CASE REPORT

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Sudden Death Due to Anomalous Origin of the Left Coronary Artery from the Pulmonary Trunk

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ABSTRACT: Anomalous origin of the left coronary artery from the pulmonary trunk is a rare congenital anomaly of the cardiovascular system. Most patients with this condition die during the first year of life without proper treatment. In rare instances a patient will survive to his teens and adulthood. However, in most of these cases minor symptoms are present such as a feeling of heaviness of the lower chest, mild chest pain, or some electrocardiographic changes. A sudden unexpected death because of this anomaly, in a previously healthy athletic 22 year old, is reported.

KEY WORDS: pathology and biology, cardiovascular system, death

An anomalous origin of the left coronary artery from the pulmonary trunk is a rare congenital anomaly of the cardiovascular system. Only slighlty more than 200 such cases have been reported in the literature [*1-3*]. More than 80% of these cases were diagnosed during infancy and the usual early symptoms are failure to thrive, tachypnea, wheezing, or angina-like episodes. If untreated, most patients die in their first year of life. However, over 40 of the reported cases survived undiagnosed to their teens or adulthood.

In fewer than ten cases, asymptomatic patients died suddenly after a period of physical exertion. One such case was recently seen at the Westchester County Medical Examiner's Office.

Case Report

A 22-year-old, 180-cm (71-in.) tall, 91-kg (200-lb), well-developed, well-nourished college senior was involved in a practice session of karate at the college gymnasium. Upon completion of practice with his opponent, he was sent to his corner where he suddenly keeled over and collapsed. This was observed not only by his opponent and the referee, but also by his teammates who were watching the practice. Cardiac resuscitation was attempted with no success.

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The deceased was the first of three children from parents who were proven to be in good health following extensive cardiovascular diagnostic examinations after his death. According to the family physician, the deceased had been in good health since birth. He participated in various sports activities throughout his school days. He had a complete physical examination (including an electrocardiogram) one year prior to his death, and it was normal.

At autopsy the heart weighed 460 g and was globoid in shape. The left coronary artery originated from the pulmonary trunk just above the left posterior pulmonary valve. It had the usual anterior descending and circumflex branch distribution pattern; however, it showed a markedly dilated lumen, thin wall, and pale tannish intima similar to that of a vein (Fig. 1). The right coronary artery, which originated from the aorta in the usual fashion, showed marked dilation of the lumen and tortuosity. The wall was of normal thickness and the intimal surface showed a light yellowish color with occasional superficial yellowish atheromatous plaques. The myocardium showed extensive diffuse fibrotic scar tissue involving the inner one third to one half of the wall, seen most prominently in the anterior wall and the anterior interventricular septum of the left ventricle. The trabeculae carneae and papillary muscles were flattened because of fibrosis (Fig. 2).

The left lung weighed 600 g and the right lung, 720 g. The cut surfaces showed marked edematous change. The upper tracheobronchial lumina contained a large amount of aspirated stomach content. The gastrointestinal system was unremarkable. The liver weighed 2050 g and the cut surfaces showed marked congestion. The pancreas was unremarkable. The spleen weighed 310 g and sections showed marked congestion. The adrenal glands were normal. Both kidneys weighed 390 g and the sections revealed moderate congestion. The brain weighed 1670 g and the cut surfaces revealed no abnormalities.

