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## Case report

## Anomalous left circumflex artery occlusion: A technical challenge in primary percutaneous coronary intervention?

Giuseppe Andò<sup>\*</sup>, Vittorio Virga, Olimpia Trio, Alessandro Di Giorgio,  
Francesco Saporito

Department of Clinical and Experimental Medicine, University of Messina, Italy

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## ABSTRACT

Anomalies of the coronary arteries can be found in approximately 1% of patients undergoing coronary angiography. Most coronary anomalies do not result in signs, symptoms, or complications, and usually are discovered as incidental findings at the time of catheterization. Coronary anomalies may pose several challenges to the interventional cardiologist in the emergency setting, as anomalous vessels may be difficult to find or to selectively cannulate. The knowledge of anatomy and the appropriate selection of suitable technical devices allow achieving successful results in percutaneous intervention of anomalous coronary arteries also in emergency situations.

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### Introduction

Anomalies of the coronary arteries can be found in approximately 1% of patients undergoing coronary angiography [1,2]. Most coronary anomalies do not result in signs, symptoms, or complications, and usually are discovered as incidental findings at the time of catheterization [3]. However, coronary anomalies may pose several challenges to the interventional cardiologist [4] in the emergency setting, as anomalous vessels may be difficult to find or to selectively cannulate. We present here a case of successful primary percutaneous coronary

intervention (pPCI) in a left circumflex artery (LCx) with an anomalous origin.

### Case report

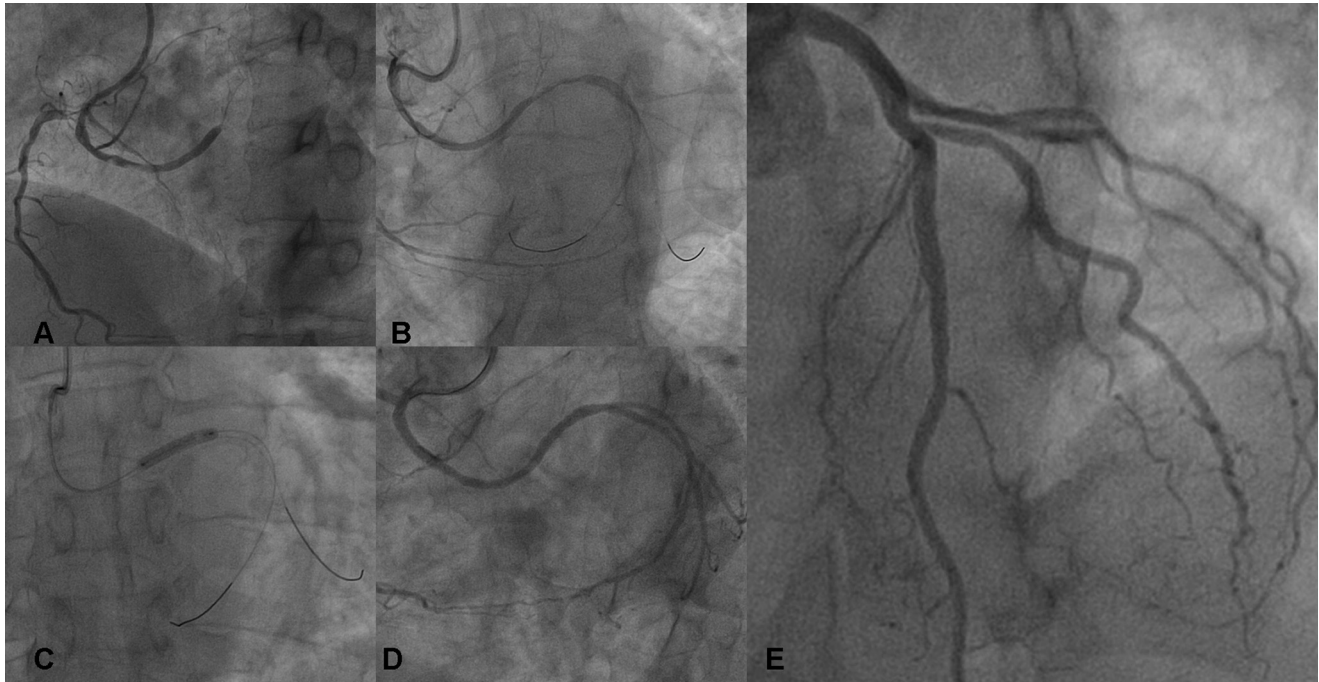
A 51-year-old man with familiar history of coronary artery disease, active smoker, presented to the Emergency department of a spoke-hospital with typical chest pain lasting for 1 h. Electrocardiogram (ECG) revealed a minimal ST-segment elevation in the inferior leads. High-sensitivity troponin was markedly elevated, and therefore he was transferred to our hub center for emergency coronary angiography and possible pPCI.

