

# I'll Stay a While: An Unusual Case of a Chronic Migrated Upper Extremity Endovascular Stent



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## INTRODUCTION

Endovascular stent migration into the right atrium is a rare but serious complication of venous stenting.<sup>1</sup> The most common migration site is from the superior vena cava; however, migration from peripheral veins and the hepatic venous system has been reported. Typically, stent migration presents acutely with sepsis or sequel of a thrombosed stent and requires urgent management.<sup>1</sup> Here we present a case of an embedded arteriovenous (AV) fistula stent into the right atrium that had migrated 3 years prior to index presentation.

## CASE PRESENTATION

An 86-year-old Caucasian female presented to the emergency department with weakness, fatigue, and shortness of breath. Her past medical history was notable for coronary artery disease with previous coronary artery bypass grafting in 2001, heart failure with preserved ejection fraction, metastatic ovarian cancer, chronic atrial fibrillation (not on anticoagulation due to recurrent falls), frailty, and a stable abdominal aortic aneurysm (AAA). She also had a history of end-stage renal disease with a remote left upper extremity AV fistula that was complicated with recurrent stenosis requiring balloon angioplasty and a basilic vein endovascular stent over the time period of 2012-15. Eventually her left upper extremity fistula was abandoned and she had a right femoral AV fistula placed. Of note, both patient and family denied any previous valvular abnormalities including aortic stenosis, mitral regurgitation, and/or tricuspid regurgitation. Multiple attempts were made to obtain a previous echocardiogram without success.

The patient was found to be hypotensive and in acute respiratory distress. She was treated for presumptive pneumonia and fluid overload. Cardiac exam revealed an irregular rhythm with +3 blowing holosystolic apical murmur. A prominent parasternal heave was readily palpated, and the jugular venous pressure was elevated to the level of the mastoid. Lung auscultation revealed bilateral crackles. Blood cultures were without growth at 120 hours. Electrocardiogram showed atrial fibrillation with a rate of 95 bpm, nonspecific ST segment changes, and findings

consistent with right heart strain. A computed tomography angiogram was performed, demonstrating an infrarenal AAA of 3.5 × 3.4 cm and small bilateral pleural effusions. The computed tomography scan was independently reviewed by the cardiology team in which observation of a right atrial cylindrical mass was appreciated (Figures 1 and 2). Due to these findings a transthoracic echocardiogram (TTE) was obtained.

## Echocardiographic Imaging

TTE revealed severe right atrial dilation. Within the right atrium, there was a cylindrical echogenic structure, measuring 6 cm in length by 1 cm in width (Figures 3-5). This echogenic structure appears to be fixated between the anterior, superior interatrial septum and the anterolateral wall of the right atrium (Videos 1 and 2). There was also evidence of severe tricuspid regurgitation and an elevated right ventricular systolic pressure of 68 mm Hg. The etiology of the severe tricuspid regurgitation was believed to be from severe pulmonary hypertension and dilation of the right ventricle. Poor coaptation can be seen on the two-dimensional images, which corresponds with the significant turbulent jet seen on color Doppler.

The findings of the TTE led to further investigation into the patient's previous radiographical imaging. The earliest evidence per our records of this endovascular stent in the right atrium was from a magnetic resonance image of the abdomen/pelvis in December 2015.

During her hospital stay, the patient decompensated secondary to other comorbidities including a left lower lobe pneumonia and metastatic ovarian cancer. The patient and family did not want any aggressive measures conducted. It was thus determined that potential retrieval of her stent by surgical or endovascular methods would not be beneficial considering her current clinical status. The patient eventually elected for hospice/comfort measures only. She eventually passed away.

## DISCUSSION

Here we present an 86-year-old female with history of AV fistula stenosis and subsequent endovascular stenting with migration to her right atrium. To date, there have been no reports presenting an endovascular stent in the right atrium for a prolonged duration. The earliest record of this interatrial migrated stent was 3 years prior to index hospitalization. Interestingly, it had not caused acute decompensation, infection, or thrombosis in that time frame.

Atrial fibrillation with decreased excursion/movement of the right atrium may have contributed to the conducive environment for the stent to imbed without acute complication.

The rate of endovascular stent misplacement or migration according to the literature is rare, occurring in <3% of all percutaneous stenting procedures.<sup>1</sup> Nevertheless, the true incidence of dislodgement of foreign bodies (including endovascular stents) is believed to be much

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## VIDEO HIGHLIGHTS

**Video 1:** Modified apical four chamber showing endovascular stent in the right atrium with a fixed position against the interatrial septum.

