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Original Research Article

Study of Fine Needle Aspiration Cytology (FNAC) for Diagnosis of Lesions of Liver Diseases Guided by Ultra Sound at GMCH, Bettiah, West Champaran, Bihar

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Abstract

Background: The main justification for fine needle aspiration (FNA) of the liver is the evaluation of mass lesions. Only the cytomorphological features can be used to diagnosis the majority of FNA biopsies of hepatic masses. It's a good idea to have a backup plan in case the backup plan doesn't work. The cytopathologist may gather significant information to include into the final diagnosis through discussions with radiologists and doctors on site. The main goal of a liver FNA is to evaluate a hepatic mass. FNA biopsy is quite beneficial for evaluating both non-neoplastic and particularly malignant mass lesions of the liver.

Methods: From October 2018 to September 2019, this study was undertaken at the GMCH in Bettiah, West Champaran, Bihar. 78 male and 38 female patients with suspected liver diseases were assessed using FNAC and cytological techniques.

Results: Fine needle liver aspirations were performed on 116 individuals. 38 women and 78 males were present. Ages of the individuals ranged from 2 to 92. The majority of patients underwent an ultrasound scan prior to the FNAC, which revealed further abnormalities and was thought to be suggestive of cancer. Several of the patients might have developed abscesses. There were 116 individuals, and 92 malignant lesions and 24 neoplastic lesions were suspected.

Conclusion: Using Fine Needles for Aspiration Cytological diagnosis of liver lesions appears to be a trustworthy, secure, and cost-effective approach.

Keywords: Diagnosis, FNAC, Liver, Ultrasound.

Introduction

The liver is likely the abdominal deep organ FNA biopsy most frequently chosen target. The principal indication for FNA of the liver is the assessment of a hepatic mass. The examination of non-neoplastic and particularly malignant mass lesions of the liver benefits greatly by FNA biopsy. [1,2] The sensitivity of FNA biopsy for liver neoplasms varies between 92 and 96% in the literature.[3] Many investigations have shown that FNA biopsy is accurate in diagnosing primary Hepatocellular carcinoma, even though most large series of hepatic aspirates have

focused on the efficacy of the method in the workup of metastatic cancer. [4]

FNA has the advantages of allowing for several needle punctures to be made during the aspiration biopsy technique and allowing for multiple planes to sample the mass. Moreover, aspiration cytology enables a quick evaluation of the data, enabling the determination of a specimen's suitability and, if additional data are required for ancillary diagnostic tests, the collection of additional samples.[5] The purpose of the current study was to demonstrate that fine needle aspiration cytology was a simple and quick process. When aspiration was performed with radiological guidance, liver lesions could be diagnosed with a high degree of accuracy.

Material and Methods

Patients who have been admitted during a period between October 2018 to September 2019 with suspected liver diseases were subjected to FNAC and cytological assessment at Govt. Medical College and Hospital, Bettiah, West Champaran, Bihar, required materials are needs 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 surgery, the patient is also observed for 30 minutes by measuring their blood pressure, pulse, and, if necessary, respiratory distress. The practise 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 116 patients, liver aspirations with fine needles were done. There were 38 women and 76 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 116 patients, 24 non-neoplastic lesions and 92 malignant lesions were suspected.

Table 1: Sex Distribution of Cases

Male	Female
78	38

Table 2: Age distribution of cases

Age	No. of Cases
Below20 years	8
21-30 years	2
31-40 years	10
41-50 years	30
51-60 years	36
61 & above	30

