CASE REPORT

CAROTICO SUBCLAVIAN BYPASS IN CORONARY SUBCLAVIAN STEAL SYNDROME: A CASE REPORT

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ABSTRACT

Subclavian steal syndrome is known as reverse flow from vertebral artery to subclavian artery due to occlusion of proximal subclavian artery. Occlusive process leading to syndrome is common in left subclavian artery. Coronary-subclavian steal syndrome may happen by reverse flow in left internal thoracic artery with occlusion in subclavian artery of patients who were performed coronary artery bypass grafting surgery using left internal thoracic artery. Subclavian steal syndrome may occur during coronary artery bypass grafting surgery or postoperatively with progression of lesion. We want to represent a cases who has carotico-subclavian steal syndrome of which one was detected before and the other one was detected after the coronary artery bypass grafting (CABG) surgery.

Key-Words: Subclavian; Steal; Coronary Heart Disease; Carotico-Subclavian Bypass

Introduction

Subclavian Steal Syndrome (SSS) which is the reverse flow from vertebral artery to subclavian artery was first described in 1977 with an incidence of 0.44%.[1] Reversal flow begins when poststenotic intraluminally pressure was below the basillary artery pressure.[2] The most common cause of left subclavian artery stenosis is atherosclerotic disease.[3] Left subclavian artery affected 3 times more than right subclavian artery or innominate artery because of atherosclerotic disease.[4] Occlusive process is localized in left subclavian artery with 72-72% and in right subclavian artery with 10-12%. Similarly, there may be seen a reversal flow in cases of coronary artery bypass grafting surgery when subclavian artery have occlusion and when left internal mammary artery (LIMA) is used as graft for coronary revascularisation.[5] This event, which impaired LIMA blood flow may lead to myocardial ischemia and angina pectoris is called as SSS.[5] We present the case of a patient causing coronary-SSS due to occlusive disease of the proximal right subclavian artery, which were applied carotico subclavian bypass surgery.

Case Report

A 62 years-old male patient was admitted to our hospital with intermittent chest pain and dizziness with exercise beginning for about three month. Laboratory tests showed normal cardiac enzymes and normal blood cell count. Echocardiography showed anterolateral and apical dyskinesia. First of all, coronary angiography was planned. He had been performed coronary bypass grafting (CABG) including LIMA- to the left anterior descending artery (LAD) artery and Aorta- the obtuse marginal three years ago. He was suffering chest pain and dizziness occurring with exercise. The control coronary angiography revealed that left subclavian artery were filled over LAD-LIMA (figure 1).

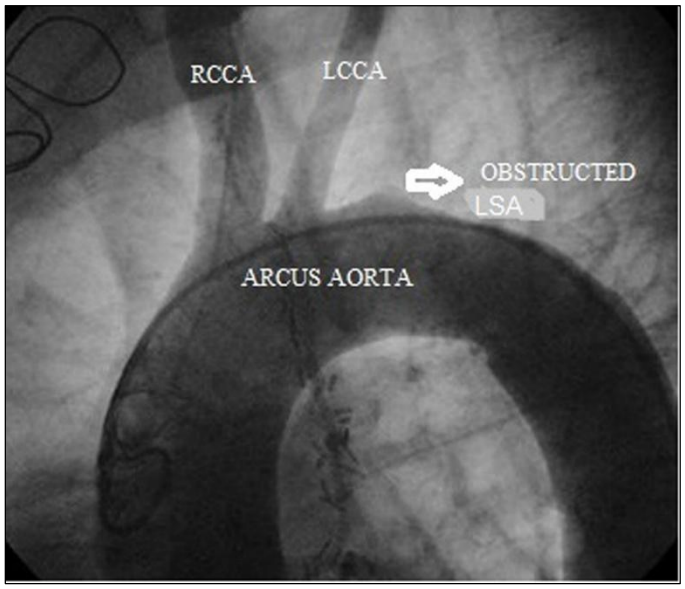

Figure-1: Aortography is showing proximal subclavian occlusion [RCCA: Right Common Carotid Artery, LCCA: Left Common Carotid Artery, LSA: Left Subclavian Artery]

The previous vein bypass graft to the obtuse marginal was patent. Aortography demonstrated that the left subclavian artery totally occluded at the proximal (figure 2). However, bilateral carotid arteries were patent. Carotico-subclavian bypass grafting was planned with diagnosis of coronary

subclavian steal syndrome. Carotid arteries was evaluated as normal in coloured Doppler ultrasonography. Carotico subclavian bypass grafting surgery was performed with 8 mm ringed polytetrafloroetilene (PTFE) graft between left subclavian artery and left common carotid artery after left subclavian incision under general anaesthesia (figure 3). Carotid shunt was not used, following clamping carotid artery and finding stoma pressure as 60 mmHg.

