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IMAGES IN INTERVENTION

Percutaneous Treatment of a Giant Right Coronary Artery Aneurysm

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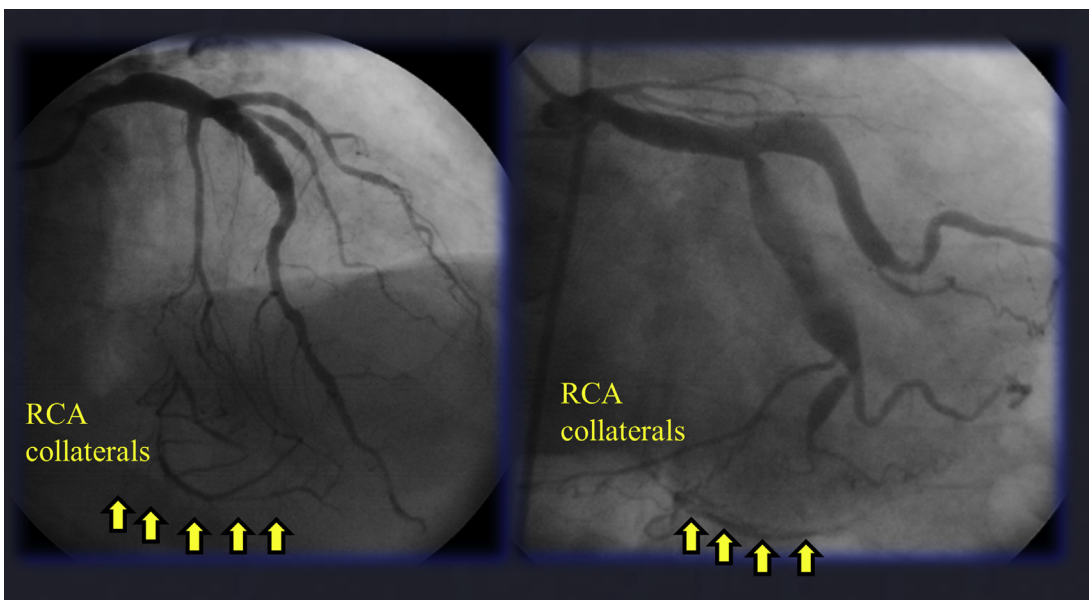
A 61-year-old smoker with a past medical history of hypertension presented with malaise to his local emergency department and was diagnosed with malignant hypertension. In view of a small cardiac enzyme rise and nonsustained ventricular tachycardia on 24-h monitoring, a coronary angiogram was performed that revealed separate origins for the left anterior descending and the left circumflex arteries (Figure 1), ectasia in the proximal left anterior descending and mid-left circumflex, and a giant coronary artery aneurysm (CAA) (15 cm × 7.5 cm) in the mid-segment of the right coronary

FIGURE 1 Ectatic Left System Arteries Supplying the Posterior Descending Artery



Ectatic left system arteries supplying the posterior descending artery, which was supplied originally by the right coronary artery (RCA). Collaterals from the left system are indicated with **yellow arrows**.