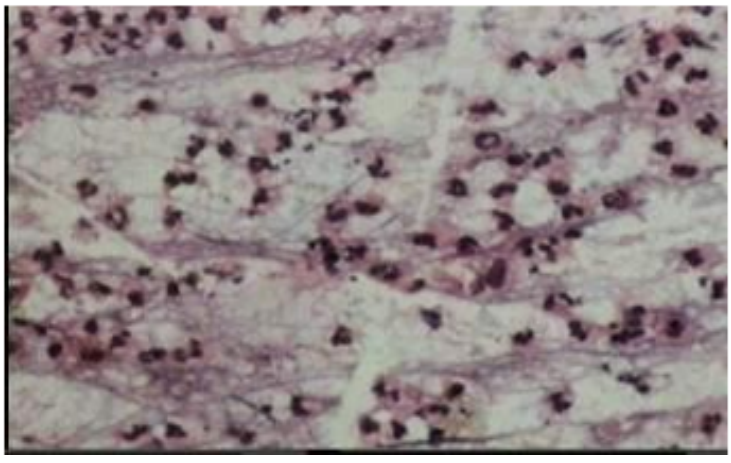

Figure 1: Showing featues suggestive of hepatic abscess (H & E X 100) of liver

72 (78.26%) of the 92 aspirations on patients with suspected cancer resulted in a positive diagnosis. These included 2 Hepatoblastomas, 18 cases of secondary deposits, and 52 cases of H.C.C. (Figures 2, 3, and 4). (table-3).

Table 3: Type of Malignant Lesions

Clinical Diagnosis	No. of aspirations	Confirmed by Cytology	No opinion
Hepatocellular Carcinoma	66	52	14
Hepatoblastoma	2	2	0
Metasatic lesions	27	18	6
Total	92	72	20

No conclusive opinions were possible because of inadequate material/not representative of lesions. Sensitivity: 78.26%.

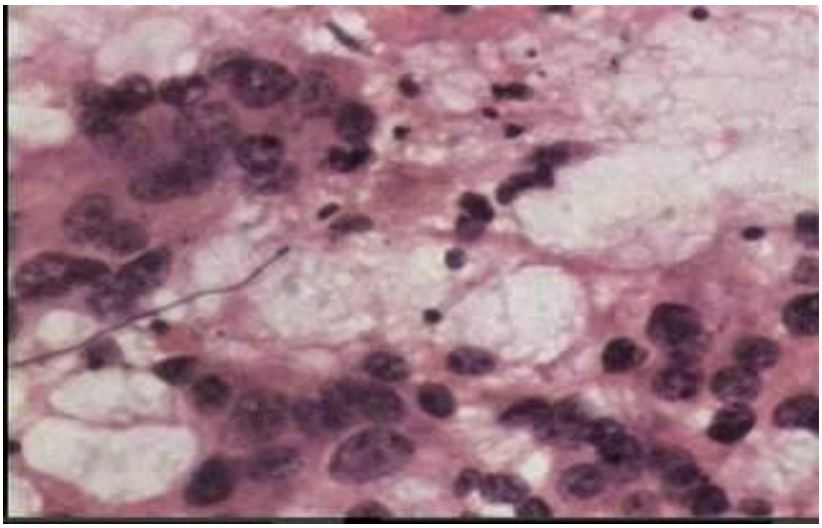

Figure 2: Features suggestive of pleomorphic large cell hepatocellular carcinoma (H & E X 100) of liver

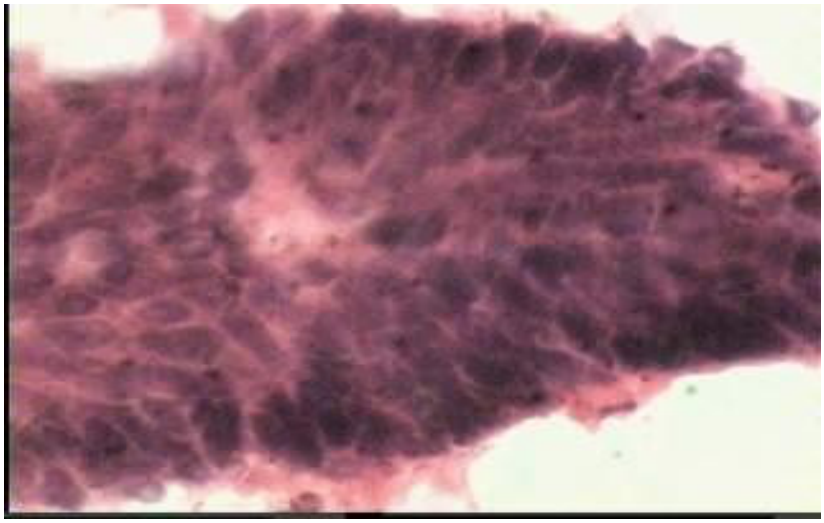

Figure 3 : Smears features suggestive of metastatic ? colorectal carcinoma (H & E X 100) of liver

