Research Paper

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First Thoracic Artery Coronary Steal Syndrome Post Coronary Artery Bypass Surgery

Medical Science

KEYWORDS : Post Cardiac bypass Coiling, Internal thoracic artery steal syndrome , Left internal mammary artery steal syndrome .

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ABSTRACT

The use of the arterial and venous vessels as conduits to the native coronary arteries is recommended by the American College of Cardiology/American Heart Association as a coronary bypass graft1. Recurrence of the symptoms post bypass are commonly seen if there is stenosis of the bypass vessel itself, Left internal mammary artery (LIMA) or Saphenous Venous Graft(SVG) ,of the vessel supplying it (Subclavian artery) or compromise of blood flow due to a large branch arisng from the main vessel (Lateral Thoracic artery).

Coronary subclavian steal syndrome (CSSS) is caused by retrograde blood flow through the internal mammary artery graft.

Coronary steal due to a large first thoracic artery which is a branch of the internal mammary artery is not well known or documented in literature .We present a series of cases of coiling of the large thoracic artery as therapeutic option for Coronary steal syndrome.

We present case reports of four elderly post coronary artery bypass (CABG) patients who underwent first thoracic artery coiling . All patients were similar in the baseline demographic characteristics with LIMA to LAD graft .

Two different techniques were used for the procedure , for two patients the multipurpose catheter was used for the deployement of the coil and the rest two underwent the procedure with the use of a microcatheter .

INTRODUCTION

The use of the arterial and venous vessels as conduits to the native coronary arteries is recommended by the American College of Cardiology/American Heart Association as a coronary bypass graft1. Recurrence of the symptoms post bypass are commonly seen if there is stenosis of the bypass vessel itself , Left internal mammary artery (LIMA) or Saphenous Venous Graft(SVG) ,of the vessel supplying it (Subclavian artery) or compromise of blood flow due to a large branch arisng from the main vessel (Lateral Thoracic artery).

Coronary subclavian steal syndrome (CSSS) is caused by retrograde blood flow through the internal mammary artery graft.

Coronary steal due to a large first thoracic artery which is a branch of the internal mammary artery is not well known or documented in literature .We present a series of cases of coiling of the large thoracic artery as therapeutic option for Coronary steal syndrome.

CASE REPORT

We present case reports of four elderly post coronary artery bypass (CABG) patients who underwent thoracic artery coiling . All patients were similar in the baseline demographic characteristics with LIMA to LAD graft .

Two different techniques were used for the procedure , for two patients the multipurpose catheter was used for the deployement of the coil and the rest two underwent the procedure with the use of a microcatheter .

First technique :

Using Seldinger's technique through Right femoral artery approach, 5 F sheath and 5F JR 3.5 Launcher (Medtronic) guiding catheter was used to hook the LIMA artery after administering 5000 IU of Heparin for both the patients . ACT was maintained around 300 msec . Angiography reveled lateral thoracic artery arising from LIMA.(Figure 1)

A 0.035 " x 260 cms J wire Terumo guide wire was used to selectively engage the lateral thoracic artery

The catheter was then exchanged to Multipurpose cathter(Figure 2). A 3mm x 5 cook pushable occluder coil (Cook) was deployed using the backend(hard end) of a 0.035 " x 260 cms terumo wire in the first left lateral thoracic artery (Figure 3). Check shoot after few minutes showed showed total occlusion of left first lateral thoracic artery(Figure 4). Patient tolerated the procedure well without any complications

Patient was discharged in a stable condition and was doing well in a recent follow up done 6 weeks after the procedure.

Figure 1 :LIMA injection showed large lateral thoracic artery arising from LIMA causing compromise of blood flow to LAD leading to Coronary steal phenomenon.

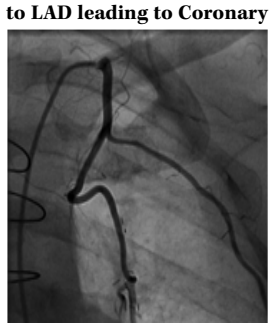


Figure 2 : Selective injection of lateral thoracic artery using multipurpose catheter

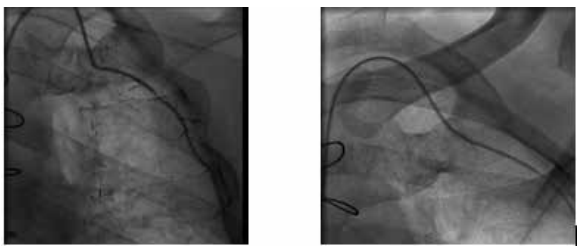


Figure 3 :A 3mm x 5 cook pushable occluder coil (Cook) was deployed using the backend(hard end) of a 0.035 " x 260 cms terumo wire in the first left lateral thoracic artery

