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Case Report

Successful diagnosis of a localized liver tumor via transjugular liver biopsy after ascites hampered a percutaneous approach ^{☆,☆☆}

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ABSTRACT

Liver biopsy is a crucial diagnostic procedure for liver-related conditions. However, it is challenging to use in cases with substantial ascites or coagulopathy. Transjugular liver biopsy has been introduced as an alternative method to overcome these limitations. Although transjugular liver biopsy is commonly used for diffuse liver diseases, its application to localized tumors has been limited. We report the case of a 66-year-old male initially diagnosed with unresectable pancreatic carcinoma, who later developed liver metastasis, peritoneal dissemination, and ascites. Treatment planning required tumor re-evaluation, but percutaneous liver biopsy was not viable because of the rapid accumulation of ascites and its presence on the liver surface. However, transjugular liver biopsy was a suitable alternative, given the proximity of the tumor to the right hepatic vein. The procedure, performed under fluoroscopic and ultrasound guidance, successfully obtained 4 specimens that were promptly diagnosed as liver metastases originating from pancreatic cancer. This case underscored the effectiveness of transjugular liver biopsy in situations where percutaneous biopsy is challenging because of conditions such as ascites. The combination of ultrasound guidance and rapid specimen assessment by pathology technicians can enhance diagnostic success rates. Transjugular liver biopsy is a valuable diagnostic tool in scenarios where percutaneous access poses significant difficulties.

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Introduction

Liver biopsy has been established as a reliable diagnostic procedure for chronic liver disease and localized lesions, but percutaneous liver biopsy (PCLB) is contraindicated in patients with ascites or coagulopathy.

Transjugular liver biopsy (TJLB) was first reported by Dotter et al. in 1964 [1], and follow-up clinical studies have shown a reduction in bleeding as a serious complication, as compared to that with PCLB [2]. However, because of its technical characteristics, TJLB is used to diagnose diffuse liver disease, in which a random biopsy is usually sufficient because the area within the liver that can be approached by the biopsy needle is limited, and only a few reports on its application to localized tumors have been published [3,4].

In this study, we report a case in which TJLB allowed the diagnosis of a liver tumor that was difficult to approach percutaneously because of the presence of massive ascites.

Case report

Written consent was obtained from the patient for the case report to be published.

A 66-year-old male visited our hospital complaining of anorexia and weight loss and was diagnosed with an unresectable pancreatic carcinoma. Despite chemotherapy administration, liver metastasis, peritoneal dissemination, and ascites were observed. Thus, we decided to re-evaluate the tumor using liver biopsy to determine a treatment strategy. He did not have coagulopathy. However, since the ascites had increased rapidly and ultrasonography showed a large amount of ascites on the liver surface, a percutaneous biopsy was deemed inappropriate.

The tumor was located on the hilar side adjacent to the anterior wall of the right hepatic vein (RHV) and was deemed appropriate for biopsy using TJLB (Fig. 1). Written informed consent for the procedure was obtained from the patient, and a biopsy was performed. The procedure was performed using an interventional radiology-computed tomography apparatus (INFX 8000C/HH; CANON Medical Systems, Otawara, Japan). After local anesthesia, the right jugular vein was punctured under ultrasound (US) guidance, and a 9-French sheath was inserted. Biopsy was performed using the TLAB® Transjugular Liver Biopsy System (Argon Medical Device, Inc., Dallas, TX, USA). A 5-French and 80-cm-long curved catheter included in the system was inserted into the lumen of the 9-French sheath, and the curved catheter was guided into the RHV over a 0.035-inch Radifocus guidewire (Terumo Corp., Tokyo, Japan). After injecting the contrast agent through the catheter and confirming that the catheter was securely inserted into the RHV (Fig. 2), the guidewire was replaced with a 0.035-inch AM-PLATZ Extra-Stiff guidewire (Cook Medical LLC., Bloomington, IN, USA), to ensure greater stability. Using this, the curved catheter was replaced with a 7-French and 60-cm-long introducer.

After rotating the curved 7-French introducer tip counterclockwise toward the tumor on the ventral side, the introducer

in the RHV and the target tumor were observed in the same cross-section on US images obtained from the body surface. An 18-gauge flex-core biopsy needle was inserted into the 7-French introducer, and was used to puncture the tumor while observing the positional relationship between the biopsy needle and the tumor in real-time using US imaging (Fig. 3) and confirming the position of the introducer and biopsy needle via fluoroscopic images (Fig. 4). Four specimens were collected and 2 pathology technicians waiting immediately outside the angiography room rapidly ascertained that suitable specimens had been obtained.

