

The THAI *Journal of* SURGERY

Official Publication of the Royal College of Surgeons of Thailand

Vol. 27

October - December 2006

No. 4

Abnormal Origin of Coronary Artery from the Aorta: A Case Report

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Abstract

We report the case of a 15-year-old boy with abnormal course of coronary artery. Both the right and left coronary ostia originated closely from the right coronary sinus and left main coronary artery was running intramurally between the aorta and the pulmonary artery trunks. The left anterior descending and circumflex arteries followed the normal courses. The slit-like left coronary ostium was unroofed and its intimal layer was marsupialized to the aorta. The patient had been healthy after surgery and could attend all activities as he wished at 3 months postoperatively.

INTRODUCTION

Congenital malformation of coronary artery is a set of rare malformations of the heart. Prevalence of the abnormal origins of the coronary arteries from the

aorta in general population is unknown because some patients develop sudden death without knowing the cause of death and some have it without symptom. Therefore, the true prevalence is still unknown.

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There are reports of death and morbidity from this condition.¹⁻³ Risk of death was reported as high as 82%, most were sudden and cardiac related.^{1,2,4} As a result of this, proper decision should be made in patients known to have this anomaly. We reported a case of abnormal origin of coronary artery with proposed corrective procedures.

Case Report

The patient was a 15-year-old boy presented with circulatory collapse while he was playing basketball. After investigation by transthoracic echocardiogram, abnormal course of coronary artery was identified. The left coronary artery was found lying in between the aorta and the pulmonary artery. Because anatomical details were inadequate for correction, CT angiogram was performed which revealed that both the right and left coronary ostia originated closely from the right coronary sinus and the left main coronary artery was running intramurally between the aorta and the pulmonary artery trunks (Figure 1 and 2). The left anterior descending and circumflex arteries follow the normal courses.

Corrective Procedures

The patient was put on heart-lung machine with bicaval cannulation and temperature at 25 degree Celsius. The anomaly was repaired with the heart

arrested. The first dose of cold blood cardioplegia was antegrade mode but the second dose was retrograde fashion, 30 minutes later.

After the aorta was divided, by gentle probing, we explored the courses of every coronary artery and examine how close their ostia to the aortic commissure were. Interestingly, there was a segment of left main coronary artery embedded in the aortic wall (Figure 3).

The slit-like left coronary ostium was unroofed and its intimal layer was marsupialized to the aorta

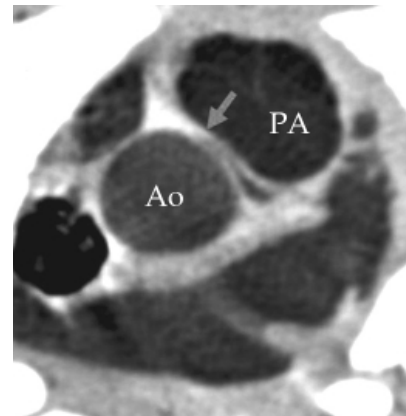


Fig. 1 Demonstration of the left main coronary artery (arrow) running intramurally between the aorta (Ao) and the pulmonary artery (PA).

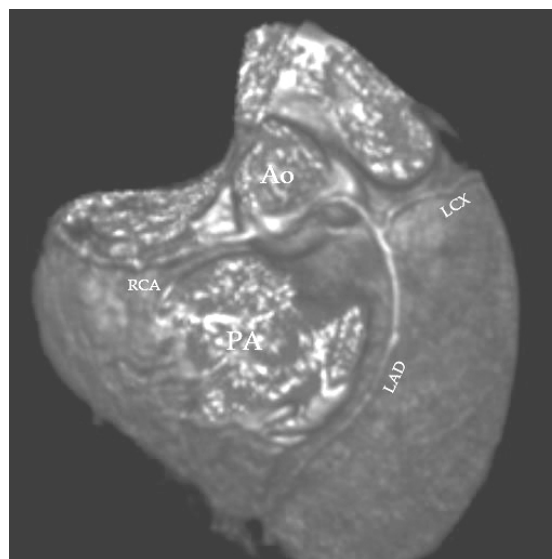


Fig. 2 Illustration of reconstructed series of CTA pictures; normal branching of the left coronary artery. LAD = left anterior descending artery, LCX = left circumflex artery.

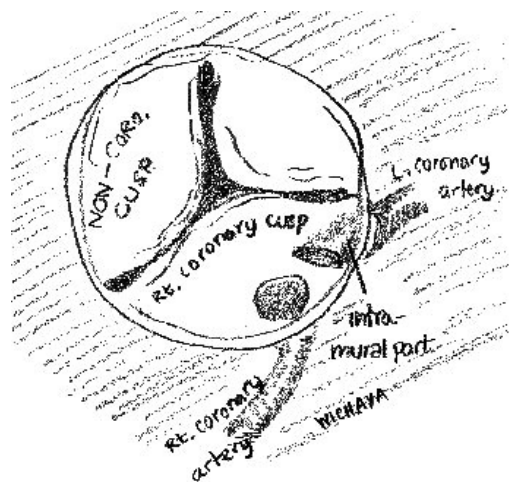


Fig. 3 Illustration of both coronary ostia in the right coronary sinus, note the slit-like left coronary ostium and intramural part.

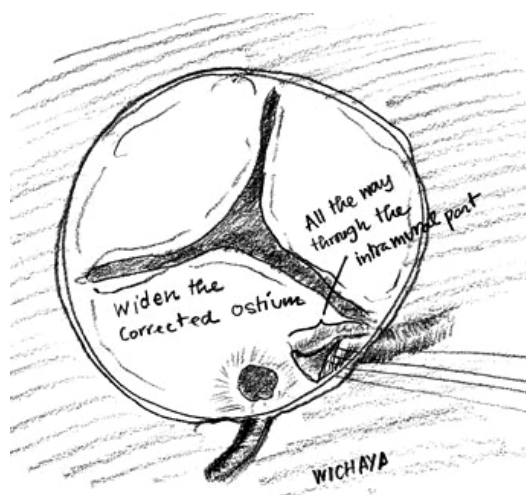


Fig. 4 To correct the compressible segment of the intramural part, the whole part of intramural segment was unroofed.

(Figure 4). The wide opening of the left coronary ostium was quite close to the aortic commissure. However, there was no need to detach the aortic commissure.

After establishment of the widely open left coronary ostium, the proximal part of the left main coronary artery was completely mobilized and the aorta was re-anastomosed in a way to avoid stretching of the coronary artery by slight rotation of the proximal part of the divided aorta.

Pulmonary artery translocation⁵ to the left was not necessary because in this case, it was believed that the external compression of the coronary artery by the pulmonary artery was negligible in the presence of the soft and normal size main pulmonary artery.

The patient had been healthy and could attend all activities as he wished at 3 months postoperatively.

DISCUSSION

Focusing on the principles of repairing abnormal origin of coronary artery, details of the abnormality should be known as much as possible. The primary “planned” operation should be made, however, the alternative ones should be prepared. For example, if there is iatrogenic and significant aortic regurgitation, valve-typed surgery or in some cases coronary artery grafting, should be promptly available.

Even in the presence of abnormal course of the coronary artery lying between the aorta and the pulmonary artery, the coronary artery does not seem to be compressed externally by the pulmonary artery because the pulmonary artery is soft.

Emphasis is on the presence of intramural part as a culprit lesion as its roof is potentially compressible by high pressure in the aorta when episodes of high blood pressure occur. To correct the problem, we propose unroofing of the intramural part all the way through its length.⁶

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