Off Pump Coronary Artery Bypass Grafting for a Young Adult Patient with Antiphospholipid Syndrome

Koji Ueyama¹, Yujiro Ide², Kazuhisa Sakamoto², Hideo Kanemitsu², Kazuhiro Yamazaki², Tadashi Ikeda², and Kenji Minatoya²

The antiphospholipid syndrome (APS) is a systemic autoimmune disorder characterized by a combination of arterial and/or venous thrombosis. We report a young adult patient of APS associated with systemic lupus erythematosus (SLE), who underwent off pump coronary artery bypass grafting for angina pectoris. She had been diagnosed with SLE at 12 years of age. Two years later, she suffered from right thalamencephalon infarction and was diagnosed as having antiphospholipid syndrome (APS) based on elevation of anticardiolipin antibodies. During twelve years until 26 years old, various thromboembolic and bleeding events occurred in the patient. At 30 years of age, she admitted to our hospital with high fever and the computed tomography detected de-novo cerebral arterial aneurysm. This suggested active vasculitis. On this admission, the ST pattern in the electrocardiogram was changed. Severe stenosis of left anterior descending coronary artery (LAD) and total occlusion of right coronary artery (RCA) were identified by coronary angiography (CAG). We performed off pump coronary artery bypass using saphenous vein grafts because of occlusion of bilateral intrathoracic arteries. The postoperative course was uneventful without any thromboembolic and bleeding complications. Postoperative CAG showed good patency of both vein grafts to LAD and RCA.

KEY WORDS: antiphospholipid syndrome, off pump coronary artery bypass grafting, systemic lupus erythematosus, young adult

Ⅰ. Introduction

Patients with antiphospholipid syndrome (APS) have an increased risk of atherothrombotic complications, such as cerebrovascular events and myocardial infarction.

The case of a young adult patient of APS associated with systemic lupus erythematosus (SLE) who had severe stenosis of left anterior descending coronary artery (LAD) and total occlusion of right coronary artery (RCA) on angiography and was successfully treated with off pump coronary artery bypass grafting (OPCAB) is reported.

Ⅱ. Case report

A 12 year-old female, complained of butterfly rash and arthritis, had been diagnosed with SLE. Two years later, she suffered from right thalamencephalon infarction and was diagnosed as having APS based on elevation of anticardiolipin antibodies. The patient started to take steroid and anti-platelet drugs. At the age of 19 years, left cerebellar hemorrhage was developed. She had subarachnoid hemorrhage at the age of twenty. Three years later, bilateral renal infarction and brain stem infarction were appeared. At the age of 24 years, subarachnoid hemorrhage was repeated. Brain magnetic resonance angiography showed various types of aneurysms in the segment of cerebral arteries and enhanced computed tomography (CT) revealed renal and internal iliac artery (Fig. 1). And then prednisolone (10 mg/ day) as steroid therapy was maintained.

The patient was urgently hospitalized because of high fever at the age of 30 years. Laboratory data showed increased erythrocyte sedimentation rate (ESR) of 79 mm (reference 3 - 15 mm) and C-reactive protein (CRP) of 9.5 mg/dl (reference < 0.3 mg/dl). New cerebral artery aneurysm was detected suggesting active vasculitis. The dose of steroid was increased and intravenous pulse administration of cyclophosphamide was begun. During this hospitalization, the ST pattern in the electrocardiogram was changed. The cardiac echography showed left ventricle hypertrophy and the result of the myocardium scintigraphy was positive. The coronary angiogram (CAG) revealed coronary aneurysm in left main trunk, 99 % stenosis of LAD and total occlusion of segment 2 in RCA (Fig. 2). The circumflex artery, in
which a 50% stenosis was detected, was not necessary for revascularization. Enhanced CT indicated bilateral inter-thoracic arteries were occluded. The heart team, which consisted of cardiologists and cardiac surgeons, discussed the method to treat two-vessel coronary artery disease. Cardiologists estimated that the diameter of LAD was too large to place the stent and the thrombus quantity in RCA was too much to be absorbed. It meant that the size and form of diseased coronary artery was not preferable for PCI. As a result, coronary artery bypass grafting (CABG) was selected. From 5 days before the operation, warfarin was changed to a continuous infusion of heparin (10,000 U/day). Activated partial thromboplastin time (APTT) was prolonged at 50–60 seconds (reference 24–39 sec). When an inflammatory reaction was stabilized with ESR of 11 mm and CRP of 0.1 mg/dl, we performed off pump coronary artery bypass grafting (OPCAB) using saphenous vein graft (SVG), anastomosed to LAD and RCA. She was extubated at 3 hrs after the operation. On post-operative day (POD) 1, she began to take oral anti-platelet drugs of 60 ug beraprost sodium and 75 mg clopidogrel. As anticoagulation, Vitamin K antagonists, was added on POD2.

Post-operative course was uneventful without any bleeding or thromboembolic complications. Post-operative CAG showed good patency of both vein grafts (Fig. 3). Two weeks after the
operation, she was transferred to the department of Rheumatology and Clinical Immunology to maintain the therapy of steroid and immunosuppressant.

III. Discussion

APS is classified as primary APS without an underlying systemic autoimmune disease and secondary APS with the presence of another systemic autoimmune disease. APS induced arterial events are the most pronounced in SLE-associated secondary APS, where traditional and non-traditional risk factors are multiplied, and atherosclerosis occurs more prematurely. The current case was diagnosed with SLE two years ago before detecting high levels of anticardiolipin antibodies, leading the diagnosis of APS.

