

Transradial rotablation in a patient with dextrocardia and acute ST-elevation myocardial infarction

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Abstract: An 82-year-old gentleman with situs inversus and dextrocardia was admitted to our unit following thrombolysis for inferior ST-elevation myocardial infarction (STEMI). Due to ongoing ischemic symptoms, he underwent emergency transradial coronary angiography. His culprit right coronary artery (RCA) was heavily calcified with severe stenosis in the mid and distal segments. Therefore, rotational atherectomy was performed for debulking, and four drug eluting stents were deployed in the RCA. To the best of our knowledge, this is the first reported case of successful transradial rotablation percutaneous coronary intervention in acute STEMI in a patient with dextrocardia. We also did not use temporary pacemaker wire insertion (TPW) because of the risk of right ventricular perforation (RV) in inferior STEMI with RV involvement.

Keywords: situs inversus, dextrocardia, STEMI, rotablation, rotational atherectomy, debulking, transradial, PCI, percutaneous coronary intervention, temporary pacemaker wire

Introduction

Rotational atherectomy of coronary arteries is a technique used for debulking the heavily calcified coronary arteries to prepare the lesion for stent implantation. This technique was rarely performed in acute ST-elevation myocardial infarction (MI), and we report a case in this setting which was performed in a patient with dextrocardia. Transradial approach was used in this patient, and rotablation was performed without insertion of temporary pacemaker wire.

Case Report

An 82-year-old gentleman who is known to have situs inversus with dextrocardia was thrombolysed by paramedic ambulance staff for inferior ST elevation myocardial infarction (STEMI) and brought to our center for facilitated percutaneous coronary intervention (PCI). Despite initial reperfusion and ST segment resolution, he continued to experience ischemic chest pain. Coronary angiography was performed via a right transradial approach. A 6 French Judkins left (JL) 3.5 and right (JR) 4 catheters (Cordis Corp., New Jersey, USA) were used to cannulate the left and right coronary ostia, respectively, with counter-directional rotation to the standard technique. Coronary angiogram revealed a severe

95% stenosis of the distal left anterior descending (LAD) segment. There was mild stenosis of the circumflex artery. The right coronary artery was dominant with diffuse severe calcification. There was severe stenosis of the mid segment and further “hazy” bifurcation stenosis at the level of crux involving the ostia of both the posterior left ventricular (PLV) and posterior descending artery (PDA) vessels (*Fig. 1*). Immediately following angiography, we proceeded to percutaneous coronary intervention (PCI) to the culprit right coronary artery. Given the presence of heavy calcification, we decided to use rotational atherectomy (RotaLink Plus, Boston Scientific Corp., Massachusetts, USA) to facilitate the deployment of coronary stents.

The radial sheath was upgraded to 7F and an Amplatz right 2 (AR2) guide catheter (Medtronic Corp., Minneapolis, USA) was used. High speed (155,000 rpm) rotablation was performed with a 1.5-mm and then a 1.75-mm burr up to the crux of RCA (*Fig. 2*). The whole of the diseased segment was then dilated with a 2.5×15-mm Trek semi-compliant balloon (Abbott Vascular Solutions, Illinois, USA). The PLV/PDA bifurcation was “T-stented” with 2 drug-eluting stents (2.75×24 mm into PLV and 3×20 mm in PDA), followed by 2 further drug-eluting stents in the mid segment (3×20 and 3.5×20 mm). In spite of rotablation and balloon dilatation, the proximal-most stent did not fully expand (*Fig. 3*). Therefore, focal post dilatation with initially a

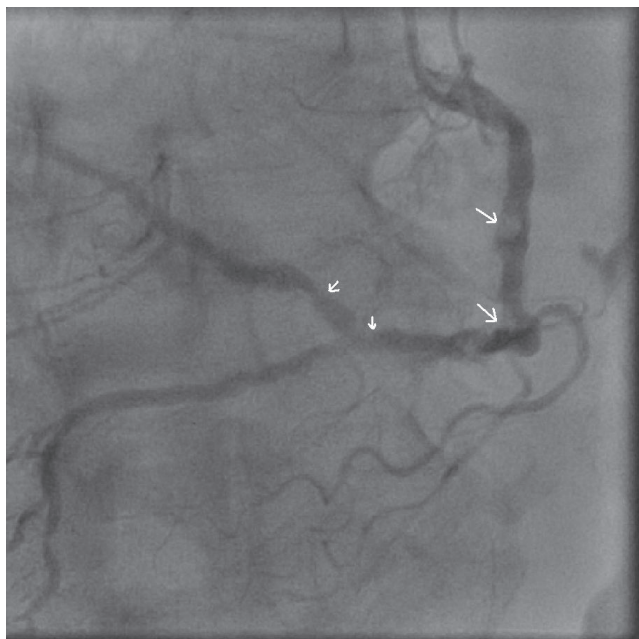


Fig. 1. Right anterior oblique (RAO), cranial view of right coronary artery (RCA) showing severe stenoses involving the RCA (white arrows)



