

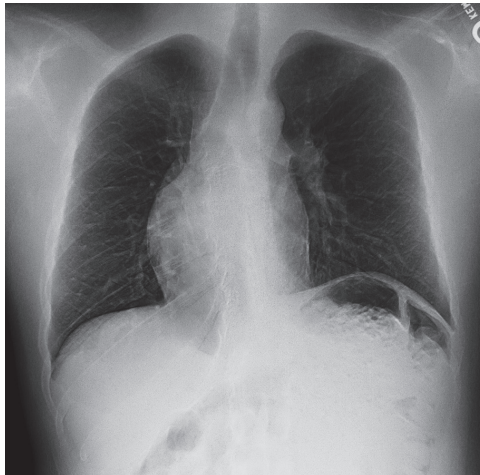
## An Abnormal Chest Radiograph

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**Figure.**

A 24-year-old asymptomatic man requested a chest radiograph for routine tuberculosis screening. He did not have difficulty breathing, palpitations, chest pain, or edema. His medical history was significant for scoliosis and Rubinstein-Taybi syndrome, a rare

genetic condition that causes short stature, broad thumbs and toes, hirsutism, and often intellectual disabilities.

On examination, his lungs were clear to auscultation. He had a regular heart rate and rhythm with no murmurs. There was no jugular venous distension. The heart sounds were shifted to the right, and the apical impulse was located to the right of the sternum. There were normal pulses in all four extremities. Chest radiography was performed (*see accompanying figure*).

### Question

Based on the patient's history, physical examination, and radiography findings, which one of the following is the most likely diagnosis?

- A. Dextrocardia.
- B. Dextroposition.
- C. Right heart failure.
- D. Situs inversus totalis.

**See the following page for discussion.**

**Discussion**

The answer is A: dextrocardia. Dextrocardia is the most common congenital positional abnormality of the heart, occurring in about one out of 12,000 persons.<sup>1,2</sup> Dextrocardia refers to the rightward pointing of the cardiac apex.<sup>3,4</sup> The malpositioning of the heart occurs during fetal development. Rubinstein-Taybi syndrome is associated with cardiac abnormalities in 32% of patients.<sup>5</sup>

Dextrocardia cannot be diagnosed from a single chest radiograph. Further evaluation of cardiac position and anatomy with computed tomography and echocardiography is necessary to confirm the diagnosis. In this patient, cardiac auscultation and palpation raised initial suspicion about cardiac placement. In this case, further evaluation with echocardiography demonstrated dextrocardia. This finding is incidental and not of clinical concern, unless it is associated with other anatomic abnormalities that may compromise functional capability.

Dextroposition refers to a shifting of the heart into the right hemithorax, often from mechanical causes.<sup>6</sup> Although congenital dextroposition may be associated with

hypoplastic right lung, it also increasingly occurs with congenital heart disease from left to right shunts.<sup>6</sup>

Right heart failure causing enlargement of the right heart may present with the cardiac silhouette in the right thorax. The most common cause of right heart failure is left heart failure.<sup>6</sup>

Situs inversus totalis is a mirror-image arrangement of normal organs. It is caused by an abnormal rotation of the organs during fetal development and is associated with dextrocardia.<sup>7</sup> The gastric bubble will appear on the right side.

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**Summary Table**

Condition	Characteristics
Dextrocardia	Cardiac apex points to the right hemithorax; associated with severe cardiac malformations
Dextroposition	Shifting of the heart into the right hemithorax
Right heart failure	Enlargement of the right heart; most commonly caused by left heart failure
Situs inversus totalis	Mirror-image arrangement of normal organs; gastric bubble will appear on the right side