

Anomalous Single Coronary Artery Presenting with Acute Myocardial Infarction

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ABSTRACT

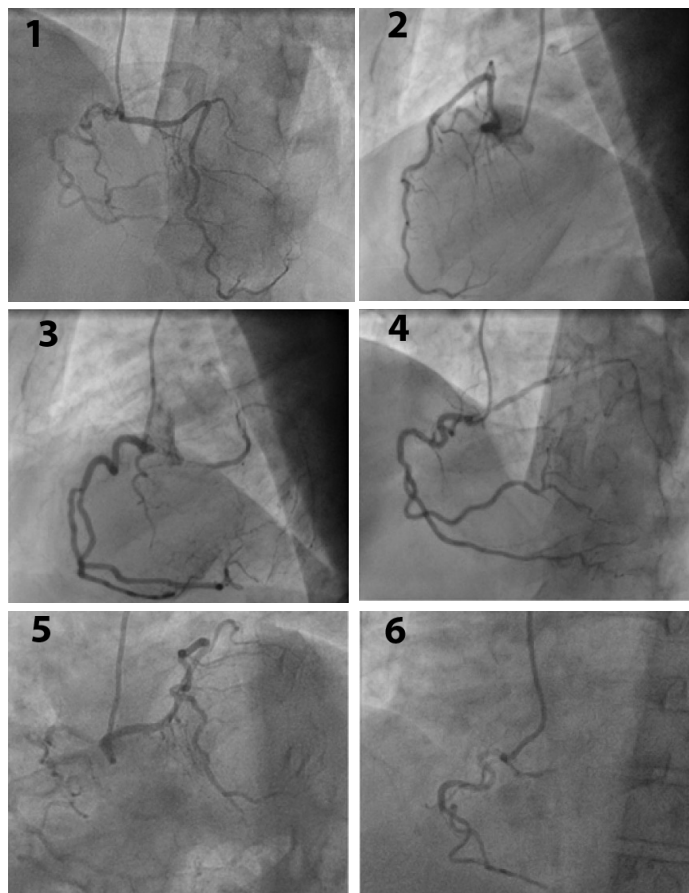
The anomalous origin of the entire coronary system from the right coronary sinus is a very rare anomaly. Here a patient with this rare anomaly, who developed acute coronary syndrome, requiring revascularization, is presented and treated successfully. His coronary angiographic findings are also discussed. We would like to highlight the rarity of the origin of all 3 coronary arteries from a single coronary trunk. The case also highlights the importance of using Amplantzer AR1 guiding catheter for such anatomical variations arising in the right coronary cusp.

Keywords: Amplantzer guiding catheter, Anomalous coronaries, Percutaneous angioplasty, Single coronary trunk

