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Case Report

Percutaneous transsplenic venous embolization of elevated jejunal varices after pancreaticoduodenectomy: A case report ^{☆,☆☆}

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ABSTRACT

Recent advances in chemotherapy and radiotherapy have led to an increase in the number of long-term survivors of pancreatic cancer. However, this has also increased the number of patients suffering from ectopic varices and bleeding owing to left-sided portal hypertension and thrombocytopenia caused by splenomegaly after pancreaticoduodenectomy combined with resection of the splenic vein. A 65-year-old woman with varices of the elevated jejunum due to left sided portal hypertension after pancreaticoduodenectomy had repeated melena, which started about 1 year before admission. We describe the first reported case of percutaneous transsplenic venous embolization using metallic coils, which successfully achieved hemostasis of refractory bleeding from the elevated jejunal varices after pancreaticoduodenectomy.

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Introduction

Pancreaticoduodenectomy (PD) combined with resection and reconstruction of the portal vein (PV) and/or superior mesen-

teric vein (SMV) and resection of the splenic vein (SV) is often performed in patients with pancreatic head cancer with invasion into the PV and/or SMV [1–3]. Recent advances in chemotherapy and radiotherapy have led to an increase in the number of long-term survivors of pancreatic

Abbreviations: CT, computed tomography; CTV, computed tomography during venography; EO, ethanolamine oleate; LSPH, left-sided portal hypertension; PD, pancreaticoduodenectomy; PSE, partial splenic artery embolization; PV, portal vein; SMV, superior mesenteric vein; STS, sodium tetradecyl sulfate; SV, splenic vein.

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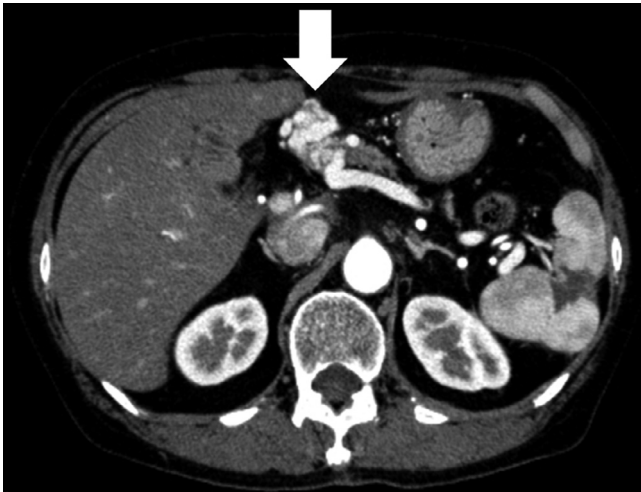


Fig. 1 – Preoperative contrast-enhanced computed tomography showing the varices of the elevated jejunum (arrow).

cancer. Consequently, there has been an increase the number of patients suffering from ectopic varices and bleeding owing to left-sided portal hypertension (LSPH) and thrombocytopenia caused by splenomegaly after PD combined with resection of the SV [3–6]. Here, we describe the first reported case of percutaneous transsplenic venous embolization to treat variceal bleeding in the elevated jejunum caused by LSPH after PD combined with PV resection and reconstruction, and SV resection for pancreatic head cancer. The embolization procedure achieved successful hemostasis of the varices.

Case report

A 65-year-old woman underwent PD combined with resection and reconstruction of the PV and resection of the SV for pancreatic head cancer 6 years before the present admission. About 1 year ago, she started suffering from repeated melena and was referred to our hospital. Upon admission, contrast-enhanced computed tomography (CT) revealed varices of the elevated jejunum due to LSPH. Their feeding veins were multiple collaterals from the splenic vein, and their draining veins were the jejunal branches flowing into the portal vein (Fig. 1). Two sessions of partial splenic artery embolization (PSE) were performed to stop the variceal bleeding. However, hemostasis following PSE was temporary, and she experienced rebleeding from the varices of the elevated jejunum. Therefore, a third PSE was proposed, but was preceded by percutaneous transsplenic venous embolization.

