patients will have elevated serum alpha-feto protein (AFP) levels. In the United States, the prognosis is quiet poor with a median survival usually less than 6 months. Patients who survive often have a small single lesion that can be completely excised. Unfortunately most patients present with large tumors, which prevents them from being surgical candidates. Therefore, FNA biopsy becomes an initial and important procedure when a dominant mass is present in the liver, because surgery may not be an option. FNA biopsy has been shown to have a high level of diagnostic-sensitivity and specificity for hepatoma.<sup>12,4,22</sup>

Hepatocellular carcinoma in the FNAC, there are many tissue fragment and cohesive cell clusters. The neoplastic hepatocytes are often arranged in trabecular fashion, as thick cords, or in cell balls. The neoplastic cells are relatively small, with round, regular uniform and centrally located nuclei. The cytoplasm is usually less than that of benign hepatocytes seen in the same specimen, and macronucleoli

are inconspicuous. Some of cohesive cell clusters are lined by sinusoidal endothelial cells. The neoplastic cells may contain coarsely granular, Intracytoplasmic bile, which appears greenish-yellow with papanicolaou stain. Occasionally bile thrombi within canaliculi between neoplastic cells are present. Mitotic figures and multinucleated neoplastic and multinucleated neoplastic cells are unusual.<sup>17,23</sup>

There was one false negative report of Hepato cellular carcinoma due to relatively necrotic material yielded by Fine needle aspiration cytology. These can be interpreted as abscess. Lymphomas may be confused as an inflammatory lesion.<sup>22,24</sup>

In evaluation of liver space occupying lesions FNAC is a sensitive, specific, safe and relatively inexpensive diagnostic procedure particularly in carcinomas.

## CONCLUSION

Among all liver lesions, malignant lesions were diagnosed more accurately when compared with non neoplastic lesions. Carcinomas are more accurately diagnosed than any other lesion. Radiological assistance plays important role in getting sample from the lesion proper. This helps in more accuracy in diagnosis. Ancillary techniques like special stains, cell block and Immunocytochemistry were very much useful in definitive diagnosis of lesion.

## REFERENCES

- Babb R.R, Jackman R.J. Needle biopsy of the liver. A critique of four currently available methods. West J Med. 1989;150:39-42.
- Tao LC, Donat EE, Ho CS, Mc Loughlin MJ: Percutaneous FNAC of liver: cyto diagnosis of hepatic cancer. Acta cytol. 1979; 23:287-291.
- Suen KC, Magee JF, Halparin LS, Chan NH, Greene CA: FNAC of fibrolamellar hepatocellular carcinoma. Acta cytol. 1985;29:867-872.
- Wee A, Nilsson B, Tan LK, Yap I. FNAC of hepatocellular carcinoma. Diagnostic dilemma at the ends of the spectrum. Acta cytol. 199;38:347-354.
- Schwerk WB, Schmitz – Moormann P: ultra sonically guided FNAC in neoplastic liver diseases: Cytohistologic diagnoses and echo pattern of lesions. Cancer. 1981;48:1469-1477.
- Prasad N, Verma N, Prasad A, Gupta N, Journal of cytology. 2006;23:133-137.
- Axe SR, Erozan YS, Ermatinger S.V, fine needle aspiration of the live. A comparison of smear and rinse preparation in the detection of cancer. Am J Clin Patol. 1986;86:281-285.
- Naguchi SS, Yamamoto R, Tatsuta M, Kasugai H, Okusda S, Wada A, Tamuraq H.: Cell features and pattern in FNAC of hepatocellular carcinoma. Cancer. 1986;58:321-328.
- Russo A, Bazan V, Plaja S et al. Flow cytometric DNA analysis of hepatic tumors on ultrasound guided FNAC. J Surg Oncol. 1992;51:26-32.
- Ali MA, Akthar M, Mattingly RC: Morphologic spectrum of hepatocellular carcinoma in fine needle aspiration biopsies. Acta Cytol. 1986;30:294-302.
- Attenbury CE, Enriquezre, Desutonagy GI, Conn HO: Comparison of histological and cytological diagnosis of liver biopsies in hepatic cancer. Gastroenterology. 1979;76:1352-1357.
- Perry MD, Johnston WW: Needle biopsy of liver for diagnosis of non neoplastic liver diseases Acta cytol. 1985;29:385-390.
- Babb R.R, Jackman R.J. Needle biopsy of the liver. A critique of four currently available methods. West J Med 1989;150:39-42.
- Beasley RP, Hwang LY, Lin CC, Chien CS: hepatocellular carcinoma and hepatitis B virus Lancet. 2:1129-1133.
- Greene CA,Suen KC:some cytologic features of hepatocellular carcinoma as seen in fine –needle aspirates.acta cyto. 1984;28:713-718.
- Bell, Carr CP, Szyfelbein WM: fine needle aspiration cytology of focal liver lesions: results obtained with examination of both cytologic and histologic preparations. Acta Cytol. 1986;30:397-402.
- Cohen M B, Haber M M, Holl E A et al: cytologic criteria to distinguish hepatocellular carcinoma from nonneoplastic liver. Am J Clin Pathol. 1991;95:125-130.
- Goodman ZD, Ishak KG,Langloss JM:combined hepatocellular Cholangiocarcinoma: a histological and immunohistochemical study. Cancer. 1985;55:124-135.
- Bermain JJ, Mc neil RE: cirrhosis with atypia: a potential pitfall in the interpretation of liver aspirates. Acta cytol. 1988;32:11-14.
- Jacobsen GK,Gammelgaard J, Fuglo M: coarse needle biopsy versus fine aspiration biopsy in the diagnosis of focal lesions in the liver. Ultrasonically guided needle biopsy in suspected hepatic malignancy. Acta cytol. 1983;27:152-156.
- Hocs mclaughlin MJ,Tao LC,Blendis L,Evans WK:Guided percutaneous fine needle aspiration biopsy of the liver cancer. 1981;47:1781-1785.
- Mauro ma parker L.A. Percutaneous drainage of a cystic tumor for relief of pain. South Med j. 1987;80:1466.
- Nguyen GK, Mc Hattie JD, Jeannot A: Cytomorphologic aspect of hepatic Angiosarcoma. FNAC of a case. Acta cytol. 1982;26:527-531.
- Pierton M. cytomorphometry of FNAC of liver tumors Patol Po91 1993;44:193-201.

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