

Percutaneous Coronary Intervention of A Stenotic Left Anterior Descending Artery with Anomalous Origin of Right Coronary Artery

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The anomalous origin of the right coronary artery (RCA) from the left anterior descending (LAD) artery is rare. We report a case of single coronary artery with proximal LAD severe stenosis. The RCA originated from an unreported course of conal branch from the LAD. This anomalous RCA also had collaterals from left circumflex. Coronary intervention was successfully carried out on a severe stenosis at the proximal LAD artery. To the best of our knowledge the scenario of anomalous course and intervention is still to be reported. (*Chang Gung Med J* 2009;32:574-8)

Key words: anomalous right coronary artery, single coronary artery, percutaneous coronary intervention

Coronary anomalies are defined by Angelini and coworkers as any coronary pattern with a feature (number of ostia, proximal course, termination, etc.) “rarely” encountered in the general population.⁽¹⁾ About 1% of the general population encounters coronary anomalies; this percentage is derived from cineangiograms performed for suspected obstructive disease.⁽²⁻⁴⁾ Anomalous origin of the right coronary artery (RCA) from the left anterior descending coronary artery (LAD) is relatively uncommon and generally of no clinical significance.^(5,6) In this case report, a previously unreported variant RCA which originated from mid LAD coursed via a conal branch. Proximal LAD had a severe stenosis with delayed flow. Therefore, RCA received good collateral circulation from distal left circumflex (LCX) artery. Percutaneous coronary intervention (PCI) to severe stenosis at the proximal LAD was done successfully with good result, the state was maintained evident 3 years later with an angiographic follow-up.

CASE REPORT

A 72 year old woman, with diabetes mellitus, hypertension and dyslipidemia, presented with a new onset progressive effort angina associated with cold sweats. Electrocardiography (ECG) showed non-specific T-wave abnormalities. The echocardiography findings were trivial mitral regurgitation and good left ventricular performance without segmental hypokinesis. Dipyridamole Thallium-201 single-photon emission computed tomographic (SPECT) myocardial perfusion study revealed reversible ischemia at LAD and RCA territories. Upon coronary angiography, trials to engage RCA failed and aortogram did not show any flow or stump to RCA. The left main (LM) artery was normal, giving LCX with no significant lesions, and LAD with proximal segment 95% calcified stenosis and delayed distal flow. Mid to distal LAD had diffuse 40% stenosis. From mid LAD arose a conal branch that gave origin

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of RCA (Fig. 1). This conal branch was long and angulated; it coursed as an incomplete circle around the right ventricle outflow tract, with an acute right and downward angle turned toward the atrioventricular groove to supply the RCA territories. The anomalous RCA had no significant lesions, but distal flow was slow. The LCX also gave collateral flow to distal RCA and formed dual supply of RCA from LAD and LCX. The LM artery was engaged with 6 French Judkin's left 4 guiding catheter (Cordis). The proximal LAD lesion was predilated using a 2.0 x 20 mm Maverick balloon (Boston) up to 10 atm. A Taxus Express 3.0 x 24 mm stent (Boston) was deployed with final good result and Thrombolysis In Myocardial Infarction (TIMI) III flow. The collaterals from LCX were still visible (Fig. 1). Coronary angiography six months latter showed no restenosis (Fig. 2). The patient had an episode of angina pectoris three years later. No change in the ECG was noted and the coronary angiogram did not reveal in-stent restenosis or progression of atherosclerosis anywhere in the coronary tree.

DISCUSSION

The incidence of anomalous RCA in congenital

coronary anomalies is variable in different populations, with the highest incidence in Indian and the lowest incidence in German populations (0.46 and 0.04%, respectively).^(7,8) A variety of anomalous origin of the RCA has been reported, including the left anterior sinus with variable courses, ascending aorta above the sinus level, descending thoracic aorta, LM coronary artery, LCX coronary artery, the pulmonary arteries, or below the aortic valve.^(4,7-10) Single coronary artery occupies approximately 0.024% of the general population.⁽¹¹⁾ Most of the coronary anomalies remain asymptomatic and are incidental to investigations by coronary angiography. However, myocardial perfusion can be affected, ranging from exertional angina to sudden death, within the different subtypes of these anomalies, such as a coronary artery arising from the pulmonary artery and a single coronary artery arising from either the left or right sinus of Valsalva.^(4,12) A study in an Asian population reported 3 cases with single coronary artery out of 7200 coronary angiograms reviewed, representing 8.8% of all found coronary anomalies.⁽¹³⁾ The anomalous origin of the RCA arising from the LAD coronary artery, a subgroup of single coronary artery, is relatively rare and more benign than other types of anomalous origin of the RCA.⁽¹⁴⁾ Ten adult cases have

