

Chest X-Ray and ECG Interface

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Abstract

Situs inversus with dextrocardia is the complete reversal of position of the thoracic and abdominal viscera. It can occur in isolation or with malformations, especially cardiac or alimentary. It is discovered by chance in adults as it remains mostly asymptomatic, however, in infancy it may be diagnosed during clinical examination and investigations for other conditions. We report a 50-year-old woman with dextrocardia and situs inversus while presenting for an unrelated problem. Her chest X-ray showed dextrocardia with sinus inversus. The findings from an electrocardiogram confirmed the location of the heart in the right hemithorax. This report underscores the need for routine screening by individuals so that such congenital anomalies can be identified.

Keywords: Dextrocardia; Situs Inversus; Chest X-Ray; Electrocardiogram.

Background

Dextrocardia is an embryologic malformation characterized by the displacement of the largest axis (base to apex) of the heart to the right side of the chest, with reversion of the apical inclination. This malformation occurs around the 8th week of embryonic life [1, 2].

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Dextrocardia with situs inversus is a rare condition occurring in about 1: 10,000 in the general population. There is no racial predilection for situs inversus and the male-to-female incidence is 1:1. This anomaly may not be diagnosed until late in life in some cases [3].

Case Report

A 50-year-old woman presented to medical department out-door clinic for an unrelated medical problem. She had no past history of MI/IT/HT/DA/DM/ST (Myocardial Infarction, Jaundice, Thyroid disease, Hypertension, Rheumatic fever, Epilepsy, Asthma, Diabetes or Stroke). Her cardiovascular system examination showed on inspection and palpation no visible and palpable apex beat in the left 5th intercostal space in supine position and absent apex beat even in the left lateral position. Inspection and palpation of right anterior chest were suggestive of visible and palpable apex beat in the right 5th intercostal space 9 cm from mid-sternal line. No murmurs were present on auscultation. The hepatic dullness started in the 5th left intercostal space and the anterior liver span was 8 cm. The woman underwent laboratory investigations, chest X-ray and ECG all leads including lead II. The patient did not give consent for echocardiography and abdominal ultrasonography.

X-ray chest was suggestive of dextrocardia with situs inversus. There was displacement of the largest axis (base to apex) of the heart to the right side of the chest, with reversion of the apical inclination. The horizontal fissure, normally seen on the right side of chest X-ray, was seen here in the left side of the X-ray suggesting that there is complete rotation of the lungs. The left diaphragm was at a higher level compared to right diaphragm on the chest X-ray due to levo-rotation of liver and gastric bubble was visible

on the right side on the chest X-ray suggestive of rotation of gut (Fig 1).

The ECG showed inversion of all complexes i.e. global negativity (inverted P, negative QRS, inverted T wave) in lead I, positive QRS complexes with upright P wave and T wave in aVR, right axis deviation and absent R wave progression in chest leads and dominant S waves throughout (Fig 2). All these features were suggestive of dextrocardia. The laboratory profile of the patient was normal.

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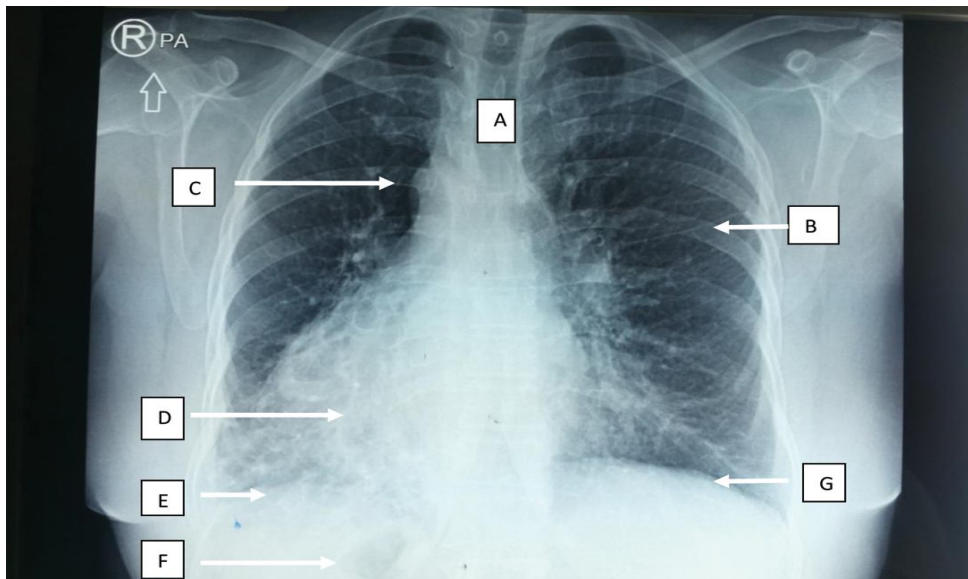


Fig. 1: Chest X-Ray PA view showing Trachea (A), Horizontal fissure of right lobe of lung on left side (B), Aortic knob on right side (C), Cardiac apex on right side (D), Left hemidiaphragm on right side which is at a lower level compared to other side (E), Gastric air bubble on right side (F), and right hemi-diaphragm on left side overlying liver (G)

