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Original Research Article

Study of Different Types of Liver Pathology by Ultrasound Guided Fine Needle Aspiration Cytology at JNKTMC, Madhepura, Bihar

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Abstract

The evaluation of mass lesions of the liver. Most FNAC of hepatic masses could be accurately diagnosed by using only the cytomorphological characteristics. However, in some circumstances, auxiliary tests could be very useful in establishing the exact diagnosis. The cytopathologist may obtain important information to incorporate into the final diagnosis through discussions with radiologists and doctors on site. Evaluation of a hepatic mass is the primary reason for FNA of the liver. The evaluation of non-neoplastic and particularly malignant mass lesions of the liver benefits greatly from FNA cytology.

Methods: This study was conducted at JNKTMC, Madhepura, Bihar from October 2021 to September 2022. A total of 88 individuals were taken with hepatic masses, already screened by USG due to suspected liver disorder were evaluated through aspiration and microscopic cytosmear examination method: 65 male and 23 female.

Results: On 88 patients USG guided liver aspirations with fine needles were done. There were 23 women and 65 men. The people's ages ranged from 9 to 92. In the majority of patients, an ultrasound examination that revealed further abnormalities like cirrhosis, not looking like benign and was viewed as indicative of malignancy came before the FNAC. A handful of the patients may have had some space occupying lesion comprising of chronic non-specific inflammation, regenerating nodule and Hemangioma. On the 88 patients, 52 non-neoplastic lesions and 36 malignant lesions were diagnosed.

Conclusion: Although FNA is not useful in identifying diffuse liver diseases like hepatitis and cirrhosis, it works so wonderfully in differentiating non neoplastic from neoplastic lesion which appear to be non-homogenous or mimic mass-like lesion on radiology. Aspiration Using Fine Needles through radiological guidance, the diagnosis of liver lesions by cytology seems to be a reliable, secure, rapid and reasonably priced procedure.

Keywords: Diagnosis, FNAC, Liver, Ultrasound.

Introduction

FNAC is a very recent approach that was first used in 1833 and has since been modified (Melcher, 1980)[1]. The first instance of FNAC was performed in 1833 at St.

Bartholomew's Hospital by Stanley and Earla on a patient with an infected hydatid cyst. For the diagnosis of reticulosis, Ward used aspiration in 1912, and Gunthric followed suit in 1921[1,2]. With a 2.0 m (outside diameter) needle, Iverson and Roholm invented percutaneous liver core biopsy in 1939[3,4]. With the analysis of 500 cases, Sodenstorm established fine needle aspiration of this organ in 1966 [4,5]. The aim of this study to different types of liver pathology by ultrasound guided fine needle aspiration cytology at JNKTMC, Madhepura, Bihar.

Material and Methods

Patients who have been attended OPD during a period between October 2021 to September 2022 with suspected liver disorder were send for USG and LFT at Jannayak Karpuri Thakur Medical College, Madhepura, Bihar, got hepatic masses were again evaluated by guided FNAC to diagnose exact underline pathology of liver disease required to direct the pathway of treatment. Materials required are Cotton and rectified spirit, Disposable needles(22-Gauge), Disposable Syringes, Slides, Glass marking pencil, Screw capped bottles containing fixative (Ethyl alcohol and ether).

The patient or the patient's relatives are asked for their informed consent. To prevent patients with bleeding tendencies, the platelet count and plasma prothrombin time are evaluated in addition to the clinical evaluation. Following the procedure, the patient is also observed for 30 minutes by measuring their blood pressure, pulse, and, if necessary, respiratory distress. The practice always includes keeping an anaphylactic tray nearby. Patients with nodular or diffuse hard liver lesions underwent fine needle aspiration under the supervision of ultrasound. Clinical data were thoroughly investigated. These included: whether there are one or more lesions, cirrhosis, concomitant lesions in other parts of the body, including the colon, gall bladder, breast, pancreas, and ascites. taken into consideration include laboratory results like ascites fluid cytology and history of cancer.