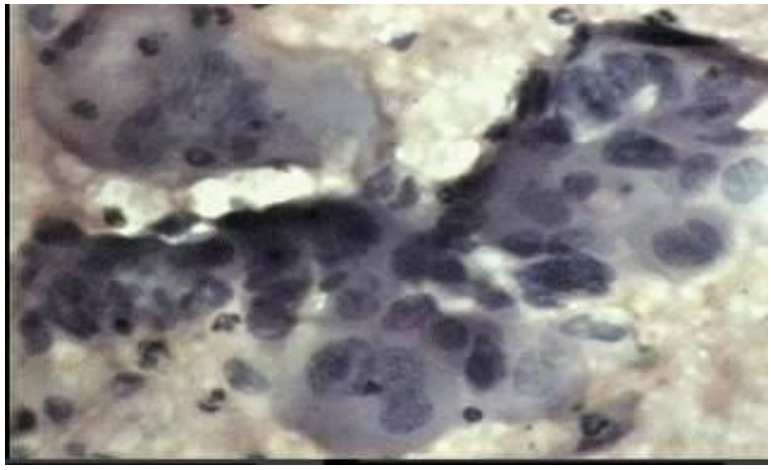

Figure 4: Metastatic poorly differentiated squamous cell carcinoma most probably metastasis from ? carcinoma of cervix. (H & E X 100) of liver

Table 4: Distribution Of Non Neoplastic Lesions

Clinical Diagnosis	No. of aspirations	Confirmed by Cytology	No opinion
Abscess	14	10	4
Cholestatic Hepatitis	8	4	4
Hemangioma	2	0	2
Total	24	14	10

Sensitivity: 58.33%

Discussion

In the past 20 years, imaging techniques such as ultrasonography, computed tomography, and magnetic resonance have been widely utilised to diagnose liver illness. However, imaging techniques alone cannot provide a definitive, conclusive diagnosis of liver space-occupying (LSO) lesions. Since the 1970s [6,7,12], ultrasonography has been used in conjunction with fine needle aspiration biopsies to diagnose liver disorders. Since then, this approach has become important in the diagnosis of LOS lesions in large hospitals in CHINA.

The accuracy of differential diagnosis of liver diagnosis of both benign and malignant lesions may reach 88.8%. It's important to note that Dr. Edoute reported 279 cases of LSO lesions between 1976 and 1988 that were identified using non-ultrasonically guided aspiration biopsy[8-10].

The thick needle biopsy method continues to be crucial for diagnosing a variety of liver non-neoplastic disorders. However, it has a rather limited sensitivity for detecting malignant liver lesions. The minimal amount of liver that was sampled was only taken from a narrow, specific location. Typically, just one biopsy is taken. It is therefore not unexpected that this procedure has shown high success rates only in situations with significant liver involvement[11-13]. The possibility of consequences, including bile peritonitis, bleeding, intestinal puncture, and even death, is another drawback of the thick needle biopsy technique [1,14]. Contrary to FNAC, thick needle biopsy is contraindicated in patients with ascitis, obstructive jaundice, left lobe lesions, and right lobe lesions that are difficult to approach. FNAC gets around some of these restrictions.

Although the amount of tissue retrieved by FNAC is only about one-tenth that of a

thick-needle biopsy, it nevertheless represents a superior sampling of the liver because, as the needle is moved up and down during the aspiration, more cells and tissue fragments are aspirated from a greater area of the liver. Slides that have been air dried can be quickly stained, and several aspirations can be carried out with little danger to the patient[16]. Tao *et al* reported 34 of 47 positive tumours if diagnostic tissue was not recovered on the first aspiration; by doing numerous aspirations on each patient, this group was able to correctly diagnose carcinoma in all 13 cases even when the same individual aspirations were negative. Only one major complication, an intrahepatic hematoma requiring surgery, was described by Lundquist in this series of 2,611 aspirates[17-19]. Many clinicians now use FNAC for the diagnosis of intrahepatic neoplasms and limit the use of thick-needle biopsy to the few instances in which FNA does not yield sufficient material, especially in non-neoplastic liver disorders. This is due to the relatively low positive yield and higher complication rate associated with the conventional thick-needle biopsy.

