Sponsored by Boston Scientific Corporation

CASE REPORT

Transarterial Embolization of Neuroendocrine Tumor Liver Metastases With Embozene™ Microspheres via Extrahepatic Collateral Arteries

BY R. JUSTIN KNEBEL, MD; DANNY CHENG, MD; AND CATHERINE VU, MD

A 54-year-old woman presented with a history of small bowel carcinoid neuroendocrine tumor metastatic to the liver. She had undergone multiple radiofrequency ablation and transarterial embolization (TAE) procedures since 2006, with hepatic arterial access complicated by dissection/chronic occlusion of the common hepatic artery. Systemic therapy was limited by allergy to octreotide. She developed worsening carcinoid symptoms of diarrhea, nausea, flushing, and abdominal pain. Her chromogranin A level was persistently elevated (124 ng/mL). Liver and renal function were preserved (total bilirubin, 0.6 mg/dL; creatinine, 0.66 mg/dL). She elected to undergo repeat bland embolization of liver metastases for palliation of hormonal and bulk symptoms.

PROCEDURE

Preprocedure MRI of the abdomen (Figure 1) demonstrated multifocal liver metastases measuring up to 5.4 cm (solid arrows) showing progression by RECIST criteria and prior ablation sites (dotted arrows). The main portal vein was patent. The MRI and prior angiographic studies were reviewed for procedural planning.

Vascular access was achieved at the right common femoral artery with ultrasound guidance, and a 5-F sheath was placed. The celiac artery was selected with a 5-F diagnostic catheter. Digital subtraction angiography (Figure 2) demonstrated chronic dissection/occlusion of the common hepatic artery with extrahepatic collateral arterial supply to the right (solid arrows) and left (dotted arrows) hepatic lobes.

A small arterial collateral extending from the dorsal pancreatic artery to a tumor in the right hepatic lobe (Figure 3) was selected with a 2.4-F microcatheter over a 0.014-inch Transend™ Microwire (Boston Scientific Corporation). It was not possible to advance the microcatheter beyond an inferior branch (dotted arrow), but flow in this branch was retrograde and there was preferential

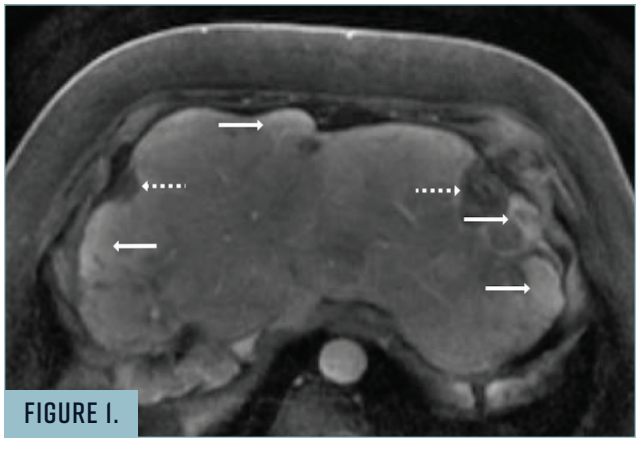

FIGURE 1.

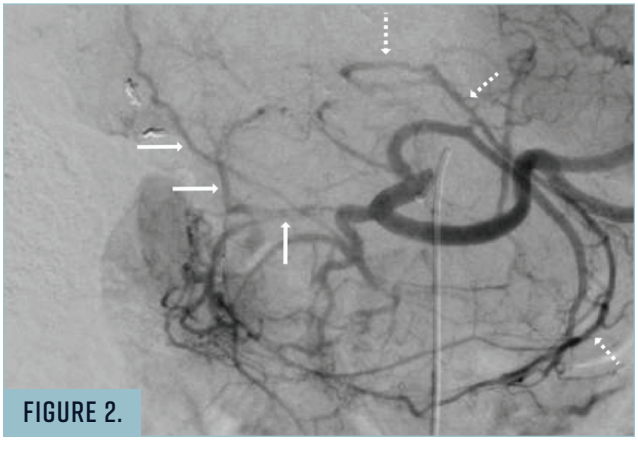

FIGURE 2.

Sponsored by Boston Scientific Corporation

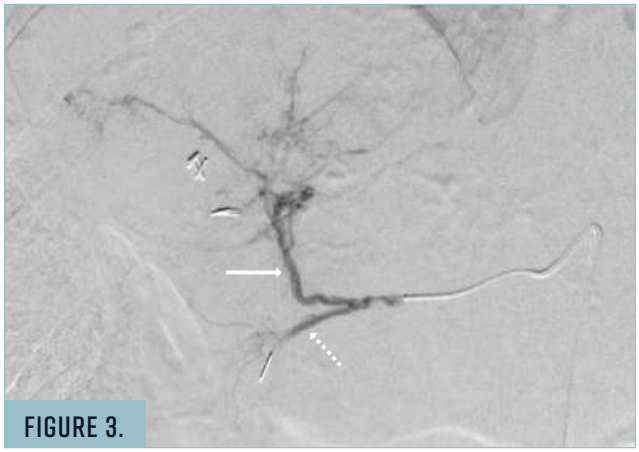

FIGURE 3.