CASE REPORT

A 60-year-old man, presented with complaint of sudden onset of breathlessness since the previous night. There was history of orthopnea and Paroxysmal Nocturnal Dyspnea (PND). There were no other symptoms of Acute Myocardial Infarction (AMI) or cardiac failure. He was not a known case of Ischemic Heart Disease/Hypertension/Dyslipidemia. On clinical examination the patient appeared afebrile, tachypneic and tachycardic. His blood pressure was 190/100 mmHg. The remaining systemic examination was unremarkable for any abnormal findings. Laboratory investigations revealed: 29/12/15- NT-Pro Brain Natriuretic Peptides (BNP) -1897pg/ml (40-125) TROPONIN Ts- 0.331ng/ml (up to 0.02ng/ml). An Arterial Blood Gas (ABG) analysis was done which revealed metabolic acidosis. Electrocardiogram (ECG) was done which revealed ST-T changes concurrent with Non-ST-Elevation Myocardial Infarction (NSTEMI). Echocardiography was done next which revealed a normal left ventricular function, mild pulmonary artery hypertension, mitral annular calcification, trivial mitral regurgitation and mild left ventricular hypertrophy. A Chest X-Ray (CXR) was done which showed signs of acute pulmonary oedema for which the patient was intubated and kept on mechanical ventilation. Blood samples and endotracheal aspirate were sent for culture to rule out any source of infection and the same was reported to be sterile. The CXR also showed signs of consolidation and he was started on IV antibiotics. After the patient's condition improved, he was extubated and planned for Coronary Angiogram (CAG). The CAG showed single vessel disease with anomalous coronary origin. All the 3 coronary arteries originated from the right sinus [Table/Fig-1-5]. Left Circumflex (LCX) originated from Right Coronary Artery (RCA) ostia with retro aortic course, with ostioproximal 95% thrombotic occlusion [Table/Fig-3]. Left Anterior Descending (LAD) was originating separately near the RCA ostia and had a pre-pulmonary course [Table/Fig-1,2,5]. The guide selected was 6F AR1 [Table/Fig-6] and the work-horse wire used was SION BLUE (ASAHI) coronary wire. We used buddy wire for support which was placed into the RCA [Table/Fig-7] to help complete the procedure. Lesion was dilated with 1.25mm x 10mm TAZUNA Balloon [Table/Fig-8] and 2mm x10mm MINITREK Balloon [Table/Fig-9]. Angioplasty with Stent (3.0 mm x 28 mm XIENXE XPEDITION) for proximal LCX was performed successfully [Table/Fig-10]. Post stent flow showed good Thrombolysis In Myocardial Infarction (TIMI) 3 flow into the distal LCX [Table/Fig-11,12]. The whole procedure was carried out without any unforeseen complications. Post procedure period was uneventful. His medi-

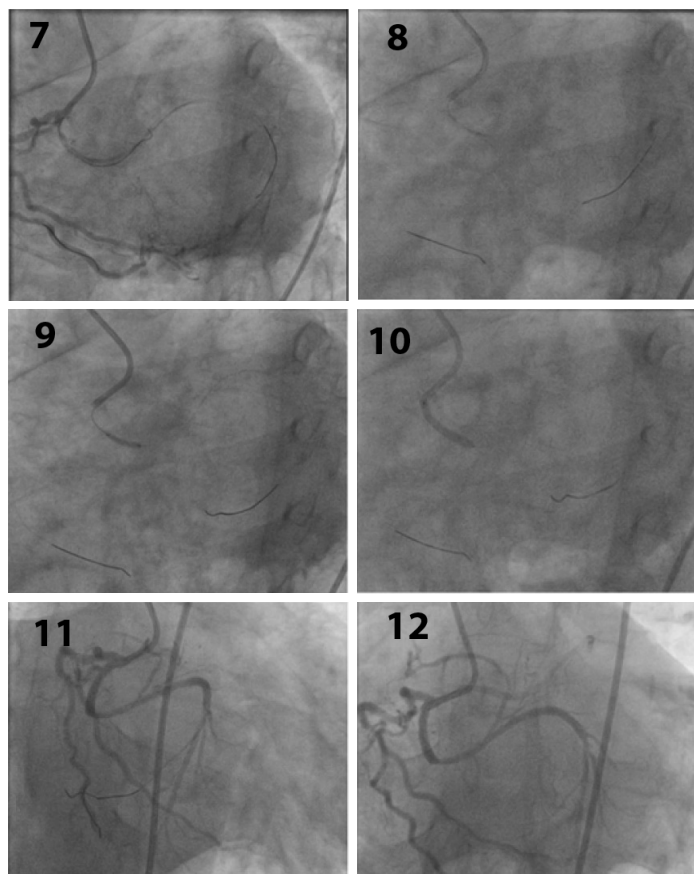
cations were optimized with Anti-platelets, Statins and Diuretics and he was discharged from hospital within 3 days. On 6 week follow-up patient was asymptomatic and doing well.