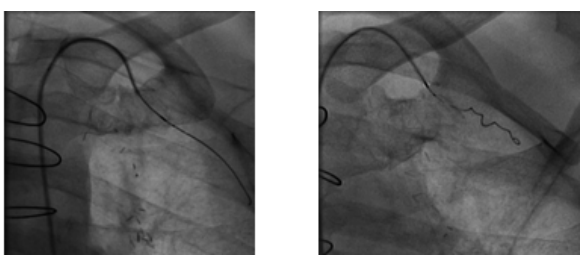
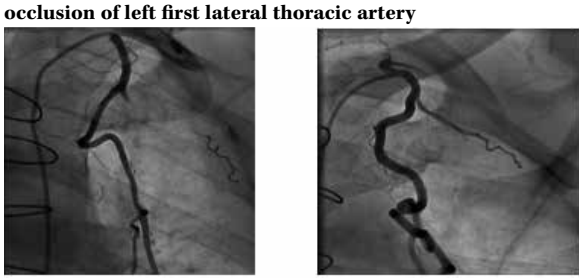


Figure 4 :Check shoot after few minutes showed showed total occlusion of left first lateral thoracic artery



Second technique:

Using Seldinger's technique through Right femoral artery approach, 6 F sheath anf 6F JR 3.5 guiding catheter (Medtronic) was used to hook the LIMA artery after administering 5000 IU of Heparin for both the patients. ACT was maintained around 300 msec . Angiography reveled lateral thoracic artery arising from LIMA.(Figure 5).

A 0.014 X 190 cms coronary guide wire(BMW) was used to selectively engage the lateral thoracic artery . A 2.2 F microcatheter (Cook)was just passed over the guide wire into the vessel (Figure 6). Through the microcathter a 2cm x 2 mm Hilal microcook pushable occluder coil (Cook) was deployed using the backend(hard end) of a 0.018 " x 260 cms terumo wire in the first left lateral thoracic artery (Figure 7). Check shoot after few minutes showed showed total occlusion of left first lateral thoracic artery(Figure 8)in one patient but the other had partial occlusion. Patient tolerated the procedure well without any complications.

In the other patient another 2cm x 2 mm Hilal microcook pushable occluder coil (Cook) was deployed using the backend(hard end) of a 0.018 " x 260 cms terumo wire in the first left lateral thoracic artery through the microcatheter(Figure 9). Check shoot after few minutes showed showed total occlusion of left first lateral thoracic artery Patient tolerated the procedure well without any complications(Figure 10).

Patient was discharged in a stable condition and was doing well in a recent follow up done 6 weeks after the procedure.

Figure 5 :LIMA injection showed large lateral thoracic artery arising from LIMA causing compromise of blood flow to LAD leading to Coronary steal phenomenon.

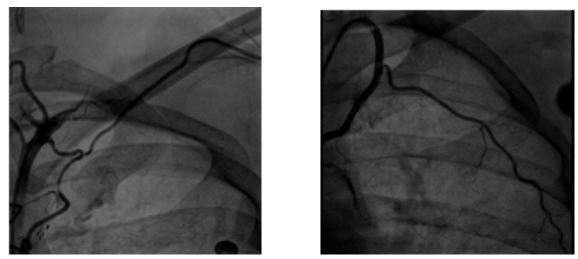


Figure 6 :A 2.2 F microcatheter (Cook)was just passed over the guide wire into the vessel

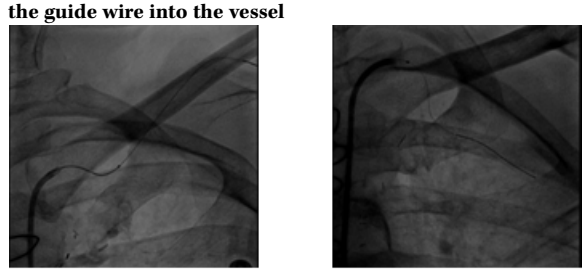


Figure 7 :Through the microcathter a 2cm x 2 mm Hilal microcook pushable occluder coil (Cook) was deployed using the backend(hard end) of a 0.018 " x 260 cms terumo wire in the first left lateral thoracic artery

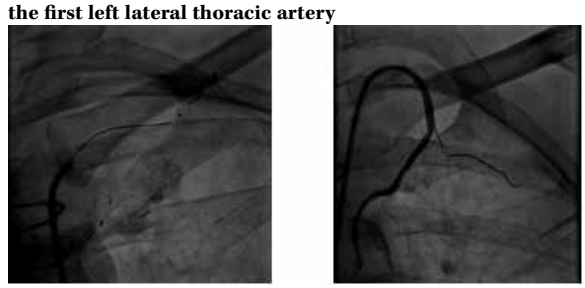


Figure 8 :Check shoot after few minutes showed showed total occlusion of left first lateral thoracic artery in one patient whereas in the other partial occlusion was seen . Patient tolerated the procedure well without any complications.

