

Case Report

Successful Right Coronary Artery Drug-Eluting Stent Implantation in a Male Patient with *Situs Inversus*

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We describe a case of successful right coronary artery angioplasty in a male subject with *situs inversus*. Although the interventional management of such individuals follows the standard general rules, there are also some technical aspects that should be taken into consideration in this special clinical setting.

Dextrocardia is a rare condition that includes complete *situs inversus*, where there is complete transposition of all the body organs, including the heart, and *situs solitus*, where only the heart is located in the right side of the body, with the other organs remaining in the normal position.¹ The prevalence of coronary artery disease in this setting is not precisely known, but it is considered to be similar to that in the general population.²

Regarding the interventional management of such individuals there are few reports in the literature, probably due to the rarity of this condition.³ Apart from the standard general guidelines, some special technical aspects should be considered in the percutaneous coronary angioplasty of these patients, such as the opposite direction of manipulation of the catheters. In addition, with respect to the imaging of the coronaries, mirror images are usually needed, that is equivalent right-sided views to produce the usual left-sided images and *vice versa*, without changing the cranial or caudal angulations.⁴

Case presentation

A 42-year-old hypertensive and dyslipid-

emic male patient with known dextrocardia (complete *situs inversus* type) was referred to our cardiac catheterization laboratory due to signs of residual ischemia on stress-echocardiography after a recent inferolateral ST-elevation myocardial infarction. Cardiac catheterization was performed via the right common femoral artery, using a 6 Fr introducer. The left coronary artery was cannulated using a 6 Fr Judkins left 4 (JL 4) catheter without technical difficulties. In addition, the right coronary artery was cannulated with a 6 Fr Judkins right 4 (JR 4) catheter, rotating it counterclockwise, rather than using the usual clockwise approach.

The left ventriculogram, performed in the left anterior oblique position (the “mirror image” of the standard right anterior oblique position), revealed an ejection fraction of 45% with severe hypokinesis of the inferior wall. Regarding the angiographic findings, the left main stem, left anterior descending and left circumflex arteries were atheromatic with no hemodynamically significant stenoses (Figure 1), while the right coronary artery (RCA) was a dominant vessel, totally occluded in the middle of its second tertile (Figure 2a).

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Figure 1. Right anterior oblique cranial view, representing the “mirror image” of the typical left anterior oblique cranial view, showing no significant stenoses of the left coronary artery.

We proceeded with intervention to open the totally occluded RCA. A standard JR4 guiding catheter was used, based on the normal RCA take-off, which in such cases provides optimal support and easier delivery of balloons and stents to the lesion. The lesion was crossed by a 0.014” hi-torque Whisper MS wire (Abbott Laboratories, Abbott Park, IL, USA) and was sequentially predilated with Maverick2 (Boston Scientific, Boston, MA, USA) 2 × 12 mm and 2.5 mm × 15 mm balloons using 8-12 atm for 15 to 30 s. The lesion site was subsequently stented with a Xcience V 3 × 23 mm (Abbott Laboratories, Abbott Park, IL, USA) drug-eluting stent, using an inflation pressure of 16 atm for 20 s. The intervention was successful, achieving optimal antegrade TIMI III flow without residual stenosis (Figure 2b) and the patient’s course post angioplasty was uneventful. Apart from a strong recommendation regarding smoking cessation, the patient was counseled to receive dual antiplatelet therapy with aspirin and clopidogrel for at least a year, as well as an angiotensin-converting enzyme inhibitor, a beta-blocker and a statin.

