

Computed Tomography Angiography–Guided Bypass for Adult Long-Segment Aortic Coarctation

A 39-year-old woman presented with an 11-year history of exertional dizziness, palpitations, and chest tightness, accompanied by progressive facial edema over the preceding 5 years. Physical examination revealed a systolic blood pressure gradient of 50 mm Hg between the upper and lower extremities. A grade 3/6 systolic ejection murmur was audible at the left sternal border and a separate systolic murmur was noted over the left interscapular region. Laboratory investigations, including renal function, thyroid function, and B-type natriuretic peptide, were unremarkable, ruling out secondary causes of facial edema. Computed tomography angiography (CTA) identified severe focal isthmic coarctation (3 mm diameter, 15 mm length) (Figure 1A) with extensive collaterals, and a Sievers Type 0 bicuspid aortic valve with mild stenosis but no aortopathy. She underwent left subclavian-to-descending aorta extra-anatomic bypass using a 14-mm Dacron graft; this approach was chosen over endovascular stenting due to the coarctation's length and location. The pressure gradient resolved intraoperatively. At 12-month follow-up, CTA confirmed graft patency without stenosis or pseudoaneurysm (Figure 1B), and symptoms fully resolved (NYHA Class I).

Aortic coarctation (CoA) accounts for only 5%–8% of congenital heart defects and is rarely encountered in adult practice, as most cases are corrected in early childhood.¹ However, milder lesions may remain occult until adulthood, typically identified during evaluation of exertional intolerance or refractory hypertension.^{2,3} Over 60% of affected adults harbor a bicuspid aortic valve, substantially elevating life-long risks of aortopathy—including dilation, aneurysm, and dissection—and mandating sustained imaging surveillance.^{4,5} High-resolution CTA is the cornerstone of preoperative risk stratification and procedural planning, precisely quantifying stenosis severity, lesion length, arch anatomy, and collateral burden. For long-segment coarctation unsuitable for stenting, CTA directly informs the feasibility and configuration of extra-anatomic bypass. Percutaneous interventions in adult CoA achieve favorable procedural success and low in-hospital mortality, though rare but serious complications underscore the necessity for meticulous management and lifelong follow-up.⁶ Postoperatively, repaired CoA patients remain susceptible to recoarctation, pseudoaneurysm, and dissection. Computed tomography angiography enables robust surveillance of graft patency and early complication detection; guidelines recommend cross-sectional imaging at 5-year intervals in stable patients.¹ Thus, CTA remains indispensable for orchestrating individualized care and ensuring long-term prognostic surveillance in adults with congenital aortic disease.

E-PAGE ORIGINAL IMAGE

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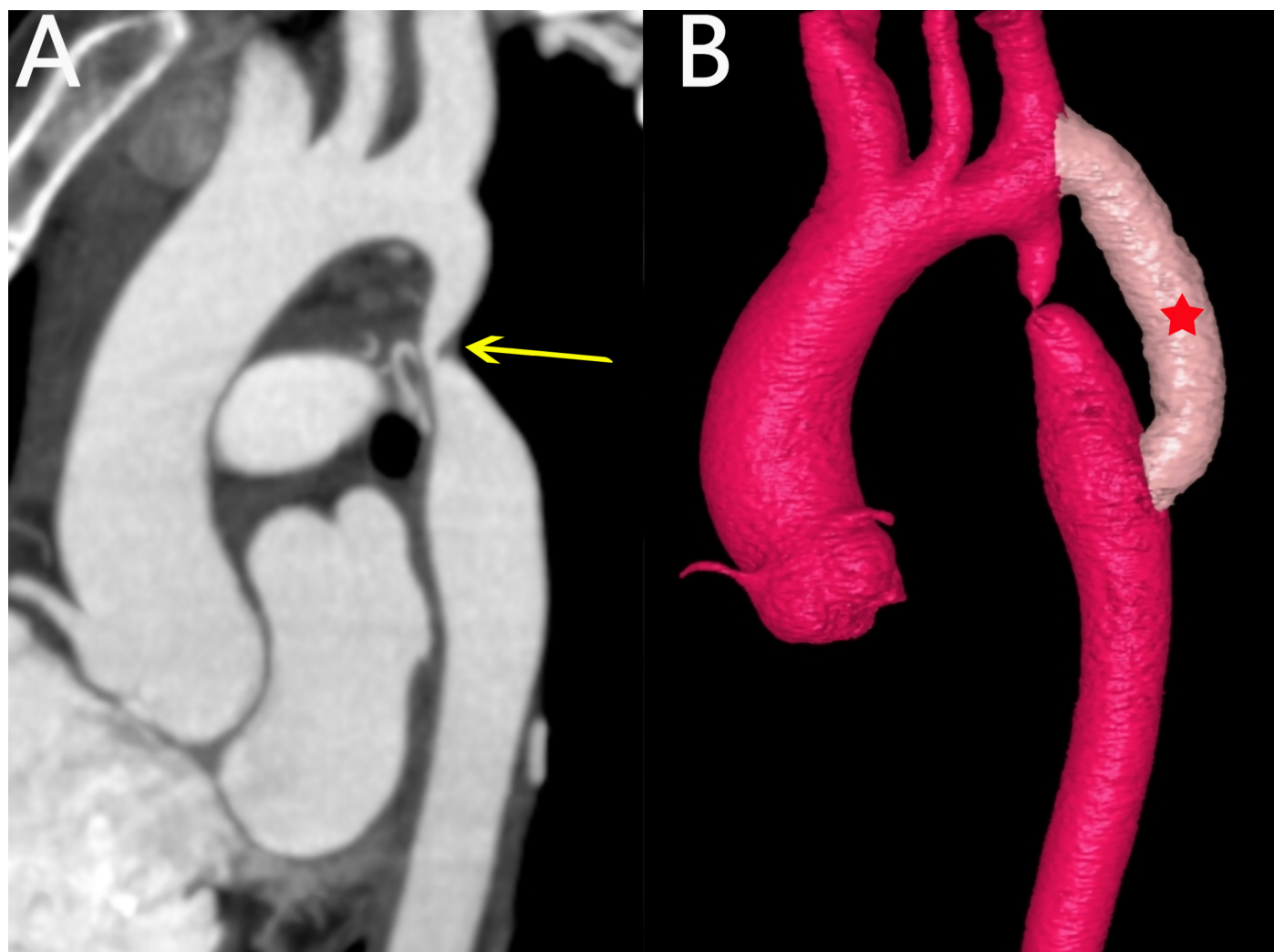


Figure 1. (A) Preoperative computed tomography angiography (CTA) demonstrating severe focal isthmic coarctation (3 mm diameter, 15 mm length; arrow) accompanied by extensive collateral circulation. (B) Twelve-month postoperative CTA confirming patency of the left subclavian-to-descending aorta Dacron graft (star), without evidence of stenosis or pseudoaneurysm.

Informed Consent: This report has obtained the patient's informed consent for the publication of their anonymized clinical data.

Declaration of Interests: The authors have no conflicts of interest to declare.

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