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COMPARISON OF FINE NEEDLE ASPIRATION CYTOLOGY AND NEEDLE CORE BIOPSY IN THE DIAGNOSIS OF RADIOLOGICALLY DETECTED LIVER MASSES

Radiology

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KEYWORDS

Patients with radiologically detected liver masses can be managed by accurate diagnosis via percutaneous tissue sampling. For purpose of percutaneous tissue sampling two methods are commonly used: 1) fine needle aspiration cytology (FNAC) and 2) needle core biopsy (NCB).

Both methods have their advantages and limitations. For lesions which are deeply situated FNA is usually preferred. [1]

Cytological samples can be readily examined after staining and provisional reporting can be done immediately.

Histological samples can preserve tissue architecture and may be helpful for further tissue sub typing and immunohisto chemistry.

There is wide range of variation and discrepancies in diagnostic sensitivities of FNA and NCB, due to that reason some authors suggest that only NCB used be used. [2-6]

We have compared sensitivity of FNA and NCB in 100 radiologically detected liver masses undergoing radiology guided tissue sampling in our hospital.

MATERIAL AND METHODS

Study was conducted from March 2018 to August 2018, in patients who were radiologically diagnosed liver mass either on CT or on USG. In total, 100 patients were identified with liver mass and were subjected to ultrasound guided tissue sampling. There were 63 men and 37 women with an age range of 35-85 years. Written informed consent for the procedure were taken from all patients. Imaging guidance was provided by ultrasound. The main exclusion criterion was the presence of altered bleeding parameters. All the patients underwent ultrasound examination prior to biopsy to assess the feasibility of the biopsy.

Bleeding parameters prothombin time (PT), partial thromboplastin time (PTT) and platelets counts were recorded. Any PT value with and INR less than 1.4 and PTT value of 23.8-37.4 s were considered acceptable.

Needle entry site was marked on patient's skin and surrounding area was cleansed with betadine. Local anaesthetic (1-2% lidocaine hydrochloride) was injected with 23 G needle. In general, NCB samples were taken first followed by FNA samples. Under ultrasound guidance needle path was assessed using colour Doppler to avoid any blood vessel in the expected needle path. Biopsies were taken using 3.5-7 MHz vector- phased array probes. For NCB sampling 18 G needle was advanced into liver mass under real time ultrasound guidance. When needle tip reached the site of biopsy patient was asked to hold the breath to minimize injury. Two to four passes were made from skin to area of the lesion. The samples were fixed in 10% neutral buffered formalin and later stained with haematoxylin and eosin. The samples were examined and reported by histopathology staff.

FNA samples were taken after NCB sampling, using a standard 21 G Chiba needle attached to 10 middle lobe syringe. Needle was gently passed through the lesion four to six times with aspiration. Direct smears were prepared using Diff-Quik method in the scanning room. Smears were examined by cyto pathologist.

Post procedural ultrasound was performed to look for any immediate complications. Patients were monitored for 30 minutes in ultrasound room.

For our study purposes, histological diagnoses were considered "gold standard". In patients with negative core biopsy definitive diagnosis was based on subsequent biopsy results.

Table 1. Pathology results of FNA, NCB and combined sensitivity of FNA/ NCB in 100 radiologically suspected malignant liver masses.

Total number of patients	Number of cases correctly diagnosed on FNA	Number of cases correctly diagnosed on NCB	Combined sensitivity
100	76	98	100 %

FNA, fine needle aspiration; NCB, needle core biopsy.

Table 2. Sensitivity of FNA, NCB and combined FNA/ NCB in different histo-pathological type of malignant liver masses.

Histo-pathological type of lesion	Total number of lesions	Correct diagnosis by FNAC	Correct diagnosis by NCB	Combined sensitivity
Metastatic adenocarcinoma	45	38 84.44%)	45 (100%)	100%
Hepatocellular carcinoma	26	23 (88.4%)	24 (92.3%)	100%
Cholangiocarcinoma	8	3 (37.5%)	8 (100%)	100%
Metastatic round cell tumour	1	1 (100%)	1 (100%)	100%
Metastatic small cell carcinoma	1	1 (100%)	1 (100%)	100%
Metastatic NET	7	2 (28.5%)	7 (100%)	100%
Un-differentiated carcinoma	5	3 (60%)	5 (100%)	100%
Adenocarcinoma NOS	5	3 (60%)	5 (100%)	100%
Metastatic GIST	1	1 (100%)	1 (100%)	100%
Metastatic malignant melanoma	1	1 (100%)	1 (100%)	100%

FNA, fine needle aspiration; NCB, needle core biopsy.

