

Posterior Descending Artery Arising from Septal Perforator

Causes Angina in an Otherwise
Healthy 20-Year-Old Man

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A 20-year-old man presented with exertional substernal chest pain. His electrocardiogram showed evidence of left ventricular (LV) hypertrophy (Fig. 1). His medical history and serial troponin results were not noteworthy. A transthoracic echocardiogram revealed an LV ejection fraction of 0.59 with mild LV hypertrophy. The patient underwent a nuclear exercise stress test with myocardial perfusion imaging. The technetium-99m single-photon emission computed tomographic (SPECT) scan revealed ischemia in the mid anteroseptal and inferior septal segments of the LV (Fig. 2).

A ventriculogram showed no hypertrophic obstructive cardiomyopathy. A coronary angiogram revealed an anomalous posterior descending artery (PDA) arising from a septal perforator (SP). The SP arose from the left anterior descending coronary artery; the left circumflex coronary artery was dominant. The PDA, which traversed the intraventricular septum and supplied the posterior wall of the myocardium, was

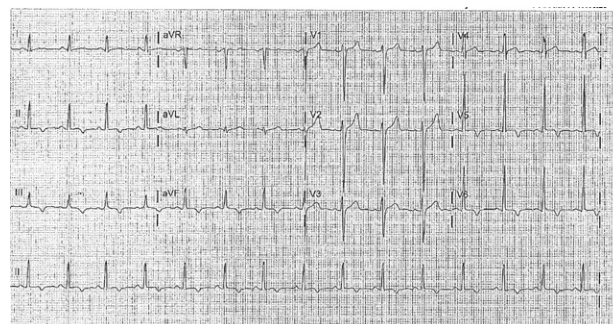


Fig. 1 Electrocardiogram shows evidence of left ventricular hypertrophy.

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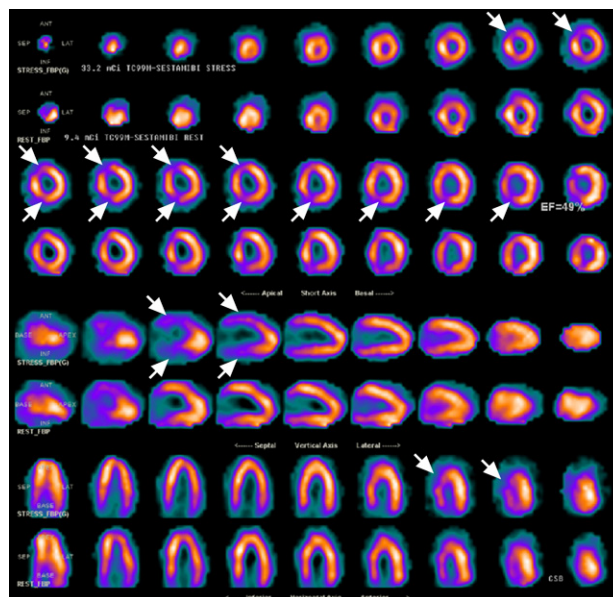


Fig. 2 Single-photon emission computed tomographic scan shows ischemia (arrows) in the mid anteroseptum and inferior septum during stress.

compressed in systole (Fig. 3A–C). An angiogram of the right coronary artery confirmed that the PDA originated from the SP (Fig. 3D). The patient had no obstructive coronary artery disease. We prescribed oral diltiazem, and his symptoms improved.

Comment

In our patient, external compression of the intramyocardial SP as it transitioned to the epicardial PDA mimicked the physiology in myocardial bridging. The perfusion defects during the exercise SPECT test may

have represented coronary steal. The defects in the SP and PDA territories most likely resulted from dynamic compression of the intramyocardial segments, accentuated by stress.

In a study of 18,950 autopsies,¹ the incidence of anomalous coronary arteries was 2.85 per thousand. We found only 2 other reported cases of a PDA arising from an SP^{2,3}; both were incidental findings in individuals who had risk factors for coronary artery disease, unlike our patient. Being alert for potential coronary anomalies is important when evaluating angina in an otherwise healthy person.

