



Cardiac Arrest in a Patient with Critical Left Subclavian Artery Stenosis

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Abstract

A 78-year-old female patient was admitted to our emergency room with cardiac arrest due to acute coronary syndrome. After 15 minutes of mechanical and medical cardiopulmonary resuscitation, it has obtained cardiac rhythm and 75/45 mmHg arterial blood pressure. Her medical history was revealed coronary artery bypass grafting surgery ten years ago. Electrocardiography was showed sinus rhythm with diffuse ST depression. Angiography was demonstrated a critical stenosis of outlet of the left subclavian artery which originating from the left internal mammary artery. We performed a successful stent implantation for the critical left subclavian artery stenosis. This report highlights the possibility of myocardial ischemia-induced coronary subclavian steal syndrome caused by subclavian artery stenosis in patients undergoing coronary artery bypass grafting surgery using the left internal mammary artery grafts and that the patients may present with acute coronary syndrome and cardiac arrest.

Keywords: Coronary-subclavian steal syndrome; Left subclavian artery stenosis; Acute coronary syndrome; Cardiac arrest

Introduction

The American College of Cardiology/American Heart Association (ACC/AHA) recommends as a first option that the use of the left internal mammary artery (LIMA) as a conduit to the left anterior descending (LAD) artery in coronary artery bypass grafting (CABG) surgery [1,2]. The proximal left subclavian artery stenosis induces cardiac ischemia in CABG patients who have LIMA grafts [3]. In the presence of significant critical stenosis of the left subclavian artery, there is a risk for myocardial ischemia supplied by the LIMA, which may cause a reversal of blood flow through the LIMA. At the clinical practice, this phenomenon is known as the coronary-subclavian steal syndrome (CSSS) [2].

Herein, we aimed to report a case of CSSS-induced acute coronary syndrome caused by left subclavian artery stenosis who had undergone CABG, and this case was successfully treated with stenting.

Case Presentation

A 78-year-old female patient was admitted to our emergency room with cardiac arrest due to acute coronary syndrome. After 15 minutes of mechanical and medical cardiopulmonary resuscitation, it has obtained cardiac rhythm and 75/45 mmHg arterial blood pressure. Her medical history was revealed CABG ten years ago. Additionally, the patient had some underlying disorders including diabetes mellitus, hypertension, and hyperlipidemia. Coronary angiography was showed a normal left main coronary artery (LMCA), 100% proximal stenosis of LAD, and a patent LIMA-LAD conduit. In addition, 100% proximal stenosis and retrograde filling of the circumflex coronary (Cx) artery, a patent stent inserted into the first obtuse marginal artery (OM1), and 100% proximal stenosis of the right coronary artery (RCA) were seen. Saphenous vein stumps were completely detected. Electrocardiography was showed sinus rhythm with ventricular arrhythmias and diffuse ST depression. The levels of cardiac enzymes and troponins were abnormally high. Selective coronary angiography was performed by using a 7F sheath, 7F JR4 guiding catheter and 0.35 guidewire. The angiographic view of the lesion is shown in Figure 1. A 9 x 37 mm balloon-expandable stent (INVATEC S.p.A., Roncadelle, Italy) was inserted into the critical stenotic segment of the left

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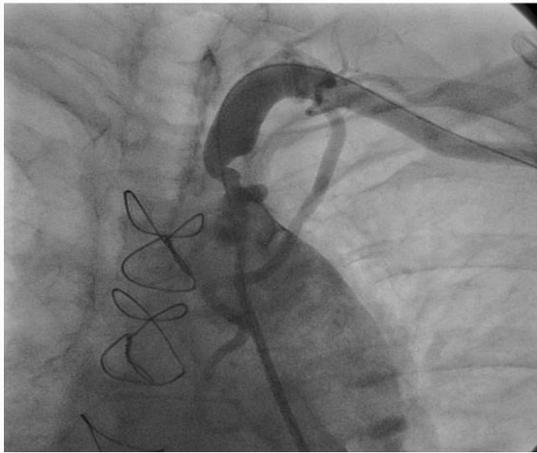


Figure 1: An angiographic view is shown critical stenosis in the proximal part of the left subclavian artery.

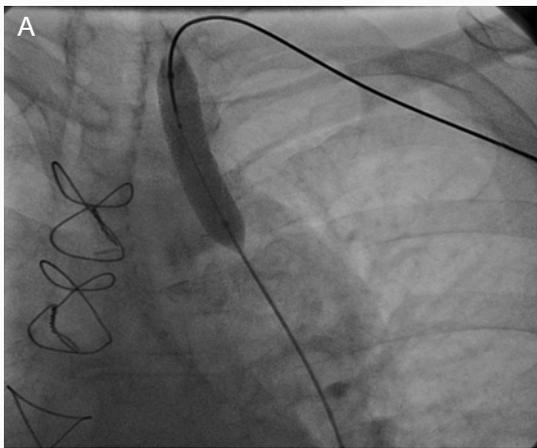


Figure 2 and 3: Angiographic views are shown a successful endovascular intervention using the direct stenting technique for the left subclavian artery stenosis.

subclavian artery (Figure 2 and 3). Following a successful stenting, it was observed a dramatic decreasing for the arrhythmias and levels of cardiac enzymes and troponins, as well as an improvement of electrocardiography findings.

Discussion

Subclavian artery stenosis was first described in 1975 [4]. It may lead to myocardial ischemia due to the reduced blood flow caused by the critical stenosis of the subclavian artery in mid- and long-term follow-up in patients who had undergone CABG with LIMA grafts [2]. Subclavian artery stenosis-associated myocardial ischemia is a rare phenomenon and its incidence has been reported to be 0.5 to 1.1% in patients with previous CABG [5]. The diagnostic modalities which use to detect a subclavian artery disease prior to the placement of a LIMA graft include arteriography, computed tomography angiography, and the combination of magnetic resonance imaging, magnetic resonance angiography, and Doppler ultrasonography [6]. In our case, we were able to establish a diagnosis based on coronary angiographic findings, as we did not initially suspect subclavian artery stenosis. The most common therapeutic modalities for subclavian artery stenosis or occlusion-induced myocardial ischemia include an aorto-subclavian bypass, a carotid-subclavian bypass, and transposition of the LIMA, a directional atherectomy, a subclavian endarterectomy, and angioplasty either with or without stenting of the subclavian artery [5]. In our case, we performed a more practical and rapid stenting procedure.

Conclusion

It should be kept in mind that myocardial ischemia-induced CSSS caused by a severe stenosis or complete occlusion of the left subclavian artery in patients who had undergone CABG previously using the LIMA grafts and that the patients may present with acute coronary syndrome and cardiac arrest due to reduced or lost blood flow.

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