

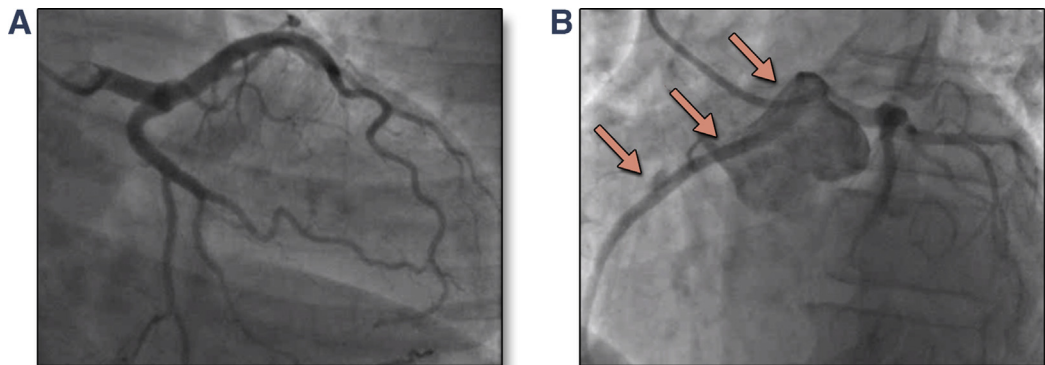
Nonatherosclerotic Coronary Artery Narrowing



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MOST PATIENTS WHO PRESENT WITH ANGINA OR ACUTE CORONARY SYNDROMES ARE EVALUATED FOR atherosclerotic obstructive coronary artery disease, the most common cause of myocardial ischemia (MI). However there are uncommon situations in which compression of coronary arteries represents the main pathophysiologic feature leading to MI. Compression of left main coronary artery by a dilated pulmonary artery is increasingly recognized as a cause of MI, but requires a high index of suspicion. Anomalous origination of a coronary artery from the opposite sinus with intussusception of the ectopic proximal vessel, variable degrees of hypoplasia and lateral compression, represents a subgroup of coronary anomalies that has the most

FIGURE 1 57-Year-Old Female Admitted With Typical Chest Pain and T-Wave Inversions in Inferior Leads in ECG



(A, B) Coronary angiogram revealed anomalous origination of the RCA. The angiographic images were not sufficient to properly evaluate the presence of possible stenosis in the first segment of the vessel. (C to E) CTA showed both the left main stem and RCA arose from the left sinus, and showed a possible narrowing of the proximal part of the RCA. Note that CTA 3D reconstruction (D) was impressive in showing the ectopic origin of the RCA, but CTA images were still imprecise in confirming a clear stenosis of that segment. In this case, IVUS was able to demonstrate an eccentric slit-like luminal area, confirming the compression affecting the proximal segment of RCA (Online Video 1). The distal proximal segment of the vessel had a lumen area of 10 mm² (I), whereas the ostium had an eccentric lumen with an area of 6 mm² and a minimal diameter of 1.8 mm (F). (F to I) Proximal to distal part of the proximal RCA. CTA = computed tomography angiogram; IVUS = intravascular ultrasonography; RCA = right coronary artery.

