

IMAGING VIGNETTE

INTERMEDIATE

CLINICAL VIGNETTE

# Venous Stent Migration of the Right Ventricle



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## ABSTRACT

Peripheral migration of a venous stent to the heart is a rare but known complication, with the heart being the most common site of landing. Echocardiographic modalities are essential in clinical diagnosis and management, particularly with limited data and consensus regarding the best management approach. (**Level of Difficulty: Intermediate.**) (J Am Coll Cardiol Case Rep 2022;4:1429-1431) © 2022 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## CASE PRESENTATION

A 70-year-old asymptomatic man, with end-stage renal disease on hemodialysis via left upper extremity arteriovenous fistula with 2 prior vascular stents (LifeStar 8 × 20mm, Becton Dickinson) placed a year ago, presented to the hospital for an incidental finding of stent migration into the right ventricle (RV) on the chest x-ray film performed as part of his preoperative renal transplant workup (**Figure 1A**). Physical examination, vital signs, and electrocardiographic findings were unremarkable. Transthoracic echocardiogram revealed a normal left ventricular size and mild concentric hypertrophy with normal function and estimated ejection fraction of 55% to 60% and normal RV size and function. The tricuspid valve (TV) was normal in structure with mild to moderate tricuspid regurgitation. However, the stent was visible in the basal portion of the RV, close to the septal tricuspid leaflet (**Figure 1B, Video 1**). Transesophageal echocardiogram revealed that the stent is contained within the RV and has fixed movement with the chordae of the leaflet of the TV, indicating likely attachment to the TV apparatus (**Figures 1C to 1F, Videos 2 to 5**). A multidisciplinary heart team discussion was held, and conservative management with close follow-up was recommended.

## DISCUSSION

Venous stenting is a treatment option for peripheral and central venous obstruction including hemodialysis access site in patients with end-stage renal disease; however, one of its rare yet recognized complications is stent migration.<sup>1</sup> Stent migration has a lower incidence with upper extremity venous stenting than iliofemoral and renal systems,<sup>2</sup> and the RV was reported to be the most common landing site.<sup>2</sup> A broad spectrum of clinical presentations has been reported that range from incidental imaging findings in asymptomatic patients to arrhythmias.<sup>2</sup> The decision about the best management approach of venous stent migration to the heart should be made on a case-by-case basis after a thorough evaluation of the clinical picture along with weighing of the