Discussion

Dextrocardia is a rare anomaly that includes complete *situs inversus*, accounting for about 2 in 10,000 live births, and *situs solitus*. In the former case all the

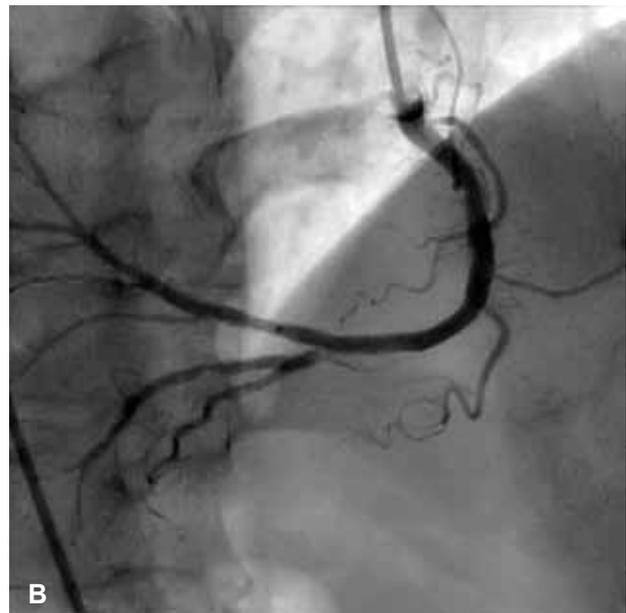
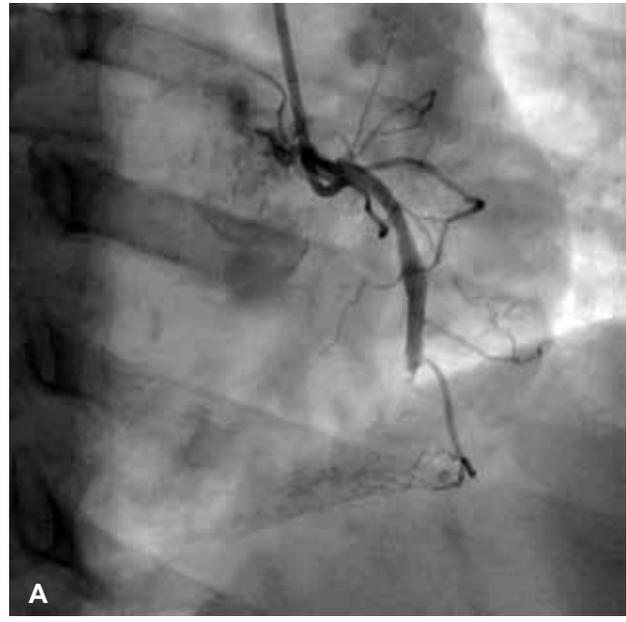


Figure 2. Right anterior oblique cranial view of the right coronary artery, showing (A) total occlusion in the middle of the second tertile of the vessel and (B) successful treatment with implantation of a drug-eluting stent.

body organs, including the heart, are located in the opposite side compared to normal, whereas in *situs solitus*, only the heart is located in the right side of the body with the other organs remaining in the normal position.¹ The pathogenetic mechanism has its origin in the embryonic stage of development, where a defect in the folding of the primitive heart tube results in malposition of the cardiac apex into the right chest.^{1,3} The life expectancy of patients with dextro-

cardia is considered to be normal and the incidence of atherosclerosis with the full spectrum of clinical manifestations is thought to be similar to that of the general population.²

There are few reports of percutaneous intervention in patients with dextrocardia, due to the rarity of this condition.^{2,4} There is no advantage of the femoral over the radial arterial approach in this setting.⁴ Contrary to the initial view that multipurpose catheters should be used, optimal results can also be achieved with the use of standard catheters, but their manipulations are opposite in direction (i.e. counter-clockwise rotation of the JR4 catheter to cannulate the left-sided anatomical RCA).⁴⁻⁸ In addition, mirror images are usually needed, that is equivalent right-sided views to produce the usual left-sided images and *vice versa*, without changing the cranial or caudal angulations.

In our case, we applied the abovementioned technique for the imaging of the coronary arteries and angioplasty of the occluded RCA was also performed with the standard wire, balloons and stent, leading to optimal angiographic results.

In summary, although subjects with dextrocardia constitute a minor portion of the general population, they are equally affected by coronary artery disease.

The interventional management of such individuals follows the same general rules, but there are also some technical details that should be taken into consideration in order to obtain the optimal benefit for the patient.

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