The splenic vein was punctured using a 21G ultrasound needle (Disposable puncture needle, CREATE MEDIC CO., LTD., Kanagawa, Japan) under ultrasound guidance. A 0.018-inch guidewire (Radifocus Guide wire M, Terumo Clinical Supply, Gifu, Japan) was inserted into the splenic vein, the puncture route was dilated using a 3Fr sheath inner cylinder, and a 3Fr contrast catheter (Kink resist, Medikit, Tokyo, Japan) was

advanced into the trunk of the splenic vein over the wire. CT during venography (CTV) of the splenic vein revealed elevated jejunal varices, with 3 feeding veins branching from the retrogastric vein (Figs. 2a and b). In addition, multiple jejunal branches drained into the portal vein as draining veins (Fig. 2c). Therefore, the 2 main feeding veins (shown as blue and red in Figs. 2b and 3) were embolized with 16 metallic coils (Target 360° and Target XL, Stryker, Fremont, CA) using a microcatheter. However, one small feeding vein (pink) was not embolized because it was too difficult to insert a microcatheter into the vein (Figs. 2b and 3). Splenic venography after embolization showed a reduction in the size of the varices (Fig. 2d). The puncture route was embolized using 3 metallic coils (Target XL, Stryker) to prevent intraperitoneal bleeding. The patient's melena disappeared immediately after embolization, and no rebleeding was observed until the patient died from her original disease (pancreatic cancer) 1 year after this treatment.

Discussion

The options for treating bleeding from elevated jejunal varices due to LSPH include splenectomy and PSE to reduce splenic vein blood flow [7,8]. However, splenectomy may be contraindicated, depending on the patient's background [8] and was not performed in this case. PSE causes the residual spleen to enlarge, which increases splenic vein blood flow and may cause rebleeding of the varices, as observed in this case. Approaches to perform variceal embolization that are more direct and selective than PSE include percutaneous transhepatic and percutaneous transsplenic approaches. A percutaneous transhepatic approach is required to treat varices retrogradely. Embolization of varices requires balloon-occluded retrograde transvenous obliteration, in which the draining veins are occluded with a balloon catheter and either sodium tetradecyl sulfate (STS) or ethanolamine oleate (EO) is injected [9]. However, the risk of portal vein thrombosis is high, and incomplete embolization of the draining veins may exacerbate bleeding. By comparison, the greatest risk associated with the percutaneous transsplenic approach is bleeding caused by splenic puncture. In this case, we chose the percutaneous transsplenic approach because the use of a 21G thin needle, 0.018 inch guidewire, and 3F catheter reduced the risk of bleeding. Percutaneous transsplenic embolization is a method for embolizing varices and their feeding veins, in which STS, EO, or metallic coils may be used as embolic materials. When using STS or EO, it is necessary to use a thick balloon catheter, which increases the risk of bleeding during puncture. Also, there is a risk of STS and EO flowing into the portal vein. Therefore, in this case, we decided to use metallic coils for embolization of the feeding veins of the varices. Long-term hemostasis was achieved after embolization. A caveat to this method is that it increases splenic vein pressure owing to embolization of multiple collateral veins. Therefore, when removing the catheter, it is necessary to embolize the puncture route using metallic coils. However, because this method is not a fundamental treatment for LSPH, it is possible that other collateral veins may develop

