

IMAGES IN INTERVENTION

# Percutaneous Correction of Right Superior Vena Cava to Left Atrium



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A 69-year-old woman presented with dyspnea and oxygen saturation of 89%. Echocardiogram showed a dilated coronary sinus. When injected in the right arm (but not the left), bubbles appeared in the left atrium (LA). Computed tomography showed bilateral superior vena cavae (SVC) connected by a bridging vein. The left SVC drained to the coronary sinus. The right SVC drained to the right upper pulmonary vein (RUPV) and into the LA. A smaller caliber remnant of the right SVC connected the RUPV to the right atrium. It appeared as though the right SVC was transected by the RUPV (Figures 1A and 1B).

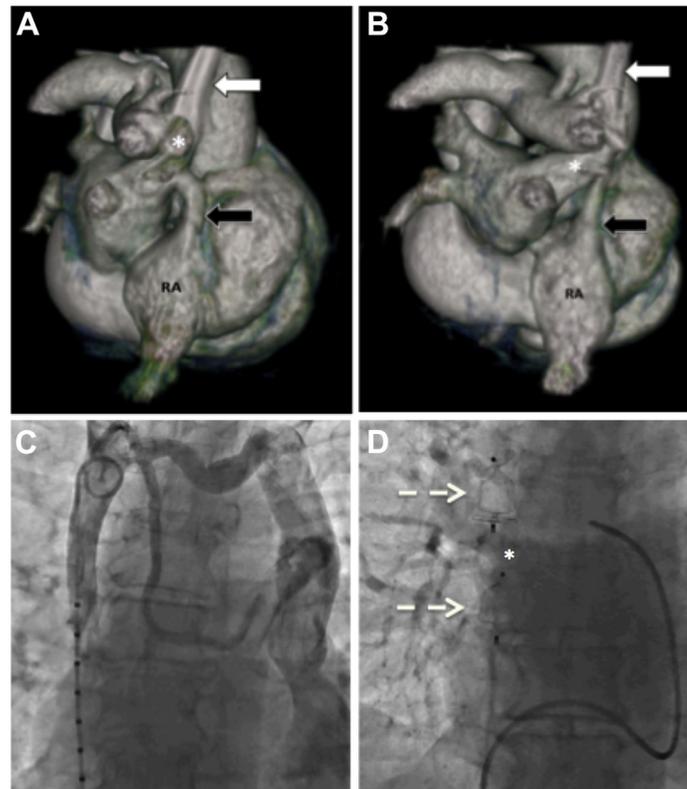
Angiography confirmed the connections (Figure 1C). Balloon occlusion of the lower right SVC did not alter pressure in the upper right SVC. A 14-mm Amplatzer Vascular Plug II (St. Jude Medical, St. Paul, Minnesota) was deployed in the right SVC at the SVC-RUPV junction. A 10-mm Amplatzer Vascular Plug II

was deployed in the inferior remnant of the right SVC at the SVC-RUPV junction. Completion angiography from the right pulmonary artery showed unobstructed flow from the RUPV to the left atrium (Figure 1D). Femoral artery oxygen saturation rose from 90% to 94%.

The most common systemic venous anomaly is a persistent left-sided SVC (0.3%) (1). Percutaneous closure of a left SVC draining to the LA (2) and surgical correction of a right SVC draining to the LA (3) have been described. To our knowledge, this is the first report describing percutaneous closure of a right SVC to LA connection.

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**FIGURE 1** Diagnostic and Procedural Images

**(A to B)** 3-dimensional volume-rendered images from cardiac computed tomography. Two views of the posterior aspect of the heart are shown with slightly different degrees of obliquity. The right superior vena cava (SVC) (**white arrow**) is shown to drain to the right superior pulmonary vein (**asterisk**). A smaller "remnant" SVC (**black arrow**) arises from the undersurface of the right superior pulmonary vein and continues caudally to drain to the right atrium (RA). Note the offset between the upper and lower portions of the SVC, with the inferior remnant SVC lying more anteriorly than the upper SVC (best appreciated in **A**). **(C)** Contrast injection in the right SVC shows predominant flow from the right to the left SVC. **(D)** After deployments of 2 Amplatzer Vascular Plug II devices (St. Jude Medical, St. Paul, Minnesota) (**dashed arrows**), the right SVC is isolated from the right upper pulmonary vein (**asterisk**) and flow in the right upper pulmonary vein is unobstructed.

## REFERENCES

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**KEY WORDS** anomalous systemic venous drainage, catheter occlusion, right superior vena cava to left atrium