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Percutaneous closure of gastrorenal shunt as adjunctive therapy for esophageal carcinoma

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ABSTRACT

The embolization of gastric varices is an established technique for acute bleeding in patients with portal hypertension. Here, we report an attempt to embolize a gastrorenal shunt to facilitate esophagectomy in a patient with an esophageal malignancy. To our knowledge, this is the first case in the literature to highlight the role of interventional medicine in the treatment of patients with esophageal malignancy.

1. Case presentation

A 70-year-old man presented to our hospital with dysphagia. Endoscopic ultrasound revealed an obstructive tumor at the mid-thoracic esophagus with full-thickness involvement and invasion beyond the adventitia. Biopsy revealed moderately differentiated squamous cell carcinoma. A positron emission tomography (PET) computed tomography (CT) scan showed three suspicious regional lymph nodes. The tumor was clinically stage III (cT3N2M0), according to the AJCC 8th edition (Fig. 1).

A multidisciplinary tumor board consisting of surgeons, oncologists, pathologists, and radiologists recommended neoadjuvant chemotherapy with a TPF regimen (docetaxel, cisplatin, and fluorouracil) followed by resection. Large gastric varices were incidentally discovered on the contrast-enhanced component of the PET CT scan and were thought to be a congenital gastrorenal shunt in view of the otherwise absent features of chronic liver disease. This posed a challenge for esophagectomy, as the varices would preclude the use of the stomach as a conduit. Therefore, the patient was scheduled for catheterization to embolize the shunt while undergoing chemotherapy.

2. Intervention

The procedure was performed by an interventional radiologist under local anesthesia. Systemic heparinization was administered. Right femoral venous access was obtained under ultrasound. The gastrorenal shunt was selected using a diagnostic catheter and exchanged for a balloon-guided catheter (BRTO catheter, Terumo, Tokyo, Japan). A balloon-occluded digital subtraction venogram revealed a type B gastrorenal shunt connecting the left renal vein and portal vein, with a large gastric variceal component and small coronary, pericardial, and phrenic collaterals. In view of the collaterals, embolization with sclerosants was not pursued. An 8 Fr long sheath (Ansel, Cook, Indiana, USA) was exchanged for support. The upstream portion was catheterized using a microcatheter (Progreat, Terumo, Tokyo, Japan). Embolization was performed with a selection of detachable coils (Concerto, 6 mm × 20 cm to 10 mm × 30 cm, Medtronic, Minnesota, USA) and an Amplatzer plug (AVP2, 14 mm diameter, 10 mm long, Abbott Vascular, Illinois, USA). A retrograde venogram showed non-opacification of the shunt. Both the portal and left renal veins were confirmed to be patent on ultrasound after closure (Fig. 2).

3. Progress

The patient was discharged on day one post-intervention. Reassessment imaging two months post-intervention showed a partial response of the tumor after three cycles of TPF and complete obliteration of the gastrorenal shunt (Fig. 3). There was a non-occlusive thrombus extending from the caudal end of the shunt into the left renal vein. The patient was treated with a course of tinzaparin, and further reassessment imaging

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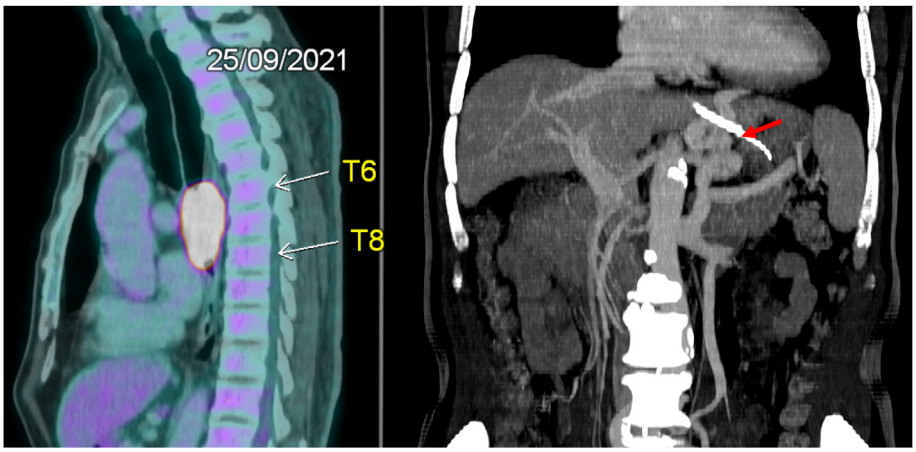

Fig. 1. Initial positron emission tomography computed tomography scan showing a hypermetabolic mass at the mid-esophagus consistent with malignancy (left) and an incidentally found gastrorenal shunt connecting the portal vein and left renal vein (right, arrows).