The method for fine needle aspiration was chosen after considering the ultrasonographic images. A 23–24 gauge needle with a 10cc syringe was used to try aspiration. Deep-seated lesions were treated with ultrasound-guided aspiration using a 22-gauge 90mm lumbar puncture. In a supine position, the patient was positioned. Spirit swabs were used to clean the aspiration target. The vacuum created by the plunger retracting was used to slowly insert the needle into the lesion. The needle was repeatedly inserted into the lesion while being softly taken out. The plunger was left in its regular position when the needle was removed from the lesion.

Onto the slide was placed the material that had been gathered. Then, by applying light pressure between two slides, streaks were created and spread. Each time, six smears were made on labelled slides, and one of the smears was promptly examined for material adequacy after being stained with toludine blue. If the evidence for malignancy was insufficient or nondiagnostic, aspirations were repeated. By dipping the slides twice into the fixative, the slides were quickly fixed and removed to dry. By using this technique, fixation occurs sooner while also preventing the removal of granular and aspirated material, which would have occurred if slides were dropped directly into the fixative and left there. A gentle pressure was applied over the site of aspirate for few minutes. No dressing is needed.

The slides were left in the fixative for the recommended minimum of 15 to 30 minutes for fixing. The slides can then be stored for any amount of time, preferably in the refrigerator.

The smears are stained with Ehlrich hematoxylin and eosin after sufficient fixing. Where applicable, Papanicoloau, Geimsa, Periodic Acid Schiff, and Reticulin stain are also employed as additional stains.

A light microscope is used to examine the stained smears. Records of observations are kept. Generally speaking, cytological smears are classified by Gershergorn *et al* (1977). 1. An acellular stain 2. an inflamed smear 3. Unharmful smear 4. A cancerous smear. In a few instances, further biopsies were performed, and the tissue was processed as per standard paraffin block and H&E staining procedures.

Results

On 88 patients, liver aspirations with fine needles were done. There were 23 women and 65 men (table-1). Ages varied from two to 92. (table-2). In the majority of patients, an ultrasound examination that revealed further abnormalities and was viewed as indicative of malignancy came before the FNAC. A few patients may have had abscesses (Figure 1). On the 88 patients, 52 non- neoplastic lesions and 36 malignant lesions were diagnosed.

Table 1: Sex Distribution of Cases

Male	Female
65	23

Table 2: Age Distribution of Cases

Age	No. of Cases
Below 20years	12
21-30years	22
31-40years	18
41-50years	9
51-60years	16
61&above	11

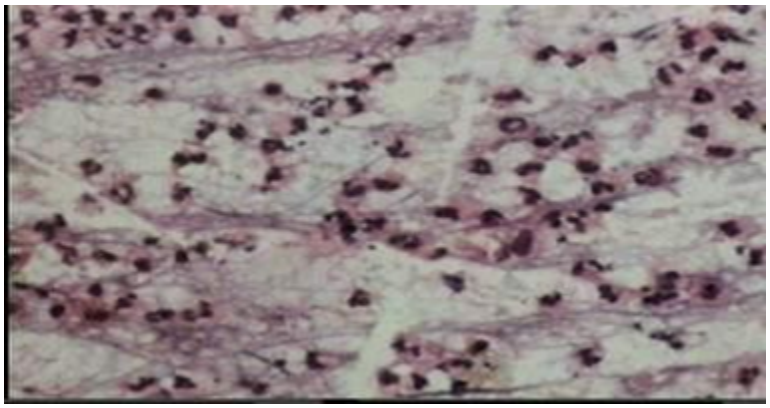

Figure 1: Showing featues suggestive of hepatic abscess (H & E X 100) of liver

Out of 88 aspirations performed on patients with suspected pathology, 81 were diagnosed as positive(92%) overall both for malignant and benign lesion. For malignant cases, they comprised of 6 cases of H.C.C. (Figure.2), 29 cases of secondary deposits (Figure 3,4) and are 1 Hepatoblastoma (table-3).

