

Successful Management of a Giant Mycotic Coronary Artery Aneurysm Developed after Multivessel PCI with Drug-Eluting Stent

Muhammad Salim Mahmud¹, Mohammad Arifur Rahman², Nuruddin Mohammad Zahangir³, Rajib Kumar Basak⁴, Mohammad Maknunur Rahman Khan³

Abstract:

Coronary artery stent infection has been reported with both bare metal stent and drug eluting stent and can present as mycotic coronary artery aneurysm, pseudoaneurysm, myocardial abscess, pericarditis or exudative effusion. Infection at the site of coronary stent implantation is rare and is believed to result typically from either direct stent contamination at the time of delivery or transient bacteraemia from access site. Recently, several case reports of pseudoaneurysm formation after DES implantation have been reported in the literature. We describe the

successful surgical management of giant mycotic pseudoaneurysm of RCA presenting as fever of unknown origin with AMI (inferior) three months after multivessel PCI in LAD & RCA with DES in radial route. This report illustrates the importance of early detection and prompt management of these rare coronary pseudoaneurysms, which is a highly lethal condition. At three months follow-up after surgery, the patient was asymptomatic with fair LVEF 58% .

Keyword: Mycotic aneurysm, Coronary artery, Percutaneous coronary intervention

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Introduction:

One of the rare complications of DES is coronary artery aneurysm. Coronary Artery Aneurysm (CAA), defined as localized dilatation of the coronary artery exceeding 50% of the reference vessel diameter is considered as very rare, with a reported incidence of 0.3-6% after percutaneous coronary intervention¹. It is termed as giant if diameter exceeds the reference vessel diameter by four times or if the aneurysm is 8 mm or more². Possible mechanisms of aneurysm formation after DES

implantation apart from infection are delayed re-endothelialization, inflammation, and hypersensitivity reactions, deep arterial wall injury (rupture or resection of the vessel media), and residual dissection^{3,4}. Treatment of CAA is somewhat controversial, and there is no consensus on the modality of treatment in a given clinical situation. We report a case of giant CAA after DES implantation presenting with low grade fever followed by acute myocardial infarction which was treated by surgically.

Case Report:

A 57-year-old diabetic normotensive male presented with stable angina (CCS class-II). ECG was normal. Left ventricular ejection fraction was normal (LVEF-62%). ETT was positive. We did radial coronary angiogram & diagnosed a case of DVD, 85% stenosis in the proximal LAD & 90% stenosis in mid RCA. He underwent percutaneous coronary intervention (PCI) and stenting to left anterior descending (LAD) & right coronary artery (RCA) using Everolimus Eluting Stent (Promus Eliment Plus, Boston Scientific) in our hospital three months prior to this episode. Two weeks after stenting he came back

1. Assistant Professor, Cardiology, Dr. Sirajul Islam Medical College, Dhaka, Bangladesh
2. Junior consultant, Cardiology, National Institute of Cardiovascular Diseases, Dhaka, Bangladesh
3. Chief Cardiac Surgeon, Dr. Sirajul Islam Medical College, Dhaka, Bangladesh
4. Junior consultant, Cardiac Surgery, Dr. Sirajul Islam Medical College, Dhaka, Bangladesh
5. Specialist, Cardiology, Dr. Sirajul Islam Medical College, Dhaka, Bangladesh

Address of correspondence : Muhammad Salim Mahmud, Assistant Professor, Cardiology, Dr. Sirajul Islam Medical College, Dhaka, Bangladesh, E-mail: salimmahmod75@gmail.com, Mobile-01918993572.

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with low grade fever with anorexia. ESR was 80 mm 1st hr. TC was 11000/ cmm with predominant Neutrophillia (N-70%) but blood culture was sterile. Empirical antibiotics (intravenous Meropenem) given for two weeks. Fever subsides but after two months he came back with severe retrosternal chest pain of 6 hours duration. On general examination, the patient was restless with sweating. His pulse rate was 90/ min, regular, low volume; with blood pressure of 100/60 mm Hg. Examination of cardiovascular system did not reveal any specific findings except muffle heart sounds. 12-lead electrocardiogram showed sinus inferior ST-elevation myocardial infarction (3 mm ST elevation in lead II, III, and AVF). Cardiac biomarker was elevated (Troponin-I=35 ng/ml). Echocardiogram revealed inferior and posterior hypokinesia, mild mitral regurgitation, and mild left ventricular dysfunction (LVEF-50%). At this stage, probable clinical diagnosis was early (sub-acute) stent thrombosis. So, it was decided to subject him for coronary angiogram with the intention to do primary PCI. After informed consent, coronary angiogram was done from right femoral route which revealed patent stent in left anterior descending coronary artery(LAD) (Fig-4). Right coronary injection revealed opening of the mid right coronary artery into a large spherical cavity (30x26 mm in diameter) that filled with contrast medium in a swirling fashion with slow opacification without visualization of the distal artery.(Fig-1,2). RCA stent was distorted by pressure of the aneurysm from its mid part (Fig-3).

