



CASE REPORT

Navigating the Unforeseen: Surgical Intervention for Symptomatic Coronary Aneurysms in Acute Coronary Syndrome

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Abstract

Coronary artery aneurysms are defined as luminal enlargements greater than 50% relative to the adjacent reference vessel segment. Most cases can be managed conservatively with medical treatment. Some of them may be symptomatic or even present in the form of the acute coronary syndrome. In such cases, surgical or interventional treatment options should be considered. In addition, the severity of the lesion on coronary angiography may be underestimated at the time of diagnosis. In our case, a coronary aneurysm presenting as an acute coronary syndrome (ACS), aneurysm in the left anterior descending artery (LAD), and critical stenosis, as well as lesions in other coronary arteries, and then treated surgically, is presented.

Keywords: *Acute coronary syndrome, coronary aneurysm, coronary artery by-pass grafting organized thrombus*

Introduction

Coronary artery aneurysms can be defined as luminal enlargements greater than 50% relative to the adjacent reference vessel segment and found in 1.4% of the cases evaluated at autopsy or coronary angiography (CAG).^{1,2} Intervention is recommended when there is an obstructive coronary lesion causing ischemia or symptoms related to the aneurysm.³ In this case report, a patient with a coronary aneurysm hospitalized in our clinic with the acute coronary syndrome (ACS), and an operational decision was made as a result of CAG, is presented.

Case Presentation

A 58-year-old male patient presented to the emergency department with chest pain in the form of retrosternal burning, which lasted for approximately 30 minutes. Hypertension and smoking were known risk factors. In the electrocardiography (ECG) seen in the emergency department, there was ischemic type of deep symmetrical T waves in the anterior leads.

He was transferred to the coronary intensive care unit with the diagnosis of ACS after hypokinetic areas were observed in the apex and anterior wall of the myocardium determined by transthoracic echocardiography (TTE) and a high troponin value was detected. Anti-ischemic, antiplatelet, anticoagulant, and intensive statin therapies were initiated for the treatment of ACS. An aneurysmatic lesion forming critical stenosis was detected in the proximal LAD, at the level of the first diagonal (D1) lateral branch, in the CAG performed on the patient for whom the decision for invasive intervention was made (Figure 1). Coronary artery by-pass grafting (CABG) operation was thought to be suitable for the patient who also had critical stenosis in other coronary vessels. Standard surgical intervention was started using cardiopulmonary bypass and aortic cross-clamp. In the intraoperative evaluation, a 35x25 mm saccular aneurysm was observed in the proximal part of the LAD (Figure 2). The aneurysm was opened, the material compatible with the organized thrombus was removed (Video 1), and vascular repair was performed together with aneurysmectomy. The proximal and distal ends of the aneurysm were ligated. Subsequently, the left internal mammary artery (LIMA) was bypassed to the clean LAD distal to the aneurysm site. Appropriate grafts were anastomosed for critical stenosis in other vessels, and the operation was terminated without any complications. The histopathological diagnosis confirmed that the material removed was an organized thrombus and developed on an atherosclerotic basis. The patient, who did not experience any additional problems in the postoperative period and was discharged after medical treatment was arranged.

Discussion

Various pathologies can be found in the etiology of coronary aneurysms. Atherosclerosis is the most common cause in the elderly population, while Kawasaki disease, collagen vascular disease, vasculitis, and connective tissue diseases are more common in the younger patient group. In addition, it can occur based on trauma, dissection, and infection.³ Moreover, if high pressures are achieved while the procedure by using large-sized balloons and stents during the percutaneous coronary intervention (PCI), the formation of a residual dissection and the appearance of damage to the

deep arterial wall may also be involved in the etiology of the coronary aneurysm, but it is uncommon.⁴ The coronary aneurysm in our case was attributed to atherosclerosis. The presence of atherosclerotic risk factors such as age, hypertension and smoking and the histopathological demonstration of this condition showed that the aneurysm developed on the basis of atherosclerosis rather than pathologies such as collagen vascular disease, connective tissue disease, Kawasaki disease, and other diseases. Also, these patients, similar to our patient, are mostly administered CAG due to the ACS.