Table 3: Type of Malignant Lesions

Clinical Diagnosis	No. of aspirations	Confirmed by Cytology	No opinion
Hepatocellular Carcinoma	6	5	1
Hepatoblastoma	1	1	0
Metastaticlesions	29	27	2
Total	36	33	3

No conclusive opinions were possible because of inadequate material/not representative of lesions. Sensitivity: 88.5%.

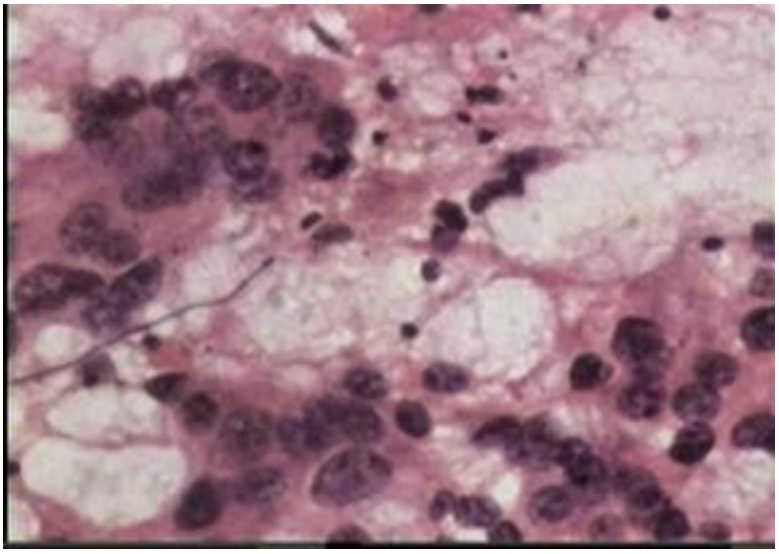

Figure 2: Showing features suggestive of pleomorphiclarge cell hepatocellular carcinoma (H&EX100) of liver

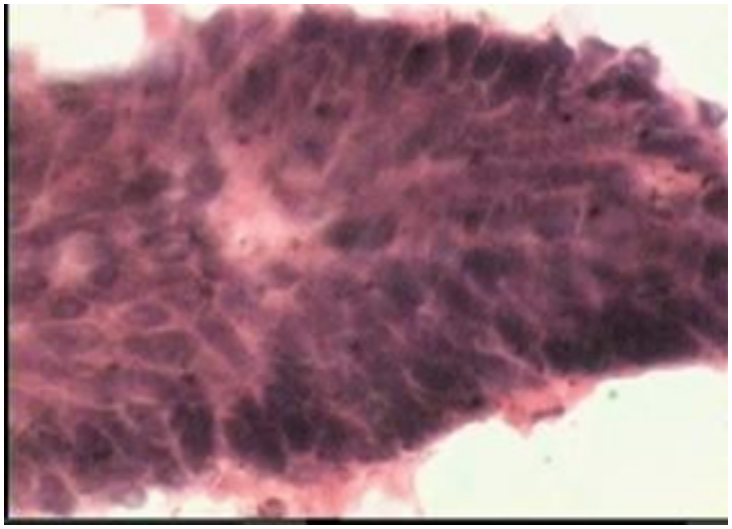

Figure 3: Smears features suggestive of metastatic? Colorectal carcinoma (H &EX100) of liver