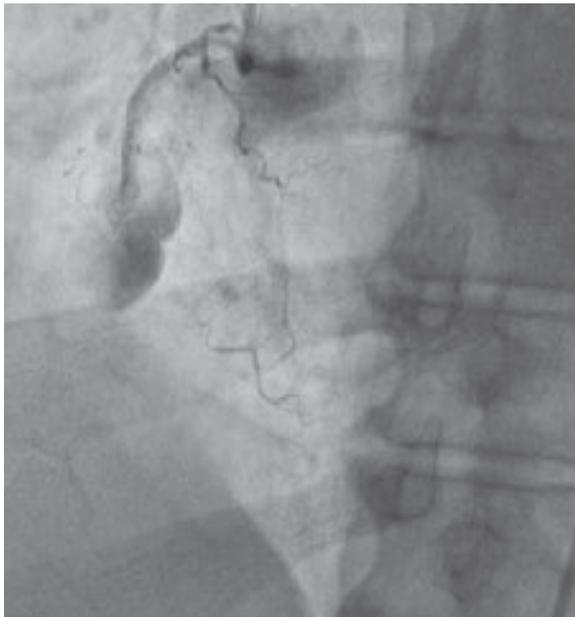


Fig.-1: Right coronary angiogram showing a giant coronary aneurysm.

The patient underwent aneurysmectomy with ligation of proximal RCA with RSVG to distal RCA grafting. Intraoperative findings included extensive 5 cm aneurysm of the RCA (Fig. 5). The aneurysm was cleaned of the thrombus in which the stent was also found (Fig. 6). The thrombus and necrotic material was sent for culture and sensitivity. The narrow neck of the pseudoaneurysm was formed by proximal RCA. RCA opening in pseudoaneurysm was closed by pledgeted



Fig.-2: A large spherical cavity (50x25 mm in diameter) that filled with contrast medium in a swirling fashion with slow opacification without visualization of the distal artery.

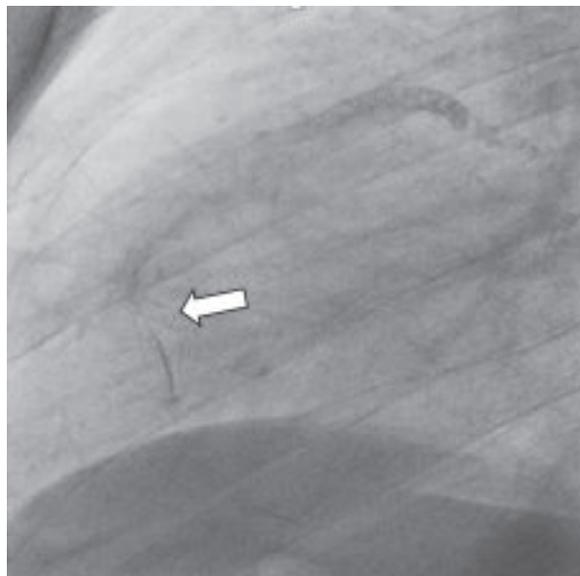


Fig.-3 : RCA Stent is distorted by aneurysm.