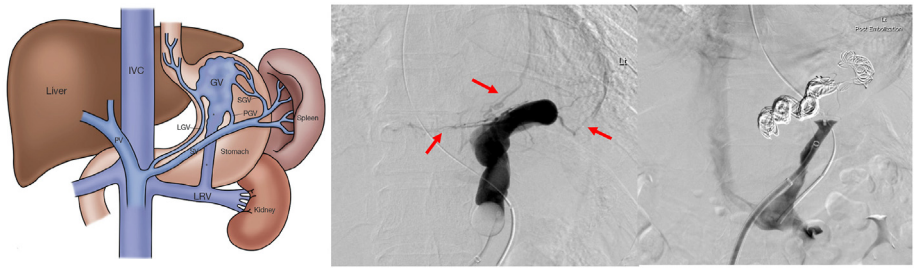

Fig. 2. Schematic diagram shows classical anatomy of the gastrorenal shunt (left).[2] Balloon-occluded digital subtraction venogram of the caudal end of the shunt reveals previously unseen coronary, pericardial, and phrenic collaterals, which are a relative contraindication for liquid embolic embolization (middle). Post embolization venogram shows non-opacification of the shunt with preservation of the left renal vein (right).

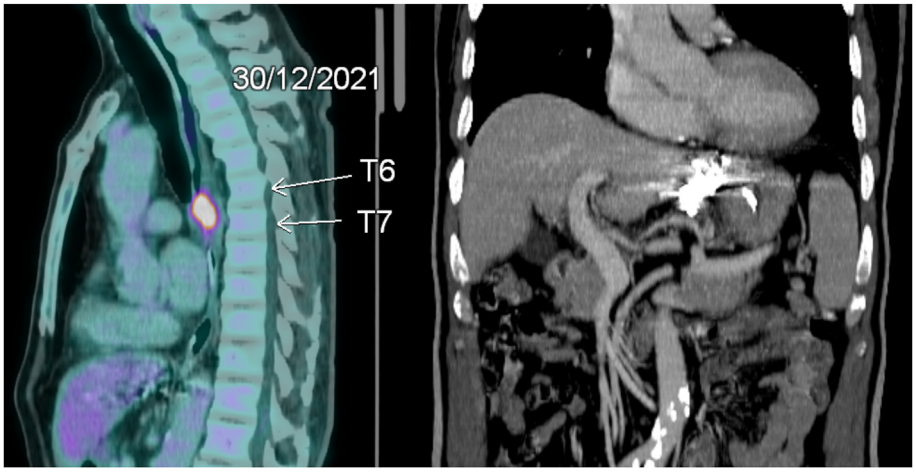

Fig. 3. Reassessment positron emission tomography computed tomography after embolization and chemoirradiation shows significant tumor shrinkage and non-visualized gastrorenal shunt, with the preserved portal and left renal veins.

revealed thrombus resolution. The patient underwent esophagectomy three months after embolization. The stomach was successfully harvested as a gastric conduit intraoperatively. Vascular supply was satisfactory, and the gastric varices were shriveled. Pathological staging showed a residual tumor with involvement of the radial margin and positive recurrent laryngeal nerve and lower mediastinal nodes, that is, ypT3N2M0 (stage IIIb) disease. The patient received adjuvant radiation (50 Gy in 25 daily fractions). The patient remained well and cancer-free at the 10-month follow-up.

4. Discussion

Esophageal cancer is the seventh most common cancer worldwide and ranks eighth in mortality. The outcomes of patients with advanced disease have improved in recent years. This is mainly because of the introduction of effective neoadjuvant chemoirradiation with potential tumor downstaging and improved surgical safety.

Advances in imaging have also contributed to improved outcomes. Local staging and systemic staging are more accurate with endoscopic

ultrasonography and PET CT. Preoperative CT and intraoperative indocyanine green angiography improve the assessment of arterial perfusion, allowing the surgeon to select an appropriate conduit, thereby reducing the risk of necrosis and anastomotic leak.[3]

The prevalence of gastric varices and portosystemic shunts in patients with esophageal cancer has not been well described in the literature. In our experience, they are uncommon, but not rare. This area deserves further research.

Embolization of gastric varices is an established technique for treating acute bleeding in portal hypertension, either as a standalone therapy or after the creation of a transjugular intrahepatic portosystemic shunt (TIPSS)[1]; however, its use in other clinical scenarios is not well documented. To our knowledge, this is the first reported instance in which interventional radiology has converted a relative contraindication for esophagectomy in abolishing gastric varices and creating a suitable gastric conduit for surgical reconstruction. As members of the multidisciplinary tumor board, both clinicians and radiologists should be aware of the technique, its indications, and its contraindications to achieve optimal patient outcomes.

Ethical approval

The study was approved by the ethics committee of the School of Clinical Medicine, University of Hong Kong. All clinical practices and observations were conducted in accordance with the Declaration of Helsinki.

Patient consent

Written informed consent was obtained from the patient for publication of the case report and any accompanying images.

Declaration of competing interest

The authors have no relevant financial or non-financial interests to disclose.

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