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Case report

Impact of Franseen needle on rapid onsite evaluation and histological examination following endoscopic ultrasonography-guided tissue acquisition in patients with splenic malignant lymphoma

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ABSTRACT

Rapid onsite evaluation (ROSE) following endoscopic ultrasonography (EUS)-guided fine-needle aspiration contributes to the establishment of a diagnosis for various organs. Newly designed three-plane symmetric needles for EUS-guided fine-needle biopsy (EUS-FNB), such as the Franseen needle, have been developed to enable histological core tissue acquisition. However, EUS-guided tissue acquisition for hypervascular splenic lesions remains challenging. Tissue acquisition in cases of splenic malignant lymphoma by using a conventional needle with multiple strokes and suction may result in indeterminate ROSE due to blood contamination and tiny fragments of lymphoma tissue, whereas EUS-FNB by using the Franseen needle with a minimal number of strokes with suction demonstrates qualified specimens for the ROSE as well as histological examination. For splenic malignant lymphomas, EUS-FNB by using the Franseen needle with a limited number of strokes may facilitate qualified specimen acquisition.

Introduction

Tissue acquisition by endoscopic ultrasonography (EUS)-guided fine-needle aspiration (EUS-FNA) in the presence of an onsite pathologist or EUS-guided fine-needle biopsy (EUS-FNB) is well established for various organs [1]. However, EUS-FNA for splenic lesions has been reported only as case reports [2–7] and remains challenging. Percutaneous ultrasound-guided or computed tomography-guided biopsies were traditionally performed for splenic lesions. Severe adverse events including pneumothorax were observed in 1% of percutaneous splenic biopsies [8].

Newly designed three-plane symmetric needles for EUS-FNB, such as the Franseen needle, have been developed for histological core tissue acquisition. Preliminary data suggest the efficacy of the Franseen needle for rapid onsite evaluation (ROSE) and histological diagnosis in >95% of patients [9]. However, to date, no studies have reported EUS-FNB by using the Franseen needle for splenic lesions. Here we report two cases of ambiguous splenic lesions in which EUS-FNB by using the Franseen needle contributed to obtaining qualified specimens for the ROSE and a definitive diagnosis of splenic malignant lymphoma.

Case report

Case 1

A 69-year-old woman with a stubborn fever lasting for a month was admitted to our hospital. Contrast enhanced computed tomography (CE-CT) revealed splenomegaly. Serum interleukin-2 receptor (IL-2R) was 6000 U/mL. A positron emission tomography (PET) scan demonstrated intensive abnormal uptake in the entire spleen (Fig. 1), which was suggestive of malignant lymphoma. She was referred to our department to undergo EUS-FNA targeting the spleen.

EUS imaging revealed no mass in the spleen. However, the PET findings suggesting diffuse involvement of the spleen led us to perform EUS-FNA. The EUS-FNA was conducted from the upper pole of the spleen but avoided the converged vessels at the splenic hilum. The tissue acquisition was initially performed using a 22-gauge

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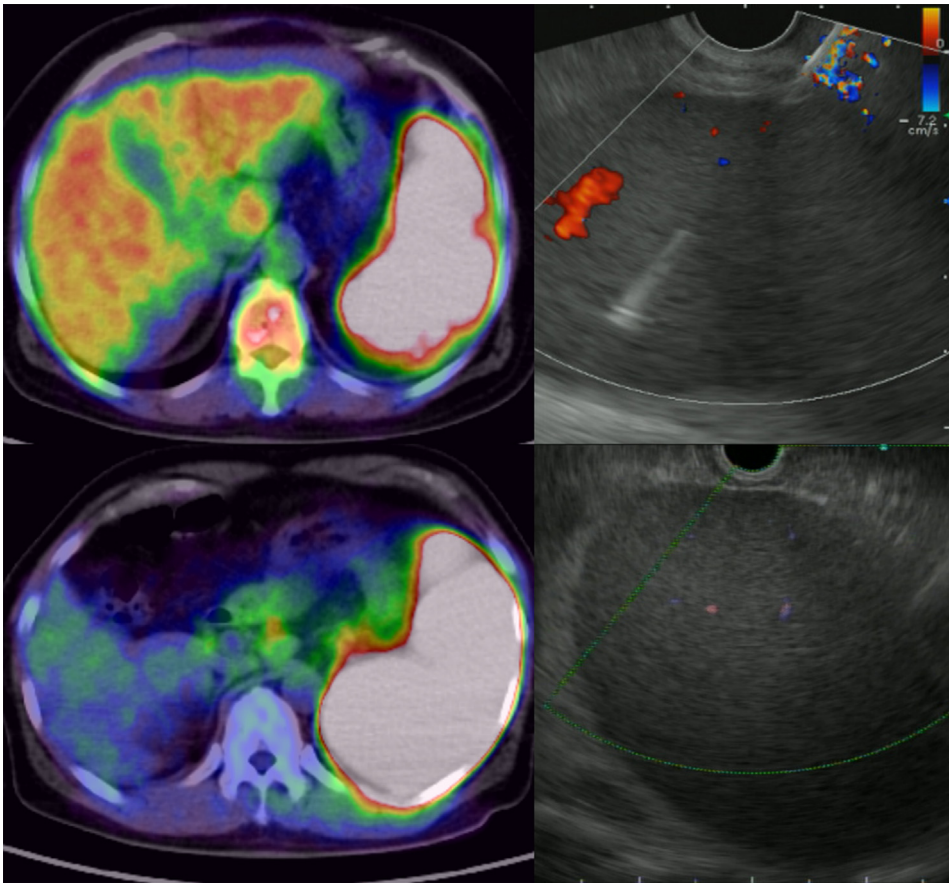