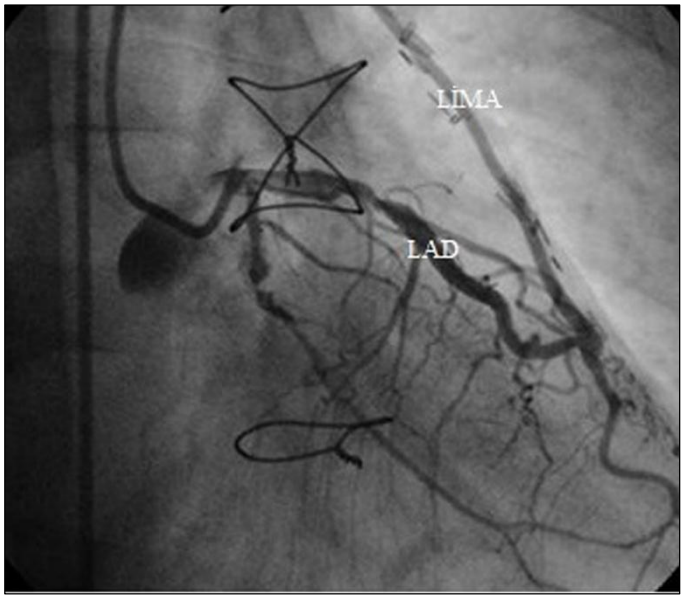

Figure-2: Coronary angiography in caudal oblique projection [The LIMA is inserted into mid-LAD and fills retrograde on injection of native Left Main Carotid Artery. LİMA: Left İnternal Carotid Artery, LAD: Left Anterior Descending Artery]

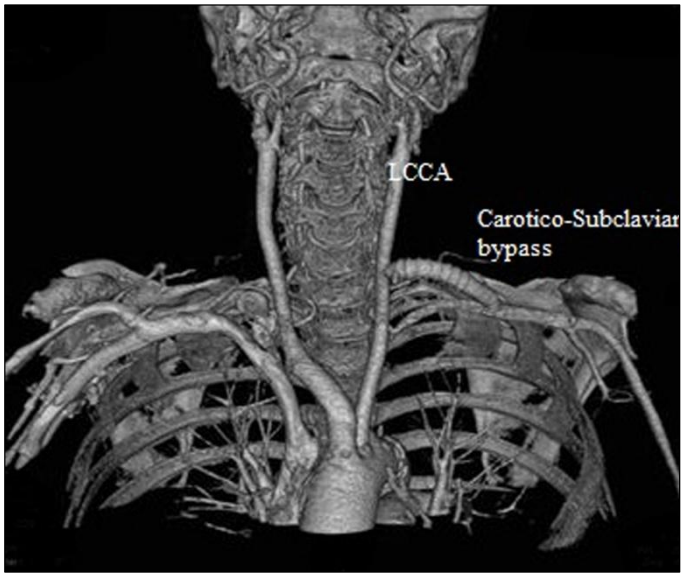

Figure-3: Carotico-Subclavian bypass with polytetrafluoro-ethylene graft [LCCA: Left common Carotid Artery]

Discussion

Atherosclerosis is the most common cause of subclavian steal syndrome.[3] The next common causes are Takayasu arteritis and radiation arteritis. Subclavian artery narrowing, which leads to subclavian artery syndrome, may occur during CABG surgery or years after due to the progression of atherosclerotic disease in subclavian artery.[6] Vertebrobasillary insufficiency, tension arterial pressure difference between two arms, decrease in pulsation of radial and brachial artery and claudication intermittent in related arm are clinical findings of subclavian steal syndrome. Coronary ischemia may be added to clinical findings if coronary artery bypass grafting surgery was performed and LIMA graft was used. Frequency of subclavian steal syndrome in patients who were undergone coronary artery bypass grafting is reported as 0.5 % to 1%.[7] Our patient were operated three years ago in our hospital. At the beginning of the left subclavian artery were totally occluded because of atherosclerotic disease.