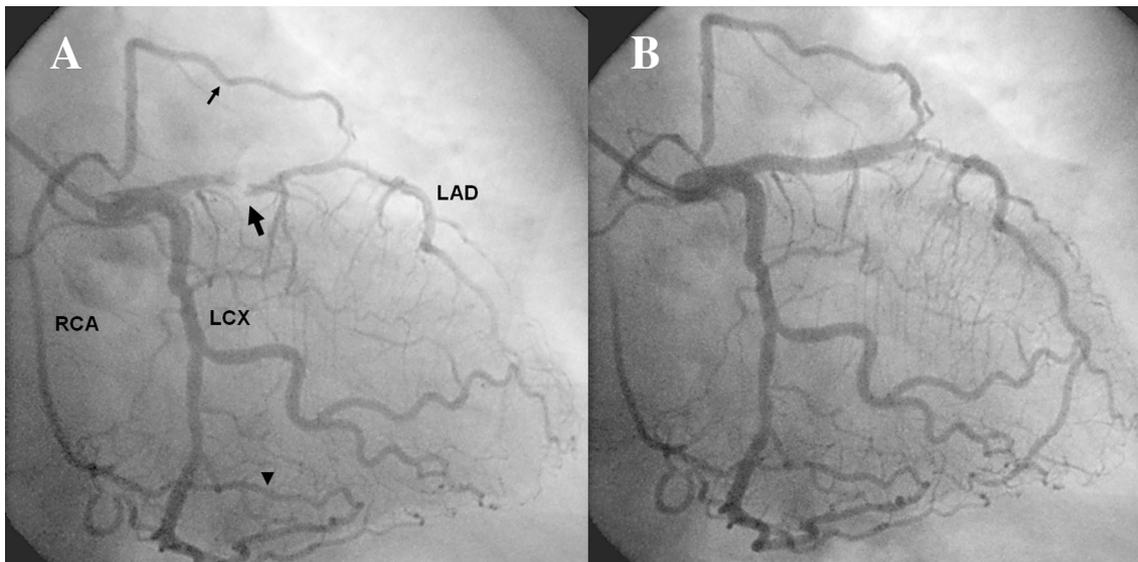


Fig. 1 (A) The subcostal view shows the left main gives left anterior descending (LAD) and left circumflex; mid LAD gives a conal branch (small arrow) that runs a long course before it gives the anomalous right coronary artery (RCA); proximal LAD has a severe stenosis (large arrow). Collaterals run from left circumflex (LCX) to RCA (arrow head). (B) good result after percutaneous coronary intervention (PCI) to proximal LAD.

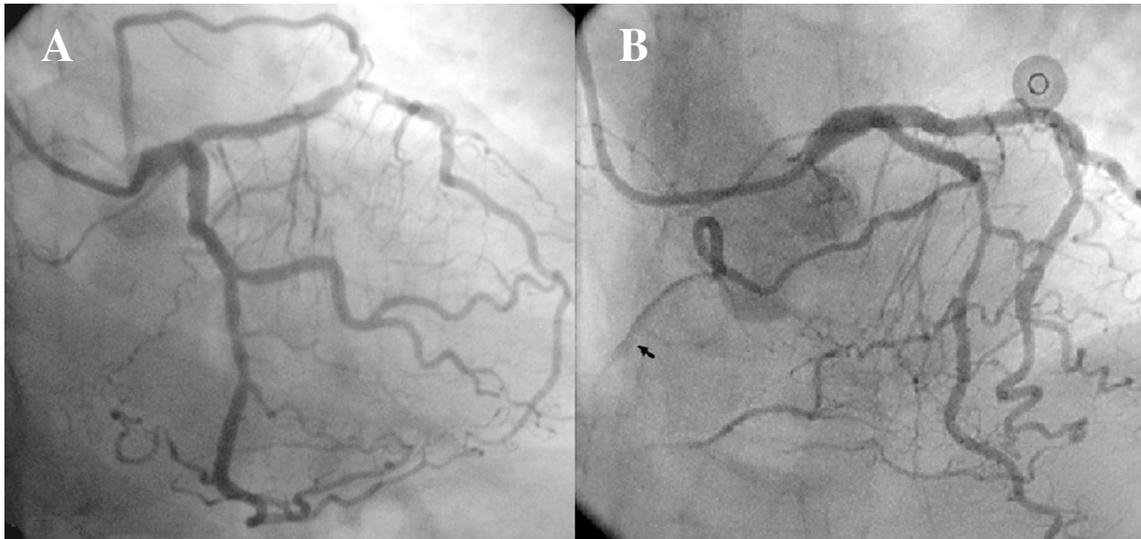


Fig. 2 (A) The subcostal view showed good result post PCI six months later. (B) Right anterior oblique view showed long course of conal branch and the collaterals from LCX to RCA with relatively delayed flow to mid RCA (arrow).