Fig. 1. Cross-sectional images of a positron emission tomography (PET) scan and an endoscopic ultrasonographic colour Doppler image in both cases. Upper, case 1. Bottom, case 2. Left, PET scan demonstrating splenomegaly with intensive uptake. Right, endoscopic ultrasonographic image of an enlarged spleen in which a mass is never identified.

conventional needle (EchoTip Ultra; Cook Medical, Bloomington, IN, USA) with a fanning technique [10] under negative pressure (Fig. 1). In the first and second EUS-FNA sessions, the ROSE demonstrated inadequate touch smear cytology due to blood contamination (Fig. 2). In the third session, we converted to EUS-FNB by using a 22-gauge Franseen needle (Acquire™; Boston Scientific, Marlborough, MA, USA) in one stroke per needle pass under negative pressure. The ROSE result on Diff-Quik staining revealed adequate touch smear cytology in which exceedingly predominant lymphocytes were observed including large atypical lymphoid cells suggestive of malignant lymphoma. All of the acquired ROSE specimens were re-dyed with May-Giemsa stain (Fig. 2). The procedure was terminated based on the ROSE findings of the third session.

All remnant specimens sampled by both needles revealed diffuse proliferation of medium- to large-sized lymphoid cells in the histology assessment. However, the microscopic findings in the remnant specimen sampled by the Franseen needle were significantly different from those sampled by the conventional needle. A histology specimen by using the conventional needle showed massive bleeding with only a tiny fragment of splenic lymphoma tissue and a small number of isolated lymphocytes. To the contrary, bulky splenic lymphoma tumour tissue with a small quantity of blood was obtained in EUS-FNB by using the Franseen needle (Fig. 2). The splenic tissues in the specimens were reviewed by a single pathologist (Y.S.) using a Nikon DS-Fi1 digital microscope equipped with a camera and specialised software (Nikon NIS-Elements D, version 4). The median area of the six largest splenic fragments under the conventional needle and the Franseen needle were 0.21 (range: 0.56–0.18) mm^2 and 1.85 (range: 2.8–0.72) mm^2, respectively ($p = 0.028$, Wilcoxon signed-rank test using SPSS version 24, IBM Japan, Ltd., Tokyo, Japan).

The patient underwent optimal chemotherapy of rituximab plus cyclophosphamide, doxorubicin, vincristine, and prednisone after the final diagnosis including the results of additional immunohistochemistry by using antibodies to CD20, BCL-2, and Ki-67. The subsequent clinical course was consistent with malignant lymphoma.

Case 2

A 48-year-old man with an elevated IL-2R level (13,300 U/mL) was referred to our department with suspicious recurrent testicular malignant lymphoma. CE-CT and PET scans revealed splenomegaly with intensive uptake throughout the spleen (Fig. 1). EUS imaging revealed no mass in the spleen as in case 1 (Fig. 1). The specimen sampled in the first EUS-FNA session by using the conventional needle, as described above, only demonstrated blood in the ROSE with touch smear cytology. Therefore, we performed a second EUS-FNB session by using one stroke per needle pass under negative pressure by using a 22-gauge Franseen needle. The second ROSE specimen revealed an adequate touch smear cytology including sufficient large atypical cells suspicious of malignant lymphoma (Fig. 3). The remnant acquired specimen was a

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