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# Transjugular Intrahepatic Portosystemic Shunt (TIPS) Migration to the Heart Diagnosed by Emergency Department Ultrasound

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A 57-year-old man presented to our emergency department with altered mental status. He had a past medical history significant for cirrhosis and previous placement of a transjugular intrahepatic portosystemic shunt (TIPS). On cardiac auscultation, a new heart murmur and an unexpected degree of cardiac ectopy were noted. On the 12-lead electrocardiogram, the patient was noted to have multiple premature atrial contractions, corroborating the irregular heart rhythm on physical exam. A focused bedside emergency ultrasound of the heart was then performed. This exam revealed an apparent foreign body in the right atrium. It appeared as if the patient's TIPS had migrated from the heart into the right atrium. This case, as well as the literature describing this unusual complication of TIPS placement, is reviewed in this case report. [West J Emerg Med. 2012;13(6):525-526]

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## INTRODUCTION

Transjugular intrahepatic portosystemic shunt (TIPS) placement is a common procedure performed in patients with complications of portal hypertension due to cirrhosis. This procedure is primarily used in the management of variceal bleeding refractory to endoscopic and medical therapy, as well as in cases of severe ascites. TIPS results in a permanent intrahepatic tract that typically lies between the right hepatic and the right portal vein, shunting blood away from hepatic sinusoids and thereby reducing portal venous pressure.<sup>1</sup> Patients often experience an improvement in their liver disease following the procedure. Unfortunately, the procedure may also result in complications, the most important of which are deterioration in liver function and hepatic encephalopathy. These complications are related to increased shunting of blood away from the liver with reduced sinusoidal flow.<sup>2</sup> Migration of TIPS into the heart is a rare complication, but has been previously described in the literature.<sup>3-4</sup> In this case report presented, we describe a diagnosis of TIPS migration into the heart made in the emergency department (ED) by bedside emergency ultrasound (EUS).

## CASE REPORT

A 57-year-old Hispanic male presented with a 1-day

history of altered mental status. He had a past medical history significant for alcohol abuse, hepatitis C and Child-Pugh Class B cirrhosis. He had undergone TIPS placement an unknown number of years before presentation to the ED. Additionally, he had been previously hospitalized for hepatic encephalopathy due to noncompliance with his medical regimen.

On physical examination, the patient appeared comfortable and calm. He was alert, but oriented to name only. Vitals signs were temperature 98.1°F pulse 78 beats/min, respiratory rate 16 breaths/min and blood pressure 130/89 mmHg. The patient was noted to have scleral icterus, and his abdominal exam revealed moderate ascites without tenderness, rebound, or guarding. Unexpectedly, on cardiac auscultation, the patient was noted to have a 2/6 systolic and a 2/6 diastolic murmur with ectopy. A 12-lead electrocardiogram (ECG) was obtained in addition to standard laboratory studies to elucidate the cause of the patient's altered mental status.

The serum white blood cell count was 6,500/mm<sup>3</sup> without neutrophilic predominance, hemoglobin of 10 g/dL, BUN of 10 mg/dL and a creatinine of 0.6 mg/dL. The patient was noted to have an elevated ammonia level at 138 umol/L. The 12-lead ECG showed normal sinus rhythm with multiple

premature atrial contractions. To further assess cardiac function, a bedside EUS was performed. This exam showed an apparent foreign body in the right atrium (Video 1). The object could be traced back to the liver and was consistent with a TIPS that had migrated distally into the heart. On closer evaluation using color doppler ultrasound, the patient was noted to have an atrial septal defect. The stent appeared to be located close to this defect, although it had not yet crossed the midline (Video 2).

The patient was admitted to the hospital for management of his hepatic encephalopathy, as well as for evaluation of the aberrantly located TIPS. During his hospitalization, the patient underwent a formal right upper quadrant ultrasound, which revealed a patent TIPS without definite portal venous clot. The patient did not have further episodes on ectopy as an inpatient. After review with interventional radiology, his case was deemed amenable to outpatient TIPS evaluation with a catheter snare and replacement procedure.

## DISCUSSION

TIPS placement is a common, relatively non-invasive procedure used in patients with complications of portal hypertension. In this case report, a rare complication of this medical device is described. Cardiac complications of this procedure are uncommon, but include arrhythmias during or after placement. Structural damage to the heart by TIPS migration or extension into the cardiac chambers is rare, even though the distance from the hepatic vein-inferior vena cava take-off and the right atrium is only 1.6-2.2 cm.<sup>3</sup> Various cardiac injuries caused by TIPS migration have been previously described, including tricuspid valve injury, atrial-aortic fistula, cardiac rupture with hemopericardium, atrial septal perforation, and heart failure.<sup>3,5-7</sup> The stent may either partially migrate with subsequent damage caused by the cephalad end of the stent or become completely dislodged as a free intracardiac foreign body.<sup>5</sup> Management of this complication most commonly involves percutaneous techniques generally performed by interventional radiologists.<sup>8</sup> Occasionally, open cardiomy is necessary.<sup>9</sup>

The use of bedside EUS has become standard practice for evaluation of an expanding list of critical diagnoses. The ability of the emergency physician to perform detailed cardiac and abdominal ultrasound provides critical information early in the course of the evaluation of the ill and injured patient. The case reported here illustrates the use of this exam in allowing for the immediate diagnosis of TIPS migration into

the heart of a patient with advanced cirrhosis and hepatic encephalopathy. Migration of a TIPS should be considered in any patient with a new heart murmur, signs of right heart strain or dysrhythmia. Focused EUS may then be employed to make the diagnosis of this unusual, but important and potentially life-threatening complication.

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*Conflicts of Interest:* By the WestJEM article submission agreement, all authors are required to disclose all affiliations, funding sources and financial or management relationships that could be perceived as potential sources of bias. The authors disclosed none.

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