Case Report

A CASE OF THE RIGHT CORONARY ARTERY ORIGINATING FROM THE DISTAL LEFT CIRCUMFLEX OUT OF A SINGLE CORONARY ARTERY

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Abstract : A case of the right coronary artery originating from the distal left circumflex out of a single coronary artery was found in a 77-year-old Japanese man during an ordinary dissection at Nara Medical University in 2009. A single orifice in the left sinus of Valsalva was found and the left circumflex ran around the heart distributing the area where the normal right coronary artery hormally runs. Nothing but the coronary artery was abnormal in the whole circulation.

Key words : single coronary artery, distal left circumflex, congenital anomaly

INTRODUCTION

Although it is relatively frequent to have variations of coronary circulation, a single coronary artery is a rare congenital anomaly which is commonly associated with other congenital cardiac malformations[1]. Most are found at autopsy or surgery and some during clinical evaluation.

Generally, there are the following two types of a single coronary artery which is defined by the side of the aortic sinus of Valsalva that the single coronary artery arises from: the right coronary artery and the left coronary artery. Although the frequency of the two types is approximately the same[1], a case of the right coronary artery originating from the distal left circumflex is rare, and this case may be the 27th case reported in our survey (Table 1).

FINDINGS

The right coronary artery originating from the distal left circumflex out of a single coronary artery was found in a 77-year-old Japanese man who died of Parkinson's disease. The heart weighed 240 grams and no hypertrophy of the heart was found.

A single orifice was found in the left sinus of Valsalva and the single coronary artery divided into two branches which were the anterior interventricular and left circumflex artery. The anterior interventricular also divided into two branches and the long branch, which was 10.7cm long and 2.7mm in diameter, ran toward the apex and compensated the posterior

Table 1. Reported Cases With Right Coronary Artery Originating From The Distal Left Circumflex Artery

Case NO.	Author	Year published	Age	Sex	Reference
1	Smith	1950	4d	M	3)
2	Smith	1950	33y	M	3)
3	Smith	1950	35y	M	3)
4	Smith	1950	37y	M	3)
5	Smith	1950	39y	M	3)
6	Smith	1950	42y	F	3)
7	Smith	1950	44y	F	3)
8	Smith	1950	63y	M	3)
9	Smith	1950	66y	F	3)
10	Ogden	1970	70y	F	1)
11	Ogden	1970	68y	M	1)
12	Ogden	1970	84y	M	1)
13	Lipton	1979	39y	M	5)
14	Tavernarakis	1986	57y	M	6)
15	Sheth	1998	60y	M	7)
16	Vrolix	1991	51y	M	8)
17	Desmet	1992	52y	M	9)
18	Desmet	1992	53y	M	9)
19	Desmet	1992	45y	M	9)
20	Desmet	1992	41y	M	9)
21	Desmet	1992	64y	M	9)
22	Desmet	1992	55y	M	9)
23	Desmet	1992	51y	M	9)
24	Turhen	2003	52y	M	10)
25	Chou	2004	42y	M	11)
26	Yoshimoto	2004	63y	M	12)
27	Present case	2009	77y	M	-

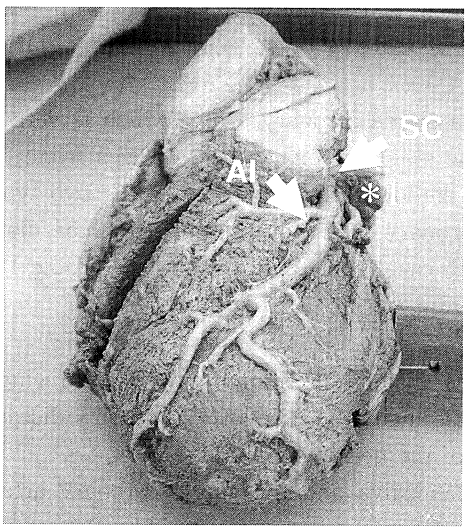

Fig. 1
The single coronary artery (SC) divides into two branches which are the anterior interventricular (AI) and the left circumflex artery (*1).
The left circumflex artery continues to Fig. 2 and the anterior interventricular continues to Fig. 4.

