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Case report

Rings Flying Around: A rare complication of Transjugular Intrahepatic Portosystemic Shunt

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ABSTRACT

We present a rare case of TIPS stent migration. TIPS is considered a relatively safe procedure with a high success rate. We present a case of 58 year old male with decompensated alcoholic liver cirrhosis requiring TIPS stent, which fractured and migrated into the pulmonary artery. Our case represents a rare complication, reported only 4% of the population.

Rings flying around: a rare complication of Transjugular Intrahepatic Portosystemic Shunt.

1. Introduction

1.1.

Transjugular Intrahepatic portosystemic shunt (TIPS) is the percutaneous creation of conduit from the hepatic vein to portal vein to bypass the hepatic parenchymal sinusoids to reduce portal pressure. TIPS is used to manage complications associated with portal hypertension such as variceal hemorrhage. Although TIPS is considered to be a successful and efficacious procedure with 90% success rate, it is associated with potential complications that include acute liver failure, hepatic encephalopathy, hemorrhage, biliary injury, TIPS thrombosis and dysfunction [1]. However, stent migration is a rare complication of TIPS stent placement, with cases reported both pre and post-procedural [2]. We present a rare case of TIPS stent migration into the pulmonary arterial system which resulted in epithelialization, and the patient remained asymptomatic.

2. Case description

58-year-old male with history of alcoholic liver cirrhosis, portal hypertension, and variceal bleed who underwent failed endoscopic esophageal banding, and had to receive TIPS stent in 2013 presented due to shortness of breath, progressively worsening for few weeks prior to presentation, now also accompanied with atypical pleuritic chest pain. Patient originally presented to a small rural hospital, where computed tomography angiography of chest (CTA Chest) was done to rule out pulmonary embolism, which revealed an incidental finding of a stent in the segmental pulmonary artery. Patient was transferred for possibly needing interventional radiology service.

2.1.

Upon arrival at our institution, the patient was not in any acute respiratory distress and had normal vital signs except for mild hypoxia and tachycardia with heart rate ranging between 90 and 110. On physical examination, patient was obese with BMI of 31, lungs and cardiac examination were unremarkable. Laboratory tests including complete blood count, basic metabolic panel, brain

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Fig. 1. CT Chest showing fragmented TIPS stent in segmental pulmonary artery.

natriuretic peptide, urine analysis were within normal limits. Electrocardiogram upon admission revealed normal sinus tachycardia, with no ST segment changes noted. Chest X-ray done upon admission was negative for any acute cardiopulmonary process as well. Patient continued to require supplemental oxygen for the first 24 hours. Differentials upon admission included pulmonary embolism, pulmonary edema, or cardiac causes including cardiac ischemic events.

Imaging done in the outside hospital included a CTA chest and revealed a fractured TIPS stent, which had migrated into the segmental branch of the right lower lobe pulmonary artery (Fig. 1). Stent was noted to be well aligned with the arterial wall and adjacent vessels were patent with no signs of stenosis or active bleeding (Fig. 2). TIPS stent was placed originally at another institute 5 years prior to presentation, after which the patient was incarcerated. Due to lack of continuity of care, we were unable to access previous records for the patient to delineate the details of the TIPS procedure technique or the type of the stent used at that time. Patient now presented to our institution due to current symptoms. In house interventional radiology (IR) team was consulted to further evaluate the fragmented stent. Per IR, the patient likely had 2 overlapping stents placed, the proximal end of the overlapping TIPS stent had fragmented off and migrated into the right lower lobe segmental pulmonary artery and was well aligned within the vessel. They recommended against retrieval as it may cause more harm and predispose patient to further complications including possible pulmonary artery damage and bleeding. It was considered to possibly treat the patient with anticoagulation given the fragmented stent portion but given the high risk of bleeding as the patient is a cirrhotic, anticoagulation was deferred.

2.2.

To further confirm the patency of TIPS, abdominal ultrasound was done which showed patent portosystemic shunt with no evidence of ascites. Dedicated Doppler evaluation of the intrahepatic portosystemic shunt demonstrated peak velocity within the inferior aspect of the shunt measuring 106.9 cm/s, within the mid aspect of the shunt measuring 81.8 cm/s, and within the upper aspect of the shunt measuring 102.0 cm/s. Hepatopedal flow within the main portal vein and hepatofugal flow in the hepatic vein were noted.