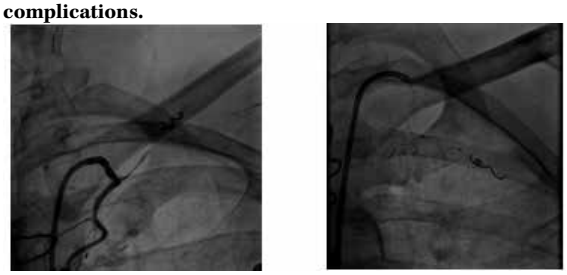


Figure 9 :Through the microcatheter another 2cm x 2 mm Hilal microcook pushable occluder coil (Cook) was deployed using the backend(hard end) of a 0.035 " x 260 cms terumo wire in the first left lateral thoracic artery

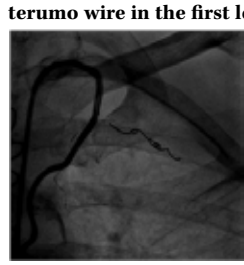


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Figure 10 :Check shoot after few minutes showed showed total occlusion of left first lateral thoracic artery. Patient tolerated the procedure well without any complications

DISCUSSION

The use of the left internal mammary artery (LIMA) as a conduit to the anterior descending artery is recommended by the American College of Cardiology/American Heart Association as a coronary bypass graft1. because of enhanced long-term survival with a well-documented long-term patency rate.2 The LIMA is rarely the source of atherosclerotic disease: however, there is a risk of ischemia of the myocardium supplied by the LIMA, if there is hemodynamically significant stenosis of the left subclavian artery, causing reversal of blood flow through the LIMA. This phenomenon is known as the coronary-subclavian steal syndrome (CSSS) and its incidence after coronary artery bypass grafting (CABG) is about 0.44%[3,4].

Coronary subclavian steal syndrome (CSSS) is a rare but well known risk entity after coronary surgery caused by retrograde blood flow through the internal mammary artery graft. The internal mammary (internal thoracic) artery originates from the subclavian artery, and blood flow is dependent on inflow by the vessels in the aortic arch. Stenosis or occlusion of the subclavian artery may cause insufficient or retrograde blood flow in the mammary artery graft with steal phenomenon in the coronary bed.

Coronary steal syndrome has been documanted for the subclavian artery . The literature does not mention about the coronary steal which may arise from the presence of a large branch of the LIMA .

We document post CABG patients who presented with cardiac symptoms and the etiology was found to be a large internal thoracic artery (ITA) arsing from the LIMA .

Our decision to coil the branch was driven by the intent of restoration of the coronary blood flow to the bypass vessel . The reduction of steal subsequently observed, seems to derive from an important reduction in the diverison of blood into the branch vessel , leading to a crucial increase in coronary reserve. The occlusion of these artery resulted in improvement of the symptoms.

CONCLUSION :

This innovative approach and technique may be used as a possible alternative strategy in patients with ITA steal due to a large branch and its occlusion may lead to improvement of cardiac symptoms.

REFERENCE

1.Guidelines and indications for coronary artery bypass graft surgery. A report of the American College of Cardiology/ | American Heart Association Task Force on Assessment of Diagnostic and Therapeutic Cardiovascular Procedures (Subcommittee on Coronary Bypass Graft Surgery). J Am Coll Cardiol 1991; 17: 543-589. | 2. Cameron AA, Green GE, Brogno DA, et al: Internal thoracic artery grafts. J Am Coll Cardiol 1995; 25:188-192. | 3. Mihalis argiriou1, vassilios fillias1, et al Surgical Treatment of Coronary Subclavian Steal Syndrome. Hellenic J Cardiol 48: 236-239, 2007 | 4. A. C. Rossum, S. R. Steel, and M. F.Hartshorne, "Evaluation of coronary subclavian steal syndrome using sestamibi imaging | and duplex scanning with observed vertebral subclavian steal," Clinical Cardiology, vol. 23, no. 3, pp. 226–229, 2000. |