

## Percutaneous transluminal coronary angioplasty of anomalously originating left coronary artery from right coronary sinus - A case report

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### ABSTRACT

Laboratory investigations included Hb 15 gm%, WBC count 12000/ $\mu$ L, P 66% L30% E4%; PLT count 1.8 lakhs/ $\mu$ L; RBS 125 mg%; Urea 35mg%; Serum Creatinine 1mg%; Serum Sodium 140 mEq/L; Serum Potassium 3.4 mEq/L. Balloon angioplasty may be a more favorable approach for revascularization in these vessels. Percutaneous coronary intervention (PCI) in an anomalous left coronary artery (LCA) can be technically difficult because selective cannulation of the vessel may not be easy. We thereby present a case with anterior wall myocardial infarction of an anomalously originated LCA. The PCI was successfully performed without severe cardiovascular adverse effects. The earlier unpublished data from our center also suggested that PCI with an anomalous origin of LCA might also be a safe, available, and feasible strategy.

**Key words:** *Coronary angiogram, Left main coronary artery, Percutaneous trans luminal coronary angioplasty*

An anomalous origin of the left coronary artery (LCA) is not an exceedingly rare congenital anomaly. According to our knowledge, there have been case reports concerning the usefulness of percutaneous coronary intervention (PCI) for the coexistent anomalous origin of coronary artery. Detailed information about such situations has therefore remained rather scanty [1]. Thus, we described here a case of anterior wall myocardial infarction (MI) whose culprit lesions were located at the site of anomalous LCA and were successfully treated with PCI. The classification of congenital anomalies varies between the absence of a coronary artery or multiple origin of the coronary arteries from the aortic sinus and origin of the left or right coronary artery from the pulmonary artery [2]. The expansion of a percutaneous transluminal coronary angioplasty (PTCA) and greater operator experience have presented an attractive technique for treating patients with anomalous origin of LCA from right coronary sinus, but the purpose of PTCA to these arteries can be challenging technique.

### CASE REPORT

A 56-year-old male smoker, with no past history of hypertension, diabetes, or family history of coronary artery disease (CAD), presented with acute anterior wall MI. As primary PCI was not available at his first medical contact, he was thrombolysed with streptokinase. Post-thrombolysis ST resolution was found to be 70%. He was treated with unfractionated heparin, dual antiplatelet, high-dose statin, nitrates, and proton-pump inhibitors. As the patient developed postinfarction angina, he was subjected to elective coronary angiography (CAG).

### Laboratory Investigations

Laboratory investigations included Hb 15gm%, WBC count 12000/ $\mu$ L, P 66% L30% E4%; PLT count 1.8 lakhs/ $\mu$ L; RBS 125mg%; Urea 35mg%; Serum Creatinine 1mg%; Serum Sodium 140 mEq/L; Serum Potassium 3.4mEq/L. Viral screening including hepatitis B surface antigen, human immunodeficiency virus, and hepatitis C virus wa negative. Electro cardiographic findings were suggestive of anterior wall MI due to proximal left anterior descending (LAD) CAD. Chest X-ray was found normal. Color Doppler echocardiography showed left ventricular dimensions of 45/30 mm, good left ventricular systolic function with ejection fraction 62%, and hypokinesia of mid and apical anterior wall segments.

The CAG done through right radial access by 5F Tiger catheter using non-ionic contrast (Ultravist). Fig. 1a shows coronary angiography showing LAD and LM lesions. Fig. 1b shows left anterior oblique views with wire in LAD.

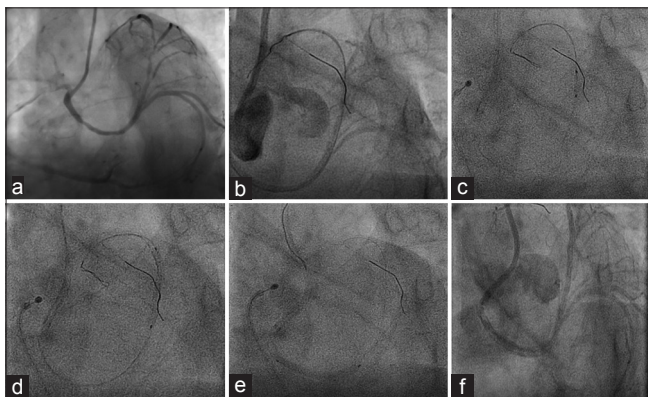
Left main coronary artery (LMCA) 44 mm long originates from right coronary sinus close to the right coronary artery (RCA) origin, slightly posterior to the right coronary origin. Midshaft of the LMCA had a long plaque producing 60% luminal narrowing. LMCA bifurcated into LAD and left circumflex artery (LCX). LAD was type 2 vessel, proximal LAD mildly disease maximum 60% luminal narrowing, and mid LAD had tubular lesion with 80% luminal narrowing. There was no flow-limiting disease in the distal LAD. First diagonal was a small caliber vessel (1.5 mm) with 70% ostial disease, second diagonal was also small caliber vessel with no lesions, and third diagonal was a 2 mm vessel

with 60% ostial disease. LCX non dominant showed without flow-limiting disease. RCA was dominant vessel with mild plaque in proximal and mid RCA.

