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Case report of a Clopidogrel-resistant patient with giant thrombotic saphenous vein graft bypass aneurysms

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A 65-year-old patient was referred to our department due to an incidental finding of two aneurysmatic saphenous vein coronary artery bypass grafts (SVG). Two weeks earlier, he had primarily presented at another institution's emergency department with increased exertional dyspnea and productive cough as part of an exacerbation of his chronic obstructive pulmonary disease (COPD). The aneurysms were detected by computed tomography (CT) scan that was performed to rule out pulmonary embolism after lab results had revealed elevated D-dimer levels. Besides COPD and coronary artery disease, pre-existing illnesses included arterial hypertension, hyperlipidemia and hypothyroidism. Due to acute myocardial infarction at the age of 39, he had undergone urgent coronary artery bypass graft surgery (CABG) with a left internal mammary artery (LIMA) bypass graft to the left anterior descending artery (LAD) as well as two SVGs, one to the right coronary artery (RCA) and one to the left circumflex artery (LCX). At the age of 58, percutaneous coronary intervention of a distal 90% stenosis of the SVG-to-LCX-bypass using a bare metal stent was performed in the setting of acute coronary syndrome. The patient was put on clopidogrel and aspirin, however he autonomously stopped his aspirin intake after one month due to dizziness. Four years later, emergency coronary angiography showed late-thrombosis in the described stent as well as a degenerated, slightly ectatic SVG-to-RCA-bypass. The attending physicians opted for conservative therapy recommending life-long treatment with addition of aspirin to the previously prescribed clopidogrel-therapy, but the patient again did not comply. Upon admission at our department, the patient's condition had ameliorated and he was widely symptom-free. Echocardiography showed hypertensive and ischemic cardiomyopathy with a left ventricular ejection fraction of 45%. To evaluate the coronary status, cardiac multi-slice CT (MSCT) was performed, which revealed total obliteration of the SVG-to-LCX-bypass with formation of a giant thrombosed aneurysm up to a diameter of 6.6 cm located proximally to the thrombosed stent mentioned above. In addition, examination of the SVG-to-RCA-bypass demonstrated a massively degenerated graft with a large thrombosed aneurysm up to a diameter of 2.8 cm and suspected decreased perfusion, while blood flow in the LIMA-to-LAD-bypass was unrestricted. Both aneurysms did not compress any heart chambers or other relevant structures (Fig. 1). For further examination, coronary angiography was performed, which confirmed complete obstruction of the SVG-to-RCA-bypass and reduced blood flow (TIMI II) in the SVG-to-LCX bypass, whilst showing good collateralization to the small myocardial territory primarily supplied by the described graft (Fig. 2). After synopsis of all findings and the reasons stated in the discussion below, we opted for conservative therapy. Interestingly, after several days of controlled intake of clopidogrel at our department, a VerifyNow-P2Y₁₂-assay was performed to evaluate platelet inhibition, which revealed a rate of 0%. Therefore, in the presence of clopidogrel-resistance, and since the patient strictly refused intake of aspirin, we decided switching to prasugrel. Subsequent reevaluation of platelet inhibition confirmed adequate response with a rate of 71%. In addition, to rule out further progression of SVG aneurysms, the patient was advised to undergo another cardiac MSCT in 6 months.

Discussion: Saphenous vein graft aneurysms have been described as a potentially fatal complication of CABG with an incidence of less than 1% and are said to develop after an average postoperative period of 13 years [1, 2]. Multiple pathophysiologic mechanisms of formation have been postulated, including atherosclerotic degeneration, venous wall weakness, trauma or vasculitis [3, 4]. A large portion of coronary artery aneurysms remains undetected due to lack of symptoms. However, if symptomatic, they usually manifest with symptoms of myocardial ischemia due to graft thrombosis or distal embolism. Complications include myocardial infarction, aneurysmal rupture or compression of adjacent structures [5]. Coronary angiography is considered the reference standard for diagnosis including the probability to assess blood flow and patency in coronary arteries and bypass grafts [6]. However, in our case, the most diagnostically conclusive method was cardiac MSCT, since the true extent of the SVG aneurysms would have been underestimated in coronary angiography due to extensive thrombosis. In consequence of the low prevalence, the ideal management of coronary aneurysms remains controversial. Considering the high mortality associated with the probability of rupture, repeated CABG and aneurysm resection or graft ligation is still considered first choice [6, 7]. However, based on the advance of percutaneous treatment modalities such as coil embolization, covered stent implantation or amplatzer vascular plug occlusion, management options are becoming increasingly diverse [2]. It has been recommended that treatment should depend on symptoms, aneurysmal morphology, expansion history and pathophysiology [8]. In our case, we opted for a conservative approach, because of the lack of