OPEN ACCESS Freely available online

ISSN: 2155-9627
Journal of Clinical Research & Bioethics

Commentary

Single Coronary Artery Malformations Combined with Coronary Heart Disease, What Should We Do?

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ABBREVIATIONS

ACS: Acute Coronary Syndrome; CABG: Coronary Artery Bypass Surgery; CAG: Coronary Angiography; CHD: Coronary Heart Disease; CTA: Computed Tomography Angiography; ECG: Electrocardiogram; FFr: Fractional Flow reserve; LAD: Left Anterior Descending Artery; LCA: Left Coronary Artery; LCX: Left Circumflex Artery; LDL-c: Low Density Lipoprotein-c; MB: Myocardial Bridge; PCI: Percutaneous Coronary Intervention; SCA: Single Coronary Artery; SCD: Sudden Cardiac Death; RCA: Right Coronary Artery

DESCRIPTION

We reported the world's first case of type R-I Single Coronary Artery (SCA) combined with Myocardial Bridge (MB) over the second right ventricular branch of the Right Coronary Artery (RCA) in April [1]. Computed Tomography Angiography (CTA) and Coronary Angiography (CAG) showed that the presence of a single RCA, absence of the Left Coronary Artery (LCA), and the formation of multiple plaques, 20% stenosis in the RCA. The right crown supplied blood to the myocardium. This patient suffered from hypertension grade 2, at high risk. MB commonly appears over Left Anterior Descending Artery (LAD), and it a few appears over the Left Circumflex Artery (LCX). There is hardly over RCA. Although the coronary artery occlusion was only 20% narrowing, the patient received treatment according to high-risk of Coronary Heart Disease (CHD). That is to say, Low Density Lipoprotein-c (LDL-c) lowed less than 1.4 mmol/L and heart rate maintained at 55-60 beats/minute. What's more, blood pressure was controlled at 125/70 mmHg. At present, his LDL-C, heart rate, blood pressure, and Electrocardiogram (ECG) are controlled up to standard (Table 1).

Table 1: LDL-C, heart rate, blood pressure, and Electrocardiogram (ECG) readings.

Time\Items	LDL-C (mmol/L)	Heart rate (beats/min)	Blood pressure (mmHg)	ECG
On admission	3.09	77	137/91	ST↓(V5,V6)
At discharge	2.62	65	130/85	normal
At present	1.38	60	125/70	normal

You know that the patient has only a single RCA, if the coronary artery is blocked by thrombus or a prolonged spasm of RCA, which may lead to serious consequences, even Sudden Cardiac Death (SCD). Kettner et al. reported that the case of a 6-year-old boy who collapsed during exercise and died subsequently of acute cardiac death was presented [2]. At autopsy a single RCA with an anatomically correct course (R-I type) arising from the right sinus of Valsalva was found. MB as one of the important causes of SCD. MB is prone to accelerate atherosclerosis. In patients with SCA associated with significant atherosclerotic coronary artery disease.

Pourafkari et al. reported that single left coronary artery with RCA originated from distal LCX [3]. A bare metal stent was deployed in LAD. Kafkas et al. reported an Acute Coronary Syndrome (ACS) case due to a subtotal paraostial LAD occlusion of a single L-I type coronary artery [4]. Another severe stenosis was also present at mid-LAD. The patient was successfully treated with trans-radial Percutaneous Coronary Intervention (PCI). Calişkan et al. reported RCA originating from the left

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Received: 21-Nov-2022, Manuscript No. JCRB-22-18894; **Editor assigned:** 23-Nov-2022, Pre QC No. JCRB-22-18894 (PQ); **Reviewed:** 07-Dec-2022, QC No JCRB-22-18894; **Revised:** 16-Dec-2022, Manuscript No. JCRB-22-18894 (R); **Published:** 26-Dec-2022, DOI: 10.35248/2155-9627.22.13.445.

Citation: Cai M (2022) Single Coronary Artery Malformations Combined with Coronary Heart Disease, What Should We Do? J Clin Res Bioeth. 13:445.

sinus of Valsalva and 80% narrowing just proximal to the right ventricle branch [5]. Initial PCI was directed to the LAD. Rudan et al. reported that anomalous origin of the RCA from the LCA with stenosis was in the middle segment [6]. PCI was stent implantation in the stenotic region of the middle RCA. These were PCI in cases of SCAs with RCA originating from the left sinus or the branch of LCA. Duijvelshoff et al. reported that PCI in a case of SCA type R-I with a culprit lesion in the posterolateral branch proximal to the LCX was successfully performed [7]. Attempting PCI in SCAs poses a technical challenge as any complication would compromise the blood supply of the entire myocardium [8]. It was greater technical challenges that PCI in case of SCA with RCA originating from the right sinus.

TREATMENT

The prevalence of SCA reported in the general population is 0.0240%-0.066%, diagnosed by invasive CAG [9]. Coronary artery anomalies have been found in approximately 1.3% ofsymptomatic adult patients undergoing coronary arteriography [9]. SCA originating from the right sinus of Valsalva is an uncommon subset of SCA, which is the rarest of the coronary anomalies and occurs with a frequency of <0.0008% [10]. To date there are sixteen patients with type R-I SCA were reported in the literature. SCA can lead to a lot of clinical presentations, such as cardiopalmus, angina, chest pain, and dyspnea, syncope secondary to coronary spasm/myocardial infarction and SCD. The presence of SCA itself should be considered as a potential cause of myocardial ischemia and SCD even without obstructive coronary artery diseases [11].

The etiology of SCA is still unclear. It may be related to gene mutation. It is more likely to occur in people whose parents marry close relatives, and in those, whose mothers suffer from metabolic diseases, take certain drugs, lack of folic acid, and are infected with viruses during the fetal period. It is very important to have a good birth.

If type R-I of SCA combined with CHD, What should we do? If the patient's main trunks of the SCA type R-I is more than or equal 50% narrowing, and Fractional Flow reserve (FFr) less than 0.8, do we advise that he receive PCI treatment according to the standard of PCI for CHD? Under this condition, can Coronary Artery Bypass Surgery (CABG) be more appropriate? I expect there will be guideline for SCA.

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