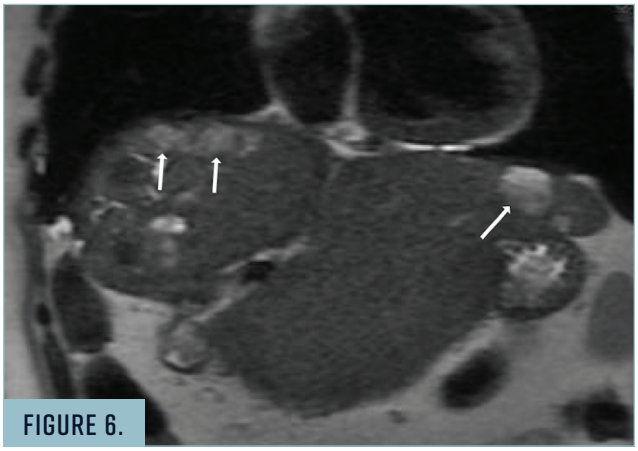

FIGURE 6.

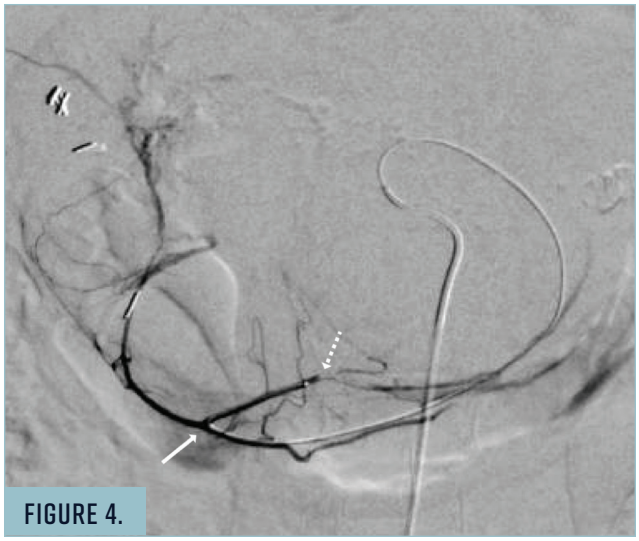

FIGURE 4.

FIGURE 7.

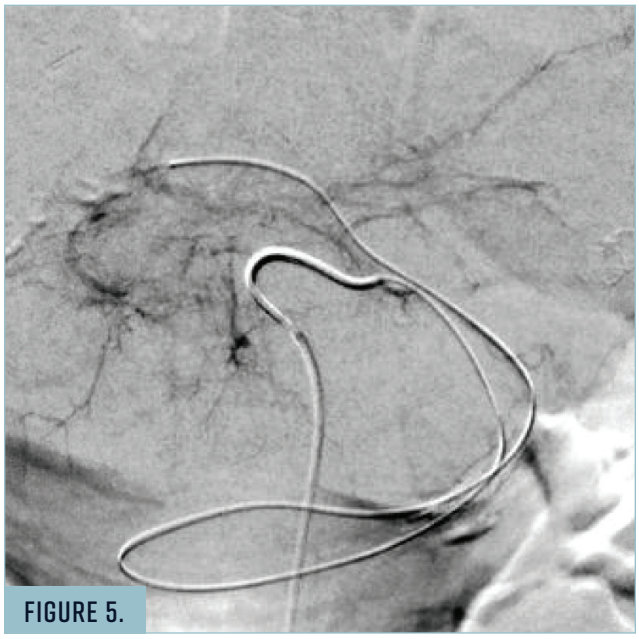

FIGURE 5.

flow to the liver (solid arrow). Embolization was performed to near stasis with one vial of 100-µm Embozene™ Microspheres (Boston Scientific Corporation).

The base catheter was repositioned into the left gastric artery. The microcatheter was advanced through the left gastric artery to an accessory left hepatic artery originating from the left gastric/right gastric arcade (Figure 4). A 0.018-inch hydrophilic guidewire was helpful in selecting the acute origin of the accessory left hepatic artery (solid arrow) but resulted in vessel spasm (dotted arrow) that resolved after 15 min with intra-arterial administration of 100 µg of nitroglycerin and 5 mg of verapamil. The microcatheter was successfully advanced into the accessory left hepatic artery (Figure 5) over the Transend™ Microwire. Embolization was performed to near stasis with one syringe of 100-µm Embozene™ Microspheres.

Based upon prior angiographic imaging and coronal MRI demonstrating metastases in the liver dome (Figure 6, solid arrows), the right internal thoracic artery was selected with a 5-F diagnostic catheter (Figure 7), and the microcatheter was advanced inferiorly. Angiography demonstrated arterial supply to the liver dome from a medial branch (Figure 8, solid arrow) and to the abdominal wall from lateral branches (dotted arrow). The medial branch was selected (Figure 9), with angiography demonstrating multifocal tumor blush (Figure 10, solid arrows). Embolization was performed to near stasis with one syringe of 100-µm Embozene™ Microspheres.

