Successful Percutaneous Intervention for Ostial Stenosis of Left Internal Mammary Arterial Graft

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The left internal mammary artery (LIMA) is the commonly preferred graft for bypass surgery and is especially anastomosed to left anterior descending artery. Stenosis of this graft frequently develops in the distal anastomosis site or within the distal native vessel after surgery. Stenosis of LIMA graft rarely develops in ostial site and its pathophysiology still remains unclear. Percutaneous stenting cure of ostial lesions has been rarely reported in literature. We believe that such percutaneous tranluminal stenting is appropriate for ostial lesions of LIMA graft.

Key words: Percutaneous Transluminal Angioplasty, Coronary Artery Bypass, Stents

Sol İnternal Mammarian Arter Ostial Darlığına Başarılı Perkutan Girişim

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Sol İnternal Mammarian Arter (LIMA) baypas cerrahisinde genelde tercih edilen grefttir ve özellikle sol ön inen artere anastomoz edilir. Bu greftin operasyon sonrası daralması genelde distal anatomoz bölgesinde veya distal nativ damarda meydana gelir. LIMA greftinde nadiren ostial bölgede daralma gelişir ve bu durumun patofizyolojisi halen net değildir. LIMA ostial lezyonunun perkutan stentleme ile tedavisi literatürde nadir olarak bildirilmiştir. Belirttiğimiz yöntemle LIMA greftinin ostial darlığının stent ile tedavisinin bu durum için en uygun tedavi yöntemi olduğunu düşünmekteyiz.

Anahtar Kelimeler: Perkutan Transluminal Anjioplasti, Koroner Arter Baypas, Stent

INTRODUCTION

LIMA is the preferred graft for bypass surgery and it is generally anastomosed to left anterior descending artery (LAD). LIMA grafts usually have long term patency (1). Stenosis of this graft develops frequently in distal anastomosis site or within the distal native vessel (2-3). Ostial stenosis of LIMA grafts is extremely rare. Percutaneous stenting of ostial LIMA lesions has been rarely reported in literature (4-5).

Case Presentation

A 80-year-old female patient was admitted to our clinic with the diagnosis of non-ST elevation myocardial infarction. She had a history of coronary artery bypass graft surgery 13 years ago. Two saphenous vein grafts (SVG) were anastomosed to circumflex artery (LCX) and right coronary artery (RCA) and LIMA graft was anastomosed to LAD. On admission, her blood pressure was 130/85 mmHg and pulse rate was 100/min. Electrocardiogram showed atrial fibrillation, ST depression and T wave inversions in precordial (V4-V6) and extremity derivations (DI-aVL, D III and aVF). There was a mild increase in cardiac enzyme levels. Transthoracic echocardiography revealed that ejection fraction was 35% and anterior wall, septum mid and apical segments were akinetic. On the next day, coronary angiography was performed and revealed severe stenosis in distal left main coronary artery, in ostial intermediate artery (IM), in ostial LCX and total oclusion of ostial LAD. There was also severe stenosis in RCA ostium. Sinus branch was well devoloped and severe stenosis of sinus branch was also observed. LCX and RCA- SVG anostomos were patent. Critical stenosis in ostium of LIMA graft was revealed. We decided to perform percutaneous coronary intervention to culprit lesions which were ostial stenosis of LIMA graft and ostial IM artery.

Our approach was through the right femoral artery. A 6F Judkins right coronary guiding catheter was advanced to the aortic arch and into the left subclavian artery. A 0.014 inch Soft J guide wire was placed in LIMA. A distal protection device was not required due to absence of thrombotic material at the site of lesion. We implanted a 3.0 x 15 mm zotarolimus-eluting coronary stent into the ostium of LIMA at 16 atmospheres (Figure 1). Final injection of LIMA showed TIMI grade III blood flow. Following successful intervention of LIMA, a 6F Judkins left coronary guiding catheter was advanced to left main coronary artery. A 0.014 inch Soft J guide wire was placed into IM artery. We performed angioplasty of distal left main artery and ostial IM artery with a 2.0 x 20 mm Hopor balloon at 14 atmospheres. Afterwards, we implanted a sirolimus-eluting coronary stent at 16 atmospheres which had a size of 2.5 x 22 mm in order to cover both distal left main and ostial IM artery (Figure 2). Final injection of left coronary system showed TIMI grade III blood flow.

DISCUSSION

LIMA grafts have high patency rates (6). Most stenosis of LIMA grafts are located at distal anostomosis site or within the distal native vessel. Ostial stenosis of LIMA grafts is very rare (3-5), and its pathophysiology remains unclear. Different mechanisms have been suggested such as atherosclerosis subsequent to severe subclavian artery disease (7), trauma of the ostium due to prior angiography and damage of the ostium during bypass surgery (8).

Different treatment strategies can be used for treatment of stenosis in bypass grafts. These include percutaneous balloon angioplasty, percutaneous stenting and redo-bypass surgery. Angiographic evidence of recoil after balloon angioplasty was demonstrated in LIMA grafts. A histologic study showed that the vessel wall of IMA has an elastic component (9). Therefore, balloon angioplasty alone may not be sufficient enough for long term patency of the vessel. Redo-bypass surgery obviously has high mortality and morbitide rates (10-11). However, percutaneous stenting of ostial stenosis of LIMA grafts has been rarely reported in literature.

Femoral artery is traditionally preferred vascular access for percutaneous coronary interventions due to providing successful cannulations of coronary arteries and LIMA (12). Therefore we preferred femoral approach for LIMA intervention and subsequent coronary intervention. Angioplasty and stenting of distal anastomotic lesions provides adequate results in LIMA grafts however, there is not sufficient data about the angioplasty and stenting of ostial lesions in LIMA grafts (13-15). In addition, there is not enough published data in literature on the use of drug eluting stents in ostial lesions of LIMA. In literature, only one report has been published in which a drug-eluting stent has been implanted in LİMA ostial lesion (16). In our case, drug-eluting stent was succesfully implanted in ostial part of LIMA graft. Our patient was discharged from hospital 24 hours after stent implantation and she is currently under follow up in our outpatient clinic.

We suggest that such percutaneous drug-eluting stent treatment of LIMA grafts via femoral approach is the most appropriate treatment strategy for revascularization of severe ostial lesions of LIMA grafts.

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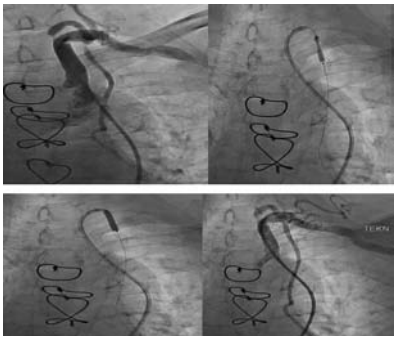

Figure 1. Successful intervention of left internal mammary artery

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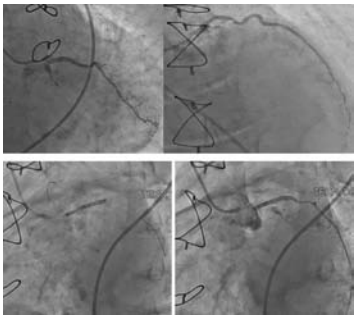

Figure 2. Succesful interventions of distal left main artery and ostial intermediate artery