Due to the possibility of surgical resection in some early, chosen instances, early identification and cytomorphologic separation of hepatocellular carcinoma from metastatic carcinoma are of particular importance nowadays. According to reports, patients with untreated liver cell carcinoma have an average life expectancy of six months. However, with successful surgical excision, a patient may be cured. Recent developments in chemotherapy further increase the likelihood that a patient would experience better survival outcomes when treated with a particular anticancer agent[17-19].

Separating hepatocellular cancer from reactive, atypical hepatocytes and from metastatic adenocarcinoma is the most frequent issue in the interpretation of FNAC. Our research demonstrates that the presence of a characteristic trabecular pattern, frequent prominence of nucleoli, and an aspirate made up of a single cell population are crucial diagnostic indicators for the diagnosis of hepatocellular carcinoma. Within the same population of cells, cellular pleomorphism and anisokaryosis can be observed, yet the tumour cells share similar nuclear, nucleolar, and cytoplasmic morphologies, creating an overall monotonous image. If present on the same smear, the reactive hepatocytes are typically topographically distinct from the tumour cell aggregates[17-20]. Although macronucleoli as large as those in hepatocellular carcinoma can occasionally be seen in smears from benign hepatic proliferation, they typically affect individual cells randomly and piecemeal, and these atypical cells are frequently intimately admixed with normal-appearing hepatocytes within the same tissue fragment. In the same aspirate, a change from normal to slightly abnormal to noticeably aberrant hepatocytes is frequently observed. The unwary may mistake these atypical reactive alterations for hepatocellular cancer because they give the appearance of cellular pleomorphism and anisokaryosis. In a benign hepatic proliferation, it's more typical to encounter inflammatory cells and benign or reactive ductular cells[17,19,21]. When hepatocellular carcinoma is present, tumour cells may be the predominate or occasionally the only cells. In metastatic adenocarcinoma, the tumour cell nuclei are typically more pleomorphic and exhibit uneven chromatin clumping. Unlike the typically single macronucleolus found in hepatocellular carcinoma, single or variable numbers of nucleoli might be present. Individual tumour cells are typically columnar, cuboidal, and pleomorphic. They can also form clusters or cell sheets, which can be used to visualise structured patterns or gaps resembling glands. Although there was no attempt to subclassify HCC in this study,

the cytomorphological characteristics were correlated with the three forms of HCC, which will be useful for clinical care. There was one false negative report in this study. A case of hepatocellular carcinoma where the FNAC test showed necrotic material. The cause is incorrect necrotic core content. The causes of false-negative diagnoses include (Kline Ts *et al*) 3. Focal nature of lesions, 2. Necrotic tumour core, and 1. Needle placing The majority of mistakes are due to poor needle positioning. Unsuitable samples acquired from necrotic tumour cores could be mistaken for an abscess[4,12,22]. Although fibrotic neoplasms often don't produce tumour cells, well-differentiated lymphomas can be mistaken for an inflammatory lesion. They can all be categorised as benign hepatocytes if they are sufficiently differentiated. Correct interpretation is aided by altered nuclear cytoplasmic ratio, fuzzy nuclear membranes, coarsely clumped chromatin, macronucleoli, and conspicuous endothelial cells. Multiple passes into various sites and avoiding central necrotic areas can be used to avoid the majority of errors[17,23,24].

Conclusions

116 patients with probable liver disease had needle aspirations. In 72 of the 92 aspirations done on patients with malignant hepatic illness (78.26%), a definitive diagnosis of malignancy was achieved. No false positives occurred. Primary carcinomas of the liver were the most frequently seen tumours. In 14 (58.33%) of the 24 aspirates conducted on benign lesions, a conclusive diagnosis was achieved. Aspiration did not lead to any significant difficulties.

Nearly all liver masses can be sampled with the aid of an imaging specialist with experience. However, certain smears must be preserved for use in immunocytochemistry and specific stains. Screening the smears in the imaging room itself, whether they are toludine blue stained or not, aids in providing an accurate report and preventing unnecessary delays. All deep-seated masses should have cell blocks prepared for histological analysis and immunocytochemistry. Aspiration Using Fine Needles The diagnosis of liver lesions by cytology seems to be a reliable, secure, and reasonably priced procedure.

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