**Video 2:** Off-axis apical four chamber showing the entirety of the endovascular stent in the right atrium.

[View the video content online at www.cvcasejournal.com.](http://www.cvcasejournal.com)

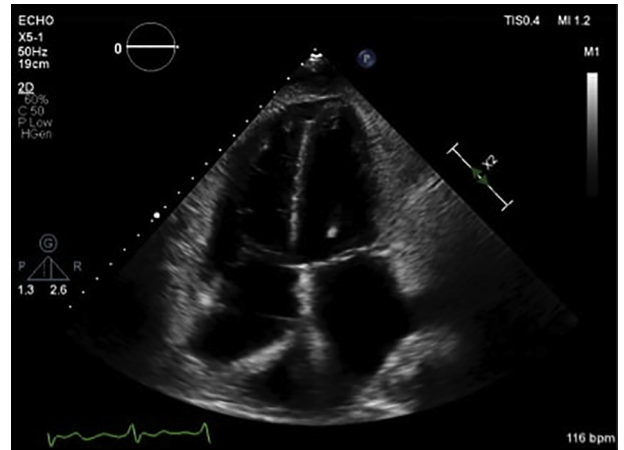


**Figure 1** Computed tomography angiography axial view showing cylindrical mass located within the right atrium.

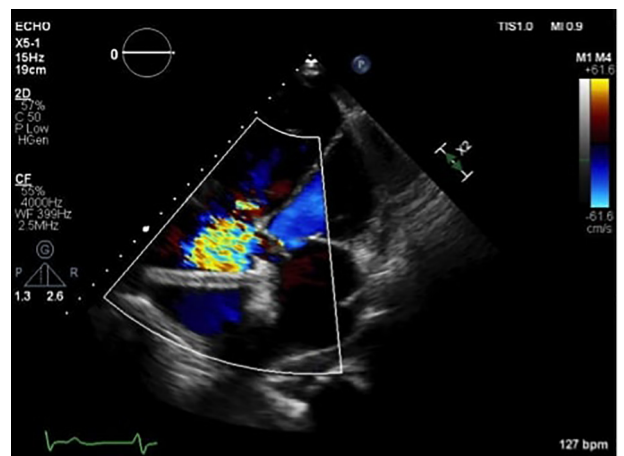


**Figure 2** Computed tomography angiography redemonstrating a cylindrical mass located in the right atrium seen in a coronal view.

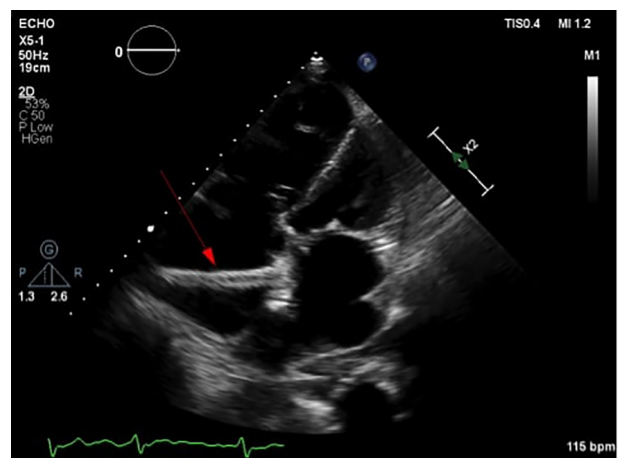
higher than the number of cases reported in the literature.<sup>2</sup> This rate may continue to rise as intravascular stenting rates increase for both peripheral venous stenosis and hemodialysis-access stenosis. Per Bani-Hani *et al.*,<sup>3</sup> the relative growth of stent placement has outpaced that of angiography. With increased growth of stent placement come



**Figure 3** Off-axis apical four-chamber view showing endovascular stent attaching to the anterior-superior right interatrial septum. The double lumen density is appreciated in this view.



**Figure 4** Apical four-chamber view showing endovascular stent in the right atrium with attachment to the right atrial free wall.



**Figure 5** Off-axis parasternal short-axis showing endovascular stent (red arrow) embedding into the interatrial septum just superior and posterior to the noncoronary aortic valve cusp.

increased rates of stent complications including stent shortening, fracture, and, such as in our case, migration.

Migration of stents in the venous system can stop at different levels. The most common location lies between the superior inflow area of the right atrium and the inferior atrial or ventricular wall (as in our case). The next most common location is found within the pulmonary artery itself.<sup>1</sup>

When discussing treatment, there are two possible options, depending on placement of the migrated stent and severity of symptoms. Asymptomatic patients can be treated with observation and routing x-ray studies and electrocardiogram.<sup>4</sup> Patients with concerning symptoms should have their stent surgically removed or retrieved by endovascular methods. If surgical/endovascular intervention is warranted, there should be minimum delay in retrieval. This urgency is endorsed by the reality of thrombosis rather than the possibility of further migration.<sup>1</sup> If the migrated stent is left in place, anticoagulation must be considered secondary to complications of thrombosis.<sup>1</sup>

## CONCLUSION

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In summary, our images show a migrated endovascular stent embedded in the right atrium over a duration of 3 years.

## SUPPLEMENTARY DATA

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Supplementary data related to this article can be found at <https://doi.org/10.1016/j.case.2019.02.006>.

## REFERENCES

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1. Slonim SM, Dake MD, Razavi MK, Kee ST, Samuels SL, Rhee JS, et al. Management of misplaced or migrated endovascular stents. *J Vasc Interv Radiol* 1999;10:851-9.
2. Marcy P, Magne N, Bruneton J. Strecker stent migration to the pulmonary artery: Long-term result of a "wait-and-see attitude". *Eur Radiol* 2001;11:767-70.
3. Bani-Hani S, Showkat A, Wall B, Das P, Al-Absi A. Endovascular stent migration to the right ventricle causing myocardial injury. *Semin Dial* 2012;25:562-4.
4. Haddadian B, Shaikh F, Djelmami-Hani M, Shalev Y. Sudden cardiac death caused by migration of a TrapEase inferior vena cava filter: Case report and review of the literature. *Clin Cardiol* 2008;31:84-7.