

Abstract

PHT initiates from resistance to hepatic inflow and is exacerbated by compensatory increases in cardiac output and splanchnic vasodilation that increases portal vein inflow, largely via the splenic venous system. While transjugular intrahepatic portosystemic shunts (TIPS) is the most commonly utilized procedure to reduce transhepatic resistance, PSAE is an alternative modality when TIPS is not an option. We describe three patients who underwent PSAE to address diverse manifestations of PHT due to contraindications to TIPS.

Introduction

- PHT is due to fixed and dynamic obstruction to vascular inflow and increased compensatory splanchnic blood flow (largely through the spleen)
- PHT complications include: hypersplenism, ascites, and esophagogastric varices (EV)
- The most common procedural intervention for PHT is TIPS
- Contraindications to TIPS include: difficult anatomy, comorbid cardiopulmonary disease, or significant hepatic encephalopathy (HE)
- PSAE is an emerging alternative intervention for PHT
- PSAE works by reducing splenic arterial inflow and thereby splenic vein flow into the portal vein
- Studies have shown improvement of hepatic function, variceal risk reduction, HE, hematologic indices, and variceal risk reduction
- PSAE effects typically last at least one-year post-procedure
- There are limited data discussing the role of PSAE in patients with refractory PHT undergoing organ transplant evaluation

Case 1

- 50 y.o. male with PMH of CKD stage 4 and non-cirrhotic, idiopathic PHT 2/2 longstanding portal vein thrombosis (PVT) from a remote episode of acute pancreatitis

Case 1, cont.

- Complications include:
 - Diuretic-refractory ascites requiring large volume paracenteses every 14-28 days
 - Grade 1 EV
 - Severe thrombocytopenia (average platelet count <30,000 K/mm³) that precluded placement of an arteriovenous (AV) fistula and renal transplantation
- Interventions:
 - TIPS was contraindicated due to the extensive PVT
 - PSAE led to complete resolution of ascites, reversal of EV by endoscopy, and marked improvement in thrombocytopenia (initial increase from 39,000 K/mm³ to 106,000 K/mm³; Figure 1).
- Outcomes:
 - He ultimately received an AV fistula and was placed on the kidney transplant waitlist
 - He has been followed for 30 months with sustained clinical improvement

Case 2

- 60 y.o. male with HIV, prior hepatocellular carcinoma (HCC) with right partial hepatectomy, and hepatitis C cirrhosis
- Complications include:
 - Grade 1 EV
 - Significant thrombocytopenia (average platelet count ~40,000 K/mm³)
 - Refractory ascites (weekly large volume paracentesis)
- Interventions:
 - Two previously aborted TIPS procedures related to unusual hepatic vein anatomy
 - PSAE led to a reduction in frequency of therapeutic paracenteses to twice monthly, and improvement of thrombocytopenia initially to 100,000 K/mm³ (figure 1).
- Outcomes:
 - Eight months later, TIPS was reattempted and resulted in complete ascites control for over six years.
 - He is currently on the waitlist for simultaneous liver-kidney transplantation.

