

## Percutaneous Treatment of a Celiac Artery Aneurysm Using a Stent Graft

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Celiac trunk aneurysm is a rare finding and, like other visceral aneurysms, is usually detected incidentally. If the aneurysm is wider than 2 cm, treatment is warranted to avoid catastrophic rupture. Embolization of these aneurysms is the accepted method of treatment to replace surgical options. Endovascular treatment using a stent graft is a known therapy for aneurysms, but it is not used in a celiac artery aneurysm.

### Patient Description

A 71 year old patient presented with recurrent dull right upper quadrant abdominal and flank pain of 4 months duration. The patient had undergone a left nephrectomy due to hydronephrosis 30 years previously, and had moderate renal failure and recurrent nephrolithiasis in the remaining kidney. He had also suffered from a duodenal ulcer, splenomegaly and recurrent bilateral inguinal hernias.

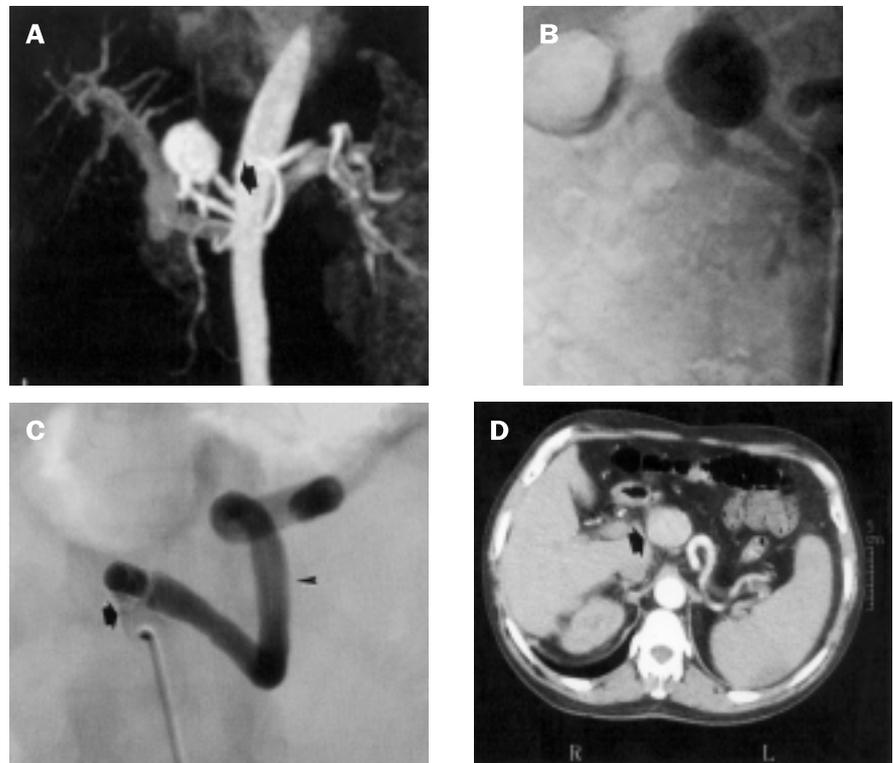
An abdominal ultrasound was unremarkable except for a small septated cyst in the right kidney. An outpatient non-contrast abdominal computed tomography scan revealed a round 6x4 cm mass with a well-defined calcified rim in the porta hepatis area. The mass was suspected to be an arterial aneurysm whose origin was difficult to determine. Magnetic resonance arteriography confirmed the diagnosis of an aneurysm and clearly identified its origin from the celiac trunk [Figure A].

The celiac trunk was elongated with a round aneurysm originating proximal to the splenohepatic bifurcation. The aneurysm had a long proximal neck and a short distal neck proximal to normal celiac and splenic arteries. The left gastric artery was

not identified and the portal vein was patent.