[Table/Fig-1]: Antero Posterior (AP) cranial view showing anomalous origin of left anterior descending (lad) from a common trunk at right coronary CUSP. **[Table/Fig-2]:** Lateral 90 showing origin of left anterior descending (LAD). note the anterior course of LAD. **[Table/Fig-3]:** Lateral 90 Showing Right Coronary Artery (RCA) and Left Circumflex Artery (LCX) at the Right Coronary CUSP. Note the thrombotic 95% occlusion at proximal LCX. **[Table/Fig-4]:** LAO 30 cranial 30 fluoroscopic image showing anomalous lcx and lad origin from the common trunk at right coronary cusp: note the lad course anterior to aorta, LCX course posteriorly. **[Table/Fig-5]:** LAO caudal fluoroscopic image showing origin of lad from common trunk at right coronary cusp. **[Table/Fig-6]:** Hooking the RCA with 6F AR1 Guide.

DISCUSSION

Anomalous origin of the entire coronary system from the Right Coronary Sinus (RCS) is a very rare anomaly. The course of the arteries once they originate from the RCS is variable. The RCA



[Table/Fig-7]: Wiring the RCA and the anomalous LCX. **[Table/Fig-8]:** 1.25mm x 10 mm tazuna ballooning at proximal LCX. **[Table/Fig-9]:** 2mm x 10 mm minitrek ballooning at proximal LCX lesion. **[Table/Fig-10]:** Stenting 3.0 mm x 28 mm Xience Xpedition stent at 16 ATM. **[Table/Fig-11]:** Post-stent flow in anomalous LCX which has a retro-aortic course (rao caudal view). **[Table/Fig-12]:** Post-stent flow in anomalous LCX which has a retro-aortic course (AP caudal view).

follows the usual pathway to the right atrioventricular sulcus in all cases. The LCX usually takes a posterior course, behind the aortic root, but has been reported to run anterior to the Pulmonary Artery (PA) or along the interventricular septum. The LAD has two forms of course: 1) Anterior (anterior to the PA or right ventricular outflow tract); 2) Inter arterial or Septal course (between the PA and aorta). Sometimes, 'accessory' vessel can originate from the left coronary sinus, and can be mistaken for the LAD or LCX [1]. The clinical importance in this anomalous coronary anatomy lies mainly in their course in relation to the great vessel. The two most common courses, anterior and posterior routes are believed to be benign [2]. Patients with an interarterial course is the malignant form of course which may develop coronary obstruction secondary to aortic or PA dilation during exercise and consequently, ischemia, which may be fatal. Classification for single coronary artery was first introduced in 1979 by Lipton et al., and was modified by Yamanaka and Hobbs, for describing the origin and course of these single coronary anomalies [3,4].

Contrast CT Coronary Angiography (CCTA) has emerged as a non-invasive diagnostic modality and as a complementary tool for coronary arteriography. CCTA can identify the origin, characterize the proximal course of the vessels relative to the aorta and PA and therefore, can aid in the clinical decision making [5].

Although anomalous coronary arteries are rare, they are still at risk of CAD and they should be treated the same way as CAD in native coronaries [6,7].

Anomalous LCX coronary arteries have a greater degree of stenosis than that in non anomalous arteries in age- and gender-matched control patients [8-10]. Hutchins et al., has suggested that the unusual angle of takeoff and the tortuous course of the proximal portion of the anomalous coronary artery predisposes it to accelerated atherosclerosis [11]. Some say that the junction point of the anomalous artery and the free portion as it wraps around the aorta area is susceptible to lipid accumulation and finally increased atherosclerosis [12].

CONCLUSION

Single coronary arteries are extremely rare but have important prognostic implications placing the patient at increased risk of future myocardial ischemia, infarction and sudden cardiac death. The classification for single coronary arteries was introduced by Lipton, and modified by Yamanaka and Hobbs, to describe the origin and course of single coronary anomalies. Studies have suggested the incidence of coronary artery disease to be no different in patients with single coronary artery compared with the rest of the population. Proper selection of guiding catheter for these anomalous arteries helps the operator to complete the procedure quickly, less radiation, less fluoroscopy time and with ease.

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I, Dr. Vamsi Krishna Kamana, on behalf of all the authors certify that the manuscript is original. I undertake full responsibility for any ethical issue of medical activity or practice described in the manuscript.

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