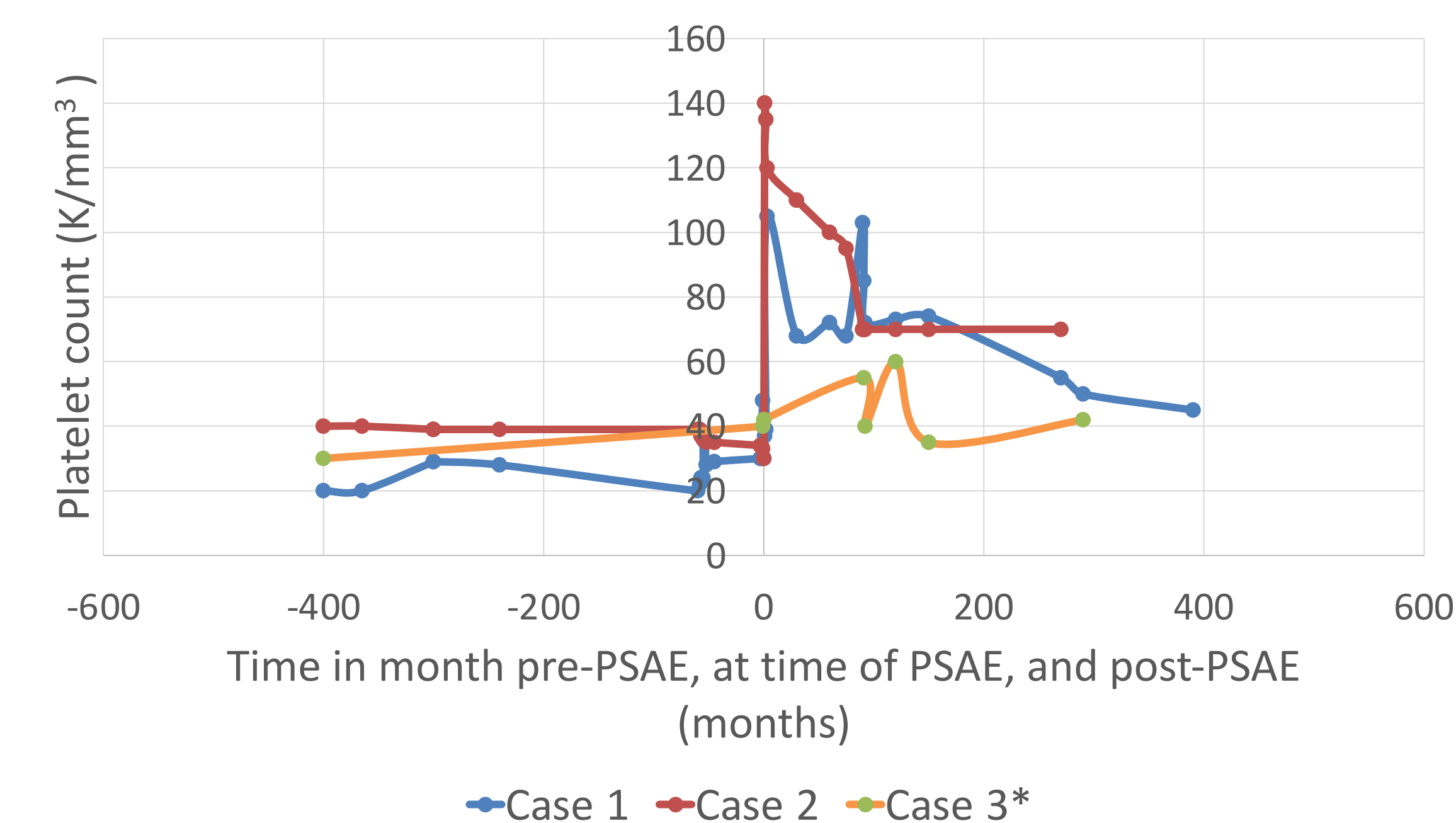
Case 3

- 60 y.o. male with cryptogenic cirrhosis
- Complications include:
 - Grade 1 EV
 - Mild ascites
 - Significant thrombocytopenia
 - Massive splenomegaly leading to polyuria and nocturia due to splenic compression of his bladder initially followed by dyspnea secondary to diaphragmatic compression
- Interventions:
 - PSAE of the inferior pole of the spleen (~35% of the spleen embolized) resolved his urinary symptoms.
 - One year later, repeat PSAE (embolization of ~30% of the spleen) led to significant symptomatic improvement in respiratory symptoms and improvement in his thrombocytopenia from 40,000 K/mm³ to 60,000 K/mm³ (figure 1).
- Outcomes:
 - The patient was declined for liver transplant due to lack of social support
 - He relocated out of state and ultimately expired from advanced HCC

Discussion

- These three patients had complications from decompensated PHT and received successful PSAE while awaiting organ transplant evaluation between 2017 and 2021
- PSAE resulted in improvement in PHT sequelae, specifically ascites, splenomegaly, and significant thrombocytopenia.
- On average, thrombocytopenia improved by 120% in the immediate post-procedural period with sustained effects for a minimum of six months (limited by follow-up status).
- Few studies have specifically examined the role of PSAE in patients awaiting organ transplantation evaluation/operation
- The effects of PSAE are not often sustained, particularly that of improvement in hematologic indices, but their temporary effects may benefit advancement in patient care.
- Risk benefit ratio must be considered in the context of PSAE
- The most common complication is post-embolization syndrome that occurs 24-48 hours post-operatively in up to 78%-100% of patients described by transient abdominal pain, fever, and leukocytosis that is self-limited and managed with supportive care.
- Other more serious complications include PVT, pleural effusion, worsening ascites, bacterial peritonitis, splenic abscess, liver failure, and death.
- Our 3 patients did not suffer from any serious complications, but all required a short hospital stay for close monitoring

Figure 1: Change in platelet count following PSAE



*2nd PSAE attempt in case 3 represented at time 0

Conclusions

- While PSAE is not the primary treatment for PHT, it can be valuable in advanced PHT while awaiting more definitive management, such as transplantation, when interventions like TIPS are not possible
- PSAE may be considered a possible bridge to transplantation
- Larger studies should be conducted to further evaluate the role of PSAE in patients with PHT awaiting solid organ transplantation

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