

Transradial percutaneous intervention for chronic total occlusion of an anomalous right coronary artery arising from the left coronary sinus

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Abstract: Advances in techniques and devices have enabled the use of transradial route for percutaneous coronary intervention of chronic total occlusion. However, transradial PCI for anomalously arising coronary arteries represents the most technically challenging cases for interventional cardiologists. In the index case we describe transradial recanalization of a chronic total occlusion of a rare anomalous right coronary artery from the left sinus in a 60 years old male with effort angina. Engaging the ostium of an anomalously arising right coronary artery from left sinus is sometimes the limiting step in the percutaneous intervention of such cases. Published case reports and small case series have predominantly used transfemoral route. Nevertheless the use of transradial route for PCI of anomalously arising right coronary artery from left sinus is feasible and should be considered as the initial approach or as an alternative to transfemoral route.

Keywords: Anchoring technique, anomalous right coronary artery, chronic total occlusion, congenital coronary anomaly, contralateral injection, transradial approach.

INTRODUCTION

Anomalous aortic origin of a coronary artery from the opposite sinus of Valsalva (AAOCA) is a rare congenital anomaly affecting less than 1% of the population[1]. Percutaneous interventions (PCI) for anomalous coronary artery is technically extremely challenging. Transfemoral route has been used in majority of cases of PCI to anomalous coronary arteries. Significant advances in hardware and technical skills has enabled the use of transradial route for PCI of complex lesions like chronic total occlusion (CTO). Jang et al have shown that aggressive revascularization in patients with coronary CTO may reduce the risk of cardiac mortality and MACE[2]. Here we are reporting a case of successful transradial PCI for CTO of anomalous right coronary artery arising from the left sinus.

CASE REPORT

A 60 years old male presented with history of inferior wall myocardial infarction 1 year back which was managed medically. Since then he was having angina on exertion. The angina was CCS (Canadian Cardiovascular Society) class III. Patient continued to have exertional angina while on guideline-directed medical therapy (GDMT) for stable angina. Electrocardiogram was showing qR complexes with T-wave inversion in leads III and aVF, suggestive of old inferior wall myocardial infarction. Echocardiography

evaluation revealed concentric left ventricular(LV) hypertrophy, normal resting LV systolic function (ejection fraction = 60%), no regional wall motion abnormality and type I diastolic dysfunction. Patient was taken up for coronary angiography and revascularization in view of continued symptoms while on GDMT which showed anomalous origin of dominant RCA from left sinus, with an anterior and superior takeoff (Figure 1).

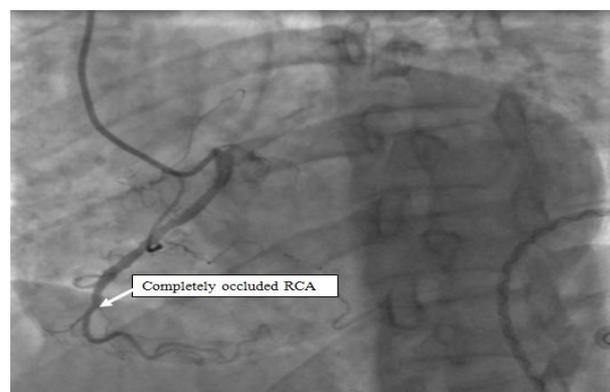


Fig-1: Anomalous origin of right coronary artery (RCA) from left sinus.

The left anterior descending and left circumflex coronary arteries were normal in origin, course and calibre. In addition to anomalous origin

from opposite coronary sinus, the right coronary artery had chronic total occlusion at the level of the right ventricular branch and was being filled retrogradely from left injection by grade 3 collaterals (according to Rentrop grading of coronary collaterals)[3]. Patient was taken up for PCI to anomalous RCA. Vascular access was obtained by right radial puncture and right femoral artery puncture. We avoided puncturing the left radial artery as the Allen test was abnormal on the left side. The right femoral artery puncture was done for contralateral injection. We preferentially use the transradial route for PCI of anomalous coronary arteries. A diagnostic JL 4 catheter (via transfemoral route) was used to engage the left main ostium. The ostium of the anomalous RCA was engaged with 6F Heartrail II guiding catheter (Trumo corporation, Tokyo, Japan). Initially support from the guiding catheter was suboptimal, with clockwise rotation the catheter securely engaged the ostium. A 0.014" Runthroughwire (Trumo corporation, Tokyo, Japan) was placed in the right ventricular branch as an anchor wire (Figure 2).