RESULTS:

Pathological results of 100 patients with radiologically diagnosed malignant liver lesions who underwent ultrasound guided FNA and NCB is presented in table 2. The most common diagnosis was metastatic adenocarcinoma (45 cases out of 100) followed by hepatocellular carcinoma (26 cases out of 100).

All metastatic adenocarcinoma were accurately diagnosed on NCB while on FNA 38 patients with metastatic adenocarcinoma were diagnosed accurately.

Out of 26 patients, FNA and NCB were diagnostic in 23 and 24 patients of Hepatocellular carcinoma, respectively. Both FNA and NCB samples were inadequate for assessment in two patients. Subsequent follow up core biopsy showed hepatocellular carcinoma in both cases. For diagnosis of cholangiocarcinoma NCB proved to be more sensitive accurately diagnosing all of 8 cases of cholangiocarcinoma.

FNA showed positive results in 3 (37.5 %) cases of cholangio carcinoma only.

There was a case of metastatic round cell tumor which was diagnosed on both FNA and NCB.

In diagnosing metastatic NET, NCB appeared to be more sensitive (with sensitivity of 100%) than FNA (with sensitivity of 28.5%).

One case with small cell carcinoma of lung with liver metastasis was diagnosed correctly on FNA and NCB.

In one case both cytology and histology showed metastatic GIST of liver.

One case of metastatic malignant melanoma of liver was correctly diagnosed on both histology and cytology.

In five cases, NCB samples reported as consistent with undifferentiated carcinoma, whereas corresponding FNA showed only 3 positive results. Rest of 2 were reported on FNA as unsatisfactory specimen.

Five cases were reported as adenocarcinoma, NOS, on histology whereas corresponding FNA showed only 3 positive results (60%).

Overall therefore, FNA was diagnostic in 76 of 100 (76%) cases and NCB was diagnostic 98 of 100 (98%) cases. A combination of FNA and NCB improved diagnostic yield to 100%.

The definitive cytology report was issued in all of the cases within 24-48 hours with mean reporting time 1.6 days. And the definitive histology report was issued in all of the cases with mean reporting time 4 days.

The results for NCB were significantly better with sensitivity of 98% compared to FNA which showed sensitivity of 76%.

DISCUSSION:

Needle biopsy is useful in establishing diagnosis of radiologically diagnosed liver neoplasms. Many factors including size, site and proximity to vessels may affect decision to use FNA and/or NCB.

This study demonstrates NCB was superior diagnostic method in diagnosing malignant liver lesions compared with FNA with equally low complication rates for both procedures.

Our results of NCB were similar to those reported by several other authors. [7-14]

However some studies have also reported that sensitivity of FNA is superior to NCB. [15-23]

Nyman and colleagues reported 61.8% sensitivity for FNA and 90.1% sensitivity for NCB in study of 55 patients with malignant liver lesions. [24]

The authors have concluded that core biopsy should be preferred method of sample taking and that combination of FNA and NCB had no additional value.

False negative rates for FNA were greater in these studies when compared with combined FNA/ NCB sampling. [25-28]

NCB is clearly superior to FNA in obtaining adequate tissue sample and malignancy can be more reliably excluded. Combined use of both techniques increase the diagnostic accuracy. [29,30]

Advantage of NCB is that it also provides more sample which can be utilised for tissue subtyping. Retained architectural pattern in samples provided by NCB also allows to perform immunohistochemical and Mucin stain studies. [31-35]

Advantage of FNA is an immediate assessment of the sample can be done and provisional diagnosis can be made which is useful in deciding further investigation for the patient and treatment can be determined without delay. In our study immediate diagnosis with the help of FNA was possible in 76 cases which were confirmed on follow up.

In conclusion, comparison of FNA and NCB in 100 cases of radiologically diagnosed liver masses showed that NCB was more sensitive and accurate. It also offered advantage of specific tumour subtyping and complementary diagnostic techniques can also be performed. The need for repeated procedure is also reduced with NCB resulting in less chances of complications and morbidity.

When combined FNA with NCB diagnostic sensitivity reached up to 100%. Combination of both techniques should be used in suspected liver masses so that immediate assessment of sample can be done by FNA with architectural pattern preservation for tissue subtyping by NCB.

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