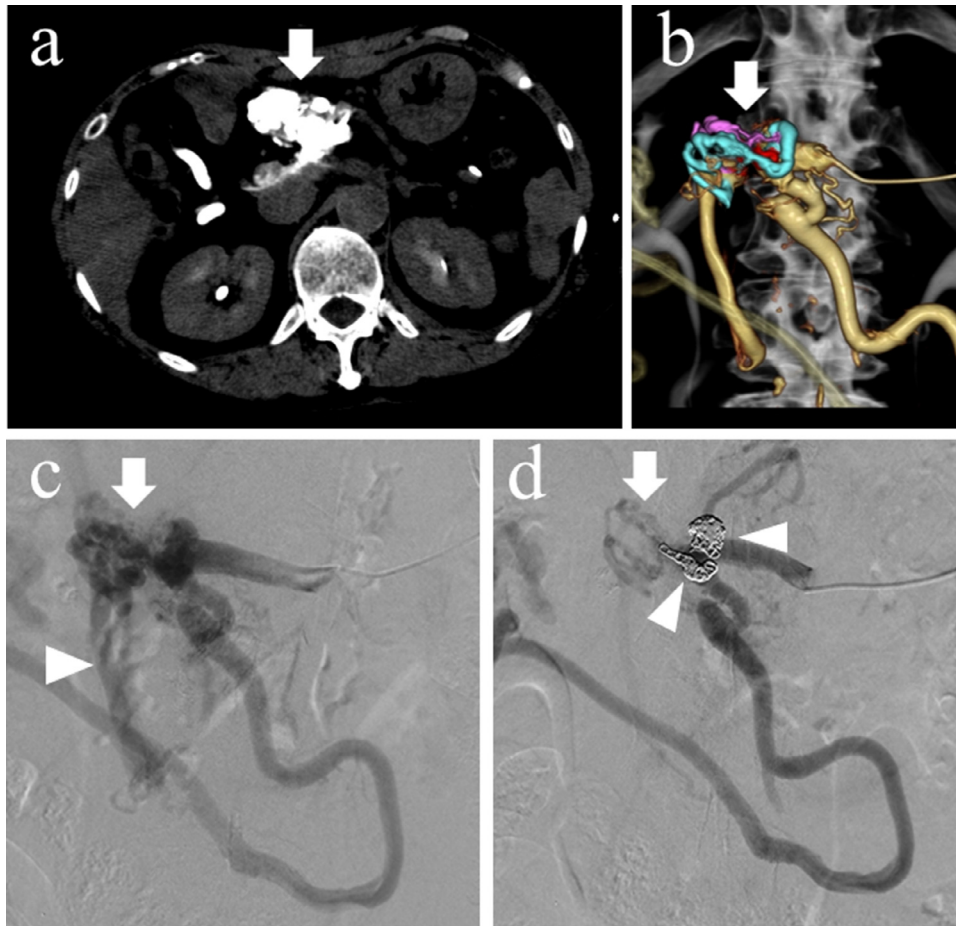


Fig. 2 – Computed tomography during venography (CTV) and angiography. (a) CTV showing the varices in the elevated jejunum (white arrow). (b) Three-dimension reconstructed image created from CTV showing the 3 feeding veins (blue, red, and pink). (c) Preoperative splenic venography showing the portal vein (arrowhead) through the elevated jejunal varices (arrow). (d) Postoperative splenic venography showing reduced blood flow in the varices (arrow) after the blue and red feeding veins were embolized with metallic coils (arrowheads).

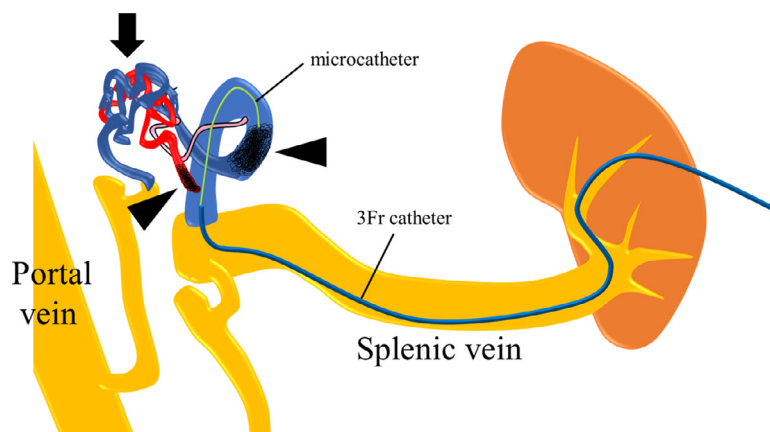


Fig. 3 – Diagram of the percutaneous transsplenic venous embolization. Three feeding veins (blue, red, and pink) flowed into the elevated jejunal varices (arrow). The blue and red feeding veins were embolized using metallic coils (arrowheads). However, the thin vein (pink) was not embolized because it was too difficult to insert a microcatheter into the vein.

after embolization and new varices may appear. Therefore, regular follow-up with contrast-enhanced CT is necessary.

In conclusion, percutaneous transsplenic venous embolization using metallic coils was effective for repeated bleeding from the elevated jejunal varices after PD.

Data availability statement

Data may be obtained from the corresponding author.

Past presentation

None.

Patient consent

The patient provided informed consent for publication of this case report (12/20/2020).

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