Coronary Arteriography in Situs Inversus Dextrocardia

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Selective coronary arteriography by the Judkins' technique can be readily accomplished in dextrocardia. Cineangiograms should be obtained in the mirror image obliques for each coronary vessel and cardiac chamber. To avoid any potential error of identification and interpretation of the coronary vessels, films could be reviewed in reverse fashion, which would project the cardiac structures as if there were no dextrocardia.

The advent of the preformed catheters has simplified the technique of selective visualization of the coronary arteries.1,2 In normal cardiovascular anatomy and in expert hands, this technique is safe and has done much to popularize selective coronary arteriography. There is, however, a paucity of information in the literature on the use of techniques in selective catheterization of the coronary arteries in situations in which an abnormal position or relation exists between the cardiovascular structures.

We have recently had the opportunity to perform coronary arteriography in a patient with complete situs inversus who raised some questions among the members of our staff as to the proper technique in such instances.

Since, to our knowledge, a technique of selective coronary arterial catheterization in cardiac malpositions has not been previously reported, we believe that this case report might serve as a future reference.

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Case Report

This 55-year-old white man was admitted to the Veterans Administration Hospital on Sept. 9, 1972, for evaluation of chest pain of three months' duration.

The chest pains were dull and aching in character, occurring mostly at rest and lasting from a few minutes to hours. The pain was present over the right anterior chest wall, radiated to the neck and right arm and was occasionally accompanied by shortness of breath. Nitroglycerin therapy did not relieve the pain.

He had bilateral pneumonia and empyema in 1935 with development of exertional dyspnea over the subsequent years, but there had been no clinical or x-ray film evidence of bronchiectasis. There was no family history of coronary artery disease. The patient smoked two packages of cigarettes per day.

Physical Examination

The blood pressure was 110/70 mm Hg. His apical rate was 70 per minute and he was in no distress. There were no abnormalities of the eyes, ears, nose or throat. Examination of the neck revealed no abnormality, except for mild bilateral carotid bruits. Abdominal examination revealed no organomegaly or bruits. The extremities were unremarkable, except for bilateral femoral bruits with strong pulses. The lungs were clear to percussion and auscultation. Cardiac examination revealed that the point of maximum impulse was in the fifth right intercostal space in the midclavicular line. First and second sounds were normal and there were no extra heart sounds. No heave, thrill or cardiomegaly was detected.

A submaximal stress test on a treadmill was incomplete due to the development of fatigue. The electrocardiogram showed typical changes of mirror image dextrocardia (Fig 1). Chest x-ray films showed dextrocardia but heart size and lung parenchyma were within normal limits (Fig 2). The patient was thought to have chest pain of undetermined etiology, possibly angina pectoris. Diagnostic cardiac catheterization was recommended.

Materials and Methods

The procedure was performed utilizing the percutaneous technique for coronary angiography, as described by Judkins.1,2 A no. 7 right coronary catheter was introduced into

Figure 1. (a, left) Standard leads of electrocardiogram at time of cardiac catheterization reveal typical changes of mirror-image dextrocardia with inverted P, QRS and T waves in lead I. (b) Precordial leads of same electrocardiogram show progressive loss of R wave from lead V₁ through V₆.

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FIGURE 2. Anteroposterior view of chest x-ray film shows situs inversus dextrocardia. Heart size and lung parenchyma are normal.

the right femoral artery and was advanced into the central aorta under continuous pressure and electrocardiographic monitoring using a multichannel recorder. The patient was placed in a 30 degree right anterior oblique position. The tip of the catheter pointed towards the right-sided left coronary ostium. With minimal manipulation and clockwise rotation the left-sided right coronary ostium was cannulated and selective injections were performed in varying degrees of right and left obliquity (Fig 3). This catheter was then exchanged for a no. 7 left coronary catheter which was advanced slowly until it entered the right-sided left coronary artery ostium without any difficulty. Selective injections were performed in different degrees of right and left anterior oblique views (Fig 4). A diagnosis of mirror-image dextrocardia was confirmed. Intracardiac pressures were normal. Left ventricular contractions were normal on ventriculography, which was filmed in a 30 degree left anterior oblique view. Coronary angiography revealed minimal irregularity of the proximal left anterior descending coronary artery and right coronary artery.

