

## Case Report

# Acute coronary syndrome with unusual form of right coronary artery aneurysm and treated with overlapping two covered stents across coronary aneurysm: case report

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**Received:** 12 February 2016

**Received:** 13 February 2016

**Accepted:** 08 March 2016

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## ABSTRACT

A 27-year old male presented with acute inferior wall myocardial infarction. Coronary angiogram revealed normal left coronary arteries and a giant coronary aneurysm in Right coronary artery (RCA). Primary angioplasty of RCA was performed. Large thrombus burden was retrieved with aspiration device and coronary flow restored. However, despite best efforts some thrombus remained and decision to stent was deferred to a later date. Dimensions of aneurysm on quantitative coronary angiogram were 16 mm in width and 43 mm in length. Two weeks later coronary angiogram revealed normal flow in RCA without any angiographically visible thrombus. PCI was performed with two 3.0 × 28 mm covered stents, graft master (JoStent) deployed across the aneurysm, overlapping each other. This completely sealed the aneurysm and intravascular ultrasound confirmed no leakage through the covered stents. Patient remains asymptomatic 2 months post procedure on triple antiplatelet therapy.

**Keywords:** Acute coronary syndrome, Right coronary artery aneurysm, Covered stent

## INTRODUCTION

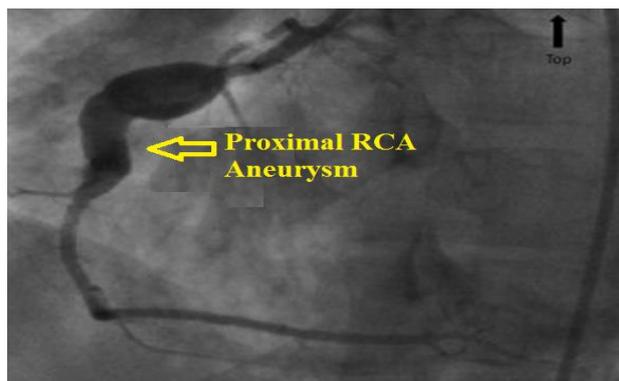
Coronary artery aneurysm defined as dilatation of the coronary artery exceeding 50% of the reference vessel diameter, is uncommon and occurs in <5% of coronary angiographic series. These are termed giant coronary artery aneurysm if their diameter exceeds the reference vessel diameter by >4 times or if they are >8 mm in diameter. Atherosclerosis accounts for the vast majority of coronary artery aneurysms in adults, whereas Kawasaki disease is responsible for most cases in children. Up to 30% coronary artery aneurysms are associated with obstructive coronary artery disease and have been associated with myocardial infarction, arrhythmias, or sudden cardiac death.<sup>1</sup>

## CASE REPORT

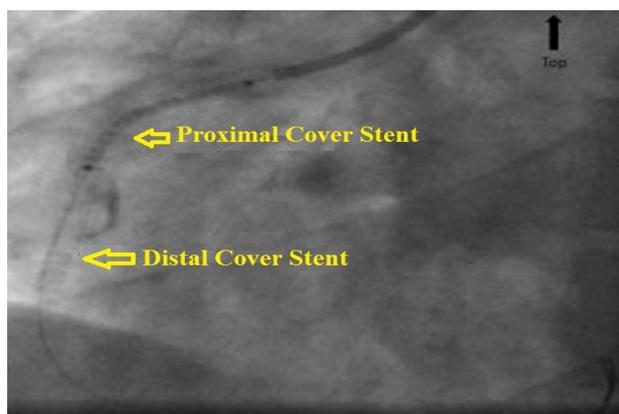
A 27-year old male normotensive, euglycemic, non-smoker presented with acute inferior wall myocardial infarction and referred to our cardiac centre with initial report of first ECG (Figure 1).

He did not have any known cardiac risk factors like hypertension, diabetes, smoking, dyslipidemia, family history of CAD (coronary artery disease), obesity, thyroid disorders. He had normal value of WBC counts, lipid profile in normal range, below average value of HSCRP (high sensitive C-reactive protein) except raised CKMB and troponin I value. ECG has denoted ST elevation in lead III, Avf and depression in lead I, Avl & V2.

