



Surgical Revascularization of a Rosary Bead-Like Coronary Artery Aneurysm: Case Report

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Abstract

A 45-year-old male patient was admitted with acute coronary syndrome. Coronary angiography showed multiple ectasias and a coronary artery aneurysm with occlusive coronary artery disease. Elective multi-vessel aortocoronary artery bypass grafting was performed. The patient was discharged uneventfully on the postoperative Day 5. This case was presented due to its rare occurrence in the clinical practice.

Keywords: Coronary aneurysm; Coronary ectasia; Aortocoronary artery bypass grafting

Introduction

Coronary artery aneurysms and coronary artery ectasias are rare abnormalities of the coronary artery. The incidence is about 1 to 5% in the overall population [1]. These aneurysms may affect one or more vessels, although they can be described as either saccular or fusiform in a single or multiple branches of a single vessel [2]. In the literature, Markis et al. [2] first classified these aneurysms according to their location (i.e., coronary arteries or arterioles) and the number of vessels involved. Herein, we report surgical revascularization of a rosary bead-like coronary artery aneurysm in a male adult case.

Case Presentation

A 45-year-old male patient was admitted to the emergency department with sudden-onset chest pain and non-ST-segment elevation Myocardial Infarction (MI) and scheduled for coronary angiography. His past medical history was non-specific for coronary artery disease, except for smoking history and essential hypertension. Through a detailed history, it was learnt that he worked as an underground mine worker for 27 years. He underwent coronary angiography twice eight years ago in an external center. He had no history of an inflammatory disease, allergy, or autoimmune disorder. He had no history of illegal substance abuse. His family history revealed that he was born to consanguineous parents (third-degree). Transthoracic echocardiography showed an Ejection Fraction (EF) of 60% with mildly depressed left ventricular function. Cardiac catheterization demonstrated an unusual rosary bead-like coronary artery appearance, suggesting multiple aneurysmatic/ectatic regions with occlusive coronary artery disease (Figure 1). The patient was diagnosed with occlusive coronary artery disease and scheduled for aortic Coronary Artery Bypass Grafting (CABG). The patient was further examined for comorbidities accompanied by coronary artery aneurysms. Laboratory tests revealed no hyperlipidemia (low-density lipoprotein cholesterol 95 mg/dL) with negative results for anticardiolipin (aCL) Immunoglobulin G (IgG) and M (IgM), Antimitochondrial Antibodies (AMA), antinuclear antibodies (ANA), Tissue transglutaminase IgG, and antimicrobial antibodies due to the suspicion of vasculitis. The laboratory results were normal, except for anti-Cytomegalovirus (CMV) IgG positivity. In the light of literature data, further testing was recommended for IgG4-related peri-arthritis, which is one of the main causes of vasculitis. Unexpectedly, however, IgG deficiency was detected using a nephelometer (5.72 g/dL; reference range: 7.51-15.6 g/dL), although IgM and IgA were within the normal ranges. A written informed consent was obtained and an elective multi-vessel (five-vessel) CABG was performed. Standard cannulation was carried out and antegrade cold blood cardioplegia was administered. The total duration of cardiopulmonary bypass and aortic cross-clamp time was 155 min and 81 min, respectively. The patient was transferred to the intensive care unit postoperatively for three days and was discharged uneventfully on the postoperative Day 5. In addition, the histopathological examination of the intraoperative tissue specimens showed no findings, except for medial calcinosis. The patient is still under follow-up at five months postoperatively.

