

Single Case

Splenic Abscess due to a Perforated Duodenal Ulcer Successfully Treated with Endoscopic Ultrasound-Guided Transgastric Drainage

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Keywords

Splenic abscess · Endoscopic ultrasound-guided transmural drainage · Perforated duodenal ulcer

Abstract

Splenic abscesses are rare, with a reported prevalence of 0.14–0.7% in autopsy studies. The treatment options for splenic abscesses include intravenous antimicrobial therapy, percutaneous drainage, and splenectomy. Although the dissemination of endoscopic ultrasound (EUS) intervention techniques has made it possible to perform puncture and drainage via the transgastrointestinal route for intra-abdominal abscesses where the percutaneous route has been difficult, there have been few reports of EUS-guided drainage of splenic abscesses. A case of a splenic abscess associated with a perforated duodenal ulcer that was successfully treated with EUS-guided transgastric drainage is described. An 89-year-old Asian woman with a perforated duodenal ulcer underwent surgery at another hospital. After surgery, the patient developed a splenic abscess, for which percutaneous treatment was anatomically difficult. Therefore, she was referred to our hospital for treatment of the splenic abscess using EUS-guided drainage. EUS-guided transgastric drainage was performed under sedation using a convex EUS scope. The splenic abscess, measuring approximately 4 × 3 cm², was punctured using a 19-gauge aspiration needle. A 6-Fr pigtail nasocystic drainage tube was placed in the abscess cavity. The procedure was completed without any complications. After EUS-guided drainage, the abscess cavity decreased in size over time, and the patient had a good clinical course and was subsequently discharged. EUS-guided drainage of splenic abscesses may be a safe and effective

therapeutic alternative to percutaneous drainage and surgery; however, large-scale investigations are required to confirm the present findings.

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Introduction

Splenic abscesses are uncommon, with a reported frequency of 0.14–0.7% in autopsy series [1]. A splenic abscess is diagnosed based on clinical and imaging findings of ultrasonography or computed tomography (CT). Traditional management of splenic abscesses involves intravenous antibiotic therapy, CT-guided or ultrasound-guided percutaneous fine-needle aspiration (FNA) or catheter drainage, and splenectomy [2–6]. Since the first report of endoscopic ultrasonography (EUS)-guided drainage of pancreatic pseudocysts, this technique has been widely used [7–12]. Although the development of EUS instruments and techniques has made it possible to perform puncture and drainage via the transgastrointestinal route for intra-abdominal abscesses where the percutaneous route has been difficult, there have been few reports of EUS-guided drainage of splenic abscesses [13–16]. A case of a splenic abscess caused by a perforated duodenal ulcer that was successfully treated with EUS-guided transgastric drainage without any complications is reported.

Case Report/Case Presentation

An 89-year-old Asian woman who presented with nausea and abdominal pain was admitted to another hospital. On admission, blood tests showed a marked inflammatory response, and CT showed free air and ascites in the abdominal cavity with edematous thickening of the duodenal wall. The patient was diagnosed with a perforated duodenal ulcer. Laparoscopic omental patch closure, lavage, and drainage were then performed. Her progress after surgery was good; however, she developed a high fever, and abdominal CT showed an abscess in the spleen and left hepatic lobe on the 4th postoperative day. Since broad-spectrum antibiotic administration did not improve the patient's condition, it was decided to drain the abscess. A drainage tube was successfully inserted percutaneously into the left hepatic lobe under ultrasound guidance; however, there was no route that could safely penetrate the cavity of the splenic abscess. A radiologist was consulted, who concluded that percutaneous treatment for the splenic abscess was anatomically difficult, because the percutaneous drainage line had an intrathoracic pathway. In addition, the patient was in critical condition postoperatively, and the risks of general anesthesia and surgical drainage were substantial. Subsequently, the patient was referred to our hospital for treatment of the splenic abscess using EUS-guided transmural drainage.

EUS-guided transgastric drainage was performed under sedation with intravenous flunitrazepam and pethidine hydrochloride using a convex array echoendoscope (GF-UCT260; Olympus Medical Systems, Tokyo, Japan) and EU-ME2 PREMIER PLUS (Olympus Medical Systems). The splenic abscess, measuring approximately $4 \times 3 \text{ cm}^2$, was punctured with a 19-gauge FNA needle (EZ Shot 3 Plus; Olympus Medical Systems) under color Doppler to avoid puncturing any intervening vessels. The drainage route was carefully examined to avoid passage through the thoracic cavity, which can lead to respiratory complications. Next, contrast medium was injected to confirm the abscess cavity, and a 0.025-inch guidewire