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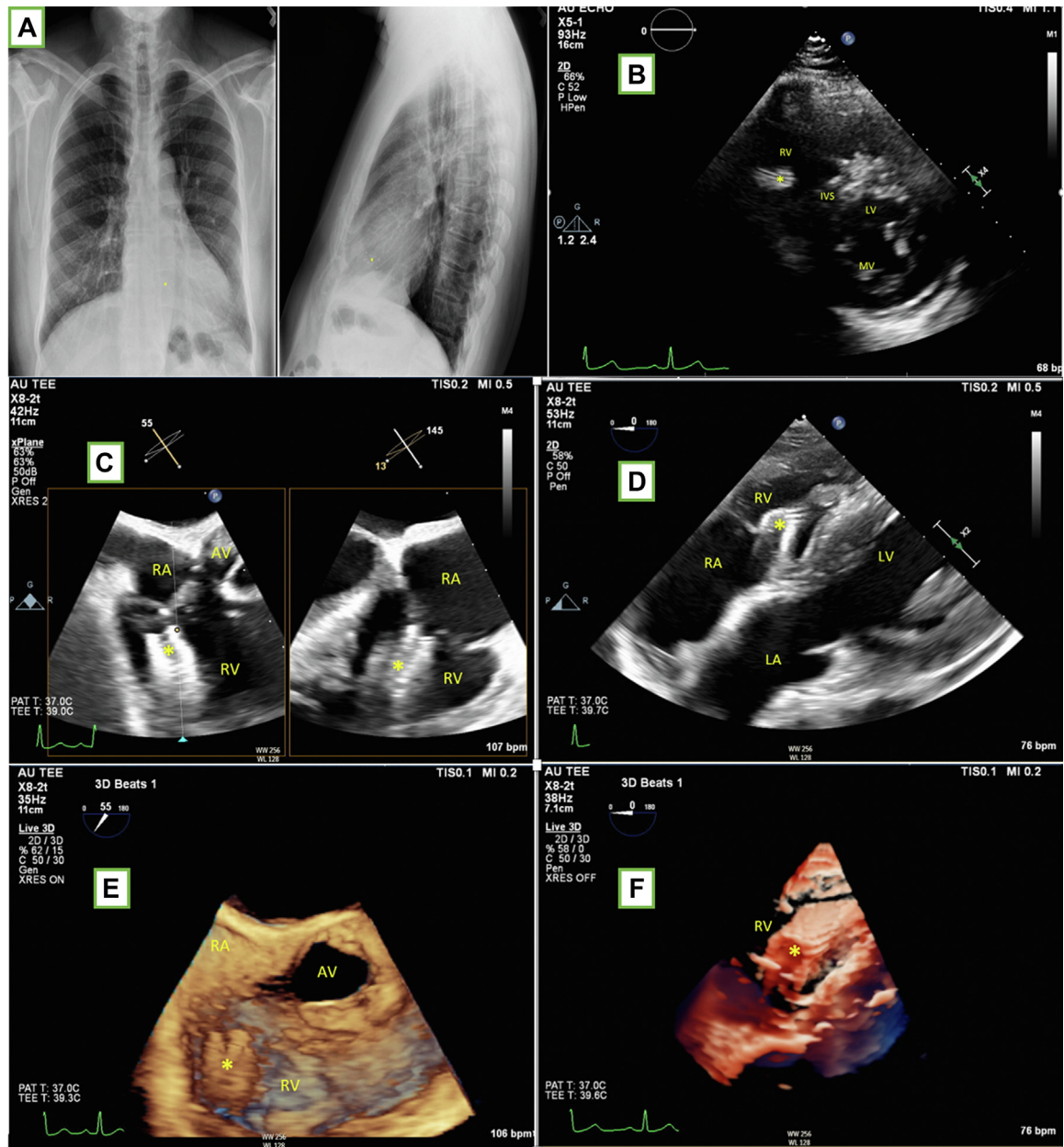
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**ABBREVIATIONS  
AND ACRONYMS**

**RV** = right ventricle  
**TV** = tricuspid valve

risks associated with the proposed retrieval method against the risk of further migration, infection, or embolization with a conservative approach.<sup>3</sup> In this case, echocardiography played a vital role in the patient's care because it provided a further evaluation of the location of the stent and its relation and adherence to the cardiac structures, which ultimately, along with a multidisciplinary approach, assisted in the decision making. It was determined that percutaneous retrieval would likely damage

**FIGURE 1** Chest X-Ray and Echocardiography Images



**(A)** Anteroposterior and lateral chest x-ray film showing the stent (asterisk) in the RV. **(B)** The 2-dimensional (2D) transthoracic echocardiogram parasternal short-axis view at the level of the mitral valve showing the stent (asterisk) in the RV cavity. **(C)** The 2D transesophageal echocardiogram (TEE) RV inflow-outflow view showing the stent in the RV with its relation to the tricuspid valve leaflets. **(D)** The 2D TEE modified transgastric view showing the stent (asterisk) in the RV with attachment to the tricuspid valve leaflets. **(E)** The 3-dimensional (3D) TEE right ventricle inflow-outflow view showing the stent in the RV. **(F)** The 3D TEE modified midesophageal 4-chamber view showing the stent in the RV with its relation to the tricuspid valve leaflets. AV = aortic valve; IVS = interventricular septum; LV = left ventricle; MV = mitral valve; RA = right atrium. RV = right ventricle.

the TV leaflets, causing chordal rupture, given its attachment to the TV apparatus. Also, a surgical retrieval option was discussed; however, given that the patient was asymptomatic with no evidence of tricuspid valve stenosis or severe regurgitation and the risk of further stent migration into the RV outflow tract or pulmonary artery was deemed low, a conservative management approach was recommended. Neither anticoagulation nor antibiotics were started because the risk of further stent migration causing pulmonary embolism or the risk of infective endocarditis were deemed low; however, these can be clinical questions for further investigations in the future.

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**KEY WORDS** echocardiography, 3D echocardiography, venous stent migration

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 **APPENDIX** For supplemental videos, please see the online version of this paper.