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Case Report

Radiology Section

Type II Amplatzer Vascular Plug in Management of Proximal Splenic Artery Pseudoaneurysm causing Haemosuccus Pancreaticus: A Rare case report

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ABSTRACT

The Amplatzer Vascular Plug device (AVP) Type II has been used for proximal Splenic Artery Embolisation (SAE) in settings of trauma and hypersplenism, but its application in the embolisation of proximal splenic pseudoaneurysms is not widespread, although it is very valid. It is particularly efficient in high-flow arteries, where there is a risk of migration and systemic embolisation compared to other traditional embolic materials. Due to shorter embolisation times, improved precision of deployment and a significantly decreased rate of recanalisation, AVP has been increasingly preferred over pushable coils. Haemosuccus pancreaticus is a rare and potentially lethal cause of upper gastrointestinal haemorrhage via the pancreatic duct. It is usually linked with pre-existing pancreatic inflammation that causes a pseudoaneurysm to rupture into the pancreatic duct, most commonly from the splenic artery. Establishing a diagnosis is difficult with endoscopy or imaging, as the presentation is insidious in nature and bleeding is intermittent at times. Authors report a rare case of a 40-year-old male, a chronic alcoholic, presenting with recurrent melena. Upon imaging, the patient was diagnosed with chronic calcific pancreatitis with a proximal splenic artery pseudoaneurysm, which was managed successfully with AVP Type II. Authors aim to popularise the use of the Amplatzer Vascular Plug Type II in achieving haemostasis of pseudoaneurysms in high-flow arteries.

Keywords: Ampulla of vater bleed, Case report, Chronic pancreatitis, Embolisation, Endovascular management, Pseudoaneurysm

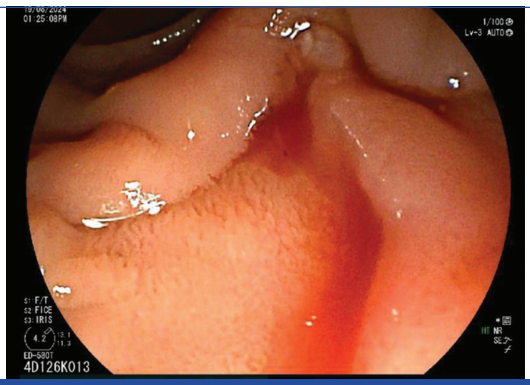
CASE REPORT

A 40-year-old male presented to the emergency department with epigastric pain, two bouts of haematemesis, and recurrent melena in the past 10 days. He had a history of chronic alcohol abuse for the past 10 years (180-270 mL/day) and was diagnosed with chronic calcific pancreatitis three years ago, for which he was on medical management. He appeared markedly pale and diaphoretic at presentation; his blood pressure was 92/58 mmHg, heart rate was 108 bpm, and Haemoglobin (Hb) was 5.3 g/dL. The patient exhibited mild epigastric tenderness but had no distension or organomegaly. He was shifted to the intensive care unit for close observation.

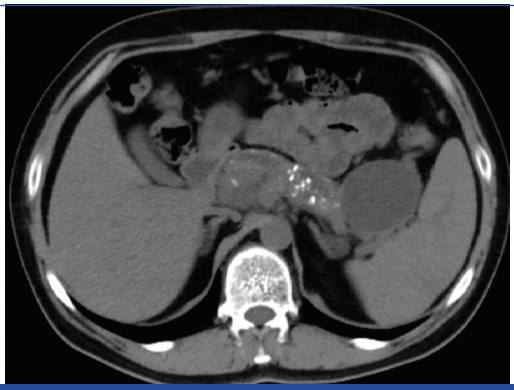
The patient had multiple admissions in the past year for intermittent melena and frequent drops in Hb. He underwent coil embolisation of a left gastric artery pseudoaneurysm six months ago and gastroduodenal artery embolisation for jejunal bleeding two months ago. Since then, the patient experienced waxing and waning episodes of melena, which had increased in severity over the last few days.

Oesophagogastroduodenoscopy (EGD) was performed to further evaluate the cause of the bleeding. There were no blood or blood products in the stomach. Active ooze was noted in the duodenum near the ampulla of Vater [Table/Fig-1]. It appeared that the blood was intermittently leaking from the ampulla of Vater, raising the suspicion of intermittent haemosuccus pancreatitis.

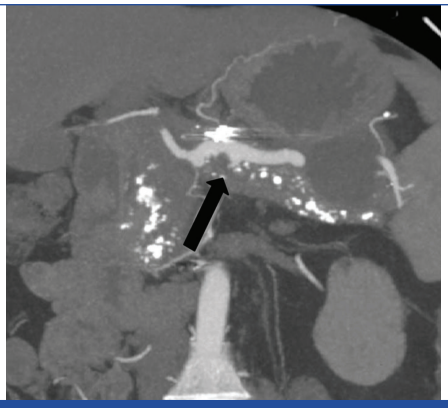
CT angiography of the abdomen and pelvis was performed. Precontrast Computed Tomography (CT) images revealed an atrophic pancreas with a dilated pancreatic duct and parenchymal calcifications, consistent with chronic pancreatitis [Table/Fig-2]. Multiple small, variable-sized pseudocysts were observed in the head, body and tail regions. On the arterial phase, a small, teardrop-shaped wall irregularity/wide-neck pseudoaneurysm measuring 3×2×2 mm was identified, arising from the proximal segment of the splenic artery, approximately 3-4 cm from its origin and projecting inferiorly towards the main pancreatic duct [Table/Fig-3].