The patient was planned for PTCA to left main and LAD in a second sitting for better delineation of abnormal coronary anatomy. 64-slice computed tomography (CT) angiogram was performed before angioplasty to rule out the malignant course of coronary. Since CT angiography showed retroaortic course of LCA, we proceeded with angioplasty. Right femoral artery access was chosen to avoid technical complications. TPI lead put in right ventricular, as it was very difficult to selectively cannulate the LMCA, as it was very close to RCA ostia, but slightly posterior. LCA was engaged with 7F AR1 guide, and lesion was crossed with whisper extra support wire and distally parked in LAD. Another buddy wire (Sion blue) was passed and distally parked in diagonal (Fig. 1c - LMCA engaged and wire in LAD and diagonal). LAD lesion was pre-dilated with 2×10 semi-compliant balloon (Fast track) dilated to 12 atm pressure and left the main lesion dilated with the same balloon to 14 atm pressures. LAD lesion was stented with 2.5 mm×30 mm drug-eluting stent (10 atm, final diameter 2.54 mm) (Fig. 1d - LAD stented with DES). Buddy wire was taken back after placing the LMCA stent in position and 3 mm×26 mm drug-eluting stent was deployed (12 atm, final diameter 3.16 mm) (Fig. 1e - LMCA stented with DES). LMCA was post dilated with 3.5 mm×12 mm NC balloon to 16 atm pressures. Final angiography showed TIMI 3 flow (Fig. 1f - Final angiography image, with deployed stent in LMCA and LAD after post-dilatation).

## DISCUSSION

Coronary anomalies are found in 0.2–1.2% of the population and represent the manifest deviation of the patterns of anomalous coronary [3]. Coronary anomalies are usually asymptomatic. Various classifications are described in the literature and the



**Figure 1: Percutaneous transluminal coronary angiogram. (a) coronary angiography showing left anterior descending (LAD) and LM lesions. (b) LAO caudal view with wire in LAD. (c) Left main coronary artery (LMCA) engaged with AR 1 guide, coronary wire in LAD and diagonal, pre-dilatation balloon tracking into LAD. (d) LAD stented with DES. (e) LMCA stented with DES. (f) Final angiography image, with deployed stent in LMCA and LAD after post-dilatation**

common anomalies are as follows: An anomalous circumflex artery originating from a separate ostium in the right sinus of valsalva or as a proximal branch of the RCA, a RCA arising from the left sinus of valsalva or as a branch of a single coronary artery, and a LCA or LAD originating from the right sinus of valsalva or as a branch from a single coronary artery. The last two types can have an interarterial course and are associated with sudden cardiac death [4]. During the procedure, selective engagement of LCA was difficult and we tried different guides to get even a near coaxial alignment. Due to the angulation of guide and LCA origin, it was difficult to wire the lesion. Due to the insufficient engagement, coronary filling during contrast injection was poor. Pre-procedure angiogram was available for the comparison. Another similar case was treated few months back, where anomalous LAD had tight disease and ended up in coronary artery bypass grafting (CABG), as there was a tight disease in the RCA also which could not be crossed even after trial with multiple guides and wires. As previous studies, the most common site of anomalous RCA mainly originated at four locations: Left coronary sinus, LCA, antethca of the aortic wall, and supracristal plane above the right coronary sinus [5-8]. Previous case reports in the literature have been used to attain good support to assist angioplasty [9]. We report a case of PCI with stent implantation in an anomalous LCA originating from the right sinus of valsalva. Moreover, Uthayakumaran *et al.* reported an experience of PCI in 17 patients with an anomalous RCA originating from the left sinus of Valsalva [10]. We had difficulty in cannulating the anomalous LMCA. The most near normal coaxiality and support were obtained with 7F AR1 guide catheter. The selective cannulation of aberrant arteries can be difficult and time consuming. Knowledge about the variations of coronary artery origin can help in choosing the proper catheters for diagnostic and therapeutic interventions.

## CONCLUSION

Successful PCI of anomalous coronary arteries relies on optimal guiding catheter seating and backup support, whereas each individual case may require a slightly different approach, depending on the operator's skill. The highlight of the case is that anomalous coronary intervention, though technically difficult if successfully done is similar to the other cases with normal anatomy. However, it is not always possible to percutaneously revascularize all the lesions in the anomalous coronaries. CABG is an alternate option for this type of anatomy.

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