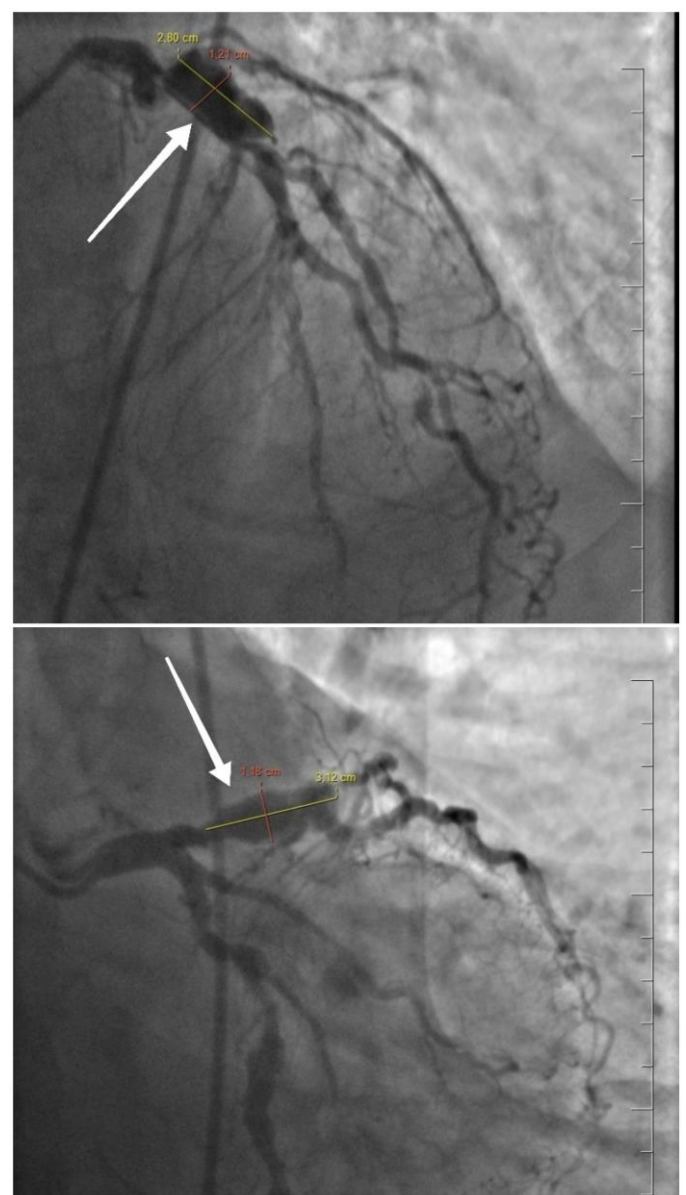


Figure 1. Coronary angiography image of the case from the Anterior-Posterior caudal and cranial positions

In the literature, it has been stated that the most common coronary aneurysm detected vessel is the right coronary artery (RCA), followed by the LAD and the circumflex artery (Cx), respectively.⁵ In the CAAR study, like in our case, it was detected most frequently in LAD and its type is usually saccular.⁶ When evaluated from a pathophysiological point of view, it can be thought that the probability of thrombosis increases, since abnormal flow conditions occur in coronary aneurysms. The slowing flow within the aneurysm results in platelet activation and thrombus formation.⁷ As in our case, in the presence of post stenotic dilatation, platelet activation will increase more as turbulent flow and shear stress will increase. In addition, the turbulent flow will bring the possibility of endothelial damage. Consequently of this cascade, the thrombus formed in the aneurysm will provide fibrin with coagulation precursors that can cause clotting and serve as a nidus for the formation of new thrombi.⁸ Last of all, this statement may result in various ischemic clinical pictures such as ACS. It should also be evaluated that on invasive imaging, only a part of the thrombus in the aneurysm can be seen due to the retained contrast, which may give an incorrect idea of the actual amount of thrombus, the actual severity of the lesion and vasculopathy may also be different and more than it seems. As a matter of fact, more thrombus material than CAG appearance was encountered in the intraoperative image of our case. There is also no clear consensus regarding the treatment of coronary aneurysms. However, conservative follow-up with medical treatment can be considered in aneurysms without evidence of coronary ischemia. Interventional treatment should be considered in individuals whose ischemia persists despite optimal medical therapy. Percutaneous coronary intervention (PCI) is not possible in all patients due to the risk of stent malposition caused by the presence of large and irregular vessel walls and distal embolization that may occur especially during guidewire progression. Furthermore, graft-covered stents used in the treatment have risks such as lateral branch closure, permanent leak, and thrombosis-restenosis.⁴ Therefore, surgical treatment should be considered in the foreground if there is a condition involving the left main coronary artery (LMCA), multiple vascular diseases, with a risk of distal embolization, bifurcation involving a large lateral branch,

especially giant-sized (> 5 cm) aneurysms, and other indications for cardiac surgery.^{4,9} For medium-sized aneurysms, the option of percutaneous intervention may be considered.

