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TITLE:

Unexpected Mirror-image Dextrocardia in a patient with ST Elevation Myocardial Infarction

ABSTRACT:

Mirror image dextrocardia is a rare congenital condition in which the heart is located in the right hemithorax. We report a case in which a patient presented with an inferior ST elevation myocardial infarction, with dextrocardia diagnosed during emergency coronary angiography. Despite the difficulties encountered during this case we were able to successfully perform percutaneous coronary intervention via the trans-radial approach without complication.

KEYWORDS: *(Five key words in order of importance for indexing purposes should be supplied below the abstract and should be taken from those recommended by the US National Library of Medicine's Medical Subject Headings (MeSH) browser list at <http://www.nlm.nih.gov/>)*

Dextrocardia, ST-elevation, percutaneous coronary intervention

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MAIN TEXT:

INTRODUCTION

A 68 year-old female presented with two hours of central chest pain associated with diaphoresis. The patient's history was significant for cigarette smoking, having quit approximately 5 months prior, but no history of ischaemic heart disease or diabetes. No other significant medical history was available due to difficulties with language barrier.

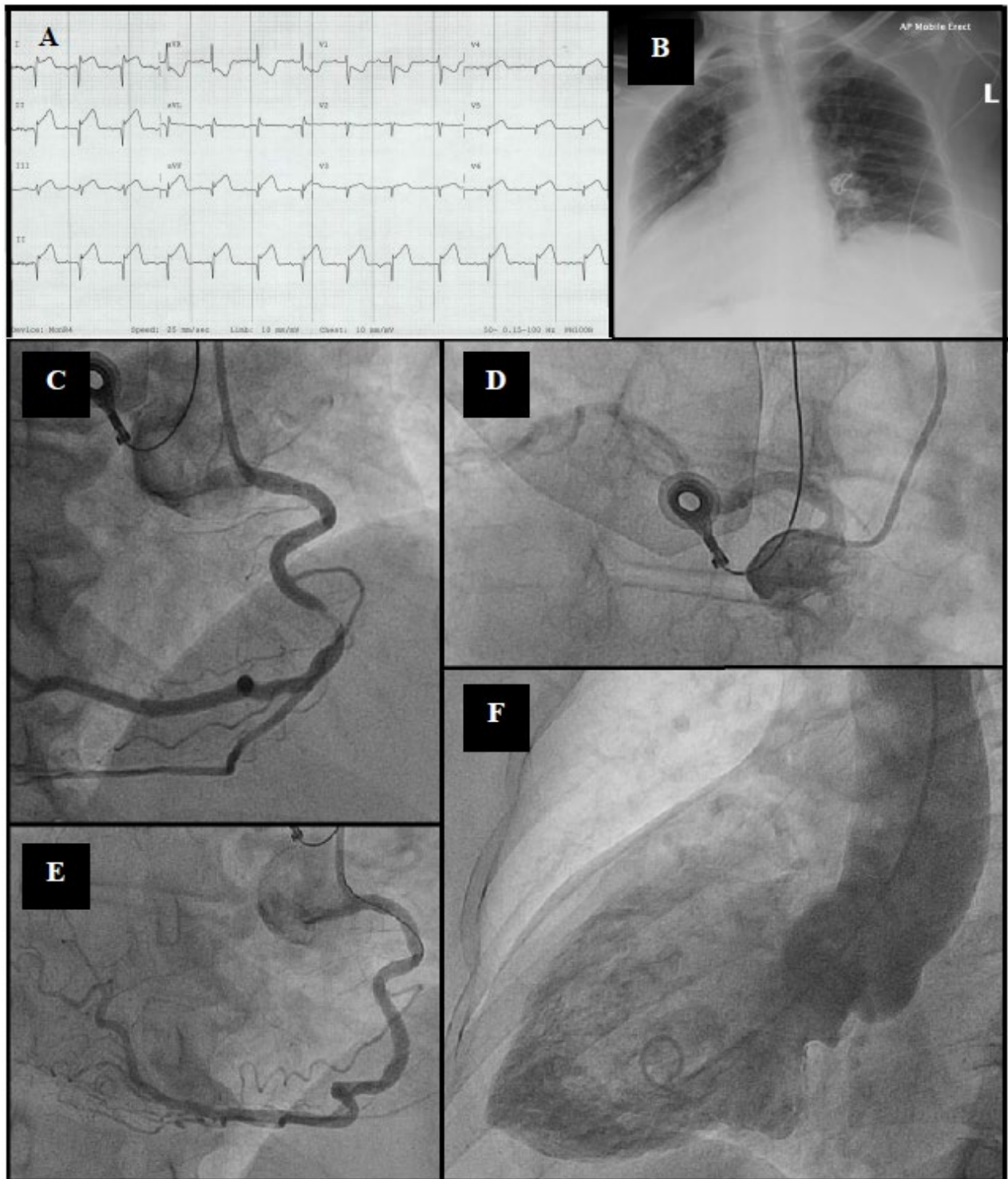
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Initial ECG demonstrated ST-segment elevation in the inferior limb leads (Figure 1A). Diagnosis of an acute inferior myocardial infarction was made and the patient was transferred to the cardiac catheterisation laboratory for urgent coronary angiography.