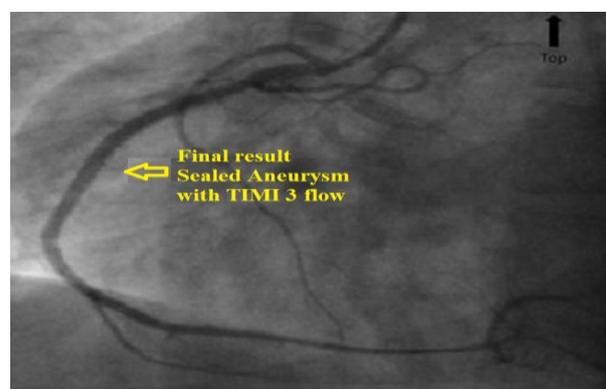
Besides 2D echocardiography done which showed basal and mid inferior wall hypokinesia and LV Ejection fraction 50% with mild mitral regurgitation. Subsequently coronary angiography was done which revealed normal left coronary arteries and a giant coronary aneurysm in right coronary artery (RCA). Patient was pretreated with aspirin, clopidogrel loading with 600 mg and unfractionated heparin. Primary angioplasty of RCA was performed. RCA was engaged with Judkins Right 4F catheter (Cordis) and RCA wired with Cougar XT (HT) wire. Large thrombus burden was retrieved with export aspiration catheter (Medtronic) (aspiration device) and coronary flow restored (Figure 2). However, despite best efforts some thrombus remained and decision to stent was deferred to a later date. Echocardiogram at this time showed normal left ventricular systolic function without any segmental wall motion abnormalities. Dimensions of aneurysm on quantitative coronary angiogram were found to be 15 mm in width and 46 mm in length. Patient was kept on abciximab infusion for 12 hr followed by subcutaneous enoxaparin for 2 weeks. Two weeks later coronary angiogram revealed normal flow in RCA without any angiographically visible thrombus. As the natural history of coronary aneurysm is not known and there was recent myocardial infarction we decided to treat this large aneurysm through percutaneous intervention. As the estimated length of coronary aneurysm on qualitative coronary angiogram was 46 mm therefore we decided to deploy two covered stents. PCI was performed with two 3.0 × 28 mm covered stents, graft master (Jo Stent) deployed across the aneurysm, overlapping each other (Figure 3). We deploy the distal stent first to minimize theoretical risk of leak at overlapping zone. This completely sealed the aneurysm and Intravascular Ultrasound confirmed no leakage through the covered stents (Figure 4). Patient remains asymptomatic four months post procedure on triple antiplatelet therapy.



**Figure 2: Giant right coronary artery aneurysm.**



**Figure 3: Overlapping two covered stents across coronary aneurysm.**



**Figure 4: Completely sealed coronary aneurysm after covered stent deployment.**



**Figure 1: (ECG showed ST segment elevation in lead III, Avf and depression in lead I, Avl and V2).**

## DISCUSSION

Coronary aneurysms are found in approximately 5% of patients undergoing coronary angiography. Most coronary artery aneurysms (CAAs) are associated with significant stenosis of the coronary lumen; however, there is no common consensus on the treatment of coronary aneurysms.<sup>2</sup> A large aneurysm in the coronary artery makes the blood flow turbulent and predisposes to thrombus formation and coronary artery obstruction even without the presence of significant stenosis. Despite this

important anatomical abnormality of the coronary artery, the treatment options are poorly understood and present a therapeutic challenge to the interventional cardiologist. While treating CAAs with percutaneous implantation of covered stents offers a less invasive option compared to surgical correction, the short- and long-term outcomes are unknown.

Coronary artery aneurysms (CAAs) were first described by Morgagni in 1761 and the first case report was published by Bougon in 1812.<sup>3</sup> Swaye, et al defined CAAs as a localized dilatation of the coronary artery exceeding 1.5 times of the adjacent coronary artery diameter.<sup>7</sup> The incidence of CAAs is up to 5% within angiographic series and up to 90% of these are associated with greater than 70% coronary artery stenosis. The right coronary artery (RCA) is the most frequently affected vessel, followed by the left anterior descending (LAD) artery and then the circumflex (CX) coronary artery. Giant CAAs are >4 times of the reference vessel diameter and/or >8 mm in diameter. Aneurysms can be saccular, with the transverse axis greater than the longitudinal axis, or fusiform, with the longitudinal axis at least twice the transverse axis.<sup>6</sup>

A coronary artery aneurysm is defined as a segment of a coronary artery that dilates to a diameter exceeding the diameter of adjacent segments or the diameter of the largest coronary artery by 1.5 times.<sup>2</sup> There can be congenital and acquired causes of coronary aneurysm like Kawasaki disease. In our patient we could not find the exact cause of aneurysm but most likely this was secondary to Kawasaki disease. History of prolonged fever in childhood was later elicited by his parents. Coronary aneurysm can lead to rupture or acute myocardial infarction as happened in our patient.<sup>4</sup> Large coronary aneurysms have been reported in literature and mostly treated with surgical interventions. Percutaneous treatment for coronary aneurysm has rarely been reported in literature.<sup>5</sup> However; here we used two long overlapping covered stents to cover a giant aneurysm. This case is unique because here we have shown that technically this is possible to deploy two covered stents overlapping in the middle part of coronary aneurysm successfully to seal such a giant and long coronary aneurysm with the support of normal coronary artery segments to stabilize both covered stents. Also this is a rare case of Giant Coronary Aneurysm leading to Acute Myocardial Infarction which was treated successfully in a planned two step manner i.e., at first dealing with the complication of the disease (MI) and then with the primary problem with two overlapping covered stents.<sup>5</sup>

## CONCLUSION

Coronary aneurysm can lead to rupture or acute myocardial infarction. Percutaneous treatment for coronary aneurysm has rarely been reported in literature.

However, here we used two long overlapping covered stents to cover a giant aneurysm. Despite the important anatomical abnormality of the coronary artery, the treatment options of CAAs are still poorly defined and present a therapeutic challenge to interventional cardiologists. Percutaneous implantation of covered stents offers a less invasive strategy in comparison to surgical correction, but the short and long term outcomes remain unknown.

## ACKNOWLEDGEMENT

Authors would like to thanks to Dr. KS Park who is a visiting faculty to Narayana Hrudayalaya institute of cardiac sciences, India. We are reporting a challenging case with support of him.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: Not required*

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**Cite this article as:** Sen N, Park KS. Acute coronary syndrome with unusual form of right coronary artery aneurysm and treated with overlapping two covered stents across coronary aneurysm: case report. *Int J Res Med Sci* 2016;4:1295-7.