We decided to exclude the aneurysm with a covered stent instead of endovascular coil embolization in an attempt to preserve the splenic artery and possibly the hepatic artery. Via the right common femoral artery, after verifying the MRA images [Figure B], the aneurysm was traversed with a guide wire (Lagierro

0.018", Terumo, Japan) into the splenic artery. The wire was exchanged for a stiff wire (Amplatz super stiff, Cordis, USA) and a 7 Fr sheath was inserted through the aneurysm. A prosthetic stent graft, with a variable diameter of 4–9 mm and length of 38 mm (JOSTENT peripheral stent graft, Jomed, Germany), was mounted on a 6 mm balloon and deployed across the aneurysm by infiltrating the balloon. A post-deploy-



**[A]** Oblique sagittal MIP reconstruction of MRA of the aorto-mesenteric arteries demonstrates the aneurysm of the main celiac trunk (arrow) and the patent portal vein. **[B]** Oblique celiac arteriography, like the MRA, verifies the MRA image. **[C]** Post-stent graft deployment angiography from the celiac trunk origin demonstrates the patent stent graft (arrow) with exclusion of the aneurysm and preservation of the flow to the spleen (arrowhead). **[D]** Contrast-enhanced abdominal CT performed 5 days after the procedure shows flow in the aorta and no enhancement in the aneurysm (arrow).

ment arteriogram demonstrated occlusion of the aneurysm by the stent graft, with preservation of flow to the splenic artery [Figure C]. The stent graft occluded the hepatic artery.

Contrast-enhanced abdominal CT performed 5 days after the stent graft deployment because of pain aggravation revealed no enhancement of the aneurysm [Figure D] but demonstrated small splenic infarcts. Recurrent coffee-ground emesis ensued and endoscopy revealed moderate diffuse gastritis. The patient was treated with omeprazole and the pain abated gradually. On follow-up 3 months after the procedure, the patient is well and his abdominal pain has completely resolved. The liver functions remained unchanged after the procedure.

### Comment

Celiac artery aneurysm is a rare condition that accounts for approximately 4% of all visceral artery aneurysms [1]. The most common pathologic finding is medial degeneration and atherosclerosis. Most visceral aneurysms are asymptomatic and only 22% are detected before they rupture, resulting unvaryingly in death [2]. Seldom are these aneurysms symptomatic and may present as abdominal pain and abdominal bruit. Many of the visceral aneurysms are detected incidentally as a curved calcification on plain abdominal radiograph or as a vascular mass on ultrasonography, CT scan or MRI. The diagnosis, however, is usually established with selective arteriogram and, recently, on CT angiography [1].

In the past, the accepted management of aneurysms larger than 2 cm in diameter and of all pseudoaneurysms was surgical –

whether aneurysmectomy, aneurysmorrhaphy, re-implantation, graft implantation, or ligation. These procedures carry a mortality rate of 5% for elective repair [2]. The surgical mode of treatment is increasingly being replaced by endovascular embolization because of the lower morbidity and mortality and high success rate [3]. The accepted endovascular approach is by coil embolization of the aneurysmal lumen, the proximal and distal aneurysmal neck, or both. Covered stents have also been used for endovascular management of aneurysms and pseudoaneurysms, and to occlude vessel wall damage or atrio-ventricular fistulas. There are only sporadic case reports describing the use of stent grafts in the visceral arteries for excluding aneurysms, all of which were case reports of endovascular pseudoaneurysmal repair [4] or splenic artery aneurysm repair [5]. To the best of our knowledge, this is the first report of a celiac artery aneurysm diagnosed by MRA and successfully managed with a stent graft.

In contrast to coil embolization, the use of a stent graft, if feasible, preserves blood supply through the vessel. The obliteration of the aneurysmal sac is instantaneous, thus reducing the risk of distal emboli (although in our case, small distal emboli to the spleen were found by CT scan but required no treatment) and shortening the procedure time. The post-procedural abdominal pains were probably due to vascular damage to the stomach's arterial blood supply (the left gastric artery that was not identified during the procedure) and perhaps partially due to the small splenic emboli in an already enlarged

spleen. The presence of a patent portal vein that supplies about 80% of the hepatic blood supply enabled our decision to occlude the hepatic artery which originated close to the aneurysm.

We believe that stent graft placement for the management of visceral aneurysms, if the vascular anatomy is suitable, is feasible and safe. MRA is equivalent to CT angiography in three-dimensional imaging of aneurysms. Thus, in patients with impaired renal function or allergy to iodine we recommend the use of MRA imaging prior to endovascular treatment in every visceral aneurysm.

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