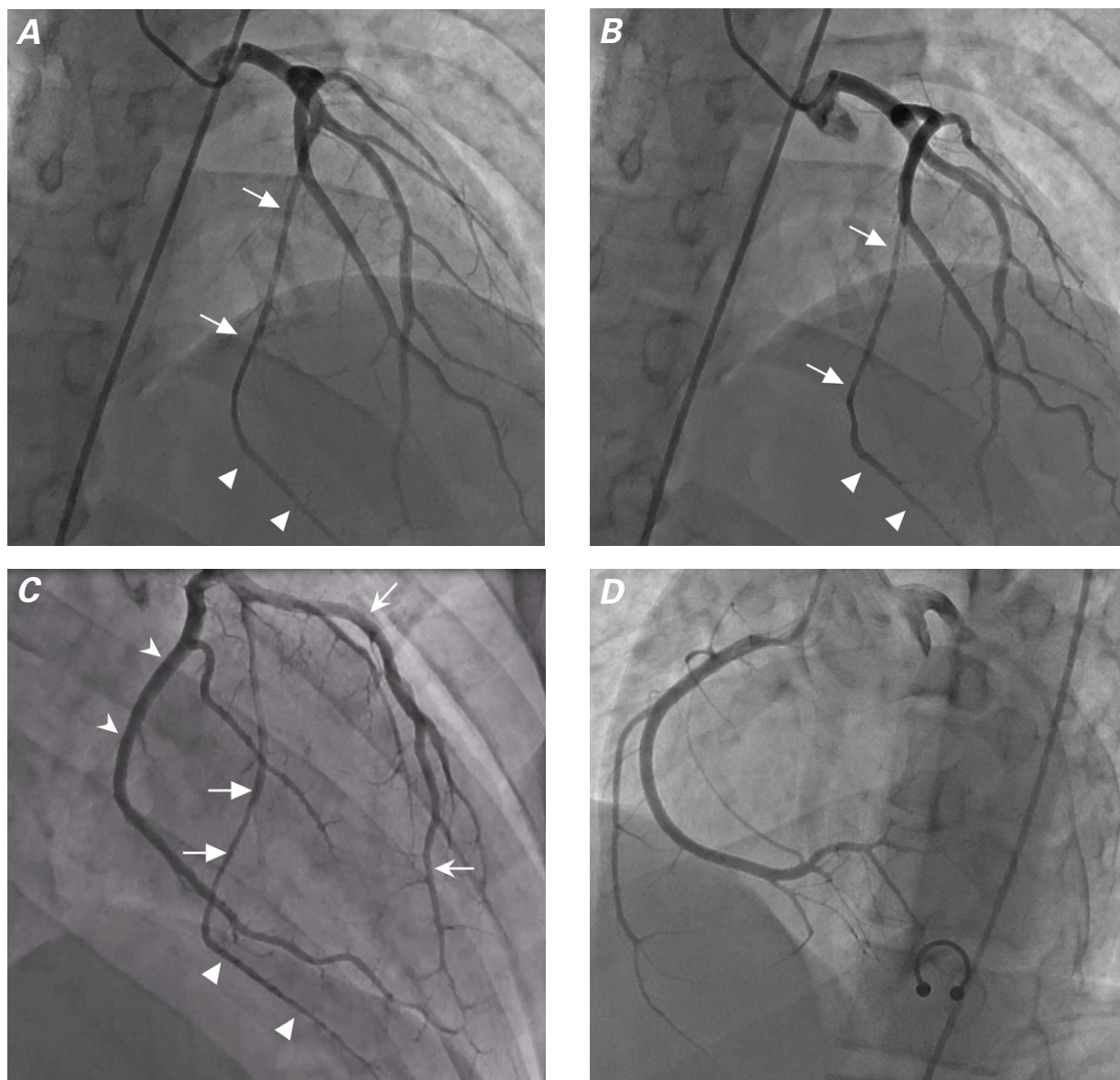


Fig. 3 Coronary angiograms. Views in **A**) diastole and **B**) systole show the septal perforator (arrows) and the anomalous posterior descending artery (arrowheads). **C**) During systole, the septal perforator (arrows), which gives rise to the anomalous posterior descending artery (arrowheads), undergoes external compression. The notched arrows indicate the left anterior descending coronary artery, and the notched arrowheads indicate the left circumflex coronary artery. **D**) The right coronary artery has few distal branches (the anomalous posterior descending artery, which arises from the left system, is not visible). The unusual opacity is a nipple piercing.

Supplemental motion image is available for [Figure 3C](#).

References

1. Alexander RW, Griffith GC. Anomalies of the coronary arteries and their clinical significance. *Circulation* 1956;14(5): 800-5.
2. Errichetti A, Mills RM Jr, Mercadante NM, Lingley JF. Anomalous origin of the posterior descending artery from the first septal perforator. *Cathet Cardiovasc Diagn* 1986;12(6): 402-4.
3. Ucar FM, Gul M, Okten RS, Topaloglu S, Gucuk E. A rare coronary artery anomaly: posterior descending artery arising from septal perforator artery. *Turk Kardiyol Dern Ars* 2013; 41(7):668.