2.3.

After detailed discussion with multidisciplinary team, it was decided patient's complain of shortness of breath is unlikely related to fragmented stent and possibly due to mild fluid overload. Further differentials including cardiac causes were excluded. Pharmacological stress test using Regadenoson injection was done, which showed no signs of ischemia, no ST segment changes upon injection either. Patient had normal systolic ejection fraction.

Patient underwent gentle diuresis with furosemide, responded well. Patient's hypoxia resolved within 48 hours and was discharged with addition of diuretics.

3. Discussion

Approximately 50% of patients with newly diagnosed cirrhosis have gastroesophageal varices with the prevalence of esophageal increasing linearly with the progression of liver cirrhosis [3].

Patients with persistent variceal bleed, despite optimal medical therapy and failed endoscopic therapy with banding and ligation are appropriate candidates for TIPS procedure with polytetrafluoroethylene stents [3,4]. Patients with a hepatic venous pressure gradient >20 mm Hg are at high risk for failure of standard therapy and TIPS placement within the first 24 hours of the bleeding. This approach has shown better clinical outcomes [5,6].

Stent misplacement and migrations are rare but potentially life threatening complications of TIPS. Multiple case reports have shown stents to be displaced to distal areas such as the right atrium, right ventricle and the pulmonary artery rarely [6,7]. Such

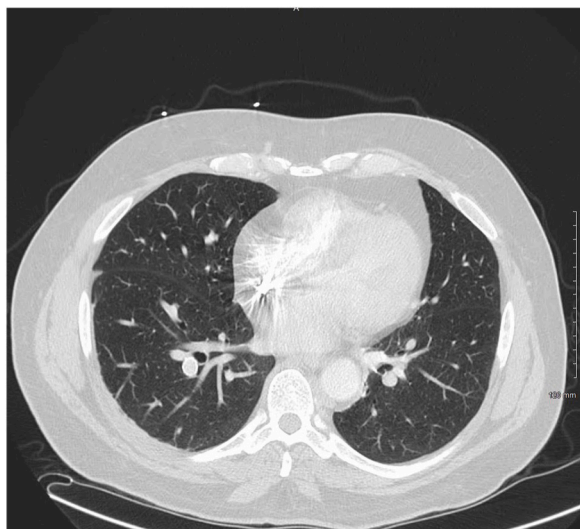


Fig. 2. Axial Cut of CT Chest showing fragmented stent migrated into the right sided segmental pulmonary artery.

complications may result in conduction abnormalities, valvular damage, perforation and possible death.

3.1.

In the post-deployment period, it is important for the interventionist to maintain wire access across the stent until satisfactory positioning is confirmed with portal venography. Cephalad migration into the cardiac chambers or inferior vena cava (IVC) may result in cardiac arrhythmias, atrial perforation, aorto-atrial fistula or IVC thrombosis. In some cases, delayed stent migration may be seen as well, with two case reports showing 3 week stent migration, post deployment in an 11 year old child [6,7]. Given these complications, stent extraction is difficult due to its own associated complications including possible valvular damage, myocardial penetration, cardiac arrhythmia or pericardial tamponade.

Stent may also migrate inferiorly into the main portal vein, further resulting in complications in procedures such as liver transplant in the future [6–8].

3.2.

However, we were unable to find case reports showing fractured TIPS stent. Literature review has shown two similar cases that were diagnosed coincidentally via chest imaging where the misplaced stent did not cause any acute mechanical complication and was managed conservatively [9,10].

3.3.

Our case highlights the importance of having a broad differential regarding simple bread and butter complaints in the vast field of Internal Medicine. Mechanical complications related to procedures may be rare but present. Treating these complications requires balancing risks and benefits to assure no bigger harm is done in an attempt to achieve a questionable benefit.

3.4.

3.5.

After reviewing the case with the radiologist and Interventional Radiology team as well who were involved in patient care for this patient. Per their expertise, given the appearance of the stent on chest CTA, the size and appearance coincides with being a fragment and not the whole stent. Also, given the location of a very small branch of segmental artery, highly unlikely that this is migration of an intact stent.

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