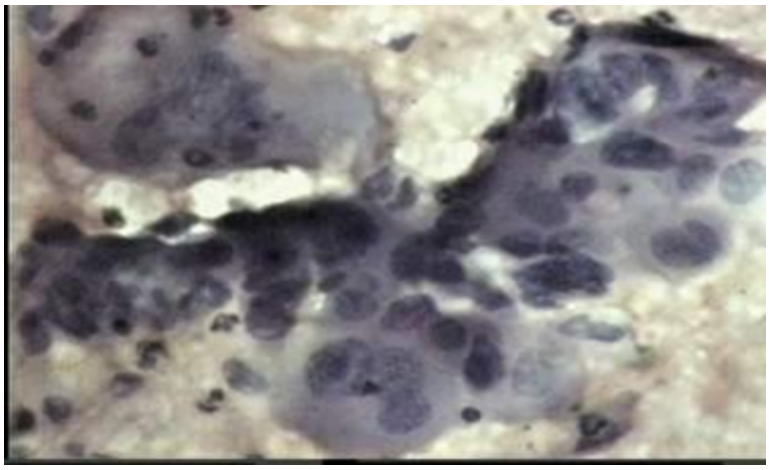

Figure 4: Metastatic poorly differentiated squamous cell carcinoma most probably metastasis from ? carcinoma of cervix. (H&E X 100) of liver

Table 4: Distribution of Non-Neoplastic Lesions

Clinical Diagnosis	No. of aspirations	Confirmed by Cytology	No opinion
Simple hepatic cyst	4	3	1
Hydatid cyst of liver	8	8	0
Hepatic abscess	29	28	1
Benign liver SOL	11	9	2
TOTAL	52	48	4

Discussion

Imaging methods like computed tomography, magnetic resonance, and ultrasound have been widely used to diagnose liver disease for the past 20 years. Nevertheless, liver space-occupying (LSO) lesions cannot be diagnosed with absolute certainty using imaging methods alone. Ultrasonography has been used in conjunction with fine needle aspiration biopsies to identify liver diseases since the 1970s[6,7]. Since then, large hospitals in CHINA have started to prioritise this method for the identification of LOS lesions. The ability to differentiate between benign and malignant liver lesions with 88.8% accuracy is possible. It is significant to note that between 1976 and 1988, Dr. Edoute reported 279 cases of LSO lesions that were found by non-ultrasonically guided aspiration biopsy[8-10].

The thick needle biopsy technique is still essential for identifying a number of non-neoplastic disorders of the liver. Only a tiny, discrete portion of liver, which was sampled, was taken from the liver. Usually, only one biopsy is performed. Hence, it is not surprising that this surgery has only demonstrated high success rates in circumstances when the liver has been significantly involved[11-13]. Another problem of the thick needle biopsy approach is the risk of complications, such as bile peritonitis, haemorrhage, intestinal penetration, and even death[1,14]. Contrary to FNAC, thick needle biopsy should not be performed on patients who have ascites, obstructive jaundice, left lobe lesions, or difficult-to-access right lobe lesions. FNAC circumvents some of these limitations.

As the needle is pushed up and down during the aspiration, more cells and tissue fragments are aspirated from a larger area of the liver, even though the amount of tissue

retrieved by FNAC is only about one-tenth that of a thick-needle biopsy. Air-dried slides can be swiftly stained, and many aspirations can be performed with little risk to the patient[15,16]. If diagnostic tissue was not retrieved on the first aspiration, Tao *et al*. reported 34 of 47 positive tumours. By doing multiple aspirations on each patient, this group was able to accurately diagnose carcinoma in all 13 cases, even when the identical individual aspirations were negative. In this series of 2,611 aspirates, Lundquist only recorded one significant complication, an intrahepatic hematoma necessitating surgery[17-19]. Nowadays, many doctors employ FNAC to diagnose intrahepatic neoplasms and only occasionally perform thick-needle biopsies when FNA does not provide enough information, especially in cases of non-neoplastic liver diseases. This is brought on by the typical thick-needle biopsy's greater complication rate and relatively poor positive yield.

Early detection and cytomorphologic differentiation of hepatocellular carcinoma from metastatic carcinoma are currently of particular importance due to the prospect of surgical resection in some early, chosen situations. Patients with untreated liver cell carcinoma have an average life expectancy of six months, according to reports. However, a patient might be healed after a successful surgical excision. The possibility that a patient may experience superior survival outcomes when treated with a certain anticancer medication has increased due to recent breakthroughs in chemotherapy[17-19].