The system was then withdrawn, and the jugular vein puncture site was compressed to prevent bleeding. No complications, such as bleeding, off-target organ damage, or bile leakage, were observed. The post-biopsy course was unremarkable, and the patient was discharged the next day after large-volume paracentesis.

As a final pathological diagnosis, these specimens confirmed the presence of liver metastases from pancreatic cancer. However, the rapid progression of the cancer and subsequent worsening of the patient's condition made further cycles of chemotherapy unfeasible.

Discussion

TJLB is usually performed when a random biopsy of the liver parenchyma would be sufficient for diagnosis of chronic liver disease. The area of the liver that can be approached for TJLB is limited to the middle third of the liver, adjacent to the RHV or the middle hepatic vein (MHV) [5]. If a biopsy is performed from the RHV, the recommended target location is the anterior aspect of RHV, whereas, if the biopsy is performed from the MHV, the recommended target location is the lateral aspect of MHV [6]. Therefore, indications of TJLB for localized lesions, such as liver tumors, are rare. To the best of our knowledge, only a few reports have described the use of TJLB in localized liver lesions. These include one case of a tumor adjacent to the MHV where TJLB was performed to determine the extent of liver necrosis in acute liver failure and one case of a biopsy performed using cone-beam CT in an obese patient [3,4].

In the present case, PCLB was not applicable because of the rapidly increasing amount of ascitic fluid, which was also found in large quantities on the liver surface. Alternative methods for patients for whom PCLB is not applicable include EUS-guided liver biopsy [7], transfemoral transjugular core needle liver biopsy [8], and plugged percutaneous liver biopsy [9]. Among these options, TJLB was considered to be the most appropriate for our patient because the tumor was located adjacent to the RHV rather than being next to the inferior vena cava, and the location was too far from the hepatic surface to allow a percutaneous approach. Furthermore, while ascites on the liver surface hampered PCLB, in this case, TJLB would also be suitable for cases of coagulopathy or when critical vessels cannot be excluded from the percutaneous puncture route.

It has been reported that TJLB can be attempted more safely with US-guidance [10]. In our case, the use of US allowed



Fig. 1 – Contrast computed tomography of the abdomen. A hypovascular tumor is visible at S8 (asterisk). The RHV runs dorsally adjacent to the tumor (arrow). At the time of this examination, the ascites on the liver surface were still small (arrowhead). RHV, right hepatic vein.

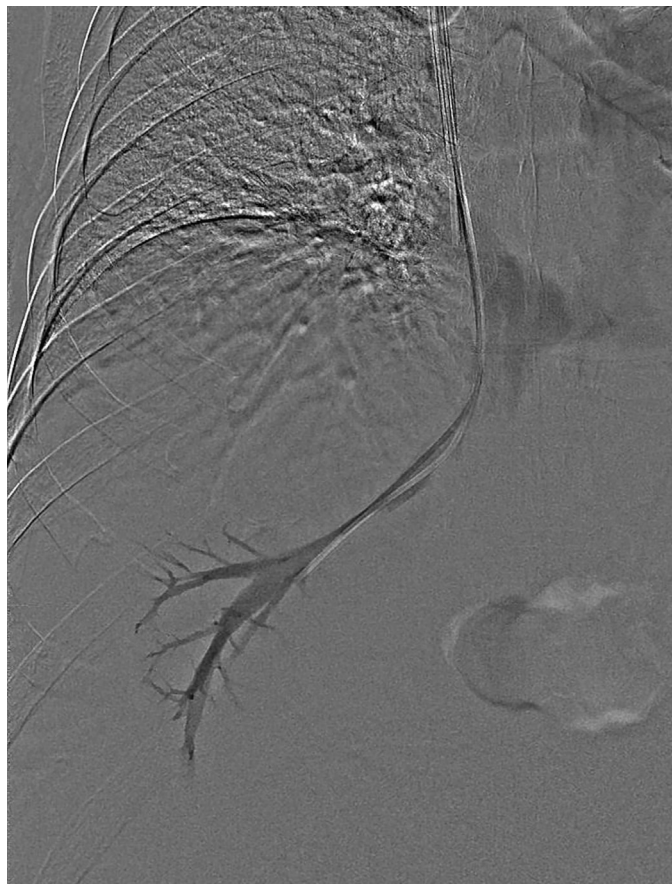


Fig. 2 – Distal subtraction angiography. The contrast agent is injected through a 5-French curved catheter to ensure that the catheter is positioned within the RHV. RHV, right hepatic vein.

