

# Acute myocardial infarction in a patient with dextrocardia and situs inversus

Siddiq Khalil, FRCP, FESC, FACC\*, Amjad Kamal, DM, MD, Shakeel Ahmed, MD

*Department of Cardiology, Almana General Hospital, Jubail, 31961 Saudi Arabia*

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## Abstract

We report a case of 54-year-old man who presented to hospital with severe prolonged retrosternal chest pain of anginal nature. Electrocardiogram taken by his general practitioner showed minimal ST elevation in chest leads  $V_1$  and  $V_2$ ; there was also marked right axis deviation of P wave (negative in lead I and aVL) and of QRS complexes, together with low voltage in precordial leads  $V_4$  through  $V_6$ , suggestive of dextrocardia. Repeat electrocardiogram with chest and limb leads reversed showed widespread, significant ST elevation in lead I, aVL, and  $V_1$  through  $V_5$  in keeping with extensive acute anterior myocardial infarction (MI). High cardiac enzymes and troponin level provided further confirmation. The extent of MI in such patients may be underestimated unless dextrocardia is timely recognized and leads reversed. We recommend that for patients with dextrocardia and situs inversus presenting with MI, both chest and limb leads be reversed to reveal the true extent of the infarcted area.

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## Keywords:

Myocardial infarction; Dextrocardia; Situs inversus

## 1. Introduction

Dextrocardia is defined as presence of right-sided heart. It can be mirror image or isolated dextrocardia. Most of the patients with mirror image dextrocardia have normal heart. Myocardial infarction (MI) has been reported infrequently in these patients [2–6]. We report a case of anterior MI in a patient with mirror image dextrocardia and situs inversus.

## 2. Case history

A 54-year-old man with diabetes presented at accidents and emergency department complaining of excruciating retrosternal chest pain radiating to jaws and left arm. Except for diabetes mellitus, his coronary risk profile was not significant. On examination, he was in stable condition and was not in heart failure. Chest was normal to auscultation. On examination of cardiovascular system, heart sounds were louder on the right side of chest and there were no

murmurs. The first electrocardiogram (ECG) was recorded by his general practitioner at 8:30 AM using standard leads (Fig. 1A) and showed marked right axis deviation of P wave (negative in lead I and aVL) and of QRS complexes and low voltage in precordial leads  $V_4$  through  $V_6$ , all suggestive of dextrocardia. It also showed minimal ST elevation in  $V_1$  and  $V_2$  with reciprocal ST depression in inferior leads, suggestive of an early anterior infarction. ST elevation in aVR was remarkable. A second ECG with chest leads reversed, that is, right-sided chest leads, was recorded at 8:46 AM, the time of his arrival to hospital (Fig. 1B), and showed marked and widespread ST elevation from  $V_1$  through  $V_5$ . When limb leads were reversed, that is, right arm to left arm and right leg to left leg in addition to reversed chest leads (Fig. 1C; recorded at 8:53 AM), ST elevation could be seen in lead I and aVL, in addition to  $V_1$  through  $V_5$ . Cardiac markers (creatinine kinase, creatine kinase-MB, and troponins) were significantly elevated and diagnostic of MI. Echocardiogram showed anterolateral hypokinesia of left ventricle with systolic dysfunction (ejection fraction, 40%). His chest x-ray and ultrasound abdomen showed right sided heart with situs inversus

\* Corresponding author.

E-mail address: [sidkhalil@awalnet.net.sa](mailto:sidkhalil@awalnet.net.sa) (S. Khalil).

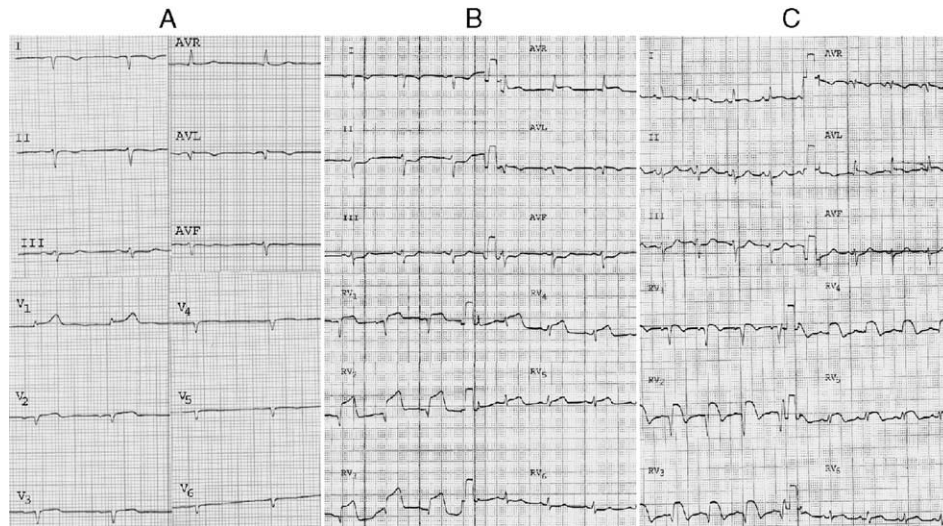


Fig. 1. A, The first ECG recorded by his general practitioner at 8:30 AM using standard leads. B, The second ECG recorded at 8:46 AM with chest leads reversed (right-sided chest leads format). C, The third ECG recorded at 8:53 AM with both limb and chest leads reversed.

(gastric bubble on the right side). Patient received Alteplase front-loaded dose and subsequently underwent coronary angiography, which showed single-vessel disease with left anterior descending coronary artery stenosis. Coronary angioplasty and stenting of left anterior descending coronary artery were successfully done.

### 3. Discussion

Dextrocardia with situs inversus is relatively uncommon cardiac condition (0.1–0.2/1000 population) [1]. Most of the patients have normal heart. About 22% of patients have Kartagener syndrome, a combination of situs inversus totalis, sinusitis, and bronchiectasis. Patients with dextrocardia are believed to have normal longevity and have an incidence of atherosclerotic coronary artery disease similar to that of the general population. The diagnosis of MI in such patients could be difficult unless dextrocardia is timely recognized. They commonly present with pain on the right side of chest with radiation to right arm [2–5]. Our patient had unusual presentation as he had retrosternal chest pain, similar to that of patients with levocardia.

The abnormal anatomic position of the heart requires change in ECG recording procedure. The initial ECG showed mild ST elevation confined to V<sub>1</sub> and V<sub>2</sub> and, therefore, underestimated the extent of infarction. When chest leads

were reversed, widespread ECG changes were apparent. However, it was only after reversing the limb and chest leads that the true extent of infarction could be revealed. Likewise, percutaneous coronary intervention poses some difficulty because of problems of orientation [6].

In conclusion, patients with dextrocardia and situs inversus presenting with MI should have both chest and limb leads reversed to appreciate the true extent of the infarcted area.

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