A 83-year-old man with known history of known coronary artery disease (prior coronary artery bypass surgery and percutaneous coronary intervention), hypertension, and hypercholesterolemia presented with ongoing exertional angina and dyspnea despite medical therapy. A dipyridamole rubidium-82 stress test showed moderate-sized ischemia in the inferior and inferolateral territory. An echocardiogram showed mild segmental left ventricular dysfunction with an ejection fraction of 45% and mild mitral regurgitation.

Angiography showed severe native triple vessel disease, patent left internal mammary artery graft to left anterior descending artery, patent stents in saphenous vein graft to obtuse marginal, and occluded vein graft to right coronary artery (RCA; previously known to be occluded). The native RCA was diffusely diseased with subtotal occlusions in its mid and distal segments including severe proximal posterior descending artery disease and was partly collateralized from obtuse marginal (Figure 1A). Given the ongoing symptoms on medical therapy, decision was made to proceed with percutaneous coronary intervention to RCA.

The RCA ostium was engaged with an 8F Amplatz (AL 0.75) guide (chosen for extra support in a calcified, diffusely diseased artery), and the total occlusions in the mid and distal RCA were crossed using a PT Graphix guide wire (Boston Scientific, Natick, Mass). Rotational atherectomy with 1.50-mm burr was performed to recanalize the entire RCA from mid vessel to posterior descending artery because the mid vessel lesion could not be crossed with 1.5-mm balloon. A localized dissection was noted in the proximal RCA, most likely induced by the guiding catheter rather than atherectomy, because it was close to the edge of the guiding catheter and proximal to the segments treated with rotational atherectomy. Gentle balloon inflation was performed in the mid and proximal RCA (3.0-mm compliant balloon to 4 atmospheres). A gentle puff of contrast after the balloon inflation showed propagation of the dissection proximally back to the right coronary sinus and ascending aorta. A 3.5×23 mm Xience stent (Abbott Vascular, Abbott Park, Ill) was immediately deployed to the RCA ostium to seal the entry site of the dissection (Figure 1B). There was no hemodynamic compromise or any evidence of aortic regurgitation. The rest of the RCA was stented with multiple Xience stents and postdilated with excellent final angiographic result (Figure 1C). At angiography, the aortic dissection seemed to be confined to the sinus of Valsalva. Transthoracic echocardiogram showed ascending aortic dissection without aortic regurgitation or pericardial effusion.

**Figure 1.** RCA angiographic appearance: preprocedure (A), contrast in the false lumen of the aortic root dissection originating from RCA ostium (image at the time of ostial stent deployment) (B), and final angiographic appearance (C).
Computed Tomography (CT) angiography (see online-only Data Supplement) was performed immediately after the procedure (no change in clinical status) to assess the extent of the dissection. This showed a type A aortic dissection originating from the RCA ostium and extending cranially for 8 cm without involvement of the great vessels of the neck and with little contrast in the false lumen (Figures 2A, 3A, 4A, 5A, and 5B). The patient was admitted for observation, and repeat CT angiography performed the following day and 4 days after the percutaneous coronary intervention procedure demonstrated significant reduction in the diameter of the false lumen (Figures 2B, 2C, 3B, 3C, 4B, and 4C). The patient was discharged home and a follow-up CT scan at 4 weeks showed complete resolution of the dissection (Figures 2D, 3D, and 4D).

Discussion

Iatrogenic aortic root dissection is a rare and a potentially catastrophic complication of coronary angiography and intervention. In published reports, the estimated incidence of iatrogenic aortic dissection is \( \approx 0.02\% \). The right coronary ostium is involved in most cases and is most often guiding-catheter induced.\(^1\)\(^2\)\(^3\)

Most iatrogenic aortic dissections from the coronary ostia remain confined to the coronary sinus and almost all are limited to the ascending aorta (Stanford type A; DeBakey types 1 or 2).\(^1\)\(^2\) However, in most reports, the extent of the dissection was most commonly defined at angiography, which may underestimate the true extent of dissection due to inadequate contrast opacification of the false lumen, especially if the ostium has been emergently stented, sealing-off the entry site of the false lumen. In this case, the dissection seemed to be confined to the sinus at angiography, and the full extent was only appreciated on CT angiography. CT has the advantage of speed and accuracy in addition to the large field of view. It provides high-quality images of the dissection flap, its origin and extent.\(^4\) This patient illustrates the noninvasive utility in the follow-up period where CT can also show progression or regression of aortic pathology.

The optimal management of iatrogenic aortic dissection remains controversial and is based largely on case reports and anecdotal experience. Most iatrogenic aortic dissections can be managed with immediate stenting of the coronary ostium to seal the entry site followed by close observation and medical therapy to control blood pressure.\(^1\)\(^2\)\(^3\) Some authors have proposed that surgical intervention should be considered if the dissection extends >4 cm up the aorta.\(^1\) However, even when the dissection is extensive, stenting of the ostium may be enough to control the dissection.\(^2\) Rapid progression of aortic dissection with involvement of the arch vessels and other complications, such as aortic regurgitation and pericardial effusion/tamponade, although uncommon, mandate surgical intervention.

Disclosures

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References


KEY WORDS: aorta \( \square \) catheterization \( \square \) imaging \( \square \) aortic dissection

Figure 2. Serial coronal reformatted CT angiography images of the ascending aorta immediately after the procedure showing type A aortic dissection with compression of the true lumen by the false lumen (arrow, A), 1 day after the procedure (B), 4 days after the procedure (C) showing decrease in the false lumen diameter with no compression of the true lumen, and complete resolution 30 days after the procedure (D).

Figure 3. Serial axial contrast-enhanced CT image at the level of the RCA ostium immediately after the procedure (A) and repeated at 1 (B), 4 (C), and 30 days (D) after the procedure show dissection flap originating from the RCA ostium (large arrow) and blood in the false lumen (small arrow) and resolution of both with time.
Figure 4. Serial axial contrast-enhanced CT image at the level of the main pulmonary artery immediately after the procedure (A) and repeated at 1 (B), 4 (C), and 30 days (D) after the procedure demonstrate the contrast-enhanced true lumen and the resolution of the blood in the false lumen (arrow) with time. The saphenous vein graft-obtuse marginal graft is seen to arise from the true lumen (at 1 o’clock) and is widely patent with contrast enhancement.

Figure 5. Three-dimensional volume rendering the contrast-enhanced aorta shows a smooth indentation (arrow) representing mass effect from the false lumen. A, False lumen is not seen, as its lower CT attenuation is not captured by the threshold technique used to generate the reformation. B, 3D volume rendering the contrast-enhanced aorta with a different threshold demonstrates the true and false (arrow) lumen.
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