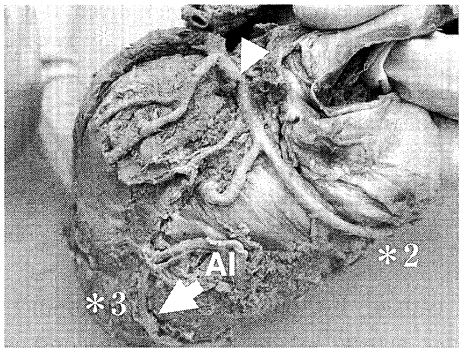

Fig. 2
The left circumflex artery (*1) extends retrogradely the course of the normal right coronary artery(*2). The distal left circumflex originating the right coronary artery is pointed by the arrow head.
The anterior interventricular (AI) ends up compensating the posterior atrioventricular artery (*3).

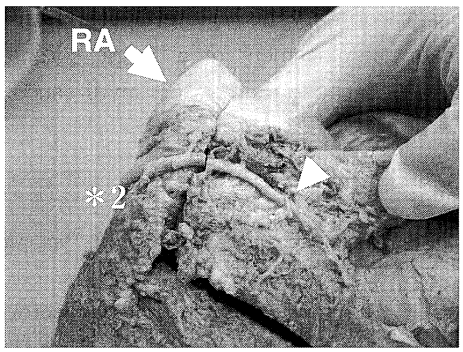

Fig. 3
The left circumflex artery ends up at the base of the right auricle (RA).
The end of the left circumflex artery is pointed by the arrow head.

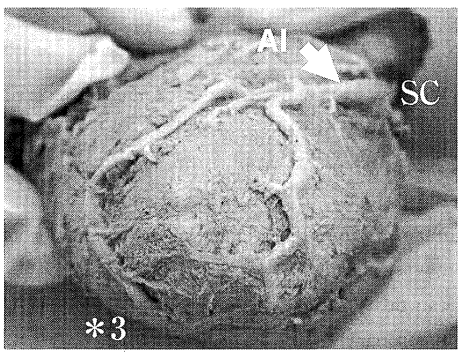

Fig. 4
The anterior interventricular (AI) runs toward the apex, from Fig. 1 (SC) to Fig. 2 (*3).

atrioventricular artery (Figs. 1, 2 & 4). The left circumflex artery extended toward the anterior surface of the right ventricle to the base of the right auricle, retrograde to the course of the normal right coronary artery. The left circumflex artery was 15.4cm long and 4.8mm in diameter at the proximal site of the left circumflex artery and 0. 7mm at the distal site (Figs. 1, 2 & 3).

DISCUSSION

Ogden reported in 1970 that there were various distribution patterns of the single

coronary artery[1]. "L-1" is one of those patterns which the circumflex branch from the left coronary artery continues as the distal right coronary artery. Table 1 shows only the reported cases of "L-1", to which our case belonged. The ratio of male/female was reported to be 1.4 : 1, but it appeared to be more common in males, as "L-1" was 5.8 : 1 in our search. The age ranged from 4 days to 84 years. About 77.7% of the cases were more than 40 years old, while about 59.3% were more than 50 years old. Although a single coronary artery results in the development of cardiac ischemia, cardiomyopathy, and congestive heart failure[2], we can say it is compatible with longevity.

A single coronary artery is assumed to be caused by one of two developmental anomalies[3]. The first is the absence of one coronary artery anlage, while the second is a misplacement of one coronary artery anlage which fuses with other vessels. Krumbhaar and Ehrich stated that a small saccular dilatation of the aortic sinus at the site from which the missing vessel arises may be a remnant of an absent coronary artery[4] and the remnant might discriminate whether the case is the absence or misplacement of a single coronary artery. In this definition, our case belonged to the former, because there is no small saccular dilatation of the aortic sinus.

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