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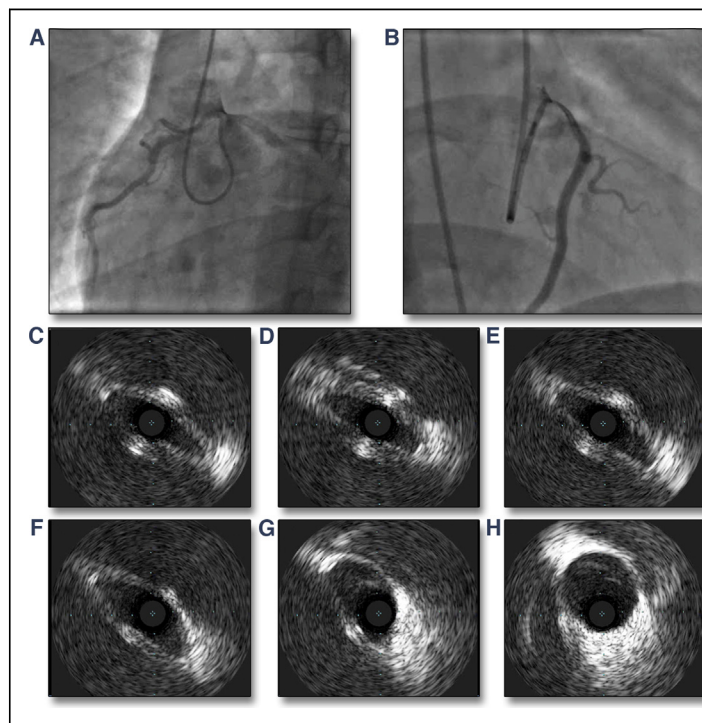
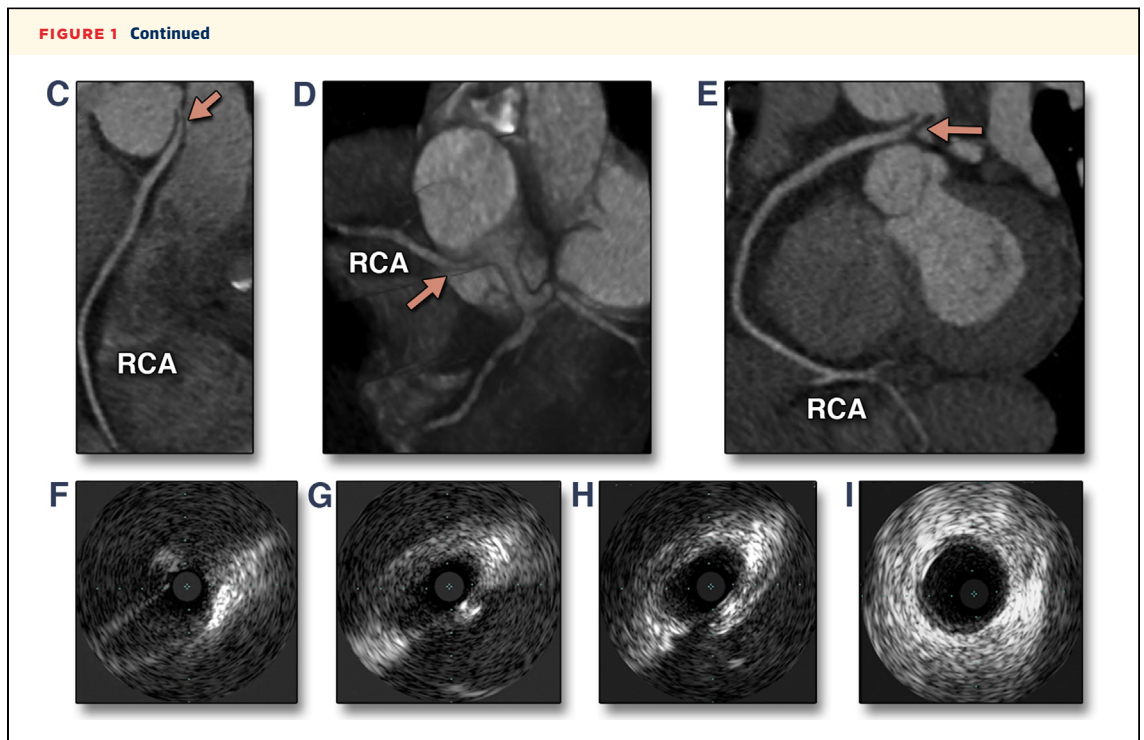


FIGURE 2 20-Year-Old Man Without History of Heart Disease Transferred to Our Institution Following Cardiac Arrest While Playing Football

(A, B) Coronary angiography showed an anomalous dominant RCA arising from the left coronary sinus. It was difficult to engage the RCA, but it was possible to see a proximal eccentric stenosis (B). Evaluation of the proximal segment with IVUS ([Online Video 2](#)) allowed us to fully ascertain the shape and importance of the stenosis. Although the distal segment of the proximal RCA had a reference area of 12.3 mm² and a diameter of 3.8 mm with a circular lumen (H), at the ostium, the lumen was eccentric, slit-like, with a minimal lumen area of 4.2 mm², and a minimal diameter of 1.5 mm (C). (C to H) Proximal to the distal segment of RCA. Abbreviations as in [Figure 1](#).

