A 54-year-old white woman with a history of hypertension, hyperlipidemia, atrial fibrillation, bicuspid aortic valve, and a previously repaired aortic coarctation in adulthood underwent a computed tomography (CT) scan of the chest to evaluate her surgical repair after an episode of chest pain. Her original repair consisted of a coarctectomy with placement of a side-to-side graft. The CT scan revealed a 4-cm, proximal descending thoracic aortic aneurysm in the repaired portion of the aorta. Magnetic resonance angiography (MRA) and a conventional aortogram did not clarify the underlying problem. She was referred to our center for further investigation and possible surgical or endovascular repair.

We performed a rotational aortogram with 3D reconstruction to solve the anatomic enigma (Figure). The study showed a prosthetic graft placed at the site of the coarctectomy, between the midportion of the aortic arch and the descending thoracic aorta, with the left subclavian artery and left carotid artery reimplanted into the proximal portion of the graft. Two aortic stumps left from the previous surgical repair were visualized. One smaller stump was located at the proximal end-to-side anastomosis of the graft with the aortic arch. A larger distal stump was located adjacent to the distal end-to-side anastomosis of the prosthetic graft with the descending thoracic aorta. The distal aortic stump and the graft were very close together, giving the impression of a dilatation in the repaired portion of the proximal descending aorta on the CT and MRA scans. The diameter of the graft and the distal stump together was exactly 4 cm. This corresponded to the size measured by the previous radiological studies that was reported as an aortic aneurysm. The patient was discharged with no further intervention after her anatomical conundrum was solved.

Rotational aortography with 3D reconstruction is a new angiographic technique currently under clinical development. It consists of a 180-degree fast rotation (22.5 degrees/second) of the C-arm around the plane of imaging while a bolus of contrast is injected through a power injector with a pigtail catheter in the area of interest. This motion creates a real-time 3D picture of the structures studied. The images are processed by specialized software to create a 3D tomographic model, which can be rotated around its 3 axes to establish an optimal viewing plane. Measurements of diameters, lengths, cross-sectional areas, and volumes can be done in any position or angle, with a high degree of precision and great definition of the underlying anatomy. The superior resolution of the 3D aortic tomographic reconstruction thus avoided further diagnostic tests and a possible exploratory thoracotomy for a presumed repaired aortic coarctation aneurysm.
Rotational aortogram with 3D reconstruction of a repaired aortic coarctation. A dilated ascending aorta and brachiocephalic trunk due to the previously existing aortic coarctation can be seen, with the right common carotid artery emerging from the brachiocephalic trunk on the left side of the figure. Two aortic stumps from previous surgical repair are visualized. A small stump is located at the end-to-side proximal anastomosis of the graft with the midportion of the aortic arch (1), and a larger stump originates at the end-to-side distal anastomosis of the graft with the descending thoracic aorta (2). The prosthetic graft (3) can be seen between the aortic arch, proximal to the coarctectomy, and the descending thoracic aorta, distal to the coarctectomy. The left subclavian and carotid arteries were reimplanted in the proximal portion of the graft. An orthogonal slice through the distal stump (2) and the graft (3) was 4.0 cm. This diameter corresponded to the size of the "aneurysm" erroneously detected by the CT scan and MRA.
Rotational Aortogram With Three-Dimensional Reconstruction in a Case of Repaired Aortic Coarctation
Fernando Boccalandro, Bernardo De La Guardia and Richard W. Smalling

*Circulation*. 2001;104:620-621
doi: 10.1161/hc3001.093606
*Circulation* is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2001 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/content/104/5/620

**Permissions:** Requests for permissions to reproduce figures, tables, or portions of articles originally published in *Circulation* can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

**Reprints:** Information about reprints can be found online at:
http://www.lww.com/reprints

**Subscriptions:** Information about subscribing to *Circulation* is online at:
http://circ.ahajournals.org/subscriptions/