



LEFT LATERAL VIEW FOR PCI TREATMENT OF INFERIOR STEMI IN A PATIENT WITH DEXTROCARDIA

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SUMMARY – Rapid recognition of ST-segment elevation myocardial infarction and electrocardiogram interpretation in patients with dextrocardia could be a challenging situation. This case report discusses presentation in a patient with dextrocardia and *situs inversus* who was found to have acute inferior myocardial infarction. Percutaneous coronary intervention in cases of dextrocardia can be technically challenging considering coronary origin and orientation, and difficulty in appropriate catheter selection.

Key words: *Dextrocardia; ST-elevation myocardial infarction; Coronary angiography; Angioplasty; Situs inversus*

Introduction

Dextrocardia is defined as a mirror image position to the heart in the right hemithorax, with apex directed to the right. The embryological development of the heart has effects on the anatomical location of the atria, ventricles and great vessels¹. In *situs inversus*, the position of internal organs is inverted, including the great vessels and heart chambers creating a mirror image¹. Dextrocardia is usually associated with complete right-to-left organ inversion (*situs inversus*), and less commonly with partial cardiac, vascular, and visceral inversions known as *situs ambiguus*. This affects 1:8000 to 1:10000 newborns¹. Patients with dextrocardia usually have a normal heart structure, normal life expectancy, and similar prevalence of coronary artery disease as in the general population². On the other hand, percutaneous coronary intervention (PCI)

in patients with dextrocardia is accompanied with numerous challenges due to reversed coronary anatomy.

In this case report, owing to the rarity of this condition, we describe a left lateral view for PCI in a patient with inferior ST segment elevation myocardial infarction (STEMI).

Case Report

Informed consent was obtained from the patient for medical data usage. A 55-year-old male smoker with hypertension and mirror-image dextrocardia (*situs inversus*) was admitted to our emergency room due to severe chest pain and ST segment elevation in inferior leads. He had a regular heart rate of 70 bpm, blood pressure of 93/52 mm Hg, and signs of mild pulmonary congestion. Specifically, standard 12-lead electrocardiogram revealed sinus rhythm, negative P wave in lead I and aVL, positive R wave in lead aVR, rS or prominent QS waves in precordial leads with inferior ST segment elevation, and anterior ST segment depression (Fig. 1A). The diagnosis of acute inferior STEMI was set and urgent coronary angiography was performed *via* right radial access. Atypical origin of

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the right coronary artery (RCA) was cannulated with a diagnostic multipurpose catheter and occlusion of the proximal segment of RCA was identified (Fig. 1B). On the left system, cannulated by standard Judkins 3.5 cm catheter, angiographically borderline 70% stenosis of the first obtuse marginal (OM1) branch was found. PCI was performed in the setting of hemodynamic instability, with invasive systolic blood pressure measured of 70–80 mm Hg. Guide wire navigation in mirror-image dextrocardia accompanied by hemodynamic instability, using standard radiographic projections,

was demanding and very challenging. The procedure proceeded using a left lateral view, i.e., mirror-view in mirror-image dextrocardia (Fig. 1C,D). The lesion was then quickly crossed with Balanced Middleweight Universal II wire (BMW UNI II, Abbott Vascular, Abbott Park, IL, USA). Two stents with minimal overlap were deployed in the mid- and proximal segment of RCA, after balloon dilatation restored flow and revealed underlying plaque rupture. The final result was checked from standard left oblique view (Fig. 1E).