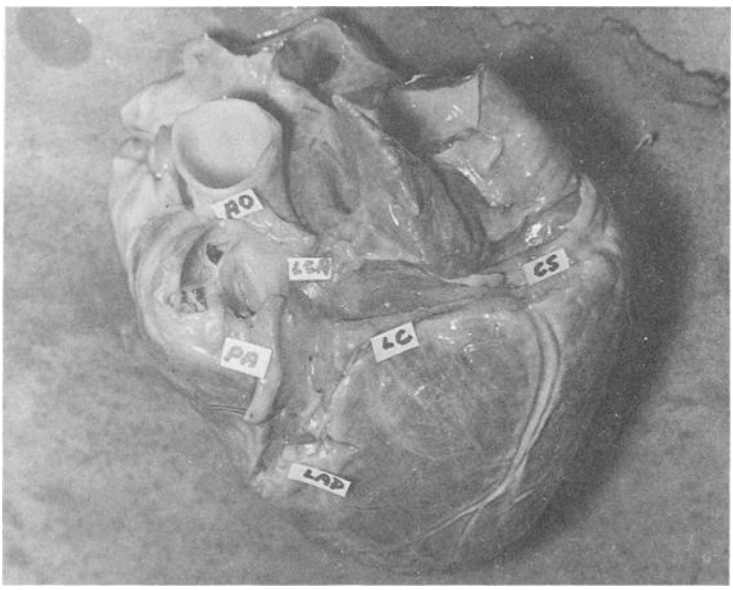

FIG. 1—*Left coronary artery originating from pulmonary trunk showing thin-walled artery similar to a vein;* LCA = *left coronary artery,* AO = *aorta,* PA = *pulmonary artery,* LAD = *left anterior descending branch;* LC = *left circumflex branch, and* CS = *coronary sinus.*

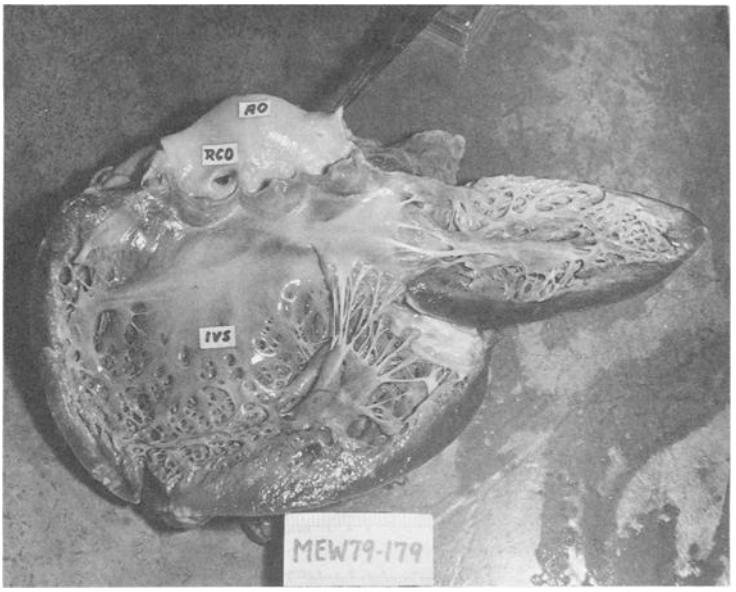

FIG. 2—*Right coronary artery originating from the base of the aorta. No left coronary artery ostium is seen. Trabeculae are flattened and fibrotic. Anterior papillary muscle is markedly atrophic. Myocardium shows diffuse subendocardial fibrosis;* AO = *aorta,* RCO = *right coronary ostium, and* IVS = *interventricular septum.*

Discussion

The first case of anomalous origin of the left coronary artery from the pulmonary trunk was described by Abbott in 1908. This rare congenital anomaly occurs once in 300 000 live births and constitutes 0.5% of all cardiac anomalies. There is female dominance with a ratio of about 2:1. The mortality rate is about 85% during infancy or childhood. In fetal life the blood flows from the pulmonary artery to the anomalous coronary artery. However, after birth, and only if the individual develops adequate collateral circulation from the right coronary artery, the condition can become an adult-type anomaly [*4*] where the blood flows from the left coronary artery to the pulmonary artery. Recently there have been successful surgical repairs by ligation of the anomalous artery or by saphenous vein grafts in selected cases [*2*].

Most reported asymptomatic cases revealed minor symptoms such as a feeling of heaviness in the lower chest, mild chest pain, or electrocardiographic changes retrospectively [*5*]. Such symptoms were not reported in the case described in this paper.

References

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