Recurrent IPDA Aneurysm from Celiac Occlusion Treated by a Flow Diverting Stent

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Inferior pancreaticoduodenal artery (IPDA) aneurysms have been associated with celiac axis stenosis and occlusion. Retrograde flow through the IPDA arcade has been hypothesized to cause enlargement of these vessels and lead to aneurysm formation. However, objective proof of this hypothesis is lacking, given the fact that celiac stenosis or occlusion and IPDA aneurysms are typically diagnosed concurrently and recurrent aneurysms have not been described. This report presents a patient with celiac axis stenosis and an IPDA aneurysm treated with median arcuate ligament lysis, celiac stenting, and aneurysmectomy. Seventeen years later, he developed a second IPDA aneurysm treated with a flow diverting stent.

Abstract

Case Report

A 72-year-old man presented to the IR clinic complaining of abdominal pain. He experienced similar pain 17 years earlier when he was found to have celiac stenosis and a 3 cm inferior pancreaticoduodenal artery (IPDA) aneurysm (Fig. 1). After the initial diagnosis, the patient underwent aneurysm resection, ligament division, and celiac stenting. The patient’s pain resolved following the interventions; however, after a 15-year absence, the pain slowly returned over a 2-year period. He underwent computed tomography angiography (CTA) demonstrating occlusion of the celiac stents and interval development of a new 1.5 cm IPDA aneurysm. Angiography was performed confirming celiac stent occlusion with retrograde flow through the IPDA to branches of the celiac axis. The occluded stents could not be recanalized. Given the patient’s recurrent abdominal pain, preservation of flow through the pancreaticoduodenal arcade was desirable. As such, instead of embolization, the aneurysm was treated with a flow diverting stent. A 7 French guiding catheter (Rist, Medtronic, Irvine, CA), 4.7 French intermediate catheter (Phenom Plus, Medtronic), and 3.1 French braided microcatheter (Phenom, Medtronic) were used in triaxial fashion to catheterize the IPDA through the aneurysm. Subsequently, a 4.5 mm x 30 mm Pipeline Flex (Medtronic) embolization device was deployed across the aneurysm (Fig. 2). The patient was maintained on dual antiplatelet agents for 6 months.

Discussion

IPDA aneurysms are rare but often associated with celiac stenosis or occlusion from median arcuate ligament compression or atherosclerotic disease.1–4 It has long been hypothesized that retrograde flow through the IPDA arcade causes enlargement of these small vessels and promotes aneurysm development.1,2,4 However, objective proof of this hypothesis is lacking given the fact that celiac stenosis or occlusion and IPDA aneurysms are most often diagnosed concurrently. In this patient, the unique opportunity to document baseline anatomy followed 17 years later with...
The treatment of IPDA aneurysms is important as these may rupture, irrespective of size, causing acute abdominal pain and life-threatening hemorrhage.\textsuperscript{1–3} Embolization is the recommended treatment due to low morbidity in comparison to surgical repair.\textsuperscript{1} If the aneurysm sac cannot be embolized, the parent artery can be occluded, typically with coils, preferably with embolization of the inflow and outflow to prevent reperfusion of the aneurysm.\textsuperscript{1} In this case, a flow diverting stent was used instead of embolization to preserve retrograde flow to the celiac axis while excluding the aneurysm. Flow diverting stent are commonly used for wide-neck, large or giant aneurysms of the internal carotid artery. These devices promote aneurysm occlusion by decreasing direct jet blood flow into the aneurysm and promoting laminar flow along the stent in the parent artery, thereby diverting the flow. The diversion of blood flow results in stagnation of blood within the aneurysm promoting thrombosis. The decreased wall stress and stagnation of flow results in aneurysm remodeling and endothelialization across the aneurysm neck.\textsuperscript{5}

Conflict of Interest
None declared.

References
