

A New Form of Coronary Subclavian Steal Syndrome: a Saphenous Vein Graft–Coronary-Subclavian Unidirectional Steal Syndrome

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ABSTRACT

Coronary subclavian steal syndrome refers to decreased or reversed internal mammary artery flow, which causes angina related to severe subclavian steno-occlusive disease in patients with in situ internal mammary-to-coronary artery graft. We present a 48-year-old man with cerebrovascular and peripheral artery disease and the first case in the literature of a saphenous vein graft–coronary-subclavian unidirectional steal syndrome.

INTRODUCTION

Coronary subclavian steal syndrome (CSSS) is a variant of subclavian steal syndrome that is seen more often as the use of left internal mammary artery (IMA) used as a graft for coronary revascularization increases [Fisher 1961; Samoil 1993]. We report a new form of coronary steal syndrome and its treatment with percutaneous transluminal intervention.

CASE REPORT

We report the case of a 48-year-old man with a 40 pack-year history of smoking and blood hypertension history who was operated on in 2008 for triple coronary artery bypass of the left anterior descending artery (LAD) with a left IMA and of the first obtuse marginal branch of the circumflex artery and first diagonal branch of LAD with saphenous vein grafts. The outcome was favorable until July 2011 when this patient presented with typical angina pectoris at rest, exacerbated by selective exercise of the left upper limb. He had also dizziness and claudication in the lower extremities with walking. Physical examination revealed that the left arm pulse and arterial pressure were weaker than those in the right arm and bilateral pulselessness on popliteal arteries. An electrocardiogram revealed myocardial ischemia of the anterior territory, and cardiac enzymes were within normal limits. A

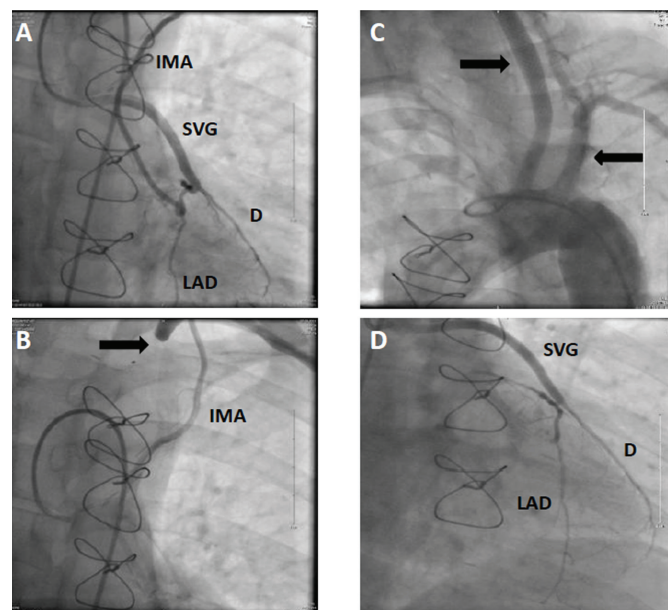


Figure 1. (A and B) A, Selective saphenous vein graft (SVG) injection showing the SVG–coronary-subclavian unidirectional steal syndrome. B, Note that the total occlusion of proximal left subclavian artery (arrow). C, Aortogram demonstrating normal filling of the left subclavian artery and left common carotid artery after stenting of critical lesion with a satisfactory result (arrow). D, Retrograde filling of the internal mammary artery (IMA) graft is not seen following stenting of the proximal left subclavian artery. D indicates diagonal branch of the left anterior descending artery (LAD).

brachiocephalic arteriography revealed a high grade stenosis of the both right and left common carotid arteries and also total occlusion of the proximal left subclavian artery. Peripheral arteriogram showed bilaterally occluded superficial femoral arteries with a diffuse collateral network. Control coronary angiogram revealed patency of the grafts, and lastly the examination brought out a typical aspect of CSSS (Figure 1, A and B). Successful stenting was achieved in both carotid arteries. A brachial approach was used in another session. The left subclavian stenosis was crossed with a Conquest Pro12 wire (Asahi Intecc, Santa Ana, CA, USA), and balloon dilatation including implantation of a 5.0 × 19 mm Express Vascular balloon expandable stent (Boston Scientific, Natick, MA, USA)

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was performed with a satisfactory result (Figure 1C). Control coronary angiogram obtained immediately after stent placement showed absence of retrograde filling of left IMA (Figure 1D). Following the intervention, the patient's chest pain was relieved, the left radial arterial pulse was palpated, and the inter-arm blood pressure difference disappeared.

DISCUSSION

Coronary subclavian steal syndrome refers to decreased or reversed IMA flow, which causes angina related to severe subclavian steno-occlusive disease in patients with in situ internal mammary-to-coronary artery graft. The incidence of CSSS is increasing with widespread usage of left IMA as a graft for coronary revascularization. Various forms of CSSS are present. One form of it, called Spinning Wheels Syndrome, is reported in a patient who had redo coronary artery bypass graft with a left subclavian artery occlusion; retrograde filling of the proximal LAD and left IMA via a right IMA revealed a subclavian steal syndrome aspect with an unusual circular circulation [Fayad 2008]. However, we report the first case in which the patient had a retrograde filling of the subclavian artery starting with a venous graft to the diagonal artery and going through filling up the proximal LAD and left IMA revealed a new form of CSSS. Before the advent of percutaneous transluminal intervention, transthoracic or extrathoracic

bypass grafting was the only available therapeutic option for subclavian artery stenosis or total occlusion. However, percutaneous transluminal intervention has been performed for the treatment of subclavian artery stenosis since 1980. Also, our patient has been free of symptoms for 6 months after the successful stenting of total left subclavian artery occlusion. Eventually, chest pain accompanied by selective exercise of the left upper limb and significant differences in blood pressure readings between arms in a patient who had a left IMA grafted to LAD may need visualization of coronary arteries, left IMA, and left subclavian artery for exclusion of CSSS. In conclusion, CSSS could be easily treated with percutaneous intervention, but first it should be considered in patients who had the left IMA harvested for coronary revascularization with typical angina pectoris exacerbated by selective exercise of the left upper limb.

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