

Fine needle aspiration cytology in the diagnosis of liver lesions

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BACKGROUND: Fine needle aspiration cytology (FNAC) is a less invasive, inexpensive and rapid method for pathologic evaluation of hepatic masses. This study was to investigate the role of fine needle aspiration cytology in the early diagnosis of liver disease.

METHODS: Forty-six patients received fine needle (1 mm diameter or 18G) aspiration for the diagnosis of liver disease under ultrasonography or computed tomography guidance. The diagnosis was verified by using hematoxylin and eosin (HE) staining and immunohistochemistry.

RESULTS: Of the 46 patients, 19 had hepatocellular carcinoma (HCC), 2 cholangiocarcinoma, 1 lymphoma, 1 carcinoid tumor, 1 squamous cell carcinoma, 1 tuberculosis, 14 no abnormality, and 6 red blood cells. Cytological diagnosis of 3 patients was inconsistent with histological diagnosis after surgery: incorrect diagnosis (2), and false-negative for failure of aspiration (1).

CONCLUSIONS: Cytological diagnosis should mostly depend on cellular morphology. In addition, immunohistochemistry and special staining are helpful for diagnosis if cytologic preparation is available. Fine needle aspiration cytology of the liver is a diagnostic method that can be used to identify the vast majority of neoplasms of primary or metastatic nature.

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KEY WORDS: biopsy; needle; liver neoplasms

Introduction

In recent years, fine needle aspiration cytology (FNAC) has emerged as a less invasive, inexpensive and rapid method for pathologic evaluation of primary or metastatic hepatic masses.^[1-8] This diagnostic method was first applied to the liver as early as 1895.

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Nowadays, this procedure is widely practised and can be employed to differentiate benign from malignant processes with an accuracy rate as high as 96%. The purpose of this study was to investigate the role of FNAC in the early diagnosis of liver disease.

Methods

Forty-six patients received fine needle aspiration between 1999 and 2000 at our hospital. With a fine needle of 1 mm (18G) in diameter, FNAC was performed under the guidance of ultrasonography or computed tomography. Smears were made as quickly as possible, fixed directly in methanol, and stained with hematoxylin and eosin. In evaluating a small-cell neoplasm, leukocyte common antigen (LCA) was used to exclude most lymphomas, and chromogranin and neuron-specific enolase were used to identify carcinoid and small cell carcinoma, respectively. If melanoma is considered diagnostically, immunohistochemical staining for HMB-45 or S-100 protein and keratin was used. Antibodies purchased from DAKO, and EnVision™ kit, DakoCytomation, Denmark were used in immunohistochemistry.

Results

Table. Cytological and histological diagnosis of 46 patients

Group	Cytology	n	Histology	n
1	Hepatocellular carcinoma (HCC)	19	Hepatocellular carcinoma	16
			Metastatic carcinoma	2
			Cholangiocarcinoma	1
2	Cholangiocarcinoma	2		2
3	Lymphoma	1		1
4	Melanoma	1	Melanoma	1
5	Carcinoid tumor	1	Carcinoid tumor	1
6	Squamous cell carcinoma	1	Squamous cell carcinoma	1
7	Tuberculosis	1	Tuberculosis	1
8	Liver cell	14	Liver cell	13
9	Failure (red blood cell)	6	Well differentiated HCC	1
			Hepatocellular carcinoma	1
			Liver cell	5

Cytological diagnosis of 3 patients was inconsistent with histological diagnosis after surgery. One of them had an incorrect diagnosis, and the false-negative for failure of aspiration (Table).

Discussion

Puncture cytology has proven to be effective in obtaining tissue from many different body sites for diagnosis. This procedure has been widely accepted as a cost-effective and safe method for differentiating benign from malignant tumors.^[4] It is used predominantly for the diagnosis of lesions if there is a neoplastic process, either primary or metastatic.^[7,8] The specificity and positive predictivity of FNAC are high and its sensitivity ranges from 67% to 93%.^[4] However, puncture cytology also has its shortcomings. Without histological structures, it is difficult for puncture cytology to determine the characteristics and classification of lesions.

Primary hepatocellular carcinoma (HCC) and cholangiocarcinoma are commonly detected by liver FNAC.^[5,6] In most patients, the diagnosis presents no significant challenges to the pathologist who had some knowledge of pathology and experience in cytology.

Quality of smear also plays a key role in cytological diagnosis. There are three key factors: quick fixing, equal smear, and enough cells. Smear is fixed in 95% ethanol or methanol as quickly as possible to avoid the cellular degeneration caused by dryness. It is also made as equal as possible to avoid cellular overlap and disruption. The best puncture result can be obtained from a lot of cellular sample and a few red blood cells in the needle. A proper amount of red blood cells may act as a buffer in the smear to avoid disruption of cellular nuclei. If all are cells in the needle, it is recommended to aspirate a few 95% ethanol or normal saline. A lot of cells not only avoid the incorrect diagnosis caused by few cells and atypical morphological findings. In addition, immunohistochemistry and special staining help diagnose if cytologic preparation is available.^[9-14] For example, PAS staining is intense in well-differentiated hepatocellular carcinoma for abundant heparin in liver cytoplasm.^[15,16] HMB45 is antigen-related with melanoma, cutaneous melanocytes, and melanoma cells.^[17,18] In evaluating a small-cell neoplasm, LCA can be used to exclude most lymphomas, while chromogranin and neuron-specific enolase (NSE) can be used to identify carcinoid and small cell carcinomas, respectively.^[19,20] Chromogranin A is present in neuroendocrine cells throughout the body, including neuroendocrine cells of the large and small intestines, adrenal medulla and pancreatic islets. It is an excellent marker for carcinoid tumors, pheochromocytomas, paragangliomas, and other neuroendocrine tumors. Coexpression of chromogranin A and NSE is common in neuroendocrine neoplasms.^[21] However,

immunohistochemistry was only an adjuvant method for pathological diagnosis, and for short of cell block tissue, it is impossible to perform immunohistochemical staining with different antibodies several times.

In conclusion, FNAC of the liver is a diagnostic method for identifying the vast majority of neoplasms of primary or metastatic nature. Cytological diagnosis should depend on cellular morphology.^[21-26] In addition, accurately sampled and well prepared fine needle aspirate samples in association with the clinical history and examination may yield the best results.

Competing interest

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

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