

Single Coronary Ostium: Successful Percutaneous Coronary Intervention in Subacute Coronary Syndrome: A Case Report

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Citation: Hajare R. Single Coronary Ostium: Successful Percutaneous Coronary Intervention in Subacute Coronary Syndrome: A Case Report. *Int J Aging Geriatr Med* 2026, 2(2), 121-122.

Received: 27 March, 2026; **Accepted:** 06 April, 2026; **Published:** 08 April, 2026

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ABSTRACT

Coronary artery anomalies are rare but clinically significant conditions that may complicate diagnosis and interventional procedures. Among these, the anomalous origin of the left coronary artery (LCA) from the right coronary cusp (RCC) is extremely uncommon. We report a case of an 86-year-old female presenting with subacute coronary syndrome and a rare single coronary ostium, in which both the LCA and right coronary artery (RCA) originated from the right sinus of Valsalva. Coronary angiography revealed a high-grade proximal RCA stenosis. Despite technical challenges in catheter engagement, successful percutaneous coronary intervention (PCI) with balloon angioplasty and drug-eluting stent implantation was achieved using a specialized guiding catheter approach. This case highlights the importance of procedural adaptability and individualized interventional strategies in managing complex coronary anomalies.

1. Introduction

Coronary artery anomalies represent a diverse group of congenital abnormalities, with a reported incidence ranging from 0.1% to 1.3% in angiographic studies. Among these, the anomalous origin of the LCA from the right sinus of Valsalva is particularly rare, with an incidence of approximately 0.017%. Although many anomalies remain clinically silent, some are associated with myocardial ischemia, acute coronary syndromes and sudden cardiac death^{1,2}. The presence of such anomalies poses diagnostic and therapeutic challenges, especially during percutaneous coronary intervention (PCI), where catheter selection and vessel engagement become technically demanding. This report presents a rare case of a single coronary ostium with anomalous LCA origin, successfully managed with PCI in the setting of subacute coronary syndrome^{3,4}.

2. Case Presentation

An 86-year-old female with a history of hypertension and hyperlipidemia presented with progressive exertional dyspnea and left-sided chest pain over 1-2 weeks. On admission, her blood pressure was 165/85 mmHg and heart rate was 77 beats per minute. Electrocardiography revealed sinus rhythm with T-wave inversions in leads II, III and aVF, suggestive of inferior ischemia^{5,6}. Echocardiography demonstrated reduced left ventricular ejection fraction (40%) with hypokinesia of the inferior wall. High-sensitivity troponin levels were elevated, peaking at 41.91 pg/mL. Coronary angiography revealed a single coronary ostium arising from the right sinus of Valsalva, with separate origins of the LCA and RCA. A critical stenosis was identified in the proximal RCA. Due to advanced age and comorbidities, surgical intervention was deferred in favor of PCI. Initial attempts

to cannulate the RCA using standard guiding catheters (JR 4.0, Amplatz, AR I/II) were unsuccessful. Ultimately, an XB RCA guiding catheter enabled successful engagement. A 0.014-inch coronary guidewire was advanced across the lesion, followed by balloon angioplasty using a 2.5×12 mm balloon. Subsequently, two drug-eluting stents (3.0×12 mm and 2.75×9 mm) were deployed, achieving optimal revascularization with no residual stenosis on final angiography⁷⁻⁹. The patient was stabilized on guideline-directed medical therapy and discharged with referral for cardiac rehabilitation.

3. Discussion

Coronary artery anomalies, though rare, have important clinical implications. Most are discovered incidentally; however, certain variants, particularly anomalous origins from the opposite sinus, may predispose to ischemia, arrhythmias or sudden cardiac death. Additionally, these anomalies can significantly complicate interventional procedures due to atypical vessel orientation and difficulty in catheter engagement. In this case, the anomalous origin of the LCA from the RCC with a shared or closely located ostium represents a rare anatomical variant. The presence of high-grade proximal RCA stenosis was the primary cause of the patient's symptoms, while the anomaly itself was likely incidental. Successful PCI in such cases requires careful planning, appropriate catheter selection and operator expertise. The use of a non-conventional guiding catheter (XB RCA) proved crucial in achieving stable engagement and procedural success. Similar cases reported in the literature emphasize the importance of flexibility and individualized approaches in managing such anatomical challenges. Furthermore, elderly patients with multiple cardiovascular risk factors often present with complex coronary pathology, necessitating minimally invasive strategies such as PCI over surgical intervention.

4. Conclusion

This case highlights a rare coronary anomaly involving a single coronary ostium with anomalous LCA origin from the right coronary cusp, presenting with subacute coronary syndrome. Despite technical challenges, successful PCI was achieved using an adapted catheterization strategy. Recognition of coronary anomalies and appropriate procedural planning are essential for optimal outcomes. This report underscores the feasibility and effectiveness of PCI in complex coronary anatomy and contributes to the growing body of evidence supporting individualized interventional approaches in high-risk patients.

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