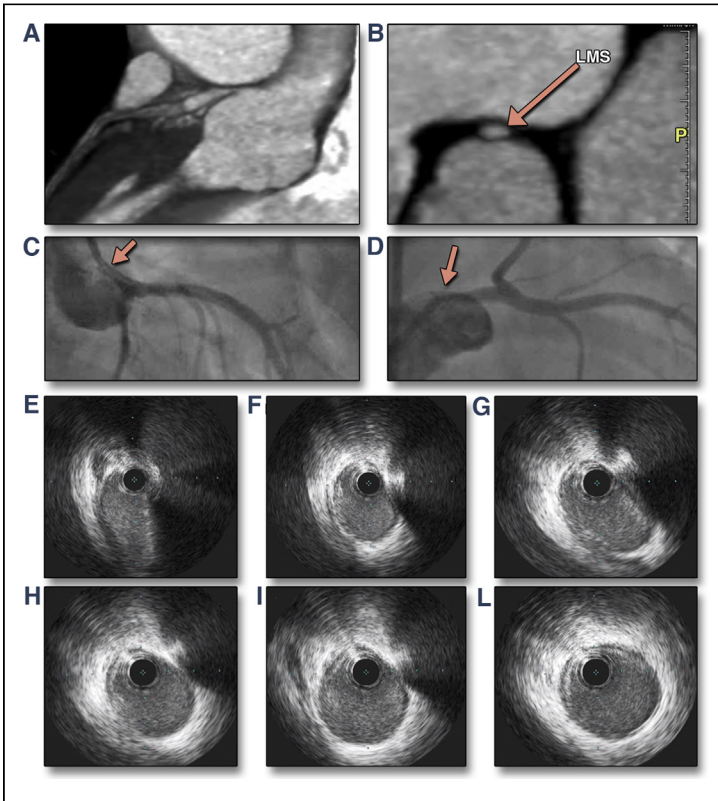


FIGURE 3 29-Year-Old Woman With a History of Pulmonary Hypertension Associated With a Large Atrial Septal Defect

The woman was admitted to the hospital with an ischaemic chest pain with troponin rise. (A, B) CTA showed compression of the LMCA between a dilated pulmonary artery and left coronary sinus. (C, D) Coronary angiogram showed a possible proximal constriction of the LMCA (arrows). IVUS confirmed the presence of stenosis (Online Video 3) showing a slit-like lumen with a minimal cross-sectional area of 5 mm² (E). (E to L) Proximal to distal segment of LMCA. LMCA = left main coronary artery; other abbreviations as in Figure 1.

