



LETTER TO THE EDITOR

Successful transradial coronary angioplasty in a patient with dextrocardia and acute myocardial infarction

**KEYWORDS**

Percutaneous coronary intervention;
Myocardial infarction;
Dextrocardia

Dextrocardia with situs inversus is a rare congenital anomaly characterized by a mirror image position of the heart and the abdominal viscera. There is a scarcity of published case reports of successful percutaneous coronary intervention (PCI) in patients who also have coronary artery disease (CAD), especially in those presenting with acute myocardial infarction (MI). PCI in these cases is technically demanding and requires various modifications, such as mirror image views, proper catheter selection, and manipulation for selective cannulation of the coronary arteries. Herein, we describe a case of dextrocardia and acute MI, with successful emergency PCI and stenting of a sub-totally occluded postero-lateral branch of the right coronary artery (RCA).

An 85-year-old male with a history of cerebral infarction, hypertension, dyslipidemia, and dextrocardia with situs inversus presented to the Emergency Department complaining of central chest pain of 30 minutes' duration, radiating to his right scapula and his mandible. The patient complained of angina during minimum effort in the last 15 days. The episodes of angina during the last 48 hours also presented at rest and were more frequent. His medications included an ACE inhibitor, clopidogrel, and a statin. Cardiovascular examination revealed a right-sided apex beat and a holosystolic murmur at the apex. Vital signs and the rest of the physical examination were normal. The electrocardiogram (ECG) showed negative P waves in leads I and

aVL, a positive R wave in aVR, a prominent S wave in the left-sided chest leads, and a prominent R wave in the right-sided chest leads; all findings were suggestive of situs inversus with dextrocardia. At the time, no signs suggestive of ischemia were present. Situs inversus with dextrocardia was well depicted with the chest X-ray (Fig. 1A).

During the first 24 hours of his admission, the patient complained of excruciating chest pain, and his ECG showed ST elevation in leads I, II, III, aVL, and aVF, with reciprocal ST depression in V1–V3, establishing the diagnosis of acute myocardial infarction (Fig. 1B). Since the patient was already hospitalized, there was no time delay for the transfer of the patient to the catheterization laboratory for primary coronary angioplasty. A transradial approach was used through the right radial artery with the use of a 6 French (F) sheath. The left main coronary artery (LMCA) was anatomically on the right side and originated from the right coronary sinus. We cannulated the LMCA with a Judkins Left 6F catheter in the right anterior oblique (RAO) view (mirror image of the typical left anterior oblique (LAO) view used in normally positioned hearts) with subtle manipulations. The left circumflex artery and the left anterior descending artery were normal (Fig. 1C). The right coronary artery (RCA), which was dominant and anatomically on the left side and originated from the left coronary sinus, was cannulated with a Judkins Right 6F catheter in the RAO view with counterclockwise rotation. There was 99% stenosis in the beginning of the large postero-lateral artery (Fig. 1D). We decided to perform primary PCI on the occluded postero-lateral branch (Fig. 2A). The RCA was selectively cannulated with a Judkin Right 6F guiding catheter, and the lesion was crossed with a BMW angioplasty guidewire followed by pre-dilatation with a 2.0×15 mm balloon at 14 atmospheres (atm). A 2.25×24 mm everolimus eluting stent was deployed at 18 atm to cover the entire lesion (Fig. 2B). Post-dilatation was carried out with a 2.5×15 mm non-compliant balloon at 22 atm. The result was excellent with a TIMI-3 flow (Fig. 2C and D) and was accompanied by relief of the pain and normalization of the ECG changes. The door-to-balloon

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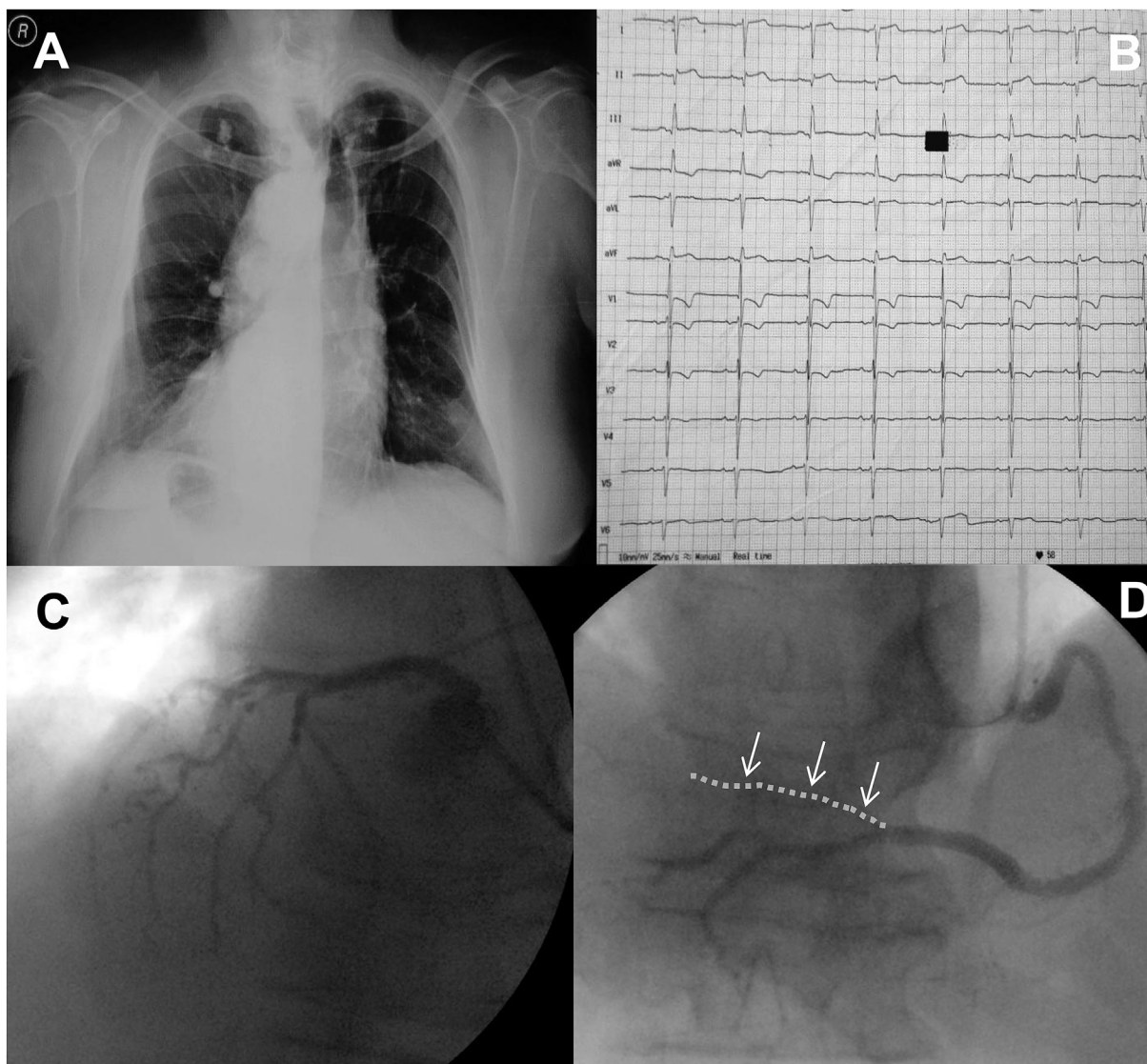