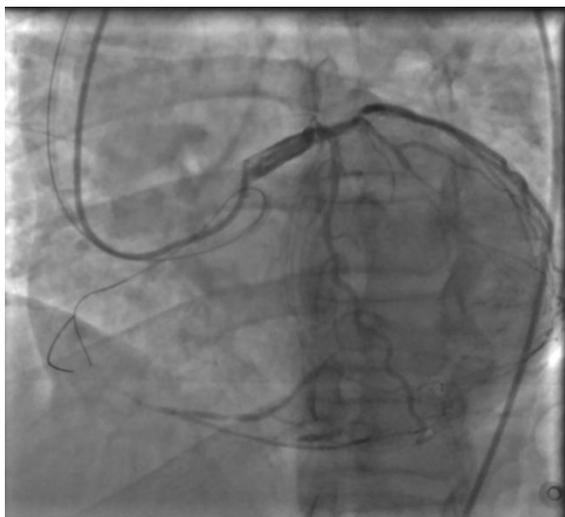


Fig-2: Contralateral injection from left coronary system showing retrograde filling of right coronary artery. There are two wires one in RV branch and another in RCA

Then we tried to cross the lesion with Miracle 3 and 4.5 (ASAHI INTECC CO., Japan) wires, which are usually our first CTO wires. The lesion was finally crossed with HI-TORQUE PILOT 150 Guide Wire (Abbott vascular, USA)(hydrophilic, tip load 2.7 gms). Step wise predilatation of the lesion was done with 1.25 x 10mm semicompliant balloon, followed by 2x 20mm balloon. The lesion was stented with 2.5x 36 mm Release R drug eluting stent (Relisys Medical Devices Limited, India) (Figure 3A). Post dilatation of stent was done with 2.75x12 mm noncompliant balloon. Optimal flow was achieved and there were no procedure related complications (Figure 3B).

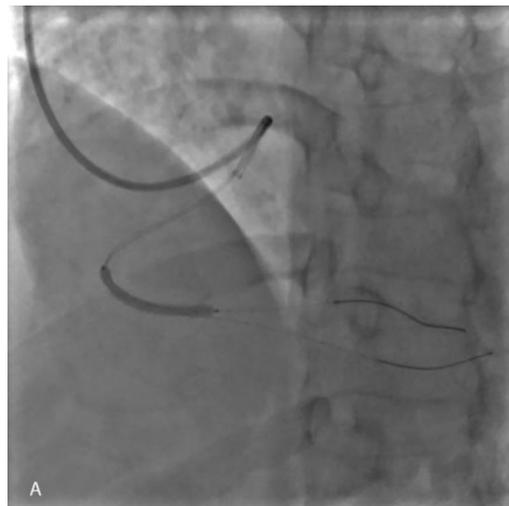


Fig-3A: Stent deployment.



Fig- 3B: Final result after stenting.

DISCUSSION

Transradial access is increasingly becoming the predominant route of PCI because of decreased complications at the puncture site, patient convenience, earlier discharge, and shorter hospitalization[4][5]. Improvements in devices and techniques such as different types of anchoring techniques, contralateral injection, retrograde wiring have enhanced the success rate of transradial PCI for technically demanding cases like CTOs. Nevertheless, the use of transradial route for PCI of anomalous coronary arteries is very limited. The present case posed the unique challenge of chronic total occlusion in an anomalous RCA arising from the left sinus. PCI of anomalous coronary artery is technically challenging, as highlighted by case reports and small case series. No generalized principles of PCI to anomalous coronary artery is applicable as each case is unique due to variations in origin, take off, direction of anomalous coronary artery, aortic root diameter [6]. Appropriate guiding catheter selection is the most important factor in determining procedural success [6]. Guiding catheters

such as the Amplatz, XB or Voda catheters, have been reliably used via transfemoral route as the curve that seats against the posterior wall of the aorta, provides the backup needed for the intervention[7].The experience with transradial PCI for anomalous coronary arteries is limited. Bagur et al used AL2 guiding catheter [8].Undersized JL has been used successfully by transradial route [9].

We used Heartrail II catheter (Terumo Corporation, Tokyo, Japan) through trans-radial route and found this approach to be particularly useful. With clockwise torque the Heartrail II catheter tip could be directed in a coaxial manner to the ostium of the anomalous right coronary artery which provided good support. Then an anchoring wire put into the RV branch enhanced the support. We could cross the CTO antegradely with HI-TORQUE PILOT 150 Guide Wire (Abbott vascular, USA). Contralateral injection from left coronary helped in wiring. The Heartrail II catheter was then advanced into the RCA for deep intubation which made passing of balloons and stents easier. Heartrail guiding catheter has this advantage of deep intubation and has been used for distal stent delivery [10].

CONCLUSION

We would like to emphasize the feasibility of transradial approach even for complex chronic total occlusions such as in this patient. The use of devices like dedicated transradial guiding catheters and different CTO crossing techniques increase the chances of success.

ACKNOWLEDGEMENT

This case or any of its contents has not been presented in any scientific meeting. The authors only contributed to the preparation of the manuscript. No funding was available for this case.

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