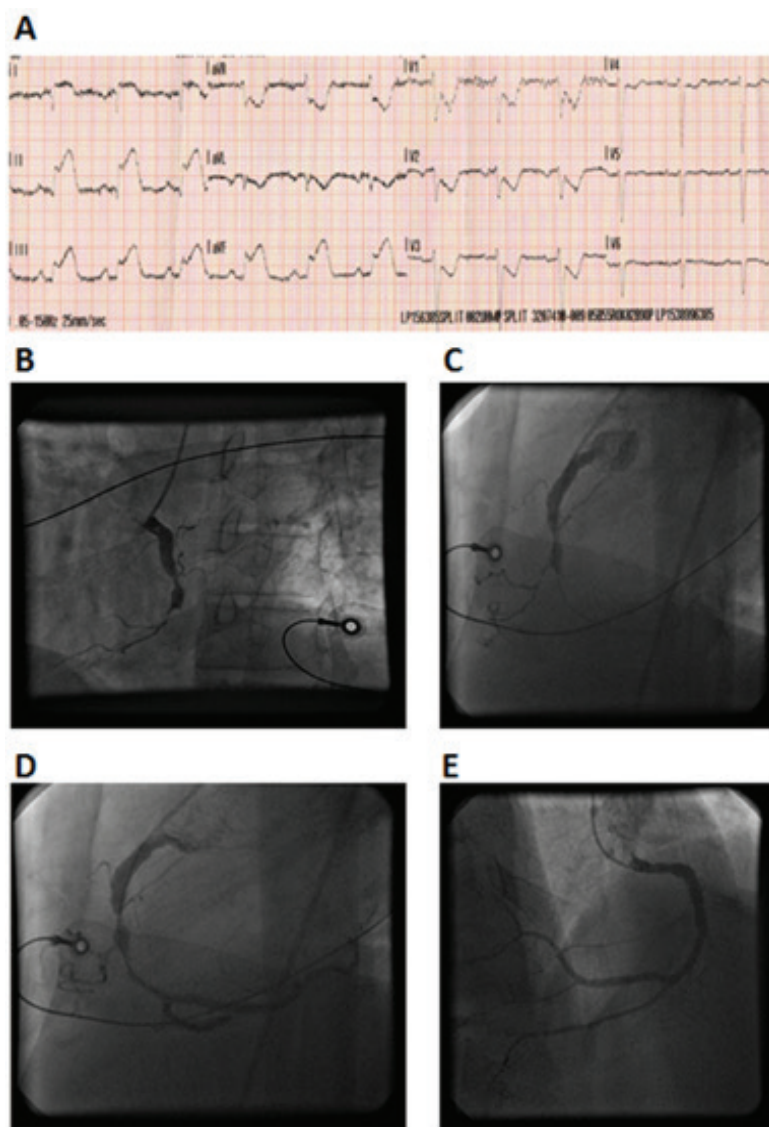


Fig. 1. (A) Left-sided ECG in a patient with mirror-image dextrocardia and inferior ST segment elevation and anterior ST segment depression; (B) right coronary artery (RCA) showing critical disease in mid-RCA, standard left oblique projection; (C, D) RCA in left lateral view (mirror-view). The image simulates conventional left oblique projection for RCA; (E) final result checked from standard left oblique view.

Discussion

In patients presenting with dextrocardia and STEMI, the complexity of establishing diagnosis and interventional procedure are challenging.

Electrocardiogram in patients with dextrocardia has poor R-wave progression in the precordial leads and both P-waves, as well as QRS complexes that usually have right axis deviation³. In addition, P-waves on standard electrocardiograms are inverted⁴. It is recommended that in patients with established or suspected dextrocardia, the ECG electrodes be reversed. In our case, ECG electrodes have not been reversed, however, without delay in the diagnosis of STEMI. This is related to inferior localization of myocardial infarction, which is well covered with regular standard leads that represent frontal plane.

Angiographic evaluation, catheter selection and manipulation contribute to the interventional outcomes in this patient group. In a recently published study, it has been reported that trans-radial approach was safe, effective, and feasible as compared to transfemoral approach⁵. Goel and Moorthy demonstrated that left radial approach could be advantageous in view of mirror-image aortic arch branching pattern⁶. Due to reversed angiographic orientation of coronary ostia and coronary anatomy in *situs inversus* dextrocardia, modification in angiographic image acquisition can help in cannulation of coronaries and interpretation of images to avoid potential complications and fasten the procedure. The mirror-image views and double inversion technique were recommended with the aim to make interpretation easier and to avoid interpretative errors^{6,7}.

In the emergency setting with a hemodynamically unstable patient, the left lateral view (mirror-view) may be of crucial importance for quicker and safer wire guidance through occluded right coronary artery in a patient with mirror-image dextrocardia, with a view to fasten revascularization.

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Sažetak

LIJEVI LATERALNI POGLED TIJEKOM PERKUTANE KORONARNE INTERVENCIJE KOD AKUTNOG INFARKTA DONJE STIJENKE MIOKARDA S PODIZANJEM ST SPOJNICE I DEKSTROKARDIJOM

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Pravodobno prepoznavanje infarkta miokarda s elevacijom ST segmenta i interpretacija elektrokardiograma u bolesnika s dektrokardijom predstavlja klinički izazov. Ovim prikazom slučaja opisujemo bolesnika s dektrokardijom i situs inversusom za kojeg je utvrđeno da ima akutni infarkt miokarda s podizanjem ST segmenta. Perkutana koronarna intervencija u slučajevima dektrokardije može biti tehnički izazovna s obzirom na poziciju ušća koronarnih arterija te poteškoće u odgovarajućem odabiru i manipulaciji intervencijskim kateterima.

Ključne riječi: *Dektrokardija; Infarkt miokarda s elevacijom ST segmenta; Koronarna angiografija; Angioplastika; Situs inversus*