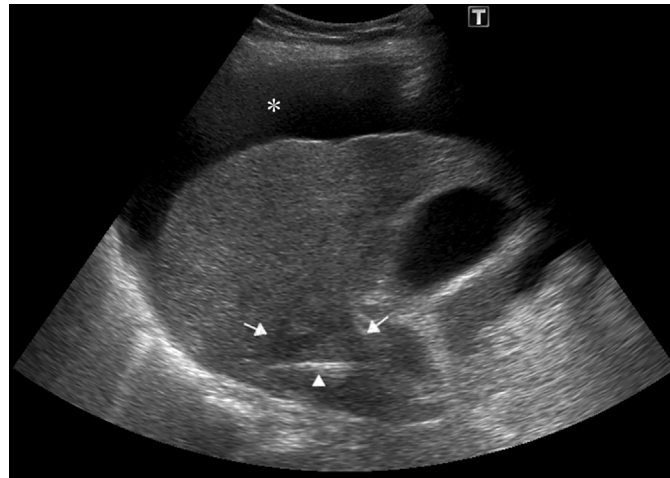


Fig. 3 – Ultrasonography image. A large amount of ascites is observed between the abdominal wall and the liver surface (asterisk). A biopsy needle, which appears as a linear high intensity (arrowhead), is inserted into the target tumor (arrows), which is depicted as a low echo.

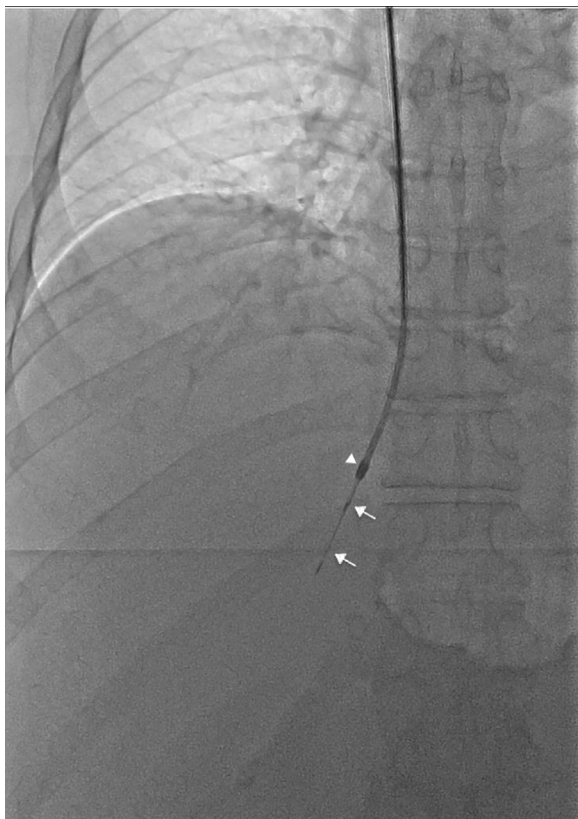


Fig. 4 – Fluoroscopic image. The 18-gauge biopsy needle (arrows) protrudes from the 7-French introducer tip (arrowhead) into the liver.

us to advance the needle while adjusting the position of the biopsy needle relative to the tumor.

There are some limitations to liver tumor biopsies performed using TJLB. First, the localization of tumors suitable

for TJLB is limited. Second, compared to percutaneous biopsy, the quality of diagnosis is a concern, because of the technical difficulty of inserting the needle into the target. However, this can be overcome because the number of punctures can be increased owing to the reduced complication rate. Furthermore, the diagnostic success rate can be further improved by combining US and rapid judgment of the specimen by a pathology technician, as in the present case.

In conclusion, TJLB can be a simple and safe approach for patients who are not candidates for PCLB if the location of the tumor is suitable.

Patient consent

The authors have obtained written consent from the patient to write and publish this case report.

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