

ST elevation myocardial infarction with right coronary aneurysm successfully treated with a drug-coated balloon-only strategy

Yu Sugawara¹

¹Yamato Kashihara Hospital

September 29, 2024

Title: ST elevation myocardial infarction with right coronary aneurysm successfully treated with a drug-coated balloon-only strategy

Word count: 493 words

First author: Yu Sugawara, MD

Department of Cardiology, Yamato-Kashihara Hospital, Japan

Corresponding author:

Yu Sugawara, MD

Department of Cardiology, Yamato-Kashihara Hospital

81, Ishikawa-cho, Kashihara-shi, Nara-ken, Japan 634-0045

Phone +81-744-27-1071

Fax: +81-744-27-4609

E-mail: waegurorunsra@hotmail.co.jp

Key clinical message:

ST elevation myocardial infarction (STEMI) with a coronary aneurysm is rare, thus its treatment is not established. This case suggested that drug-coated balloon angioplasty may be considered for STEMI patients with coronary aneurysms.

Text

The incidence of coronary aneurysm ranges from 0.3 to 5.3%.¹ ST-elevation myocardial infarction (STEMI) with a coronary aneurysm is rare; hence, no standard therapy and guidelines are established. Drug-coated balloons (DCBs) are innovative devices used in treating STEMI and large vessels (diameters [?]3.0 mm), allowing stent-less procedures with favorable outcome.^{2, 3}

We report on a 60-year-old man with hypercholesterolemia hospitalized for STEMI. His past history of Kawasaki disease was unclear. Coronary angiography (CAG) demonstrated that the left anterior descending artery (LAD) was mildly ectatic, although no stenosis or occlusion in both LAD and circumflex artery was observed. However, CAG revealed total occlusion of the middle right coronary artery and circular calcified structure (Fig. 1). Thus, urgent percutaneous coronary intervention (PCI) was performed. A 6Fr MachTM1 JR4.0 guiding catheter (Boston Scientific, Marlborough, MA, USA) was placed and a 0.014-inch Sion Blue (Asahi Intecc, Akatsuki Cho, Japan) guidewire was introduced. Following thrombus aspiration and dilatation with a 2.0×15-mm balloon (Ryurei®, Terumo, Aichi, Japan), we employed intravascular ultrasound (IVUS)

(OptiCross®), Boston Scientific, Marlborough, MA, USA) (Fig. 2). IVUS revealed a coronary aneurysm and 180-degree calcification at the distal site, plaque, and thrombus at the culprit site. The lumen diameter measured 2.45×2.87 mm, with a minimum lumen area of 5.47 mm². A 360-degree vessel wall calcification was found at the proximal site, with a lesion length of 15.7 mm (Fig. 2 a-c). We obtained Thrombolysis In Myocardial Infarction (TIMI) grade 2-3 flow. There were small amounts of coronary thrombi at that time. Generally, drug-eluting stent implantation is considered for patients with STEMI. However, this was decided against because IVUS findings showed malapposition occurring in the follow-up period. In terms of lesion restenosis in chronic phase, the DCB strategy is superior to conventional plain old balloon angioplasty strategy. Furthermore, the use of DCB for STEMI is safer than that of 2nd generation drug eluting stents in terms of all-cause mortality and all adverse cardiac events.² Moreover, DCB may be an effective strategic choice in patients with large, de novo coronary lesions.³ Thus, a 3.0×20 -mm paclitaxel DCB (SeQuent Please NEO®), Nipro, Osaka, Japan) angioplasty was performed following pre-dilatation with a 3.0×13 -mm scoring balloon (Lacrosse aperta NSE®), Nipro, Osaka, Japan) to reduce the risk of target lesion failure. The final CAG revealed TIMI grade 3 flow (Fig. 3). Cardiac coronary computed tomography (CT) following PCI showed a saccular aneurysm with plaques and heavy calcification (Fig. 4). The peak creatine kinase level was 1243 IU/L (normal range, 56 - 244 IU/L). Echocardiography showed that the ejection fraction was 60% and that cardiac wall motion was almost normal; unfortunately, a right coronary aneurysm could not be detected. This patient was discharged 9 days after admission, and aspirin and warfarin were prescribed in the chronic phase.

STEMI with a coronary aneurysm is not common, and its management is challenging. We evaluated the coronary aneurysm with multiple modalities (CAG, IVUS and cardiac CT). DCB angioplasty may be considered for STEMI patients with coronary aneurysms.

Key words: Cardiac computed tomography, Coronary aneurysm, Drug-coated balloon, ST-elevation myocardial infarction

Author contribution

Yu Sugawara: Investigation and writing-original draft

Acknowledgements

None.

Author and funding disclosures:

Yu Sugawara

Funding: None.

Conflict of interest: The authors declare no conflicts of interest.

Consent

The author has obtained written informed consent from patient.

References

1. Abou Sherif S, Ozden Tok O, Taşköylü Ö, Goktekin O, Kilic ID. Coronary artery aneurysms: A review of the epidemiology, pathophysiology, diagnosis, and treatment. *Front Cardiovasc Med.* 2017;4:24. doi.10.3389/fcvm.2017.00024
2. Merinopoulos I, Gunawardena T, Corballis N, Bhalraam U, Reinhold J, Wickramarachchi U, et al. Assessment of paclitaxel drug-coated balloon only angioplasty in STEMI. *JACC Cardiovasc Interv.* 2023;16:771–9. doi.10.1016/j.jcin.2023.01.380
3. Sciahbasi A, Mazza TM, Pidone C, Samperi S, Cittadini E, Granatelli A. A new frontier for drug-coated balloons: Treatment of “de novo” stenosis in large vessel coronary artery disease. *J Clin Med.* 2024;13:1320.

doi.10.3390/jcm13051320

Figure legends

Figure 1. The left anterior descending artery (LAD) shows mildly dilation but no stenosis in both the LAD and circumflex artery. The right coronary angiography revealing occlusion (yellow arrow) and the aneurysm's silhouette (red arrows).

Figure 2. Each line indicating intravascular ultrasound (IVUS) cross-sectional images.

a. At the distal site, IVUS showing an aneurysm and calcification.

b. Thrombus formation (white arrows) occurring at the culprit site, with a lumen diameter of 2.45×2.87 mm and a minimum lumen area of 5.47 mm².

c. The proximal site vessel exhibiting protrusion outward and 360-degree vessel wall calcification.

Lesion measuring 15.7 mm in length (white line).

Figure 3. Final angiogram showing a Thrombolysis in Myocardial Infarction grade 3 flow.

Figure 4. Cardiac CT demonstrating a saccular aneurysm (red arrows) with plaque and severe calcification (yellow arrows).