[Table/Fig-1]: Oesophagogastroduodenoscopy (EGD) of D2 segment of duodenum showing active blood ooze from the ampulla of Vater.

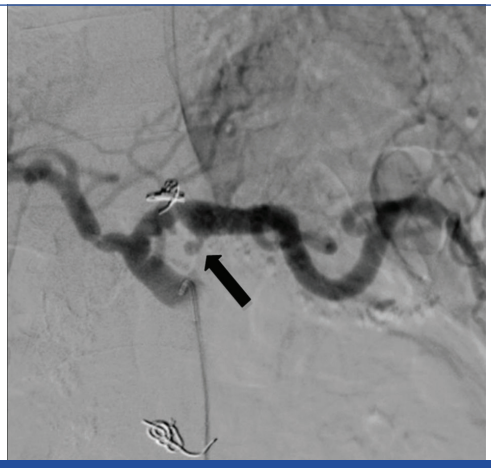


[Table/Fig-2]: Plain CT axial images show multiple calcifications in the pancreatic parenchyma with dilated main pancreatic duct, consistent of chronic calcific pancreatitis. A small pseudocyst is seen in the pancreatic tail region.



[Table/Fig-3]: On arterial phase Maximum Intensity Projection (MIP) images, is seen arising from the inferior wall of proximal splenic artery projecting downward towards the main pancreatic duct (black arrow).

The patient was immediately referred to the interventional radiology department for further management. In the interventional suite, right femoral access was obtained, and a celiac angiogram was performed. It revealed a small pseudoaneurysm measuring 4×3×3 mm arising from the inferior wall of the proximal splenic artery [Table/Fig-4]. There was no active contrast extravasation or delayed filling in the main pancreatic duct, which was consistent with the endoscopy findings, suggesting an intermittent bleed.



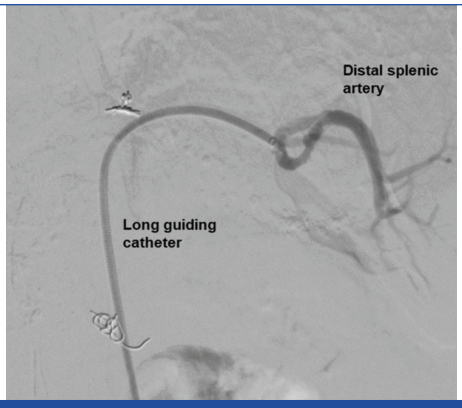
[Table/Fig-4]: Celiac angiogram demonstrating a small narrow necked pseudoaneurysm arising from the inferior wall of proximal splenic artery (black arrow).

An 8Fr long guiding catheter (Cook) was advanced across the neck of the pseudoaneurysm and positioned well beyond the desired site for AVP placement [Table/Fig-5]. The diameter of the proximal splenic artery measured 10.0±0.5 mm. A 14-mm AVP Type II was selected after appropriately upsizing the device by 30%. The guide wire was removed, and the AVP device was advanced through the guiding catheter to the desired occlusion site. While maintaining the position of the AVP device, the guiding catheter was pulled back, allowing the device to open at the preferred location [Table/Fig-6]. The plug was deployed by unscrewing the detachable safety wire. An immediate check angiogram was performed to confirm optimal wall opposition and the position of the plug. A follow-up angiogram at 10 minutes showed complete occlusion of the splenic artery and exclusion of the pseudoaneurysm from the main circulation [Table/Fig-7]. No immediate complications occurred after the procedure.

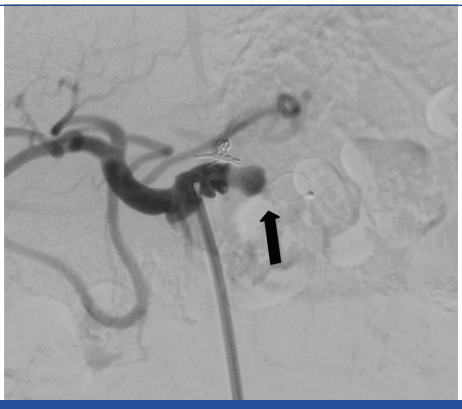
Postprocedure, the patient remained vitally stable with improving Hb levels. There were no recurrent melena or haemoptysis episodes during the remainder of the hospital stay and he was discharged well after one week. The patient recovered well at both the one-month and three-month follow-ups, with no fresh bleeding episodes.