DISCUSSION

Malposition of the heart was defined in 1843 by Marcus Aurelius Severinus and is one of the earliest recognized congenital anomalies of the heart. Over the years subjective and objective findings, electrocardiogram, chest x-ray film characteristics and other congenital anomalies associated with these malpositions have been well described. Diverse and complex congenital heart diseases associated with these entities usually do not allow longevity to adulthood, when coronary artery disease may become manifest.

Mirror-image dextrocardia, however, is only infrequently associated with other significant congenital heart anomalies and in the majority of the cases is not

FIGURE 3. (a, left) Right anterior oblique projection of left-sided right coronary artery shows dominant vessel with minimal proximal irregularity revealed in right coronary arteriogram. (b) Left anterior oblique view of same vessel.

FIGURE 4. (a, left) Right anterior oblique view of right-sided left coronary artery shows minimal irregularity of midportion of left anterior descending coronary artery as revealed in left coronary arteriogram. (b) Left anterior oblique view of same vessel.
incompatible with a normal life span. The development of other acquired cardiovascular diseases, including atherosclerotic heart disease, would be anticipated in these patients and cardiac catheterization and coronary angiography may become indicated for diagnostic evaluation.

Our experience with coronary arteriography in this patient with mirror-image dextrocardia allowed us to recognize that the evaluation of coronary arteries in this group of patients can easily be accomplished by the conventional Judkins’ technique. Reversal of the angle of projections during coronary angiography and left ventriculography is the only modification required. To avoid any potential error of identification and interpretation, the films could be reviewed in reverse fashion. This would project the cardiac structures as if there were no dextrocardia.

References
5 Hanson JS, Tabakin BS: Primary and secondary dextrocardia, their differentiation and the role of cineangiocardiography in diagnosing associated congenital cardiac defects. Am J Cardiol 8:275-281, 1961

Sequestration of Lung Associated with Achalasia Cardia*


This report of extralobar pulmonary sequestration in association with achalasia cardia in a one-year-old child is presented because of the rarity of this combination. The embryogenesis, clinical features, and management of the condition have been briefly discussed.

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The association of various congenital anomalies in patients with extralobar sequestration is well established. The occurrence of extralobar sequestration of lung with achalasia cardia appears quite interesting and to our knowledge has not been reported previously. Extralobar sequestration, though a congenital condition, does not usually give rise to symptoms in infancy and childhood. On the other hand, achalasia cardia, though a common disorder in adults, is rare in infancy and childhood.

Case Report

This child was the first born of nonconsanguineous parents. Antenatal, natal and postnatal periods were uneventful. The child was breast-fed. He started to cough when he was four months of age. Ten days after the onset of cough, he began to vomit immediately after feedings. The frequency of vomiting was from 10 to 15 times per day. The vomiting was regurgitant in nature. Vomitus did not contain blood or bile at any time.

He was first seen at the Christian Medical College Hospital, Vellore at the age of nine months. On clinical examination he was dehydrated. He had signs of consolidation in the right middle lobe region. Skiagram of chest revealed diffuse areas of pneumonitis. Barium swallow examination revealed moderate dilatation of the esophagus with a smooth narrowing at the cardia, and an absent gastric bubble (Fig 1). Endoscopy revealed dilated esophagus without any mechanical obstruction. A provisional diagnosis of achalasia cardia was made, and the infant was fed through a nasogastric tube. With appropriate antibiotics and physiotherapy the pneumonitis cleared up. Surgery was not done at this time because

Figure 1. Preoperative barium swallow which shows dilated esophagus with smooth narrowing at cardia.