Journal of the American Society of Cytopathology (2017) xx, 1–4

Available online at www.sciencedirect.com

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journal homepage: www.jascyto.org/

For diagnosis of liver masses, fine-needle aspiration versus needle core biopsy: which is better?

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Received 11 August 2017; received in revised form 18 September 2017; accepted 18 September 2017

KEYWORDS
Liver mass;
Fine-needle aspiration;
Needle core biopsy;
Hepatocellular carcinoma;
Liver metastatic malignancy

Introduction Both fine needle aspiration (FNA) and needle core biopsy (NCB) are widely accepted methods for obtaining diagnostic material. There is variability in how different institutions use these techniques in assessing liver masses. The aim of this study is to compare the diagnostic accuracy and tissue quality between FNA and NCB, and create a cost-effective algorithm for evaluating liver masses.

Materials and methods A database search was performed to detect all liver FNA cases and their corresponding NCB between January 2014 and August 2016. A retrospective chart review was performed to gather pertinent clinicopathologic information.

Results Seventy-seven FNA and 68 corresponding NCB were reviewed from 74 patients. Diagnoses in the 74 patients included 36 hepatocellular carcinomas (HCC), 29 metastatic malignancies (MET), 5 poorly differentiated carcinomas (PDC), 2 cholangiocarcinomas (CHO), and 2 benign lesions (BEN). More immunohistochemical (IHC) studies ($P < 0.05$) were performed on NCB tissues than FNA tissues in HCC (mean, 2.1 versus 0.8), MET (2.5 versus 0.5), and PDC groups (11.2 versus 0.2). The false negative rate (FNR) of NCB was lower ($P < 0.05$) than that of FNA in the HCC group; and FNR of NCB was higher ($P < 0.05$) than that of FNA in the MET group.

Conclusions For HCC, NCB usually has better tissue quality and diagnostic accuracy than FNA; for metastatic lesions in the liver, FNA has better diagnostic accuracy than NCB, although NCB can provide more tissue for ancillary testing and has better diagnostic quality. Appropriate diagnostic method is important for improving diagnostic accuracy and saving medical resources.

Introduction

Accurate diagnosis of liver masses is crucial for appropriate clinical management of patients.[1,2] The detection of liver masses is greatly advanced by the improvement of imaging techniques.[3,4] Image-guided percutaneous liver mass

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https://doi.org/10.1016/j.jasc.2017.09.004

biopsies are widely applied for diagnosis of liver lesions and are usually performed by experienced interventional radiologists.[5]

Currently, there are two accepted methods for obtaining diagnostic tissues: fine-needle aspirate (FNA) and needle core biopsy (NCB).[6] FNA specimens are usually obtained by using 20- to 25-gauge needles, whereas NCB specimens are obtained from larger (usually 16- to 18-gauge) needles. Theoretically, each sampling technique has its own advantages and limitations.[7] FNA is fast, safe, inexpensive, and interpreted by on-site skilled pathologists, which greatly helps to accurately target small lesions, although the tissues from FNA are often fragmented with distorted histologic architecture, and sometimes scant cellularity results in nondiagnostic specimens. On the other hand, NCB can provide more tissues with better preserved architecture, which are important for performing further special studies (molecular tests or immunohistochemical stains) and making accurate diagnoses, but it may cost more and result in an increased false negative diagnosis without the on-site pathologic adequacy check.[8]

There is variability in how different institutions use these techniques in assessing liver masses. NCB has replaced FNA in many institutions for the diagnosis of liver masses.[9] At our institution, FNA is followed by concurrent NCB; separate reports of FNA and NCB are signed out by same pathologist. Therefore, the purpose of this study is to compare the diagnostic accuracy and tissue quality between FNA and NCB, and create a cost-effective algorithm for evaluating liver masses.

Materials and methods

Approval was obtained from institutional review board with a waiver of patient consent for this retrospective database study. The histopathology and cytopathology databases of the Pathology Department at Ben Taub County Hospital were searched for all patients undergoing ultrasound-guided percutaneous FNA followed by NCB sampling of liver mass lesions from January 2014 to August 2016. A retrospective chart review was performed to gather pertinent clinicopathologic information including age, race, sex, clinical history, lesion characteristics including unifocal versus multifocal, numbers of FNA passes, and the pathologic diagnosis. Smear slides of FNA were objectively graded using a modified point scoring system[10] with a cumulative score between 0 and 6 (based on following criteria: amount of diagnostic cellular material [0-2], degree of cellular trauma [0-2] and retention of appropriate architectures [0-2]).

Category variables were described through absolute and relative frequencies, and continuous variables were described as mean (minimum to maximum range). All data were arranged, processed, and analyzed with SPSS version 20.0 (Statistical Package for Social Sciences, SPSS Inc, Chicago, Ill.). Two-sided Student t tests were used to compare means between two groups and Pearson's chi-squared test (χ^2) was used for categoric variables between two groups. A P-value <0.05 was considered statistically significant.

Results

In total, 74 patients with one (n = 32) or more (n = 42) ultrasound detected liver lesions were included. Final diagnoses were divided into 5 groups: 36 hepatocellular carcinomas (HCC), 29 metastatic malignancies (MET), 5 poorly differentiated carcinomas (PDC), 2 cholangiocarcinomas (CHO), and 2 benign lesions (BEN). FNA and NCB were performed in most cases (n = 71), and 3 patients (2 in the MET group and 1 in the BEN group), had only FNA without NCB (n = 3). There were 37 men and 37 women with an age range of 17 to 86 years (mean, 65.7 years). Thirty-six patients, all in the HCC group, were initially radiologically diagnosed as HCC and 29 patients in MET group had a previous history of pathologically confirmed malignancy: carcinomas of the colon (n = 9), breast (n = 7), ovary (n = 3), lung (n = 2), pancreas (n = 2), gallbladder (n = 1), adrenal gland (n = 1), thyroid (n = 1), and parotid gland (n = 1); and ocular melanoma (n = 2) (Fig. 1).

Clinicopathologic data on the 5 groups are summarized in Table 1. The mean age, number of FNA passes, quality of FNA smears, number of slides with Diff-Quick and Papanicolaou stains were similar among the groups. More immunohistochemical (IHC) studies ($P < 0.05$) were performed on NCB tissues than FNA tissues in HCC (mean, 2.1 versus 0.8), MET (2.5 versus 0.5), and PDC groups (11.2 versus 0.2).

Overall, FNA cytology and NCB were diagnostic in 32 of 36 (88.9%) (4 of the false negative cases all show fragmented tissue and scant cellularity) and 32 of 33 (97.0%) (the only false negative case showing cirrhosis, was clinically diagnosed as HCC and treated by radiofrequency ablation) cases in the HCC group, respectively. FNA and NCB were

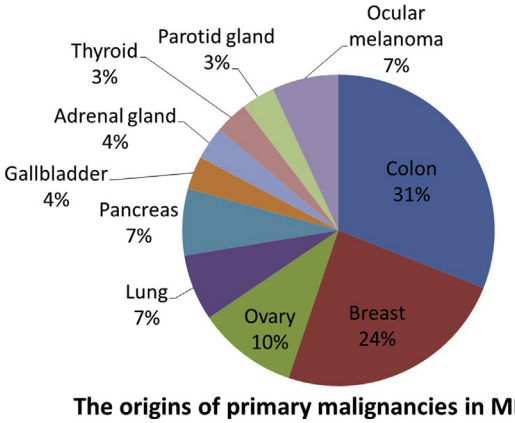

Figure 1 Pie chart of the origins of primary malignancies in MET group. Abbreviation: MET, metastatic liver malignancies.