SINGLE CORONARY ARTERY

CASE REPORT

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Single coronary artery is a very rare anomaly which does not reveal clinical
evidence and usually diagnosed fortuitously during autopsy. The occasional case
of single coronary artery may be difficult to differentiate from idiopathic hypertrophy of the heart.

Recently, a patient admitted to our hospital with a chief complaint of
shortness of breathing and diagnosis of single coronary artery was made by
angiocardiography antemortem. Due to the rarity of this anomaly, a report on
this case was prepared.

CASE REPORT

A 16-year-old boy was admitted to the hospital for evaluation of heart disease
because of shortness of breathing with an enlarged heart. He was a symptomatic
until the age of 10 years, when he began to complain of shortness of breath
during any physical exertion. At 12 years of age, he developed pretibial pitting
edema, easy fatigability and palpitation and was pointed out an enlarged heart
by a local doctor.

On March 29, 1967, the patient was admitted to the Kurume University Hos-
pital for an examination of his heart condition.

A physical examination revealed a well developed and well nourished boy
168.1 cm tall and 55.0 kg weight. His blood pressure was 132 mmHg systolic and
75 diastolic. Pulse was regular at a rate of 74. No anemic palpable, icteric tint
in sclera, cyanosis, clubbing nor chest deformity was detected. Enlargement of
relative cardiac dullness was noted on both sides. The first sound was normal,
the second was of normal intensity and normally split at the apex. The pulmonary
component of the second sound was slightly accentuated with narrow splitting.
A grade II soft systolic murmur was heard at the apex. There was no lung nor
peripheral congestive manifestations. The examination, otherwise, was within
normal limits.
Fig. 1. Chest X ray film shows enlarged heart.

Fig. 2. Electrocardiogram reveals abnormal Q waves and T waves inversion with high voltage in left precordial leads.
A X-ray of the chest revealed an enlarged heart with slight increase in pulmonary vascular markings (Fig. 1).

The electrocardiogram revealed a depression of ST segments in leads III, V, V, T waves inversion in I, II, III, V-V with high voltages. Abnormal Q waves were seen in the left precordial leads (Fig. 2).

The right and left sides of the heart were catheterized but evidence was not detected as shown in Table 1.

TABLE 1

<table>
<thead>
<tr>
<th>Cardiac Catheterization Data</th>
<th>Pressure (mmHg)</th>
<th>Oxygen content (Vol. %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Systolic</td>
<td>Diastolic</td>
</tr>
<tr>
<td>Pulmonary capillary</td>
<td>16</td>
<td>7</td>
</tr>
<tr>
<td>Pulmonary artery</td>
<td>24</td>
<td>11</td>
</tr>
<tr>
<td>Right ventricle</td>
<td>35</td>
<td>3</td>
</tr>
<tr>
<td>Right atrium</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Vena cava inferior</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Vena cava superior</td>
<td>8</td>
<td>3.5</td>
</tr>
<tr>
<td>Brachial artery</td>
<td>135</td>
<td>68</td>
</tr>
<tr>
<td>Cardiac output</td>
<td>5.0 L/min</td>
<td>oxygen saturation</td>
</tr>
<tr>
<td>Cardiac index</td>
<td>3.1 L/min/m²</td>
<td>oxygen uptake</td>
</tr>
</tbody>
</table>

Fig. 3. Selective aortogram reveals single origin of coronary arteries.
The selective aortography from the root of the aorta was performed repeatedly and revealed an abnormally wide left coronary artery with a large branch supplying the right side of the heart. The right coronary artery could not be visualized (Fig. 3). The pulmonary angiography disclosed no anomalous origin of coronary artery from pulmonary artery.

DISCUSSION

Single coronary artery is one of the rare anomaly in congenital heart disease and is rather difficult in antemortem diagnosis because of few significant clinical characteristics. By definition, a single coronary artery arises by one ostium from an arterial trunk and nourishes the entire myocardium without regard to the distribution of the branches. There have been 74 cases reports of single coronary artery. In 1950, Smith gave a comprehensive review of single coronary artery and classified then three anatomic types: Type 1. A single coronary follows the course of only the normal right or left artery; Type 2. A single coronary artery arises from one ostium but divides so that branches are present in the distribution of both the right and left coronary arteries; Type 3. A single coronary artery has so atypical distribution that it cannot be compared with the right or left coronary artery.

A type classification in this case is difficult but may be categorized as type 2 in Smith's anatomical classifications. The embryologic formation of this anomaly has proposed by Roberts: 1. Absence of the anlage for one coronary artery; 2. Displacement of the anlage of one coronary artery so that it fuses with the anlage of the others; 3. Closure of one coronary artery following its formation.

The majority of the patients with single coronary artery have no clinical significance in early stages. Their chief complaints of palpitation, dyspnea in mild degree and enlarged cardiac silhouette, are referred to as idiopathic cardiomyopathy.

In some cases, myocardial infarction may have resulted from some degree of ischemia of heart muscle due to unsatisfactory supplement of the blood flow.

The electrocardiographic changes seen in patient with this anomaly are not specific. Abnormal Q waves in precordial leads, changes of ST segments and T waves inversion, which suggest that a patient with primary myocardial disease are common and characteristic findings are the sign of myocardial infarction seen in children. In this case, the electrocardiogram revealed abnormal Q waves in the left precordial leads with T waves inversion.

The angiocardiogram, especially coronary arteriogram of this disease is helpful in diagnosing the absence of a coronary artery. Recently the first case of single coronary artery in which the diagnosis was established antemortem by selective aortogram was reported by Holperin et al. Since a single coronary artery was not confirmed by autopsy in this case, further observation of clinical course should be of interest.
SUMMARY

A case of a 16-year-old boy with single coronary artery in whom antemortem diagnosis was established is studied. The patient was symptomatic except shortness of breathing on exertion. Repeated selective aortogram disclosed the absence of right coronary artery with widened left coronary artery supplying the right side of the heart.

REFERENCES