LIMA usage is almost standard in coronary artery bypass grafting surgery. Myocardial ischemia findings due to subclavian artery narrowing or occlusions may be encountered in follow-up controls of coronary artery bypass grafting surgery. Reflux to upper extremity and cerebral circulation by internal thoracic artery from myocardium is called coronary subclavian artery steal syndrome. Finally, chest pain and burning symptoms emerge which points coronary ischemia.[8] Our patient's symptoms including chest pain and burning were occur about three month ago. We think that subclavian artery occlusion should keep in mind in every patient who is planned to operate for CABG surgery. Therefore, during routine medical examination before coronary artery bypass grafting surgery, if there is difference over 20 mmHg between two arms, it is defined as subclavian artery narrowing and subclavian artery angiography is performed.[9] In our clinic, we detect carotid artery lesions and vertebral reverse flow subclavian steal syndrome with carotid artery coloured Doppler ultrasonography, in every patients before CABG surgery.

Treatments of subclavian artery syndrome are balloon angioplasty and surgery.[10] Surgery has to be chosen intervention in cases of previous failure of balloon dilatation or aneurismatic dilatation in subclavian artery or if there is risk of damage to the LIMA ostium in cases who were undergone CABG surgery before. Technique to be chosen in subclavian steal syndrome due to narrowing of subclavian artery and coronary artery steal syndrome, alters depending on patients' condition and surgeon's choice. In a study of Mataracı et al.[11], most surgery being performed was extraanatomic bypass graft operations. They reported it as a practical surgery technique that is which carotid arteries need not to be readied or that is

decreasing the risk of neurologic damage in subclavian-subclavian bypass grafting surgery in patients with systemic atherosclerosis. By developing strategies with patient's age, localisation of narrowing in subclavian artery, additional lesion, disease or surgery in subclavian artery narrowing, a successful repair may be accomplished. After three years from our CABG surgery, a subclavian narrowing developed in our case.

Conclusion

İn conclusion, Even though it is said that a murmur in carotid artery could be heard in routine medical examination before surgery, it could not be heard in every case. We think it is essential to perform carotid artery coloured Doppler ultrasonography before CABG surgery.

References

1. Tyras DH, Barner HB. Coronary-subclavian steal. Arch Surg. 1977;112(9):1125–7.
2. Biçerol B, Köseoğlu K, Özkul A, Kıylıoğlu N. Subclavian steal syndrome: a case report. Journal of Adnan Menderes University School of Medicine. 2005;6:31-33.
3. Zimmerman NB. Occlusive vascular disease of the upper extremities. Hand Clin. 1993;9(1):139–50.
4. Contorni L. The vertebro-vertebral collateral circulation in obliteration of the subclavian artery at its origin. Minerva Chir. 1960;15:268-71.
5. Yücel SM, Doyurgan O, Karamustafa H, Göl MK. Coronary-Subclavian Artery Steal Syndrome After Coronary Artery Bypass Grafting: A Case Report of Inadvertent Deficient Preoperative Evaluation. Turkiye Klinikleri J Cardiovasc Sci. 2008;20(3):210-3.
6. Takach TJ, Reul GJ, Cooley DA, et al. Myocardial thievery: The Coronary-subclavian steal syndrome. Ann Thorac Surg. 2006;81:386-92.
7. Feit A, Reddy CV, Cowley C, et al. İbrahim B, Zisbrod Z. Internal mammary artery angiography should be routine component of diagnostic coronary angiography. Cathet Cardiovasc Diag. 1992;25:85-90.
8. 8. Gürer O, Yapıcı F, Çınar B, Kösem M, Enç Y, Sezerman Ö. Mid-Term results of subclavian steal syndromes operated by carotico-axillary/subclavian bypass grafts. Turkish J Thorac Cardiovasc Surg. 2002;10:106-109.
9. 9. Margues KMJ, Ernst SMPG, Mast Eg, et al. Percutaneous transluminal angioplasty of the left subclavian artery to prevent or treat the coronary-subclavian steal syndrome Am J Cardiol. 1996;78:687-8.
10. Maher M, Jellappallil G, Robert DS, et al. Unstable coronary ischemic syndromes caused by coronary subclavian steal. Am Heart J. 1995;131:374-8.
11. Mataracı İ, Fedakar A, Şaşmazel A, et al.Surgical Approaches and Results in Subclavian Artery Stenozis. Turkish Journal of Vascular Surgery. 2008;17(2):54-60.

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