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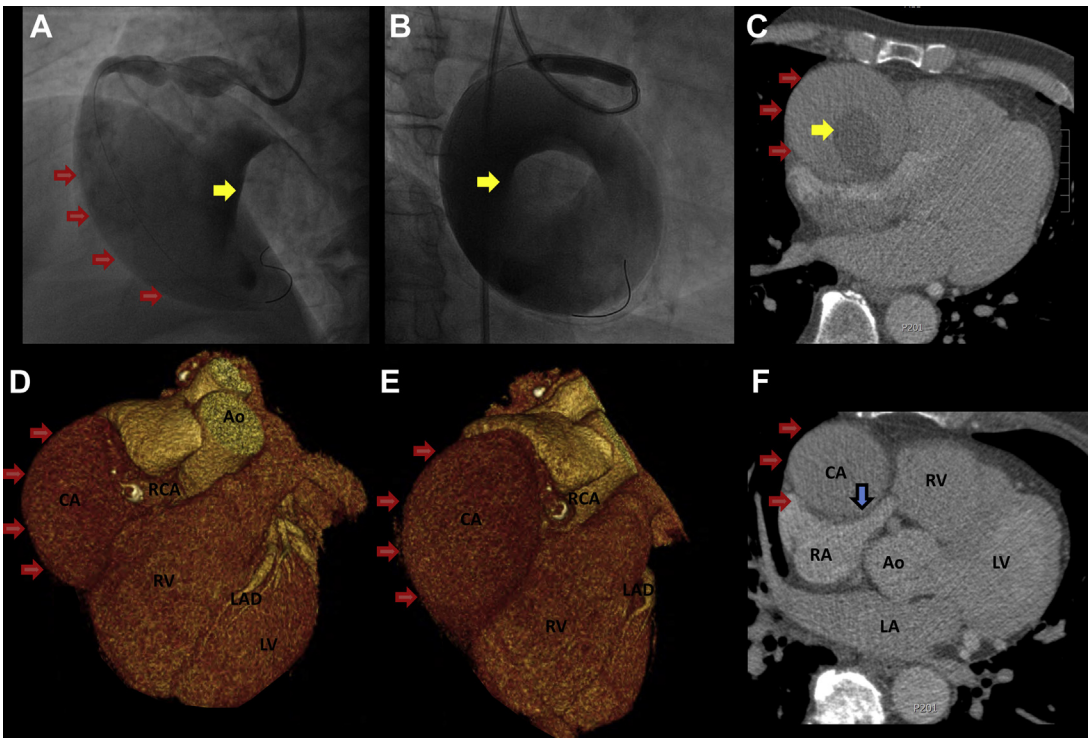
FIGURE 2 Giant RCA Aneurysm Containing Large Thrombus

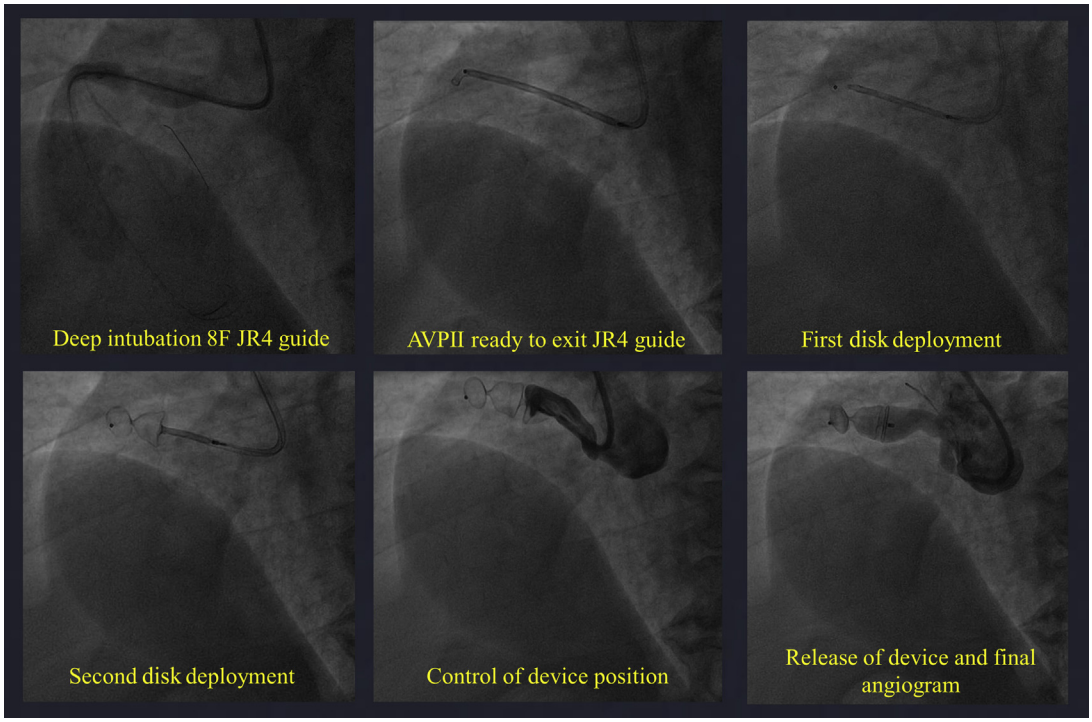


Giant mid-right coronary artery (RCA) aneurysm **(red arrows)** containing large thrombus **(yellow arrows) (A to C,** Online Video 1**)**. The aneurysm appears to be compressing the right ventricular inflow **(blue arrow) (F)**. Using an 8-F guiding Judkins Right 4 catheter and an Armada 8 × 40 mm peripheral balloon (Abbott Vascular, Santa Clara, California), the proximal part of the RCA was temporary occluded (for 10 min). No symptoms or echocardiographic or electrocardiographic ST-segment changes occurred. Ao = aorta; CA = coronary artery; LA = left atrium; LAD = left anterior descending artery; LV = left ventricle; RA = right atrium; RV = right ventricle.