The most frequent problem in the interpretation of FNAC is differentiating reactive, atypical hepatocytes from metastatic adenocarcinoma and from hepatocellular carcinoma. Our research reveals that important diagnostic markers for the diagnosis of hepatocellular carcinoma include the presence of a distinctive trabecular pattern, frequent prominence of nucleoli, and an aspirate made up of a single cell population. Cellular pleomorphism and anisocytosis can be seen in the same population of cells, however the tumour cells all have the same nuclear, nucleolar, and cytoplasmic morphologies, giving the entire picture a monotonous appearance. The reactive hepatocytes are often topographically separate from the tumour cell aggregates if they are present on the same smear[17,18,20]. In smears from benign hepatic proliferation, macronuclei as large as those in hepatocellular carcinoma can occasionally be seen; however, these abnormal cells typically affect individual cells randomly and piecemeal, and they are frequently intimately admixed with normal-appearing hepatocytes within the same tissue fragment. It is common to see a transition in the same aspirate from normal to slightly abnormal to significantly aberrant hepatocytes. These atypical reactive modifications mimic cellular pleomorphism and anisokaryosis, and the naive may mistake them for hepatocellular carcinoma. Inflammatory cells and benign or reactive ductular cells are more common in benign hepatic proliferations[17,19,21]. Tumor cells may predominate or occasionally be the only cells in the presence of hepatocellular carcinoma. The cancer cell nuclei in metastatic adenocarcinoma are frequently more pleomorphic and show unequal chromatin clumping. In contrast to the normally single macronucleus found in hepatocellular carcinoma, nucleoli may be present in single or variable numbers. Individual cancer cells are often pleomorphic, columnar, and cuboidal. They can also organise into cell sheets or clusters, which can be utilised to depict organised patterns or gaps that resemble glands. The cytomorphological traits were connected with the three kinds of HCC, even though there was no attempt to subclassify HCC in

this study; this correlation will be helpful for clinical care.In this study, there was one false negative report. FNAC test results for a case of hepatocellular carcinoma that included necrotic material. Incorrect necrotic core content is the root reason. Some factors that lead to false-negative diagnoses are (Kline Ts *et al*) 2. Necrotic tumour core, 1. Needle placement, 3. Focal character of lesions Most errors are the result of incorrect needle placement. Unsuitable samples collected from cores of necrotic tumours may be mistaken for an abscess[12,4,22]. Well-differentiated lymphomas can be mistaken for an inflammatory lesion, despite the fact that fibrotic neoplasms frequently don't develop tumour cells. If they are all sufficiently differentiated, they can all be classified as benign hepatocytes. The changed nuclear cytoplasmic ratio, fuzzy nuclear membranes, coarsely clumped chromatin, macronucleoli, and prominent endothelial cells all support the correct conclusion. The bulk of errors can be avoided by making multiple passes into distinct sites and avoiding central necrotic areas[17,23,24].

Conclusions

Needle aspirations were performed on 88 patients who likely had liver disease. A conclusive diagnosis of malignancy was made in 33 of the 36 aspirations on patients with malignant hepatic disease (92%). There were no false positives. The most prevalent malignant tumours were secondaries liver carcinomas. A definitive diagnosis was made in 48 of the 52 benign lesions aspirated. Aspiration did not result in any major problems.

With the help of an experienced imaging specialist, almost all liver masses can be sampled. However, certain smears need to be kept in order to be used for immunocytochemistry and particular stains. Whether the smears are toludine blue stained or not, screening them in the imaging room itself can help produce an accurate report and avoid wasting time. Cell blocks should be generated for histological examination and immunocytochemistry on all deep-seated masses. Utilizing Fine Needles for Aspiration Cytological diagnosis of liver lesions appears to be a trustworthy, secure, and cost-effective approach.

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