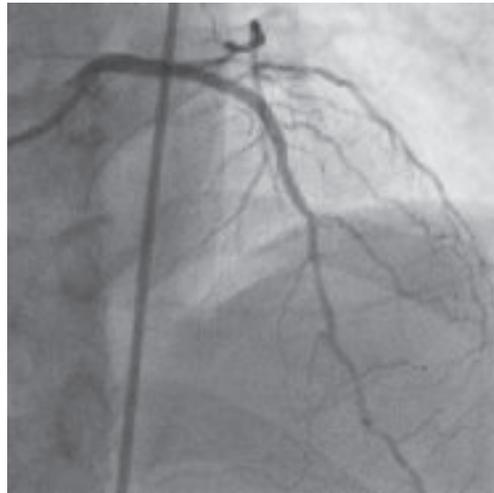


Fig.-4: Patent stent in LAD

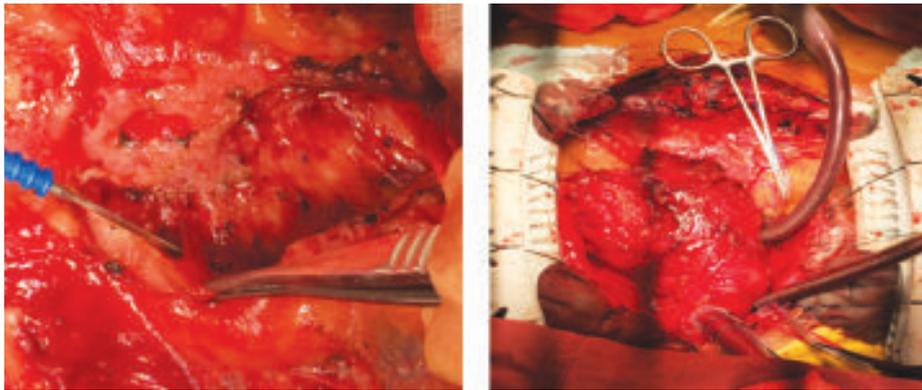


Fig.-4: Patent stent in LAD

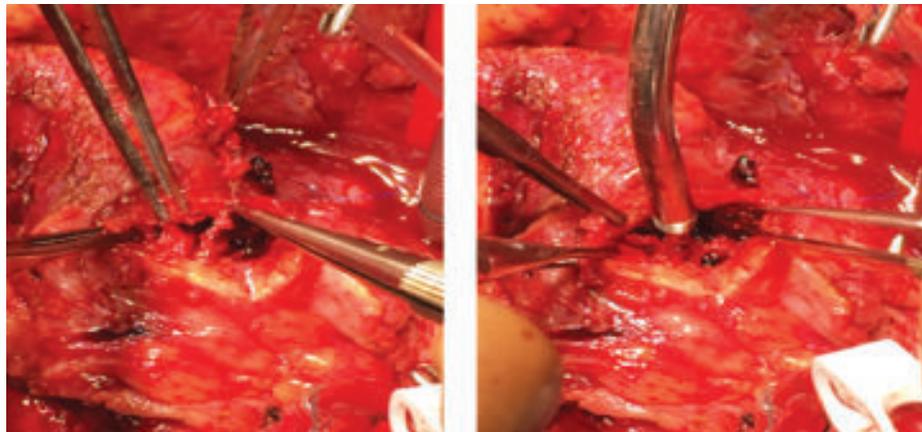


Fig.-6: During aneurysmectomy removal of stent.

sutures. All necrotic tissue was excised, a reverse-saphenous vein graft (rSVG) to the Distal RCA was grafted. The resected aneurysm wall was sent to pathology for further analysis. The operation was otherwise uneventful.

On postoperative day (POD) 1, the patient was extubated. The culture report of the aneurysm material showed pseudomonas infection which was sensitive to most antibiotics, including the ones he was already on.

Discussion:

The development of a mycotic coronary aneurysm is a rare entity being first reported by Bougon in 1812.^{5,6} The majority of coronary pseudoaneurysms occur in the setting of atherosclerosis with congenital aneurysms, vasculitis (e.g., Kawasaki syndrome) and connective tissue disorders.^{5,6,7} A distinct occurrence is a mycotic coronary pseudoaneurysm (MCA) post-percutaneous coronary intervention (0.3–0.6%) with only 19 cases reported in the international literature.⁸ Mechanical factors, infection and inflammation are three major contributors reported to lead to the development of mycotic coronary pseudoaneurysms in these cases.⁸ The arterial wall injury caused by oversized balloons and stents might be the potential mechanical factors, *Staphylococcus aureus* is the primary infectious agent in the majority of cases. The direct stent contamination at the time of delivery, repeated femoral access and femoral artery sheaths left in place for a long duration may facilitate bacteraemia of *S. aureus*, which is a normal skin commensal.⁸ Late stent infection may be caused by drug-eluting stent related local problems like delayed endothelialization of the stent struts, inhibition of neointimal growth, late incomplete healing of any injury, stent apposition, and coronary aneurysm formation.^{9,10} Coronary pseudoaneurysms have been reported from 3 days to up to 4 years after DES implantation procedures, with varying clinical presentations.^{11,12}

Interestingly, our patient had pseudomonas infection which has also been reported by Chen et al.⁸ in 3 of 19 patients as etiological organism.

Potential complications secondary to mycotic coronary aneurysms include rupture, cardiac tamponade, fistulisation, myocardial ischemia or infarction secondary to septic embolization and sudden cardiac death.^{9,10} In this case the huge mycotic aneurysm had formed slowly over three months after percutaneous transluminal coronary angioplasty (PTCA) and subsequent pseudomonas bacteraemia from the infected stent.

Coronary ligation with resection appears to offer the most uncomplicated approach, assuming viable target vessels exist for grafting. Proximal RCA was ligated and distal RCA was bypassed with an rSVG. In view of dense adhesions of pericardium to chest wall and active infection in the area, internal mammary artery was not harvested. Without appropriate target vessels, the complexity of such a surgical approach increases significantly.

The unusual nature was because of the huge size, compression to RV with distortion of stent by aneurysm and infection of the aneurysm by pseudomonas in an otherwise healthy 57-year-old male. Given the limited experience with huge RCA aneurysm, clinical management is still evolving, as the majority of reported cases have been documented post-mortem.⁵

As evidenced by this case, clinical scenario correlating findings of paramount importance in the management of these rare coronary aneurysms. Early diagnosis, appropriate antibiotic therapy and prompt surgery remain the mainstay of current therapy.

Conflicts of interest:

No conflict of interest.

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