Right Coronary Artery Pseudoaneurysm Treated by Graft-Stent Deployment

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A right coronary artery (RCA) pseudoaneurysm is a very rare occurrence, with only a few cases reported in the medical literature. The most optimal therapy has not been established because of its rarity. Herein, we report a 70-year-old male with a non-ST elevation myocardial infarction whose coronary angiography revealed a huge pseudoaneurysm supplied by the proximal RCA. The patient was safely and effectively treated by graft-stent deployment. This report includes a literature review of the incidence, associated symptoms, and treatment of coronary artery aneurysms.

Key Words: Coronary artery pseudoaneurysm • Graft-stent deployment

INTRODUCTION

Coronary artery aneurysm is an uncommon disease, found in only 0.15% to 4.9% of patients who undergo coronary angiography.1 A coronary artery aneurysm is defined as coronary dilation that exceeds the diameter of normal adjacent segments or the diameter of the patient’s largest coronary vessel by 1.5 times.2 This report illustrates a very rare case of abnormal right coronary artery (RCA) feeding a huge pseudoaneurysm that was successfully treated by graft-stent deployment. We also discuss the incidence, associated symptoms, and treatment of coronary artery aneurysms.

CASE REPORT

A 70-year-old man with a history of end stage renal disease receiving regular hemodialysis, type 2 diabetes mellitus, and hypertension was seen with a complaint of occasional chest tightness over a period of several months. He described the sensation as compression, confined to the anterior chest wall, and lasting from several minutes to several hours at a time. This sensation became more severe during exercise, but was relieved somewhat by rest. The morning of admission he experienced severe chest tightness accompanied with dyspnea and cold sweats while he was receiving hemodialysis, and was thus transferred to our hospital. The following examination of echocardiography showed regional wall motion abnormality (apical posterior/inferior wall, anterior wall and apical–middle septum hypokinesia). Because of the persistent symptoms and elevated cardiac enzyme (CPK, 303 U/L; CPKMB, 85.1 ng/mL; Troponin-I, 12.03 ng/mL), a cardiac catheterization was performed under the impression of non-ST elevation myocardial infarction. During the procedure, we noted a small contrast jet from the proximal RCA to a huge pseudoaneurysm (approximately 14 mm in diameter) without an identifiable outlet, and stasis of contrast was noted (Figure 1). Blood was spurting into the sac, and a steal phenomenon with poor enhancement of the distal RCA and its branches was also found. The diagnosis was a huge pseudoaneurysm supplied by the proximal RCA,
and myocardial ischemia of the distal RCA territory due to the steal phenomenon. A graft-stent (3.0 × 16 mm) was deployed on the proximal RCA to close the leakage. The stent was inflated to 10 atm, and post-dilation with a 3.5 mm balloon up to 14 atm. Repeat right coronary angiography revealed no contrast jet from the proximal RCA, and clear enhancement of the distal RCA and its branches, indicating the steal phenomenon had been resolved (Figure 2). As a result, the RCA pseudoaneurysm was successfully closed with the graft-stent. He also received Bare-metal stent deployment for proximal LAD critical lesion. And after the procedure, the patient felt much better, with no more chest tightness.

DISCUSSION

The first pathologic description of a coronary artery aneurysm was by Morgagni in 1761, and the first clinical case of a coronary artery aneurysm was reported by Bourgon in 1812. One-third of patients are asymptomatic, and the condition is discovered as an incidental finding during coronary angiography. When symptomatic, patients typically experience chest pain and
dyspnea on exertion or palpitations. The incidence of coronary artery aneurysms in patients undergoing coronary angiography is from 0.2% to 4.9%. In the past, coronary artery aneurysm was defined as coronary dilation, and was called aneurismal dilation. On rare occasions, a coronary artery aneurysm grows large enough to be called a giant coronary artery aneurysm, and in the literature the diameter of giant coronary artery aneurysms in adults has been reported to vary from 50 mm to 150 mm. In the case presented herein, we described a different type of coronary aneurysm, which was only found in a few case reports in our review. Our patient had normal sized coronary vessels, and the aneurysm was fed from the RCA, so we called it pseudoaneurysm.

The main causes of coronary artery aneurysms include complications of percutaneous coronary intervention, atherosclerosis, Kawasaki disease, congenital heart disease, and endocarditis. Although the etiology and pathogenesis is not very well known, however, extensive atherosclerotic changes and destruction of the media of the coronary artery vessels seem to play a role of this disease. In Europe and North America, 50% of coronary artery aneurysms are due to atherosclerosis, 17% are due to congenital heart disease, and 10% are due to Kawasaki disease 10%. However, in Japan Kawasaki disease is the main cause of coronary artery aneurysms. The complications of coronary artery aneurysms include thrombosis, embolization, rupture, and coronary steal syndrome.

Treatment options include close observation, catheter intervention, and surgery. Although a standard therapy has been difficult to establish because of the rarity of the condition, catheter or surgical intervention is likely warranted, even in asymptomatic patients, due to the risk of rupture. Various surgical strategies have been adopted, such as reconstruction, resection, and isolation with concomitant coronary bypass. In cases with fistulas, closure of the fistula is required when native coronary blood flow is compromised. A bypass graft or transcatheter coil embolization is indicated.

In our case, rupture of the aneurysm was our foremost concern; however, the steal phenomenon and myocardial ischemia were the major problems in the patient. Because there was only one feeding vessel of his aneurysm, and the feeding inlet also not large enough to receive coil embolization, we chose graft-stent deployment. The reason for choosing this procedure was its lower associated risk, and equal therapeutic efficacy could be provided by administering adequate antiplatelet therapy, although surgery generally results in longer freedom from the need for re-intervention. However, surgery should remain the primary therapy when concomitant cardiac abnormalities are present.

CONCLUSION

Coronary artery aneurysms or pseudoaneurysm are very rare, and in our review surgical repair is the primary treatment option. As the technique has been refined, percutaneous transcatheter embolization or graft-stent deployment has become a viable therapeutic option for these patients, and we have reported successful management of the condition using a graft-stent. Because of the low incidence, standard therapy has not been established. We suggest that graft-stent deployment should be the preferred method of management if the patient is not a suitable surgical candidate and the feeding inlet also not large enough to treat with coil embolization. The graft-stent offers a safe and effective method to close the aneurysm; however, long-term patency of the graft must be established by careful follow-up.

REFERENCES

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