Three-Dimensional Densimetric Analysis of Coronary Artery Aneurysm

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A 43-year-old man, previously fit and well, was admitted with an anterior myocardial infarct treated with recombinant tissue plasminogen activator. Five days later, he underwent coronary angiography, which demonstrated a proximal aneurysm of the left anterior descending coronary artery (LAD) (Figure 1), with a severe stenosis immediately distal to the aneurysm (Figure 2) and right coronary artery disease (Figure 3).

The presence of a clot or atherosclerotic plaque in the aneurysm sac, which might be disrupted and cause distal embolization with occlusion of the LAD at the site of the stenosis, could be excluded via quantitative 3D angiography of the aneurysm sac. Figure 4 shows the saccular/eccentric nature of the aneurysm sac, and Figure 5 demonstrates the absence of a clot or atherosclerotic plaque within the aneurysm. Figure 6 demonstrates a 3D reconstruction of the disease in the right coronary artery. Unfortunately, attempted angioplasty of the stenosis resulted in the coiling of the guidewire in the aneurysm sac (Figure 7). The patient was referred for coronary artery surgery. He made an uneventful recovery and was discharged 6 days later.

Figure 1. Aneurysm of LAD.

Figure 2. Severe stenosis of LAD immediately distal to aneurysm.
Figure 3. Stenosis of right coronary artery.

Figure 4. Quantitative 3D angiography demonstrating eccentric nature of aneurysm. LAD is clearly seen entering and leaving eccentric/saccular aneurysm sac. Appearance of aneurysm as a “hole” indicates that no clot or atherosclerotic plaque is present in sac. Clot or plaque would cause angiographic contrast density change that might be too subtle to be perceived by human eye unless excessive amount is present.

Figure 5. Cross section through aneurysm demonstrating no concealed plaque or hematoma within aneurysm sac. In cross-sectional views, any clot or plaque would be seen as protrusions from wall into “hole.”
Figure 6. Quantitative 3D angiography demonstrating stenosis in right coronary artery.

Figure 7. Coiling of guidewire in aneurysm sac.
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