Sponsored by Boston Scientific Corporation

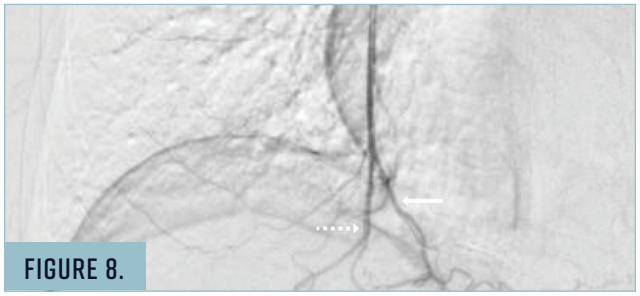

FIGURE 8.

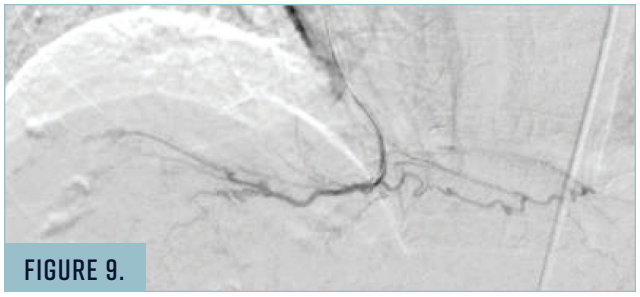

FIGURE 9.

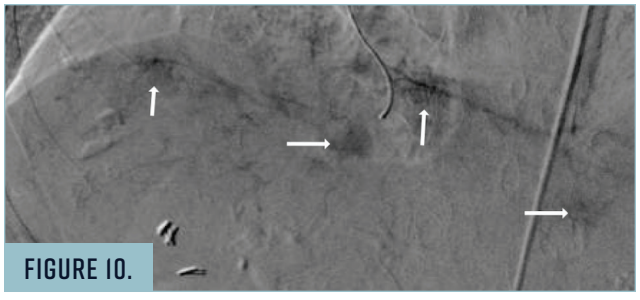

FIGURE 10.

Intraprocedure, 10 mg of dexamethasone, 30 mg of ketorolac, and 4 mg of ondansetron were administered intravenously for control of inflammation, pain, and nausea, in addition to moderate sedation with fentanyl and midazolam. Postprocedure, the patient experienced fatigue, nausea, flushing, and pain. Additionally, transient retiform erythema was noted over the abdominal right upper quadrant, likely representing inadvertent nontarget embolization (although microcatheter positioning was superselective, and no nontarget vessel pruning was apparent angiographically). She was admitted to the hospital for management of postembolization syndrome and carcinoid exacerbation (somatostatin analogue therapy was contraindicated due to history of octreotide allergy) with hydromorphone patient-controlled analgesia pump and intravenous antiemetics, later transitioned to oral formulations. Transaminitis occurred as expected with embolization and began to downtrend at 48 hours. The patient was discharged to home 4 days later. At 3-week clinical follow-up, she reported persistent fatigue but no carcinoid symptoms since discharge. Follow-up imaging with Gallium-68 DOTATATE PET/CT is pending at the time of this report.

CONCLUSION

Up to 75% of patients with small bowel neuroendocrine tumors develop liver metastases over the course of the disease.[1] These may result in significant morbidity due to hormonal hypersecretion and tumor bulk. TAE has been demonstrated to be effective in the management of hormonal symptoms and tumor burden.[1,2] This report illustrates the use of TAE for treatment of neuroendocrine tumor liver metastases, with embolization from three different extrahepatic arterial collateral vessels. The shapeable tip of the Transend® Microwire (Boston Scientific Corporation) was helpful in navigating the small, tortuous collateral vessels. Embozene™ Microspheres provided consistent, reliable penetration into the tumors, resulting in good angiographic and clinical results, with palliation of carcinoid symptoms (after the expected initial exacerbation and postembolization syndrome). Repeat transarterial embolization may be performed as needed for recurrent symptoms. Additional treatments including peptide receptor radionuclide therapy may also be used in the future. ■

1. Del Prete MD, Fiore F, Modica R, et al. Hepatic arterial embolization in patients with neuroendocrine tumors. J Exp Clin Cancer Res. 2014;33:43.
2. Kennedy A, Bester L, Salem R, et al. Role of hepatic intra-arterial therapies in metastatic neuroendocrine tumours (NET): guidelines from the NET-Liver-Metastases Consensus Conference. HPB (Oxford). 2015;17:29–37.

R. JUSTIN KNEBEL, MD

Department of Radiology
Division of Interventional Radiology
University of California, Davis
Sacramento, California
Disclosures: None.

DANNY CHENG, MD

Department of Radiology
Division of Interventional Radiology
VA Northern California Healthcare System
Mather, California
Disclosures: None.

CATHERINE VU, MD

Department of Radiology
Division of Interventional Radiology
University of California, Davis
Sacramento, California
Disclosures: None.