<sup>\*</sup> Corresponding author at: Via Santa Cecilia 98, 98123 Messina, Italy. Fax: +39 090 2939471.

E-mail address: [giuseppeando1975@gmail.com](mailto:giuseppeando1975@gmail.com) (G. Andò).

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**Fig. 1 – Interventional procedure on the anomalous left circumflex artery (LCx). Panel A: baseline angiography showing the moderately diseased right coronary artery and the occluded anomalous arising LCx. Panel B: after wire recanalization and gentle balloon pre-dilatation at the site of occlusion, a residual stenosis can be observed proximally to the obtuse marginal and the posterior descending branches. Panel C: stent implantation on the residual stenosis. Panel D: final angiographic result after drug-eluting stent implantation on the anomalous LCx. Panel E: baseline angiography of the left coronary artery.**

At angiography from the right radial access, the left coronary artery showed only minimal atherosclerotic disease (Fig. 1E). Importantly, only a single branch with obtuse marginal course emerged from the left main beyond the left anterior descending artery. The right coronary artery (RCA) was moderately diseased, but no evidence of plaque rupture or thrombus was evident. Semi-selective injection in RCA with a Judkins Right 3.5 guiding catheter showed the presence of an anomalous vessel, consistent with an anomalous LCx, which was occluded before reaching the left ventricular myocardium and which was considered the culprit lesion. Therefore, this anomalous LCx was selectively engaged with an Amplatz Left 1 guiding catheter (Fig. 1A). The vessel occlusion was crossed with a Sion Blue wire (Asahi) and, after balloon dilatation at the site of occlusion, antegrade flow was restored (Fig. 1B). The anomalous LCx was revealed to supply the postero-lateral left ventricular myocardium – with two obtuse marginal branches – and the basal inferior septum as well – with a small posterior descending artery. The residual lesion on the anomalous LCx was definitively fixed with a 3.0 × 18 mm Xience Alpine drug-eluting stent (Abbott Vascular), using a Balance Middleweight (Abbott Vascular) as a buddy wire (Fig. 1C); finally, low-pressure plain old balloon angioplasty was performed on the bifurcation of the obtuse marginal branches. The final angiographic result was excellent with restoration of Thrombolysis in Myocardial Infarction (TIMI) 3 flow and no significant residual stenosis (Fig. 1D). Despite more than 300 ml of contrast media had been used, laboratory evaluation did not

show a worsening in renal function, likely because left ventricular function was preserved (ejection fraction was 0.55) [5,6]. Post-procedural ECG showed ST-segment resolution and new Q-waves in leads III and aVF with ischemic T-waves (Fig. 2). The patient had an uneventful in-hospital recovery and was discharged on post-operative day 4 on dual antiplatelet therapy, statin and beta-blocker.

## Discussion

The LCx artery arising from the right sinus of Valsalva or from the RCA is one of the most common coronary anomalies, occurring in 0.67% of the population [7]. The anomalous LCx usually pursues a posterior retro-aortic course, anterior to the left atrium, before supplying the postero-lateral surface of the left ventricle [8]. Previous studies have intriguingly shown that the anomalous circumflex artery arising from the RCA or, separately, from the right sinus of Valsalva is prone to an increased incidence of atherosclerotic lesions [9,10]. Failure to demonstrate this anomaly may lead to erroneous interpretations of coronary artery anatomy in the setting of emergency angiography for acute coronary syndrome. Indeed, the relative frequency of LCx with anomalous origin demands a high level of anticipation during the diagnostic study to assure that adequate visualization of coronary anatomy has been obtained and that the culprit lesion has been identified. To this purpose, fast pre-procedural echocardiographic assess-

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