

The authors' reply

Dear Editor,

We would like to thank the authors for their commentary on our manuscript "A case of twin circumflex arteries associated with acute myocardial infarction".

The incidence of coronary artery anomalies is 1.3%.^[1] Widespread availability of conventional and computed angiography has increased the diagnosis of coronary anomalies. Dual circumflex (Cx) arteries originating from the left and right coronary systems, as in our case, have been reported in only two cases.^[2,3]

The anomalous origin of the Cx artery either from the right coronary artery (RCA) or right coronary sinus (RCS) is one of the common coronary anomalies with an incidence of 0.67%.^[4,5]

The circumflex artery has been classified based on the origin: Cx and RCA originate from separate ostia in the RCS (type 1), RCA and Cx share the same ostium or have adjacent ostia (type 2), Cx originates from the RCA as a branch (type 3).^[6] The initial part of an anomalous Cx is retroaortic.^[7,8]

This anomaly is usually clinically insignificant.^[7] Although some studies found more atherosclerosis in the retroaortic part than in nonanomalous vessels, other studies did not confirm this finding.^[5,7,8] Moreover, myocardial infarction, ischemia, and sudden death related to diseased anomalous Cx vessels have been reported even in the absence of atherosclerotic disease.^[9,10]

In our case, as can be easily appreciated, the severe stenosis was in the proximal/retroaortic part of the anomalous Cx. The criticism about our case was the indication for stent implantation due to possibility of stent crushing in the anomalous Cx. The stenosis was significant, thus the presence or absence of severe ischemia was not important. We did not perform PCI to prevent complications related to the anomaly. Instead, our aim was to treat myocardial ischemia, which might even help prevent anomaly-related problems. Several case reports and studies showed PCI as a difficult but safe procedure for stenosis in anomalous Cx arteries, with very good short- and mid-term results, and there have not been any reported crushed stent cases so far.^[6,11-14] Even though most of the anomalous Cx in our case was coursing between the pulmonary artery and aorta, the stenosis was in the proximal/retroaortic part where the stent was implanted. Furthermore, the compression effect of the great arteries is not well-

established and some authors believe that the pulmonary artery with normal pressures could not occlude or constrict the aberrant left coronary artery distended with systemic pressure.^[15] Moreover, in several case reports, stenting was used to treat left main coronary artery compression by pulmonary artery aneurysm presenting with pulmonary hypertension. In these reports, no incidence of crushed stent was reported.^[16-19]

Given the low incidence of all coronary artery anomalies, most publications on PCI for coronary anomalies are case reports or small case series. These case reports support that PCI is a feasible, safe procedure even in very complex coronary anomalies.^[20,21]

In conclusion, Cx-origin anomaly may have tendency to develop atherosclerosis. Even in the presence of a patent vessel, ischemia, myocardial infarction, or sudden death might develop. However, the exact mechanism and how to prevent them remain unclear. Studies and case reports have shown that PCI for anomalous Cx is related to good short- and mid-term results.

On behalf of the authors,

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*Conflict-of-interest issues regarding the authorship or article:
None declared*

1. Yamanaka O, Hobbs RE. Coronary artery anomalies in 126,595 patients undergoing coronary arteriography. *Cathet Cardiovasc Diagn* 1990;21:28-40.
2. Attar MN, Moore RK, Khan S. Twin circumflex arteries: a rare coronary artery anomaly. *J Invasive Cardiol* 2008; 20:E54-5.
3. van der Velden LB, Bär FW, Meursing BT, Ophuis TJ. A rare combination of coronary anomalies. *Neth Heart J* 2008;16:387-9.
4. Antopol W, Kugel MA. Anomalous origin of the left circumflex coronary artery. *Am Heart J* 1933;8:802-6.
5. Page HL Jr, Engel HJ, Campbell WB, Thomas CS Jr. Anomalous origin of the left circumflex coronary artery. Recognition, angiographic demonstration and clinical significance. *Circulation* 1974;50:768-73.
6. West NE, McKenna CJ, Ormerod O, Forfar JC, Banning AP, Channon KM. Percutaneous coronary intervention with stent deployment in anomalously-arising left circumflex coronary arteries. *Catheter Cardiovasc Interv* 2006; 68:882-90.
7. Leberthson RR, Dinsmore RE, Bharati S, Rubenstein JJ,

- Caulfield J, Wheeler EO, et al. Aberrant coronary artery origin from the aorta. Diagnosis and clinical significance. *Circulation* 1974;50:774-9.
8. Click RL, Holmes DR Jr, Vlietstra RE, Kosinski AS, Kronmal RA. Anomalous coronary arteries: location, degree of atherosclerosis and effect on survival-a report from the Coronary Artery Surgery Study. *J Am Coll Cardiol* 1989; 13:531-7.
 9. Patterson FK. Sudden death in a young adult with anomalous origin of the posterior circumflex artery. *South Med J* 1982;75:748-9.
 10. Edelstein J, Juhasz RS. Myocardial infarction in the distribution of a patent anomalous left circumflex coronary artery. *Cathet Cardiovasc Diagn* 1984;10:171-6.
 11. Blanchard D, Ztot S, Boughalem K, Ledru F, Henry P, Battaglia S, et al. Percutaneous transluminal angioplasty of the anomalous circumflex artery. *J Interv Cardiol* 2001; 14:11-6.
 12. Wong CB, Schreiber TL. Stenting of an anomalous left circumflex coronary artery arising from the right sinus of Valsalva. *Tex Med* 1998;94:64-6.
 13. Dardas PS, Tsikaderis DD, Manoudis FG. Stenting of an anomalous left circumflex coronary artery arising from the right coronary artery. *J Invasive Cardiol* 1999;11:510-2.
 14. Nguyen TM, Quintal RE, Khuri BN, Yount RD, Shah A, Abourahma AH, et al. Stenting of atherosclerotic stenoses in anomalously arising coronary arteries. *J Invasive Cardiol* 2004;16:283-6.
 15. Chaitman BR, Lespérance J, Saltiel J, Bourassa MG. Clinical, angiographic, and hemodynamic findings in patients with anomalous origin of the coronary arteries. *Circulation* 1976;53:122-31.
 16. Vaseghi M, Lee MS, Currier J, Tobis J, Shapiro S, Aboulhosn J. Percutaneous intervention of left main coronary artery compression by pulmonary artery aneurysm. *Catheter Cardiovasc Interv* 2010;76:352-6.
 17. Rich S, McLaughlin VV, O'Neill W. Stenting to reverse left ventricular ischemia due to left main coronary artery compression in primary pulmonary hypertension. *Chest* 2001;120:1412-5.
 18. Lindsey JB, Brilakis ES, Banerjee S. Acute coronary syndrome due to extrinsic compression of the left main coronary artery in a patient with severe pulmonary hypertension: successful treatment with percutaneous coronary intervention. *Cardiovasc Revasc Med* 2008;9:47-51.
 19. Gómez Varela S, Montes Orbe PM, Alcibar Villa J, Egurbide MV, Sainz I, Barrenetxea Bengurúa JI. Stenting in primary pulmonary hypertension with compression of the left main coronary artery. *Rev Esp Cardiol* 2004;57:695-8.
 20. Attar MN, Khan UA, Moore RK. Percutaneous coronary intervention in a single coronary artery originating from the right sinus of Valsalva. *J Cardiovasc Med* 2008; 9:866-8.
 21. Vural M, Bağırtan B, Karabay Ö. Original Images. Percutaneous coronary intervention performed for the revascularization of a single coronary artery originating from the right sinus of Valsalva. *Anadolu Kardiyol Derg* 2008;8:E8.