

Successful Transradial Percutaneous Coronary Intervention in a Patient with Dextrocardia and Situs Inversus

RAMANAND P SINHA¹, DEEPESH AGARWAL², AROHI MEHUL SARANG³, ASHOK SURYAKANT THAKKAR⁴

ABSTRACT

Dextrocardia with situs inversus is a rare clinical entity with an estimated incidence ranges from 1 in 8000 to 1 in 10,000. Percutaneous intervention in patient with dextrocardia and situs inversus is clinically challenging due to abnormal orientation of coronary geometry and the intervention requires appropriate use of guiding catheters, engagement technique, appropriate radiological angles as well as views. In this case-report, we describe percutaneous intervention with stenting in 48-year-old male patient with dextrocardia and situs inversus. We successfully deployed drug-eluting stents in right coronary artery and left circumflex artery.

Keywords: Dextrocardia, Percutaneous coronary intervention, Situs inversus, Transradial intervention

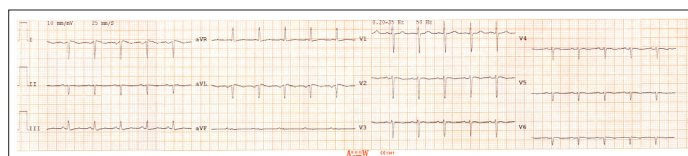
CASE-REPORT

A 48-year-old male presented with chief complain of severe right-sided chest pain from last two days. Hypertension, diabetes and obesity, the risk factors for coronary artery disease, were present in the patient. The patient had consulted three physicians for the chest pain prior to visit to our hospital. None of them suspected cardiac emergency and treated him for muscular pain but as intensity of pain had been increasing and also started having perspiration, the patient visited our clinic.

Cardiovascular examination revealed a right-sided apex beat. Electrocardiogram (ECG) revealed negative P wave in lead-I and aVL limb leads, positive R wave in aVR limb leads, prominent S wave in the left side chest leads as well as prominent R wave in the right-sided chest leads [Table/Fig-1]. This abnormal ECG was suggestive of situs inversus with dextrocardia. However, no changes related to myocardial infarction were observed. Situs inversus with dextrocardia was confirmed with ultrasonography and chest X-ray.

The patient was emergently shifted to catheterization laboratory for coronary angiography. The procedure was performed using biplane Philips image intensifier systems and through right radial approach using 6 French system (Fr). Right coronary artery (RCA) which was dominant and anatomically on left side was cannulated with 5 Fr Tiger catheter (Terumo Corporation, Somerset, New Jersey, USA) in the right anterior oblique (RAO) 40° view with counter clockwise rotation. There was 99% stenosis in the mid segment of RCA [Table/Fig-2A]. The left main coronary artery (LMCA) was on anatomically right side. We cannulated LMCA with 5 Fr AL 2 catheter (Cordis Corp., Johnson & Johnson, New Jersey, USA) in the left anterior oblique (LAO) 60° view with clockwise rotation as it could not be cannulated with 5 Fr Tiger and 5 Fr Judkins left catheter. We found 80% stenosis in proximal segment of left circumflex artery (LCX) before bifurcation [Table/Fig-2B]. The left anterior descending artery was normal.

We decided to perform percutaneous coronary angioplasty in view of occlusion in RCA and LCX. RCA was selectively cannulated with a 4 Fr Judkin right catheter and the lesion was crossed with BMW guidewire (Abbott vascular, Abbott Park, IL, USA) followed by dilatation with 2.5 x 15 mm Sapphire balloon (Abbot vascular, Abbott Park, IL, USA). A 2.75 x 23 mm Xince-V stent (Abbott vascular, Abbott Park, IL, USA) was deployed in mid RCA at 18 atmosphere



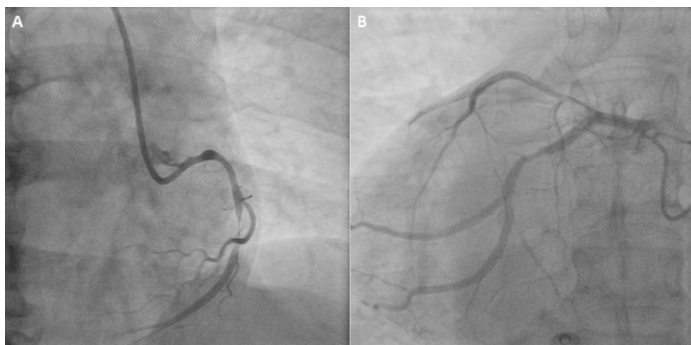
[Table/Fig-1]: Electrocardiogram suggestive of dextrocardia

(atm) pressure to cover entire lesion [Table/Fig-3A]. The cannulation of LMCA was attempted initially with 4 Fr Judkins left catheter but it was unable to hook despite repeated attempts. LMCA was later hooked with 6 Fr AL 2 catheter (Medtronic, Minneapolis, MN, USA) with clock wise rotation in LAO 60° view. The lesion of LCX was then crossed with BMW guidewire and 3.5 x 18 mm Xince V stent (Abbott vascular, Abbott Park, IL, USA) was deployed at 18 atm pressure. Post-dilatation was carried out with a 3.5 x 15 mm non-compliant balloon at 22 atm pressure [Table/Fig-3B]. There was no post-procedural complication and the patient was discharged from the hospital.