artery (RCA) (Figure 2A) containing a large thrombus at its distal part (Figure 2, yellow arrows). The posterior descending artery and posterolateral branch were supplied by collaterals from the left system (Figure 1). An echocardiogram revealed good biventricular systolic function with external compression of the right atrium by a giant RCA CAA causing turbulent flow through the tricuspid valve. RCA contrast injection and computed tomography coronary angiography revealed a large mid-RCA coronary aneurysm (Figure 2, red arrows) that contains a large thrombus (yellow arrows) and is externally compressing the right atrium (Figure 2F, blue arrow) and right ventricle.

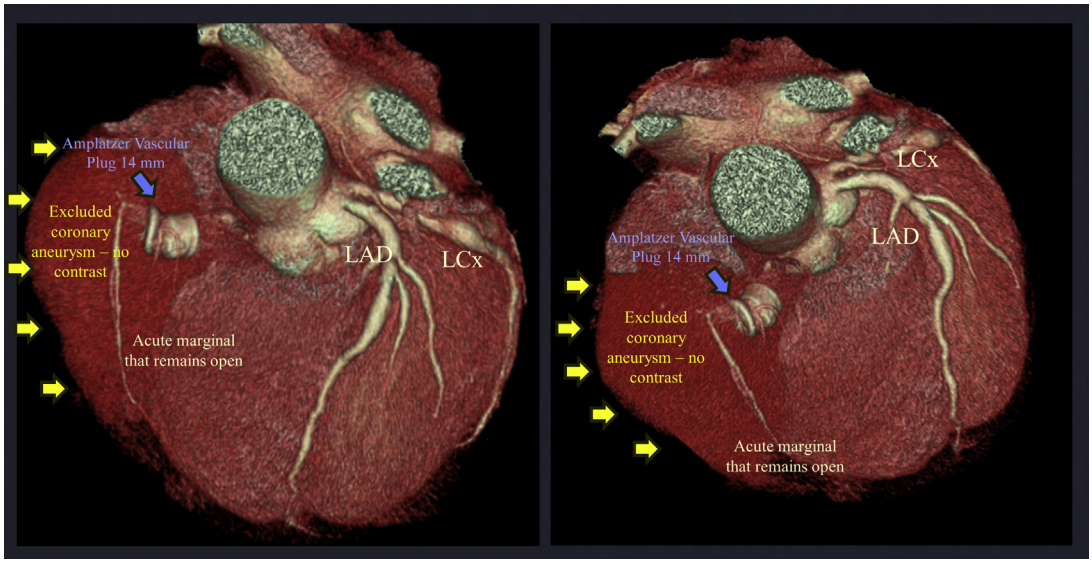
The patient had transient occlusion of his RCA using an 8-F Judkins Right 4 guiding catheter and a peripheral 8 × 40 mm balloon (Figure 2B, Online Video 1) to ensure the absence of hemodynamic instability, electrocardiographic and echocardiographic changes prior to percutaneous closure. A percutaneous approach was adopted rather than an open repair, due to the favorable proximal RCA anatomy for deployment of an Amplatzer plug and patient preference. The device diameter was oversized by 25% to eliminate embolization risk (1). The closure was performed successfully with the delivery of a 14-mm Amplatzer Vascular Plug II (St. Jude Medical, St. Paul, Minnesota) device (Figure 3), through an 8-F Judkins Right guide catheter, in the proximal segment of the RCA (Online Video 2). At the end of the procedure, there was minimal antegrade flow through the Amplatzer plug. At the 3-month follow-up computed tomography there was opacification of the right ventricular branch distal to the Amplatzer plug, suggesting the presence of some antegrade flow past the proximal RCA Amplatzer plug, but no contrast was entering the giant aneurysm (even in the delayed phase), indicating thrombosis (Figures 4 and 5). The latter was likely caused by the reduction of antegrade flow into the aneurysm (due to the Amplatzer plug in the proximal RCA) and poor outflow due to the presence of left-sided collaterals