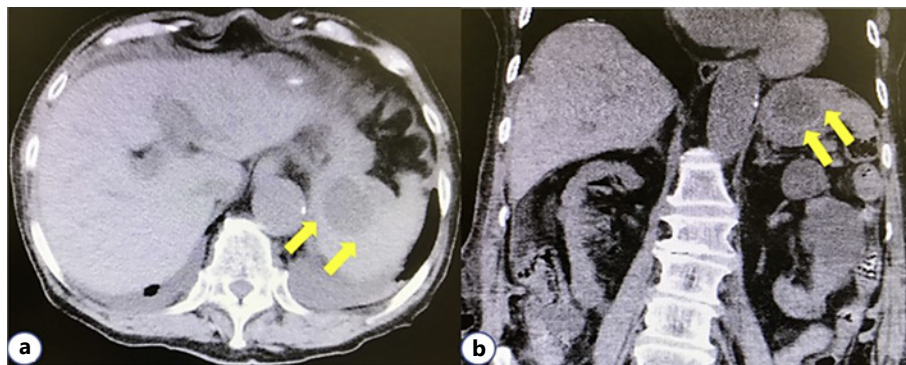


Fig. 1. CT shows fluid collection (arrows) in the spleen. **a** Axial section. **b** Coronal section.

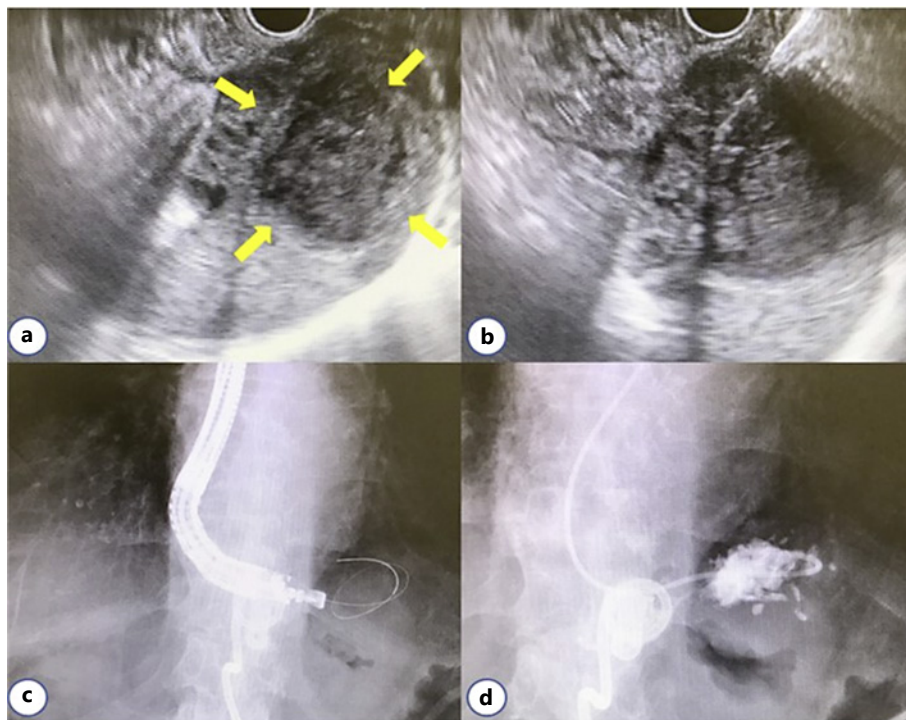


Fig. 2. EUS-guided transgastric drainage. **a** A splenic abscess (arrows). **b** A 19-gauge needle is advanced into the cavity. **c** A 0.025-inch guidewire is coiled in the abscess cavity. **d** A 6-Fr nasocystic drainage tube is placed.

(VisiGlide2; Olympus Medical Systems) was then introduced through the FNA needle. After the guidewire was coiled within the abscess cavity, a 6-Fr pigtail nasal biliary catheter (nasal biliary drainage set; Cook Medical) was deployed within the abscess cavity (Fig. 1, 2). The procedure was completed without any complications, and CT confirmed that the drainage tube was placed in the cavity of the splenic abscess (Fig. 3a). Pus culture from the puncture site demonstrated infection with the *Enterobacter cloacae* complex. After the EUS-guided drainage, the abscess cavity decreased in size over time (Fig. 3b). Conversion from external to internal drainage was performed by cutting the drainage tube using medical scissors, grabbing it with grasping forceps using a gastroscope (GIF-Q260J; Olympus Medical Systems), and dropping it into the stomach (Fig. 3c). The patient had a good clinical course and was subsequently discharged.