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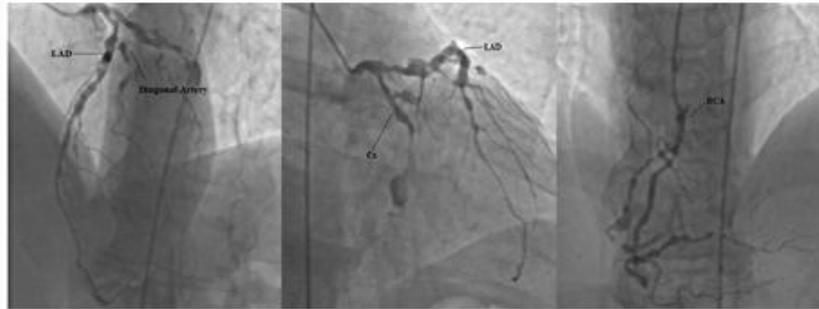


Figure 1: Cardiac catheterization showing an unusual rosary bead-like coronary artery appearance with multiple aneurysmatic/ectatic regions in the Left Anterior Descending (LAD) artery, Circumflex (Cx) artery, and Right Coronary Artery (RCA) with occlusive coronary artery disease.

Discussion

Coronary artery ectasias are defined as a luminal dilation of 1.5 to 2.0-fold, while coronary artery aneurysms are defined as a dilation of ≥ 2.0 -fold of normal diameters, according to the width of the adjacent normal coronary artery segments [3,4]. The presence of a coronary artery aneurysm was first recognized by Morgagni [5] in 1,812 in post-mortem studies and was defined by Bourgen [6] in 1,812. There are controversial results on the location of the coronary arteries and the most commonly affected vessels in the published studies, and no established consensus is available. According to the classification of Markis, et al. [2], coronary artery aneurysms are typically divided into four groups. Our case was consistent with Type 1 with diffuse aneurysmal dilation in two or three vessels. The most common cause of coronary artery aneurysms is rapidly progressing atherosclerosis [2,3,6]. Increased intraluminal pressure against the atherosclerotic vessel wall with reduced stress tolerance leads to the formation of an aneurysmatic sac [2]. Coronary artery aneurysms may be either congenital or acquired. The main atherosclerotic risk factors include hypertension and hyperlipidemia [2,7]. In our case, laboratory tests did not reveal hyperlipidemia. In addition, in recent years, coronary artery aneurysms related to percutaneous coronary interventions such as coronary artery angioplasty, atherectomy, or stenting have been reported [8]. Similarly, our patient had a previous history of coronary angiography twice in an external center. Diffuse thrombosis is the most common complication of coronary artery aneurysms, which may lead to embolism, coronary artery ruptures, and even sudden death [6]. Patients may remain asymptomatic, although sudden death due to acute MI can be seen in certain cases [6]. Disrupted laminar flow and autoregulation, and reduced blood flow in the dilated segment of the aneurysmatic vessel may impair the myocardial perfusion, resulting in exertional angina. Thrombus formation due to the blood stasis within the aneurysmal sac and distal microembolization of the thrombus reduce the myocardial perfusion, thereby, leading to MI [4,6]. Coronary angiography, which provides valuable information about the size, location, shape, and number of aneurysms, remains the gold standard for the diagnosis [8]. However, whether the aneurysm involves in the true or false lumen is difficult [8]. Intravascular Ultrasound (IVUS) is primarily used to differentiate a true aneurysm from a pseudoaneurysm (the true from the false lumen) [8,9]. However, we were unable to perform IVUS, as it is not available in our facility. Although there is no published guideline for the management of coronary artery aneurysms, they can be surgically treated with aneurysmal ligation and distal bypass,

aneurysmal plication, isolated CABG, and saphenous vein patch repair [9]. As an alternative, Polytetrafluoroethylene (PTFE)-coated stents, which were first introduced in the early 1990s, have been successfully used in the treatment of coronary artery aneurysms [10]. However, in our case, it was not applicable, due to the presence of multiple aneurysms involving multiple vessels. In conclusion, coronary artery ectasias and aneurysms are extremely rare with an unknown origin. The management strategy primarily depends on the type and location of the lesion as well as hemodynamic status of the patient and comorbidities. This case that was successfully treated with aortic CABG was presented due to its rare occurrence in the clinical practice.

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