FIGURE 3 **Percutaneous Closure of a Giant RCA Aneurysm**



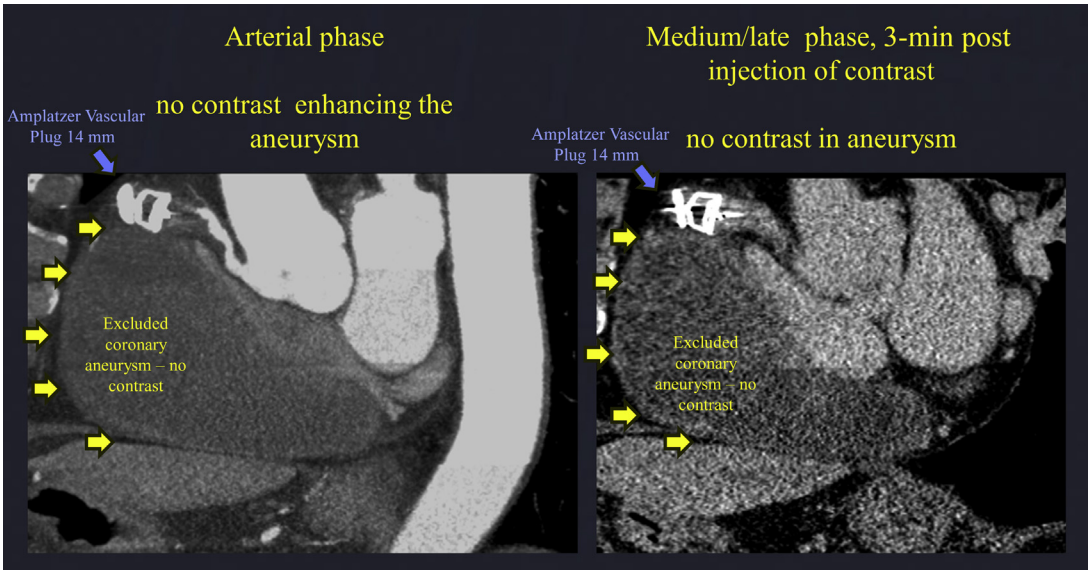
Deep intubation of a Judkins Right 4 (JR4) 8-F guide using 2 Ironman coronary wires (Abbott Vascular). An Amplatzer Vascular Plug II (AVPII) 14-mm device was successfully deployed and released in the proximal right coronary artery (RCA), with minimal contrast flowing through the device (Online Video 2).

FIGURE 4 **Three-Month Follow-Up CTCA Demonstrates Isolation of the Giant RCA Aneurysm**



Computed tomography coronary angiography (CTCA) 3-dimensional reconstruction 3 months after percutaneous closure revealed a thrombosed giant RCA aneurysm. A small amount of contrast was directed toward the right ventricular branch distal to the Amplatzer. LCX = left circumflex; other abbreviations as in Figure 2.

FIGURE 5 3-Month Follow-Up CTCA Confirms Isolation



Three months after percutaneous closure, the delayed phase (3-min post-injection of contrast) of the computed tomography coronary angiography (CTCA) indicates that there is no enhancement in the right coronary artery aneurysm, confirming successful isolation.

to posterior descending artery and posterolateral branch.

CAA, defined as dilation of the coronary artery of more than 50% of the reference vessel diameter, are uncommon encounters occurring in <5% of coronary angiographic studies (2) and are predominantly caused by atherosclerosis in adult life and Kawasaki disease in children. Giant CAA are those exceeding the reference vessel diameter by >4× or are >8 mm in diameter. Even though percutaneous closures of giant saphenous vein graft aneurysms have been previously described (1,3,4), this is the first case to demonstrate a successful percutaneous closure of a giant native right coronary aneurysm using the Amplatzer Vascular Plug II with 3-month follow-up computed tomography showing thrombosis of the aneurysm.

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KEY WORDS Amplatzer, giant coronary aneurysm, percutaneous closure

APPENDIX For accompanying videos, please see the online version of this article.