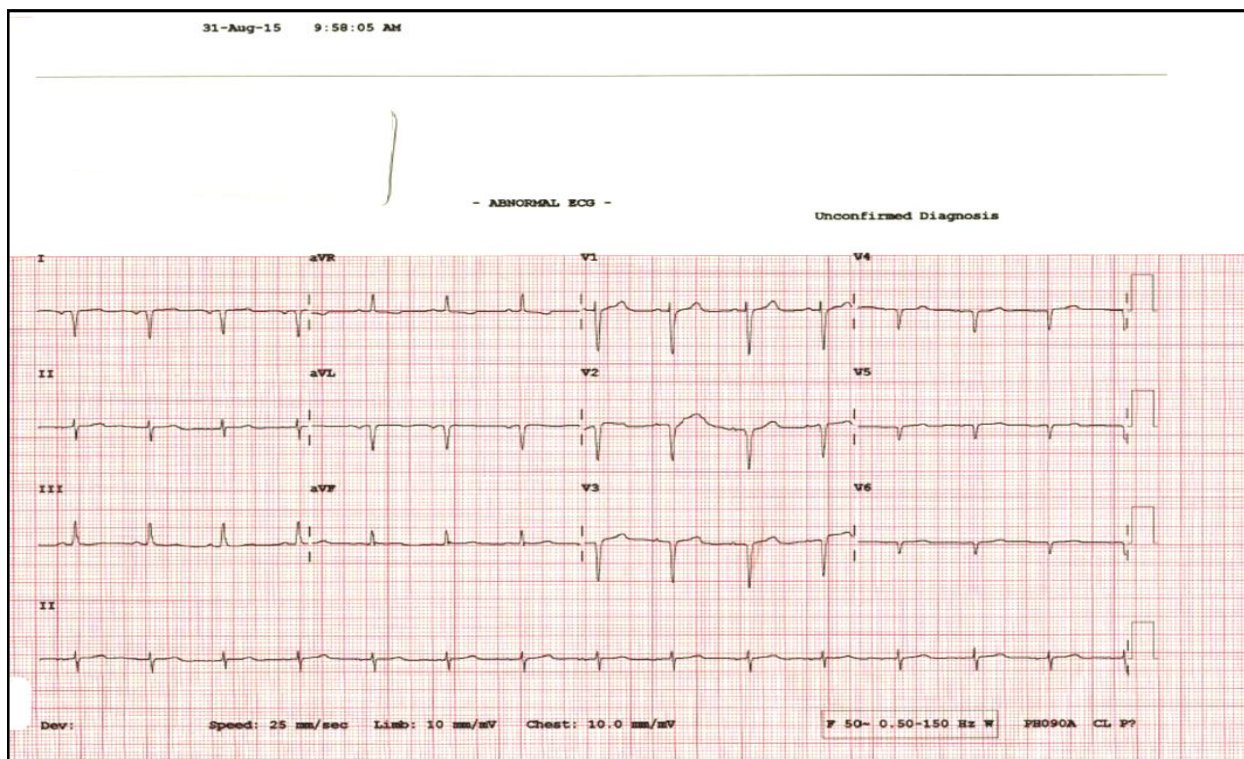


Fig. 2: ECG of the patient showing inversion of all complexes i.e. global negativity (inverted P, negative QRS, inverted T wave) in lead I, positive QRS complexes with upright P wave and T wave in aVR, right axis deviation and absent R wave progression and dominant S waves in chest leads suggestive of dextrocardia

Discussion

The diagnosis of dextrocardia with situs inversus can be attained during the physical examination, an electrocardiogram or imaging examination [4]. Thus, the knowledge of this anomaly and its variants is of crucial importance for physicians due to the risk of atypical angina presentations, its frequent association with other cardiac and/or extracardiac diseases and also, for constituting a malformation of which the abnormalities, despite their complexity, are currently possible of undergoing surgical correction [5, 6]. Dextrocardia with situs inversus can also be associated with primary ciliary dyskinesia (Kartagener's syndrome). Treatment typically depends on the heart or physical problems the person may have in addition to dextrocardia with situs inversus [7-9].

Dextrocardia with a normal abdominal situs has a high incidence of associated congenital cardiac anomalies including among others, transposition of the great vessels and atrial and ventricular septal defects in 90-95% of cases [10,11]. On the other hand, dextrocardia with situs inversus is associated with a lower incidence of congenital heart disease (0-10%) and as such, relatively asymptomatic, as was the case in our patient. In the rare instance of cardiac malformations, life expectancy is reduced depending on the severity of the defect [12].

Many people with situs inversus totalis are unaware of their unusual anatomy until they seek medical attention for an unrelated condition as in our case report. Confusion may occur as many signs and symptoms will be on the atypical side. For example, if an individual with situs inversus develops appendicitis, they will complain of lower left abdominal pain. Patient's prior knowledge that the individual has situs inversus can expedite diagnosis. People with this rare condition may inform their physicians before an examination, so the physician can redirect their search for heart sounds and other signs. Wearing a medical identification tag can help to inform medical staff in the event the person is unable to communicate.

Conflict of Interest

None

Financial Disclosure

None

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