

## Surgical Management of a Giant Right Coronary Artery Aneurysm

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### INTRODUCTION

Coronary artery aneurysm (CAA) is a rare entity, defined as localized dilation that exceeds the normal vessel diameter by a factor of 1.5. A giant CAA is described as a very large dilation, when diameter exceeds 20 mm. CAA has a prevalence of 0.02% [Markis 1976]. Different factors may lead to CAA formation, including Kawasaki disease, atherosclerosis, congenital malformations, autoimmune and infectious disorders, and percutaneous interventions [Hartnell 1985]. Management of these patients remains controversial due to a lack of data from large series studies.

We reported a case of a young female patient, who presented with an acute inferior infarction and was diagnosed with a giant right coronary artery (RCA) aneurysm. She underwent aneurysmectomy and revascularization on a beating heart through a right lateral thoracotomy. Due to the minimally invasive nature of this procedure, the patient was able to recover quickly without substantial cosmetic changes.

### CASE REPORT

A 21-year-old female presented at our emergency unit with chest pain and fainting complaints. She had no previous medical history. Initial investigation revealed ECG changes in inferior leads and elevated cardiac markers. Echocardiography demonstrated a dyskinetic right ventricle and a large aneurysm of the RCA. Cardiac catheterization confirmed a giant fusiform aneurysm, the distal part of which was filled with thrombus (Figure 1). Arterial anatomy of nonaneurysmatic segments was completely normal. Taking into consideration the cosmetic preferences of the patient, we planned aneurysmectomy and revascularization on a beating heart through right lateral thoracotomy.

The aneurysm originated immediately distal to the right coronary ostium, had a length of 5 cm, and a diameter of 3 cm. It was a compound aneurysm consisting of 2 parts: the proximal one had a fragile wall prone to rupture, while the distal part had a thicker wall and was filled with thrombus (Figure 2, A). Proximal and distal necks of the aneurysm were

identified and occluded with pledged 2/0 prolene sutures (Figure 2, B). The aneurysm was then longitudinally opened, the thrombus removed, and the arterial wall resected and sent for pathological investigation (Figure 2, B). Aorta-coronary bypass was performed with the saphenous vein (Figure 3), as the right internal mammarian artery was left intact due to inadequate calibration. The patient was discharged after 5 days and was extremely content with the submammarian and bridged small right thigh incisions.

### DISCUSSION

CAA are rarely seen, and related literature exists mainly in

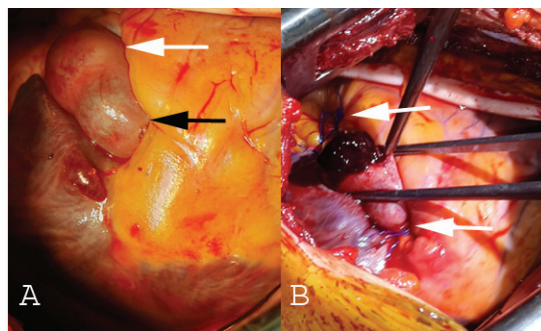


Figure 2. A, Intraoperative view of RCA aneurysm; distal part is filled with thrombus (black arrow) and proximal part is ballooned (white arrow). B, Proximal and distal neck were externally sutured (arrows) and thrombus was removed.

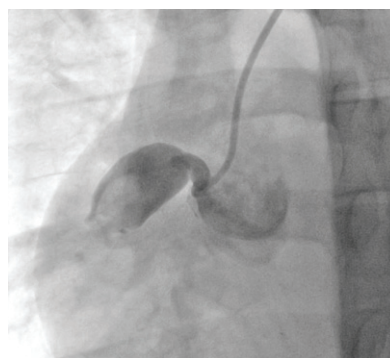


Figure 1. Angiographic view of right coronary artery catheterization. Aneurysm originates right after coronary ostium and the distal part is filled with thrombus (white).

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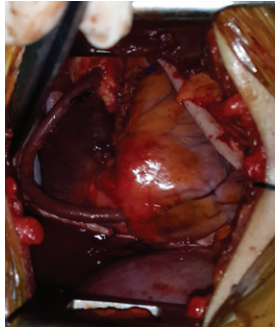


Figure 3. Final view after aneurysmectomy and aorta-coronary bypass.

the form of case reports or limited series studies. The main etiological factor in young age groups is Kawasaki disease, while atherosclerosis is more often responsible for CAA in older patients. More recently, an increasing number of iatrogenic aneurysms following percutaneous coronary intervention is being reported [Singh 2013]. Our patient demonstrated localized disease without previous significant medical history, suggesting a congenital aneurysmatic disorder rather than an acquired one.

Silent CAAs are difficult to detect upon routine examination and thus usually remain unnoticed until development of complications. Complications may include rupture and tamponade, acute coronary syndrome due to thrombosis or embolization, fistulization or compression of adjacent structures, etc. Our patient suffered an inferior infarction due to thrombotic total occlusion of the RCA. Although she did not describe any previous symptoms, angiography demonstrated collateral development and retrograde filling of the RCA, indicating a chronic background of the disease.

Management with antiplatelet therapy has been described in a few cases and may be an option in small uncomplicated aneurysms. There have been sporadic reports of percutaneous treatment using coil embolization or covered stent grafts [Szalat 2005]. However, this technique is still in an early phase of development and there are no data describing long-term results. Moreover, covered stent application is limited in tortuous and calcified lesions. These stents are less compliant than normal stents and have a shorter inflating balloon, which may lead to dislocation [Zeb 2012]. We evaluated our patient, together with the invasive cardiologists, and she was found unsuitable for percutaneous treatment because the aneurysm was in a tortuous segment right after coronary ostium.

Surgery is recommended in patients with ischemic symptoms or those who have a high possibility for future acute

coronary syndrome [Lima 2006]. It is also recommended in cases of progressively increasing aneurysms or in cases where the diameter of the aneurysm is 3 times larger than the original vessel [Nichols 2008]. Surgery is a definite solution accomplishing both aneurysmectomy and revascularization. It is usually performed through a median sternotomy and occasionally under cardiopulmonary bypass [Harandi 1999].

Although the ideal procedure has not yet been defined, a patient-based approach must be selected. We planned a right lateral thoracotomy approach with submammary incision, and the greater saphenous vein was harvested above the knee with bridged small incisions, as the right mammarian artery was not suitable for grafting. The procedure was performed on a beating heart. Proximal and distal disclosure of the aneurysm was followed by incision of the sack and internal control for feeding branches. The procedure was completed with a distal bypass. Histopathology results demonstrated a thinned tunica media with decreased smooth muscle cells and elastic fibers and increased connective tissue, pointing to congenital etiology. As a result, giant coronary artery aneurysms are rarely life-threatening disorders. Surgical repair on a beating heart is feasible, and can be accomplished with satisfying cosmetic results.

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