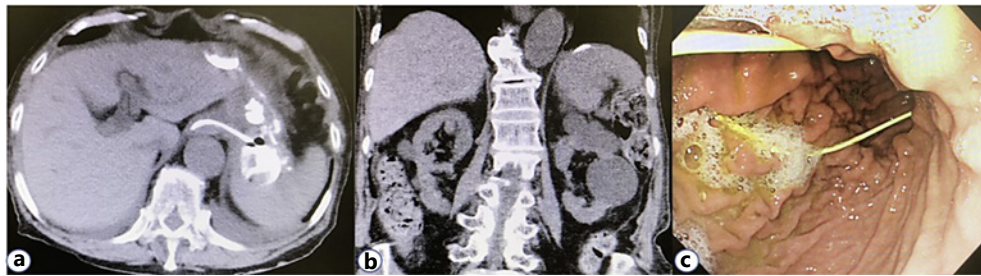


Fig. 3. **a** CT confirms that the drainage tube is placed in the cavity of the splenic abscess. **b** The abscess has disappeared. **c** The external drainage tube is cut and dropped in the stomach.

Discussion/Conclusion

Splenic abscess drainage methods include percutaneous, surgical, and endoscopic methods. Since surgical drainage is invasive, and percutaneous drainage is sometimes difficult because it may injure the surrounding visceral organs, EUS-guided drainage can be considered an alternative therapeutic option. The advantages of EUS-guided drainage are as follows: (1) clear visualization of the abscess even when located deeply, without skin and rib artifacts; (2) using color Doppler mode, puncture can be performed while avoiding blood vessels; (3) real-time video images can be obtained during the procedure; and (4) the absence of pain due to percutaneous punctures. In the present case, EUS-guided transgastric drainage was selected because percutaneous drainage was anatomically difficult.

In EUS-guided drainage of a splenic abscess, the transesophageal route should be avoided because it can lead to mediastinitis and pneumothorax. Morita et al. [17] reported that hemoclips can be placed at the esophageal junction in advance, and puncture can be performed under fluoroscopic observation at a point distal to the clips, which can help avoid intrathoracic passage. If there is a risk of requiring an intrathoracic route, this clip method can be attempted. Though a linear array echoendoscope (GF-UCT260) was used for the procedure in the present case, some case reports have reported the utility of using a forward-viewing linear echoendoscope for EUS-guided splenic abscess drainage [15, 16]. If puncture with a linear array echoendoscope is difficult, use of a forward-viewing linear echoendoscope can also be attempted.

Drainage methods for a splenic abscess can be external, internal, or both. Although there is no consensus regarding the optimal drainage method for a splenic abscess, a nasocystic drainage tube that can aspirate the pus and irrigate an abscess cavity with saline was selected, since the abscess cavity was relatively small in the present case, and, after puncturing the splenic abscess, a small amount of white viscous purulent fluid was aspirated. Recently, a drainage method using a lumen-apposing metal stent for a giant splenic abscess has also been reported, but use of a lumen-apposing metal stent is limited to such a large splenic abscess [14]. Conversion from external to internal drainage was carried out in the present case by cutting the drainage tube and placing it in the stomach; the necessity of internal stent removal and the appropriate time of stent removal should be investigated in further cases. In the present case, the drainage stent was not removed before the patient's discharge, and it was planned to remove the stent at the next follow-up visit. However, a fistula generally forms in approximately 1 month, and it may therefore be possible to remove the stent at that time.

As the number of elderly patients increases worldwide, less invasive and more effective methods for splenic abscess drainage are required. It has been reported that the clinical success rates of percutaneous and EUS-guided drainage of intra-abdominal abscesses were 65–90%

and 80%, respectively [11, 12]. Although a prospective study involving a large number of patients is necessary to confirm the utility of this approach, EUS-guided drainage for splenic abscesses is an emerging method that may have a higher success rate with fewer complications than percutaneous drainage or surgical drainage.

In conclusion, EUS-guided drainage of splenic abscesses may be a safe and effective therapeutic alternative to percutaneous drainage and surgery; however, large-scale investigations are required to confirm the present findings.

Statement of Ethics

This study protocol was reviewed and approved by the Ethics Committee of Musashino Tokushukai Hospital (approval no. 0021). Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Taiji Yoshimoto reported this case and wrote the manuscript. Takashi Takenoya was involved in the treatment of the patient. Fumiya Nishimoto, Ryuichi Yamamoto, and Hiroshi Takihara participated in critically revising the manuscript. Taiji Yoshimoto, Fumiya Nishimoto, Ryuichi Yamamoto, Takashi Takenoya, and Hiroshi Takihara declare that they have contributed to this article and have read and approved the final version of the manuscript.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further enquiries can be directed to the corresponding author.

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