Fig. 2. RAO view showing rota burr in the RCA

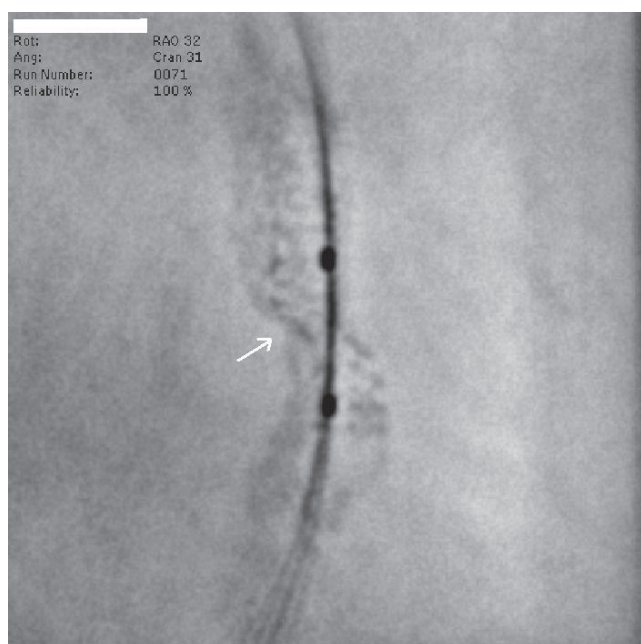


Fig. 3. Fluoroscopic stent boost image showing under expansion of the stent at the mid portion (white arrow) with non-compliant balloon *in situ*, prior to post dilatation



Fig. 4. RAO-cranial view of RCA showing good angiographic result after percutaneous coronary intervention

3.5×8-mm and then 4×8-mm non-compliant balloon at 28 atm was required. Thrombolysis in myocardial infarction (TIMI) 3 flow and a satisfactory myocardial blush were achieved at the end of the procedure (*Fig. 4*). No peri or post procedural complications were encountered. He was discharged home after 3 days.

Discussion

Situs inversus with dextrocardia is a rare clinical phenomenon with a reported incidence of 1 in 10,000 live births [1]. Dextrocardia can also be associated with more complex cardiac malformations, such as single

ventricle, double-outlet or double-inlet ventricles, and tricuspid atresia [2]. Technical strategies for successful PCI in dextrocardia include counter-directional torquing of catheter and right-left mirror-image inversion angiographic views. In our case, angiography and intervention were performed without on-screen reversal of the images.

Rotational atherectomy (rotablation) is used as a lesion preparation tool in severely calcified coronary arteries prior to stent implantation. The multicenter Cost and Outcome of Behavioural Activation (COBRA) trial demonstrated higher procedural success rates with rotational atherectomy compared to percutaneous transluminal coronary angioplasty (PTCA), but no difference in clinical outcomes [3]. The use of rotational atherectomy has continued as a lesion preparation tool for better delivery and implantation of coronary stents [4]. Rotational atherectomy is relatively contra-indicated in the setting of acute coronary thrombosis such as STEMI due to the risk of potential platelet activation by the rotator. In our patient, the patient already had thrombolytic agent and unfractionated heparin was given during the procedure. The manufacturer advises using rotablation at least 2–4 weeks after the use of thrombolytics [5]. However, rotablation has previously been performed in acute STEMI [6, 7], but to the best of our knowledge, this is the first reported case of successful transradial rotablation in acute STEMI in a patient with dextrocardia. Transradial approach is a well-established technique for PCI to reduce bleeding risk, and our patient was considered high risk because of age, thrombolysis, and the use of larger sheath for rotablation. The only disadvantage of using trans-radial approach in rotablation is related to the sheath size. The maximum size that can be easily inserted through the radial artery will be a 7F sheath. Therefore, there is a limitation of the size of the rotaburr that can be used, as anything above 1.75-mm burr would require an 8F sheath. In our case, this may be the reason for the difficulty in fully expanding the proximal stent as the lesion was not prepared fully with the

1.75-mm burr, whereas a 2-mm burr would have made stent expansion easy. Therefore, for large coronary arteries which require larger burr to de-bulk the calcification, femoral access would be the best option with an 8F sheath.

We also did not insert a temporary pacemaker wire (TPW) during rotablation, which used to be a standard practice for RCA rotablation in the past. In our experience, the brady-arrhythmias during RCA rotablation are transient and can be managed by atropine in most cases. The insertion of TPW is associated with its own risk such as access related bleeding and cardiac tamponade due to right ventricular perforation, particularly in this case as the patient had thrombolysis and had inferior wall infarction with RV involvement.

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