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An Isolated Single L-I type Coronary Artery with Severe LAD Lesions Treated by Transradial PCI

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ABSTRACT: Cases of coronary arteries with anomalous aortic origin are rare. An isolated single coronary artery is a congenital anomaly occurring in approximately 0.024–0.066% of the population. Atherosclerosis of these arteries is not infrequent with potentially severe consequences, but



interventional procedures are rarely performed. We report an acute coronary syndrome case due to a subtotal paraostial left anterior descending (LAD) occlusion of a single L-I type coronary artery. Another severe stenosis was also present at mid-LAD. The patient was successfully treated with transradial percutaneous coronary intervention (PCI). Our case shows that when the anatomy is suitable, complex PCI can be performed successfully in single coronary arteries.

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Key words: acute coronary syndrome, single coronary artery

Case Report. A 68-year-old male patient was admitted with progressive effort dyspnea. He was dyslipidemic and hypertensive with a family history of coronary artery disease and otherwise unremarkable medical history. His ECG showed normal sinus rhythm with negative T waves on leads I, aVL,



V4-V6. On echocardiography, the left ventricle had anteroseptal and apical hypokinesia, ejection fraction 35%, and pseudonormalized filling.

Coronary angiography performed via a right radial artery approach revealed a single coronary artery (SCA) originating from the left sinus of Valsalva (L-I type) (Figure 1). No other coronary artery was noted on aortography (Figure 2). The left main was very short; the LAD and circumflex had separate ostia.



The LAD had a paraostial subtotal occlusion and another focal 80% stenosis at its mid





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segment (Figures 3 and 4). A superdominant circumflex artery, after supplying the posterior descending branch, continued its course along the right posterior atrioventricular groove providing branches for the right ventricle and right atrium.

Ad hoc percutaneous coronary intervention (PCI) was performed maintaining the right radial approach. A 6 French (Fr) JL 3.5 guiding catheter (Cordis Europa NV) was chosen. The LAD lesions were crossed with a Pilot 50 guidewire (Abbott Vascular). The LAD paraostial lesion was predilated with a Sprinter 2 x 10 mm balloon (Medtronic) and an Endeavor Resolute 4 x 18 mm stent (Medtronic) was successfully implanted at 16 atm (Figure 4). Better visualization of the mid-LAD lesion was achieved and permitted direct implantation of a Nobori 3 x 14 mm stent (Terumo) at 16 atm to achieve an excellent angiographic result (Figure 5). The patient had no troponin elevation post-procedure and was discharged uneventfully after 2 days. U.S. Preventive Services Task Force Issues Draft Recommendation Statement on Aspirin Use to Prevent Cardiovascular Disease -pois the ball saming between

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pair of syncope, especially with exercise, cardiomyopathy, and myocardial inflaction. Unfortunately, the initial manifestation may be sudden death, particularly in young athletes, with the R-II-B subtype being mostly notorious for such events.⁴ According to Shirani's review, 15% of patients with isolated SCA had evidence of myocardial ischemia without significant atherosclerotic stenosis.⁵ When atherosclerotic disease develops, its consequences can be much more severe. Disease location, morphology, and extent, along with the extent of jeopardized myocardium must be considered to select the appropriate revascularization method. The affected anomalous vessels are technically difficult to perform surgical grafting. Performing PCI of a SCA has an additional risk for serious complications. Occlusion of the ballooning site due to dissection or thrombus could provoke ischemia to a significant amount of myocardium, while dissection of the single ostium (*e.g.*, guiding-catheter induced) may be catastrophic.⁶

In the largest series examining coronary anomalies in 126,595 patients submitted to coronary angiography, the L-I subtype had an incidence of 0.016%, 1.2% consisting of all coronary anomalies.² The L-I subtype is generally considered benign and usually treated medically.² The L-I SCA



subtype has been rarely reported.⁷ Chou et al reported one and reviewed 11 previous cases.⁷ Coronary atherosclerosis existed in 9 out of 12 cases (75%) and CABG was advocated in 4 (33.3%), while the rest were treated medically.⁷ Another case treated medically was reported recently.⁸ Few reports have described PCI in patients with isolated SCAs, the majority concerning R subtypes.⁹ Takano et al reported PCI for a mid-LAD lesion of a SCA arising from the left sinus of Valsalva, where the right coronary artery originated from the mid-LAD through the transverse branch.¹⁰ To the best of our knowledge, our case is the first report of a successful PCI for an L-I type SCA. In our patient the left main was short and had a very large caliber. This rendered guide catheter positioning and lesion crossing technically challenging, but the risk of guiding catheter-induced damage was low. The superdominant circumflex had a practically separate ostium with a low probability of compromise during PCI.

In general PCI of a SCA is very similar to PCI of unprotected left main. The question remains: Do patients with SCA who underwent PCI need an intraaortic balloon pump (IABP)? An IABP is used in patients with left main coronary stenosis, cardiogenic shock, refractory ischemia, and mechanical



complications of acute myocardial infarction (*e.g.*, ruptured papillary muscle or ventricular septal defect). Despite the reports of no improvement in flow across critical lesions,¹¹ IABP is still associated with clinical benefits, particularly in patients at high risk during angioplasty.¹² However, in a work by Vijayalakshmi et al,¹³ in high-risk, non-shock patients, it was unclear whether IABP provided any benefit to non-shock patients and that the potential benefit of IABP does not appear to be associated with early improvement in angiographically-determined coronary flow. Our patient was stable and the superdominant



circumflex had a practically separate ostium, so we did not use prophylactic IABP.

Our case demonstrates that PCI may be a credible therapeutic option in SCA cases, particularly when prompt treatment of critical lesions is expected to improve patient outcome.

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