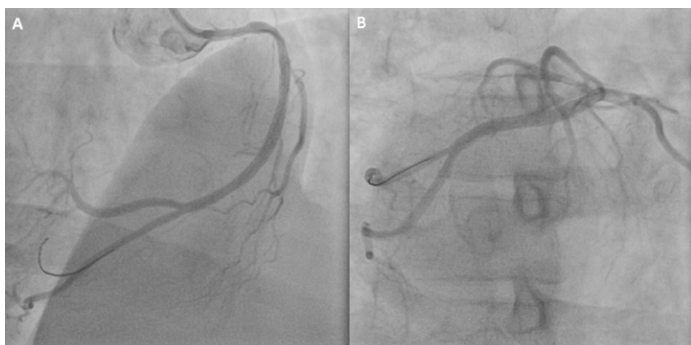
DISCUSSION

Situs inversus with dextrocardia is a rare congenital anomaly of development characterized by mirror image position of the heart and the abdominal viscera. The estimated incidence is 1 in 10,000 [1]. Generally, in such patients, there are normal anatomical structures of the heart with intact relations (atrioventricular concordance and ventriculoarterial concordance) but reversed position i.e. anatomic right ventricle lies anterior to left ventricle; aortic arch curves right and lies posteriorly. However, the occurrence of coronary artery disease in this population is same as that of general population but the percutaneous intervention (PCI) in this population presents several challenges to the interventional cardiologists due to abnormal anatomical location of the heart and unfamiliar coronary geometry. [2] PCI in dextrocardia with situs inversus requires modifications i.e. mirror image angiographic angulation, proper catheter selection, catheter manipulation for selective cannulation of coronary arteries. We herein describe a case of PCI with deploying drug-eluting stent to the RCA and LCX in patient with dextrocardia and situs inversus and to share our experience in the selection of the guiding catheters, angiographic image views acquisition and coronary catheter engaging techniques.

Moreyra et al., [3] demonstrated that Judkins catheter was not



[Table/Fig-2]: Pre-procedural angiography showing (A) occlusion in mid-segment of right coronary artery in RAO 40° view with counter clockwise rotation, cannulated with 5 Fr Tiger catheter; (B) occlusion in proximal segment of left circumflex artery in LAO 60° view with clockwise rotation



[Table/Fig-3]: Post-procedural angiography showing (A) a 2.75 x 23 mm stent in mid right coronary artery cannulated with a 4 Fr Judkins right catheter; (B) a 3.5 x 18 mm stent in proximal segment of left circumflex artery

suitable while performing PCI in patients with dextrocardia whereas Kakouros et al., [4] reported successful intervention using Judkins catheter. Kakouros et al., also suggested that catheter rotation in the opposite direction of its employment (for example, counterclockwise rotation of Judkins catheter to engage left-sided RCA) would be helpful in selective cannulation of coronary arteries. In our case also while performing angiography, we failed to cannulate coronary arteries with Judkins catheter and we used different catheters. However, we succeeded in selective cannulation while performing angioplasty with the help of suggestion given by Kakouros et al., In this case, it should be noted that LAO and RAO angulation were essentially reversed from the normal biplane angulation for both right

and left coronary arteries. The selective left coronary angiogram was obtained in the LAO 60° and selective right coronary angiogram was obtained in RAO 40° during diagnostic coronary angiography. During coronary angioplasty also, the views were similar to the diagnostic procedures. While performing diagnostic angiography and coronary angioplasty in RCA and LCX using transradial approach, the opposite direction catheter rotation and above mentioned mirror-image views proved very useful.

Transradial angiography is increasingly used as it offers several advantages over transfemoral technique. However, few cases have been reported the use of transradial approach in patient with dextrocardia [5-8] Goel et al., had reported successful percutaneous intervention through right radial artery approach using double inversion technique in patient with situs inversion with dextrocardia whereas Jang et al., had performed the procedure using left radial artery approach but without double inversion technique [6,8]. We have performed angiography and angioplasty through right radial artery approach without on-screen reversal of the image. The patient tolerated procedure well and the stay of the patient in the hospital was uneventful.

CONCLUSION

The percutaneous coronary intervention through transradial approach can be successfully performed in a patient with dextrocardia and situs inversus even without on-screen reversal of the angiographic views.

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