Figure 1 A. Chest X-ray confirming dextrocardia as well as the presence of a right sided stomach gas bubble and a right sided aortic knuckle. B. Left-sided ECG showing negative P waves in leads I and aVL, positive R wave in aVR, prominent S wave in the left-sided chest leads, as well as prominent R wave in the right-sided chest leads, and ST-elevation in leads I, II, III, aVL, and aVF. C. Left anterior oblique (LAO) view of the normal left coronary artery. D. Right anterior oblique (RAO) view of the right coronary artery (RCA) depicting the occluded postero-lateral branch (arrows and dotted line).

time was 30 minutes. There were no post-procedural complications, and the patient was discharged five days later.

The estimated incidence of dextrocardia with situs inversus is 1 in 10,000.¹ These patients have the same risk as the general population for CAD.² Coronary angiography was first reported in dextrocardia in 1975³ and PCI in 1987.⁴ Dextrocardia can pose technical difficulties during coronary angiography and angioplasty since the positions of the coronary artery ostia relative to the sinuses and to the aortic arch are a mirror image of the normal orientation. In 1987, Moreyra et al.⁴ demonstrated that Judkins catheters were not suitable for performing PCI in patients with dextrocardia; however, Kakouros et al. in 2010 and Tsioufis et al. in 2011 reported successful intervention using Judkins catheters.^{5,6} Both Kakouros et al.⁵ and Tsioufis et al.⁶ also

suggested that in cases of transfemoral procedures, catheter rotation in the opposite direction of its employment would be helpful in selective cannulation of coronary arteries (e.g., counterclockwise to seat a Judkins Right catheter).

Approaching a patient with dextrocardia from the right radial artery, as in our case, is almost exactly like approaching a patient with a normal heart position from the left radial artery or the femoral artery. The same angiographic or guiding catheters can be used, and when considering the aortic arch shape or dimensions or the specific coronaries' take-off, the same general rules should be followed (for example, using Extra Backup,⁵ Judkins Left⁷ catheters for left coronary artery ostium; multipurpose,⁸ Amplatz,⁹ Judkins Right^{5,7} catheters for right coronary artery ostium).



Figure 2 A. Right anterior oblique (RAO) view of the right coronary artery (RCA). B. RAO view of the RCA depicting angioplasty wire position and stent deployment to the postero-lateral branch (black arrows). C. RAO view after the restoration of flow to the postero-lateral branch (white arrows). D. Left anterior oblique (LAO) view after the restoration of flow to the postero-lateral branch (white arrows).

In the case presented herein, RAO view, as a mirror image of the typical LAO view used in normal heart catheterization, was used for the cannulation of both coronary ostia. Furthermore, mirror images of the standard angiographic views were used for imaging of the coronary arteries, which is equivalent to right-sided views to produce the usual left-sided images and vice versa, without changing the cranial or caudal angulations. We succeeded in selective cannulation of the RCA while performing angioplasty using a Judkins Right guiding catheter, and angioplasty of the occluded postero-lateral branch was performed with the standard wire, balloons, and stent, leading to optimal angiographic results. It is important to note that only a few cases in the current literature have reported the use of the transradial approach in patients with dextrocardia.^{9–14} To our knowledge, this is the second report of primary PCI in acute MI patients with mirror-image dextrocardia via the transradial approach.¹⁴

In conclusion, we performed the angiography and angioplasty through the right radial artery approach in a

patient with dextrocardia and situs inversus presenting with acute MI. The use of Judkins catheters, mirror image views, and counterclockwise rotation of the catheters allowed us to complete the interventional procedure without any complications.

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Disclosures

The authors have nothing to disclose.

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