Arterial access via the right radial artery was undertaken. Initial attempts to engage the left main coronary artery (LMCA) with diagnostic catheter proved difficult. Eventually, a left-ward course of the right coronary artery (RCA) (Figure 1C), and a right-ward course of the left anterior descending (LAD) became apparent (Figure 1D). Interestingly, the left circumflex (LCx) had an aberrant origin, with a separate ostium adjacent to the RCA.

The acute lesion was treated successfully by implantation of a single drug-eluting stent (Figure 1E). The left ventriculogram (Figure 1F) and chest x-ray (CXR) (Figure 1B) confirm dextrocardia.

Figure 1



A) Presenting ECG. **B)** Initial post-procedure CXR. **C)** Initial diagnostic image of RCA – right anterior oblique view (25 degrees). **D)** Initial diagnostic image of LAD - right anterior oblique view (25 degrees). **E)** Post-

PCI (with drug-eluting stent) image of RCA. **F)** Left ventricular angiogram – left anterior oblique view (30 degrees)

DISCUSSION

Mirror image dextrocardia (MID) is a rare condition in which the heart is located in the right hemithorax, demonstrating the opposite right to left orientation to normal, but with preserved antero-posterior relationship of the chambers (right ventricle is anterior to left ventricle). MID usually occurs in the context of situs inversus (viscera display complete right to left inversion), or less commonly situs ambiguous or situs solitus. The incidence of MID is reported to be 1:10,000¹.

MID should be differentiated from two other conditions characterised by a right-sided cardiac position: dextroposition; in which the heart is shifted to the right via an extracardiac mass, and dextroversion; in which the ventricles are rotated to the right with the atria remaining in their usual position. Most cases of dextroversion are associated with other cardiac abnormalities including anomalous pulmonary venous return, tetralogy of Fallot, and transposition of the great arteries².

In our case, the ECG may initially be mistaken for an infero-lateral infarct, such as a dominant LCx occlusion (suspected when ST-elevation in lead II and V6 > lead III), although this would not explain the rightward axis; or an RCA occlusion with a left-right arm lead reversal. Features of dextrocardia include: rightward axis in conjunction with inverted P waves in lead I and upright P waves in aVR; and the absence of usual R wave progression in the precordial leads. In this case the inverted P wave in lead I argues against dextroversion (normal P wave axis).

The CXR remains an important diagnostic tool; unfortunately it is not uncommon for this to be unavailable prior to PCI.

Coronary angiography can be technically challenging due to unfamiliar cardiac geometry and difficulty in appropriate catheter selection. There have only been a few case reports of trans-radial PCI in patients with dextrocardia presenting with acute coronary syndrome³⁻⁸.

CONCLUSION

Our case highlights that despite the unawareness of dextrocardia until coronary angiography, PCI was performed successfully via the trans-radial approach.

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