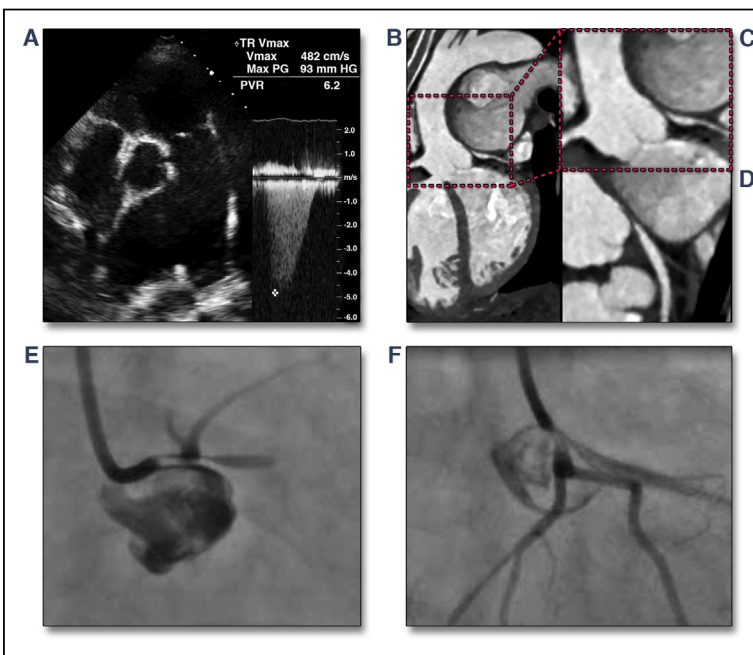
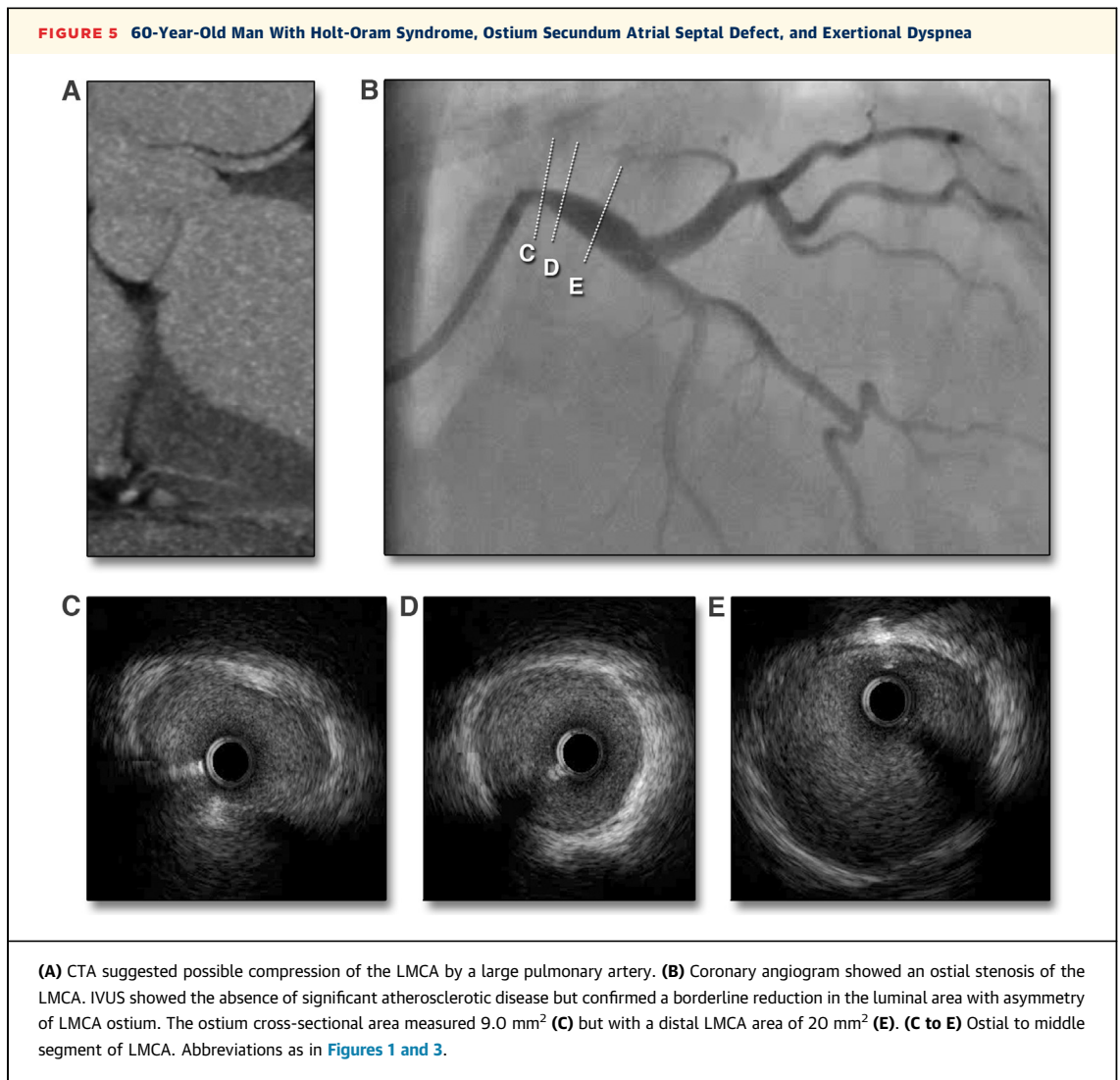


FIGURE 4 48-Year-Old Female With Eisenmenger Syndrome Caused by an Ostium Secundum Atrial Septal Defect

The woman was admitted for investigation of a recent onset of exertional angina. (A) An echocardiogram showed PA branches were dilated (right, 43 mm; left, 31 mm) with an estimated pulmonary systolic pressure of 112 mm Hg. CTA confirmed a severely enlarged main PA (35 × 40 mm) causing extrinsic compression and inferior displacement of the LMCA at its origin (B to D). Coronary angiogram showed a clear subocclusive lesion of the origin of the left anterior descending artery prolonged into the LMCA up to the ostium level (E) and involving the origin of the left circumflex artery (F). Abbreviations as in Figures 1 and 3.



potential for ischemic events. These conditions can be suspected by cardiac noninvasive imaging and confirmed by invasive angiography and intravascular imaging. Intravascular-imaging modalities, such as IVUS is considered the gold standard for diagnosis showing a typical slit-like eccentric coronary lumen. IVUS should always be considered in patients, who show signs of luminal compression, which cannot be clearly demonstrated by coronary angiography. The physicians have to be prepared to recognize these uncommon situations, thus we aim to present a selection of images representing the peculiar aspects of these challenging entities.

We presented a series of images of nonatherosclerotic coronary artery narrowing, a rare cause of myocardial ischemia. We highlighted, as both noninvasive and invasive imaging modalities are of value in these peculiar situations and in particular intravascular imaging such as IVUS is a useful tool in the most doubtful cases ([Figures 1 to 5](#), [Online Videos 1, 2, and 3](#)).

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