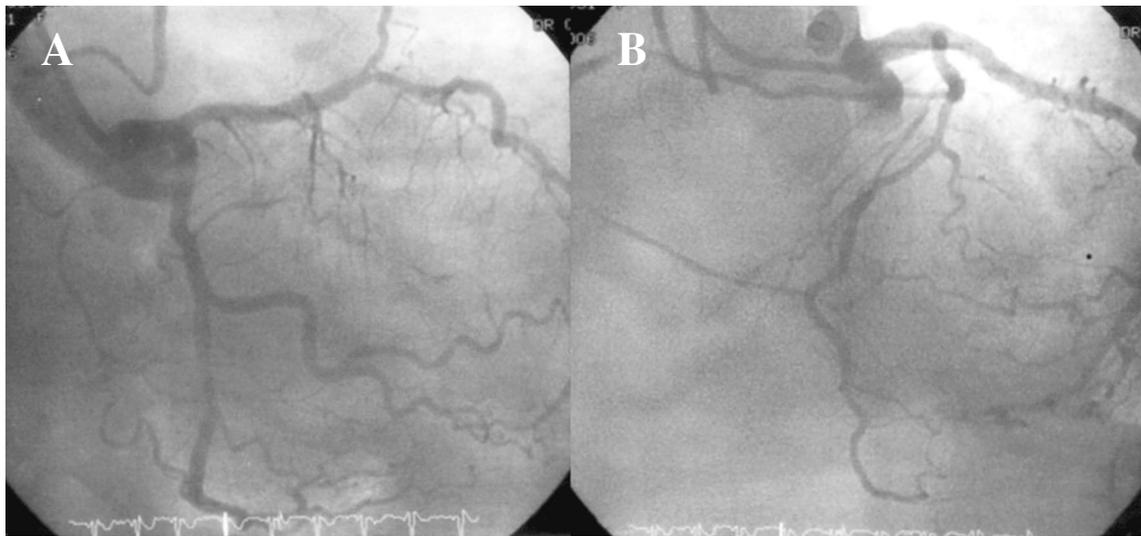


Fig. 3 (A) No significant change of subcostal view three years later post PCI. (B) Left anterior cranial view also showed long course of both conal branch from LAD and collaterals from LCX to RCA.

been reported in the literature.^(5,6,14,15) However, our case was a previously unreported variant of single coronary artery, in which the anomalous RCA arose from an unusual conal branch of the LAD. The long and angulated course of this conal branch would have reduced blood flow which was shown as delayed opacification of mid RCA in Fig. 2 and might contribute to the development of inferior ischemia. Delayed right coronary blood flow might

be the cause of occasional angina although no thallium perfusion scan was available. Coronary spasm, which might aggravate RCA territory ischemia, could also lead to subsequent angina post PCI. The presence of collaterals from LCX to distal RCA after PCI could also be explained with the anomalous course of RCA. This congenital anomaly was an incidental finding, since the patient's initial clinical presentation was suggestive of significant coronary

obstructive disease of the LAD plus either RCA or LCX territories. The proximal LAD segment had a severe stenosis, thereby all distal branches are jeopardized including the anomalous RCA. Coronary flow from conal branch to RCA was significantly improved after PCI to LAD.

In conclusion, this case represents an unreported, and an unusually long and tortuous course of a conal branch supplying the anomalous RCA. Percutaneous coronary intervention (PCI) to severe stenosis at the proximal LAD was done successfully with good result, the state was maintained evident 3 years later with an angiographic follow-up.

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右冠狀動脈支由左前降支的不正常分流合併左前降支近端的嚴重狹窄接受經皮冠狀動脈治療

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右冠狀動脈支由左前降支不正常的分流是很少見的，我們所報告的是個只有單一條冠狀動脈且合併左前降支嚴重狹窄的病例，其右冠狀動脈支所走的路徑並未有報告過，其是由從左前降支分支出的圓錐支而來，同時也有來自左迴旋支的分流。這個病例因為左前降支嚴重狹窄而接受介入性心導管治療成功，就目前所知，有這種不正常冠狀動脈並接受介入性心導管治療的病例之前並未報告過。(長庚醫誌 2009;32:574-8)

關鍵詞：不正常右冠狀動脈支，單一冠狀動脈，經皮冠狀動脈治療

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