Patients with APS have an increased risk of atherothrombotic complications, such as cerebrovascular events and myocardial infarction (MI). Both cerebrovascular and coronary artery diseases are more prevalent in patients with APS and comprise the major cause of mortality and morbidity in these patients. The presence of APS is a strong risk factor for the development of coronary artery disease, especially in young patients.

In our presented case, the patient had been suffered from repeated bleeding and thromboembolic events for about one decade. After the life-threatening disease was recognized by CAG, we discussed about the strategy to treat angina pectoris. It was reported that cardiac surgical patients with APS were a high-risk group. Furthermore, the presence of APS also appears to be associated with an increased risk of vein graft disease after coronary artery bypass graft. In fact, the risk for accelerated vein graft disease and failure has been shown to correlate well with the levels of anticardiolipin antibodies. In addition, this case had a disadvantage that the usage of both ITAs was impossible.

On the other hand, a recent report described among patients with APS who underwent CABG or PCI the need for repeat revascularization was infrequent and occurred several years after initial procedure. Finally, it was forced to choose CABG using SVG because PCI was not suitable based on the diseased type of coronary artery. Since cardiopulmonary bypass is known to exaggerate its coagulatory and fibrinolytic complications, off-pump CABG was feasible rather than conventional CABG.

In patients with APS, the baseline activating clotting time (ACT) level is often higher than that in normal controls. Therefore it is sometimes needed to measure serum heparin level when such patients undergo cardiovascular surgery using heparinization. In this case, from 5 days before the operation, warfarin was changed to a continuous infusion of heparin. Preoperative ACT level was 162 sec. The effect of intravenous heparin was considered a normal fashion. Based to these findings, we evaluated the state of APS in this patient was under good control. As a result, a regimen for anticoagulation plan during operation was not changed from a routine manner without any changes. Before snaring the target coronary artery with an elastic tape, the bolus of heparin with the dose of 100 U/kg was given, maintaining the time range from 230 to 300 seconds as ACT levels. At the completion of bypass grafting, neutralization by protamine sulfate was not performed. In the postoperative course, an anti-coagulation drug combined to two kinds of anti-platelets agents were started orally. Patients with APS and non-stroke arterial events are frequently treated with combination antiplatelet therapy or anticoagulant therapy indefinitely. Fortunately, it was uneventful after the operation in this case. Careful long-term follow-up was required.
IV. Conclusion

OPCAB was performed to treat two vessels coronary artery disease of a young adult patient of APS associated with systemic lupus erythematosus (SLE). It was uneventful post-operatively, although there were repeated bleeding and thromboembolic events during about a decade before the operation.

Disclosure statement

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

References

1) Soltész P, Szekanecz Z, Kiss E, et al: Cardiac manifestations in anti-phospholipid syndrome. Autoimmun Rev 2007; 6: 379–386
2) Cervera R, Piette JC, Font J, et al: Euro-Phospholipid Project Group: Antiphospholipid syndrome: clinical and immunologic manifestations and patterns of disease expression in a cohort of 1,000 patients. Arthritis Rheum 2002; 46: 1019–1027
3) Koniari I, Siminelakis SN, Baikoussis NG, et al: Antiphospholipid syndrome; its implication in cardiovascular diseases: a review. J Cardiothorac Surg 2010; 5: 101
4) Sacré K, Brihaye B, Hyafil F, et al: Asymptomatic myocardial ischemic disease in antiphospholipid syndrome: a controlled cardiac magnetic resonance imaging study. Arthritis Rheum 2010; 62: 2093–2100
5) Ruiz-Iturriaza G, Crowther M, Branch W, et al: Antiphospholipid syndrome. Lancet 2010; 376: 1498–1509
6) Takeuchi S, Obayashi T, Toyama J, et al: Primary antiphospholipid syndrome with acute myocardial infarction recanalised by PTCA. Heart 1998; 79: 96–98
7) Hegde VA, Vivas Y, Shah H, et al: Cardiovascular surgical outcomes in patients with the antiphospholipid syndrome—a case-series. Heart Lung Circ 2007; 16: 423–427
8) Bick RL, Ismail Y, Baker WF Jr: Coagulation abnormalities in patients with precocious coronary artery thrombosis and patients failing coronary artery bypass grafting and percutaneous transcoronary angioplasty. Semin Thromb Hemost 1993; 19: 412–417
9) Morton KE, Gavaghan TP, Krilis SA, et al: Coronary artery bypass graft failure—an autoimmune phenomenon? Lancet 1986; 2: 1353–1357
10) Ahmed N, Gandhi H, Lopez EM, et al: Outcomes of coronary artery revascularization procedures in patients with antiphospholipid syndrome. Cardiovasc Revasc Med 2019; doi: 10.1016/j.carrev.2019.01.027. [Epub ahead of print]
11) Horimoto S, Horimoto H, Sawada Y, et al: Off-pump coronary artery bypass in a patient with the antiphospholipid syndrome. J Cardiovasc Surg (Torino) 2005; 46: 81–83
12) Mehta TP, Smythe MA, Mattson JC: Strategies for managing heparin therapy in patients with antiphospholipid antibody syndrome. Pharmacotherapy 2011; 31: 1221–1231
13) Chaturvedi S, McCrae KR: The antiphospholipid syndrome: still an enigma. Hematology Am Soc Hematol Educ Program 2015; 2015: 53–60