DISCUSSION

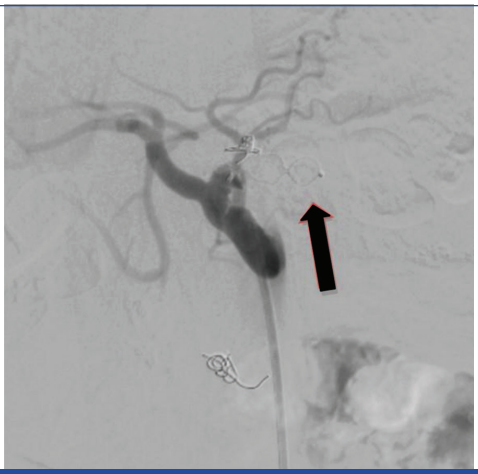
Haemosuccus pancreatitis is a rare and lethal cause of upper gastrointestinal bleeding, occurring in 1 in 1,500 cases, with an



[Table/Fig-5]: Placement of long guiding catheter in the distal segment of splenic artery.



[Table/Fig-6]: Deployment of Amplazter vascular plug (14mm) across the neck of pseudoaneurysm (black arrow).



[Table/Fig-7]: 10 min check angiogram showing complete occlusion of splenic artery with exclusion of pseudoaneurysm from the main circulation (black arrow).

expected mortality rate of 90% if treated with supportive therapy alone [1]. It predominantly affects men (male-to-female ratio 7:1), especially those with a history of alcohol abuse [2,3]. Pancreatic pseudocysts or peripancreatic pseudoaneurysms are the main culprits of pancreatic duct haemorrhage. The diagnosis of haemosuccus pancreaticus can be made immediately through endoscopic detection of bleeding from the ampulla of Vater; however, this can be challenging in some cases because the bleeding is often intermittent. As was the case with index patient, intermittent epigastric discomfort followed by melena or haematochezia 25 to 30 minutes later is a distinctive and highly specific presentation of the condition [4]. Contrast-Enhanced Computed Tomography (CECT) helps establish the diagnosis in 90% of cases [5]; however, arteriography is considered the gold standard for diagnosis and treatment. Surgery is reserved for patients with haemodynamic instability when endovascular rescue has failed or is not feasible.

The AVP is a cylindrical, self-expanding nitinol wire mesh plug that can be utilised for a range of vascular diseases with precise delivery

control. It was developed by Kurt Amplatz in the 1990s for the minimally invasive closure of atrial septal defects [5] and was further developed by the Food and Drug Administration (FDA) for use in peripheral arterial and venous occlusions.

Multiple studies have described the use of AVP in proximal Splenic Artery Embolisation (SAE) [6-9]. SAE has gained preference in the endovascular management of traumatic splenic artery lacerations. It is also used as an adjunct to improve haematological parameters in patients with hypersplenism (e.g., pancytopenia, thrombocytopenia, etc.) and in those who require high doses of chemotherapy [6,7]. However, its use in treating proximal splenic artery pseudoaneurysms is not yet widespread, although it is potentially valid. A comparative study explored the efficacy of the AVP versus traditional coil techniques in SAE. The AVP was found to provide quicker and more controlled vessel occlusion, which is especially beneficial in treating splenic artery pseudoaneurysms that often require precise and durable embolisation to prevent rupture and manage haemorrhage. The AVP has also been used in cases of splenic artery syndrome following orthotopic liver transplantation, where a pseudoaneurysm developed due to altered vascular flow. This embolisation technique proved successful in blocking the aneurysm without the complications associated with coils [10].

Traditionally, endovascular mechanical occlusion devices include coils, detachable balloons, liquid embolic agents, sclerosants and sometimes covered stents. These agents often fail to provide precise control and cannot be retrieved once deployed or injected into the circulation. The ability to recapture and reposition the AVP serves as an added advantage over pushable coils. Due to shorter embolisation times, improved precision of deployment without the risk of migration and a significantly decreased recanalisation rate at two months, AVP has been increasingly preferred over pushable coils [11]. In a meta-analysis by Johnson P et al., comparing five studies, the use of vascular plugs was associated with a lesser number of embolic devices used in proximal SAE compared to coils [12]. They also demonstrated that the use of vascular plug devices was associated with less fluoroscopy time, decreased radiation exposure and a shorter time to vessel occlusion. The use of first to third generations of AVP in tortuous vessels is difficult, requiring a minimum 6Fr sheath. However, the latest fourth-generation AVP has removed this constraint and can now be deployed over a 0.038-inch wire compatible with a 5Fr diagnostic catheter or microcatheter, although it is only compatible with vessels no larger than 6 mm in diameter [13]. In a study conducted by Pech M et al., all 50 embolisations were successful, although two required modifications to the technique due to problems with jamming of the screw thread, leading to disconnection of the plug [14].

It is possible to achieve occlusion of a large-diameter vessel with a single device rather than multiple coils. Although the device comes with a high initial cost, employing a single device is typically sufficient in most clinical scenarios; therefore, cost savings over the use of many coils could be substantial.

CONCLUSION(S)

The AVP is an extremely adaptable embolisation agent that minimises the risks of distal embolisation or migration, enabling the operator to treat particularly difficult vascular lesions, such as high-flow Arteriovenous Fistulas (AVFs) and vessels with narrow landing zones. The key to successful embolisation therapy is a meticulous technique tailored to the vessel morphology and the architecture of each specific lesion to be treated, as well as the appropriate choice of embolising agent.

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