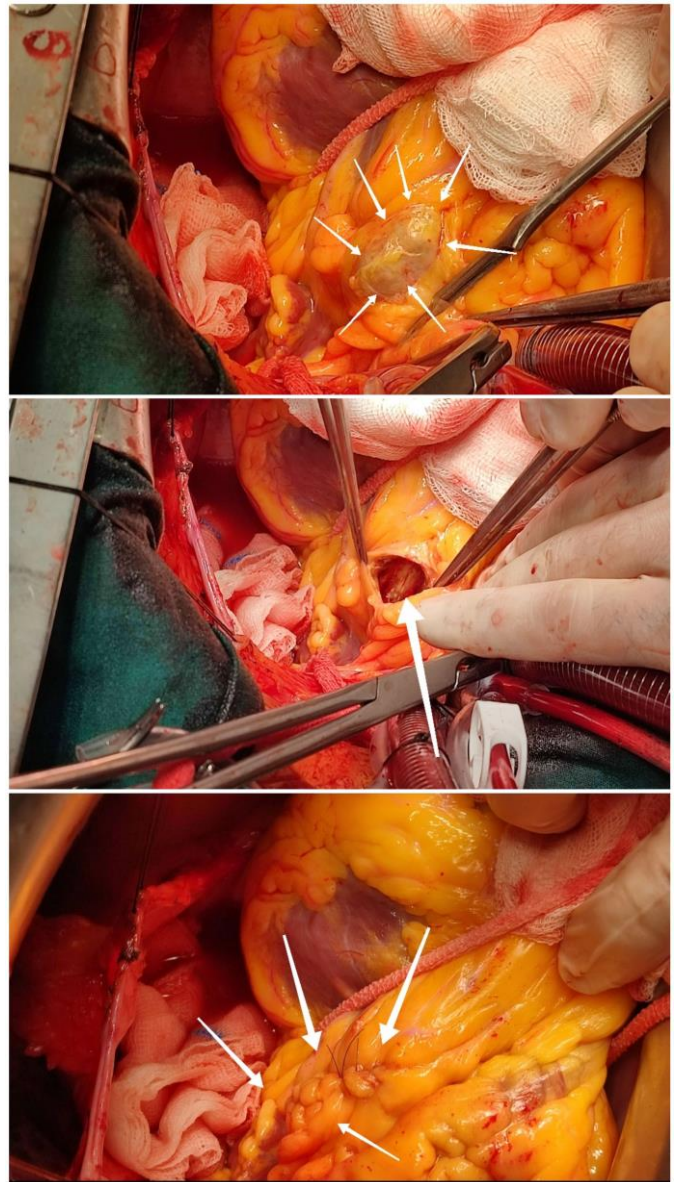


Figure 2. Intraoperative view of the aneurysm.

Conclusion

Coronary aneurysms can present themselves in the form of the acute coronary syndrome. This may be due to stenosis based on atherosclerosis in advanced age, or it may be due to distal embolization originating from an aneurysm. Small aneurysms without evidence of ischemia can be followed up with medical treatment, but aneurysms with evidence of

ischemia should be treated percutaneously or surgically. Coronary angiography may underestimate the severity of vasculopathy and aneurysm size due to its lumenographic nature. Considering this situation, surgical treatment should be considered in the forefront, especially for aneurysms with LMCA involvement, bifurcation with large side branches, multiple vascular disease, with a risk of distal embolization, unsuitable for percutaneous coronary intervention, and giant-sized aneurysms.

Acknowledgements

The author's thanks go to all those who have helped in writing this case report and the patient who gave permission for this report to be made.

Conflicts of interest

The authors have no conflicts of interest to declare.

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Citation: Zengin I, Kahraman N. Navigating the Unforeseen: Surgical Intervention for Symptomatic Coronary Aneurysms in Acute Coronary Syndrome. *Adv. Card. Res.* 2023; 1(1): 45-48. <https://doi.org/10.5281/zenodo.8031754>

Received: 22.05.2023, Accepted: 30.05.2023, Published: 13.06.2023. Copyright: © 2023 by the authors.

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