A Case of Abnormal Cardiac Position (Levoposition)

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ALTHOUGH dextroposition (dextroversation, uncomplicated isolated dextrocardia) is a well accepted anatomic configuration of the heart\(^1\,\text{--}\,\text{2}\), it is believed that displacement of the heart into the left hemithorax to the degree here reported is an anatomic abnormality that has not been described previously.

The patient was a 22-year-old white man who complained of dyspnea on exertion. He had known for many years that his heart was "not normal" and had been told repeatedly by physicians to limit his activity. He had noted for the first time when he was in high school that he became more dyspneic on exertion than his friends and although he could work all day at a steady rate, if he tried to hurry he developed symptoms. He believed that his fingernails had become cyanotic on occasions and he noted palpitation on exertion. It was difficult to be sure how much of his disability was induced by his heart and how much was iatrogenic.

Physical examination revealed the chest wall to be of normal configuration without pectus excavatum. A cardiac impulse of normal character was located between the anterior and lateral axillary lines on the left. There was a grade II to III pulmonic systolic murmur and a widely split pulmonic second sound. Chest roentgenograms (figs. 1 and 2) revealed that the gastric air bubble was on the left, and the heart was greatly displaced into the left hemithorax, lying on the diaphragm.

Laboratory examination revealed normal urine and peripheral blood. An electrocardiogram (fig. 3) showed peaking of the P waves in the precordial leads. The electrocardiographic position was indeterminate. There was an rSr' pattern in V\(_2\) and the T waves were low in V\(_4\) and V\(_5\) and inverted in V\(_6\). No specific interpretation of this tracing could be made.

Cardiac catheterization was done in order to reassure the patient, since it was considered that he had a normally functioning heart, but it was also believed that he could not be reassured effectively without having some objective demonstration of cardiac normality. The pulmonary arterial blood pressure was 26/11 with a mean of 16 mm. Hg. The mean pulmonary artery wedge pressure was 13 mm. Hg and presented V waves 9 mm. Hg in height. Right ventricular pressure was 30/1 with an end diastolic of 7. Femoral arterial blood pressure was normal as was systemic arterial oxygen saturation. By oximetry there was no evidence of any intracardiac shunt. The pulmonary wedge pressure was higher than we usually see in normal persons.

The patient was reassured that his heart was anatomically displaced but physiologically satisfactory.

DISCUSSION

Displacement of the heart secondary to disease in the thorax is not part of the present discussion, since the lesion described occurred in an otherwise normal individual. For lack of demonstrable related thoracic disease the displacement is assumed to have been congenital in origin even though there was no evidence of anomalous pulmonary venous connection as has been described in some cases with dextroposition of the heart,\(^3\,\text{--}\,\text{4}\) nor of any other congenital cardiac defect. Dextroposition is well known to occur without associated congenital defects,\(^1\,\text{--}\,\text{2}\) so that the absence of the associated congenital lesion need not militate against the assumption of congenital origin for this case of "levoposition."

Although the cause of cardiac malposition is unknown, it is said that the embryologic abnormality that produces it must take place in the second week of fetal life when normal
Fig. 1. Posteranterior and lateral roentgenograms of the chest. The displacement of the heart is well shown in the frontal projection with the mass of the left ventricle almost completely separated from the shadow of the diaphragm. The heart is rotated in a counterclockwise direction.

Fig. 2. Right anterior and left anterior oblique roentgenograms with barium in the esophagus. The left ventricle projects posteriorly more than in the normal. The unusual prominence of the pulmonary artery is noteworthy.
rotation should occur.\textsuperscript{2} Dextroposition of the heart seems to be produced by a reversal of the normal rotation,\textsuperscript{2} and is characterized by displacement of the heart toward the right, producing a radiographic picture of dextrocardia but without inversion of the cardiac chambers and without the electrocardiographic pattern of dextrocardia.\textsuperscript{1} Dextroposition is much more common than is levoposition of the degree described here. It is, of course, entirely probable that variable degrees of levoposition of the heart exist and are accepted as within normal limits until such an extreme position as that in the present case occurs. Such interpretation of cardiac positions might well account for the discrepancy between the reported incidence of the 2 types of malposition.

It is of considerable interest to observe how far from normal the cardiac position may be without distorting the electrocardiogram fundamentally, although it is known that anatomic and electric positions are frequently not related.\textsuperscript{5} The present case affords some measure of the degree of discrepancy that may occur. Cardiac catheterization, by excluding significant pathologic lesions, afforded this patient considerable relief from anxiety about his heart.

**Fig. 3.** Electrocardiogram of the patient with "uncomplicated levoposition" of the heart.

**Summary**

Dextroposition and levoposition are both believed to be forms of cardiac malposition that arise in early fetal life. It is believed that this is the first case of levoposition reported.

When cardiac positions are grossly abnormal, special investigations are required to establish normality of cardiac function, since usual criteria for physical findings, electrocardiographic data, and radiographic determination of size and shape may not be applicable.

**Summario in Interlingua**

Es opinate que dextro- e levoposition del corde es ambes formas de malposition cardiac que ha lor origine in le prime phases del vita fetal. Le presente caso pare esser le prime caso levoposition reportate in le litteratura.

In casos de grossier anormalitate del position cardiac, investigationes special es requirite pro testar le normalitate del functiones del corde, proque le criterios usual—le constatazione physic, le datos electrocardiographic, le determinacione radiographic de dimension e conformation—non es necessariemente applicable.

**REFERENCES**

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