



## A Case Report of a Combined Bypass Surgery on Coronary Artery and Right Common Femoral Artery of the Aorta

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### Abstract

Peripheral vascular operations carry high risks for myocardial infarction. In cases with severe coronary artery disease and peripheric vascular disease, combined interventions might have positive effects on patient's recovery without increasing mortality or morbidity. A 67 years old male patient came to our outpatient clinic with rest pain complaint in the right extremity. The examinations showed that his right common iliac artery was occluded and there was severe stenosis on the left anterior descending artery and the right posterior descending coronary artery. We performed a coronary artery bypass surgery with cardiopulmonary bypass. In addition, we simultaneously performed an extra-anatomic ascending aorta-right common femoral artery bypass with a 8 mm knitted polytetrafluoroethylene graft. At length, the patient was discharged without any problems following the recovery period.

**Key Words:** Peripheral Vascular Diseases; Coronary Artery Bypass; Arteriosclerosis.

### Eş Zamanlı Koroner Arter Bypass Ve Asendan Aorta Sağ Femoral Arter Bypass Operasyonu Olgu Sunumu

### Özet

Periferik vasküler operasyonlar, miyokard infarktüsü açısından yüksek risk taşımaktadır. Ciddi koroner arter hastalığı ve periferik vasküler sorunların aynı anda olduğu durumlarda mortalite ve morbiditeyi artırmayacak kombine girişimlerin hasta iyileşmesine olumlu etkileri olabilir. Altmış yedi yaşında erkek hasta, sağ alt ekstremitede istirahat ağrısı şikayeti ile polikliniğimize başvurdu. Yapılan tetkiklerinde sağ ana iliak arterin tam tıkalı olduğu, sol ön inen ve arka inen koroner arterlerinde ciddi darlık bulunduğu saptandı. Kardiyopulmoner bypass yardımı ile koroner bypass operasyonu yapıldı. Aynı seansta 8 mm politetrafloroetilen ringli greft kullanılarak asendan aort ile sağ ana femoral arter arasında ekstra-anatomik bypass operasyonu yapıldı. Hasta sorunsuz iyileşme dönemi ardından taburcu edildi.

**Anahtar Kelimeler:** Periferik Vasküler Hastalıklar; Koroner Arter Bypass; Arterioskleroz.

## INTRODUCTION

Peripheral vascular operations carry high risks for myocardial infarction. Therefore, in cases when vascular problems do not require immediate treatment, patients should undergo cardiac evaluation prior to intervention (1). Upon determining severe coronary artery disease, the priority is given to cardiac pathologies rather than treatment of vascular issues (2).

However, cases that require urgent cardiac and vascular interventions are carried out by taking high risks into account throughout operations. If, however, severe coronary artery diseases and peripheral vascular urgent problems surface at the same time, combined interventions that may decrease mortality and morbidity can have positive effects on the recovery process. In this article, we aim to present the case of a patient who had applied to our clinic with ischemic rest pain in his right lower extremity that lead to the diagnosis of severe coronary artery disease. Our study also intends to demonstrate the details of the combined bypass surgery on aortic coronary artery and right common femoral

artery of the aorta (by using an 8 mm polytetrafluoroethylene (PTFE) ringed graft).

## CASE REPORT

A sixty-seven-year old male patient was admitted to the outpatient clinic with rest pain in his right calf. Type 2 diabetes mellitus (DM), hypertension, and smoking 20 cigarettes (1 pack) a day for 40 years were the notable details in his medical history. The patient had also undergone a cross femoral bypass surgery from his left femoral artery to the right femoral artery in another center around two years ago due to a sudden rest pain in the right leg. In the physical examination, although we were able to determine the femoral and popliteal arterial pulses in the left lower extremity, we were unable to observe distal arterial pulses. In the right lower extremity, the femoral, popliteal or distal arterial pulses were not present. There was no temperature difference between the extremities. No sensory and motor deficiency has developed in the ischemic limb either. The right and left ankle brachial index values (ABI) were 0.4 and 0.8, respectively. Multislice computed tomography angiography of the lower extremity showed

that the cross-femoral bypass graft was occluded. The angiography also displayed that the right common iliac artery and external iliac artery were obstructed along their length. The right femoral artery and its distal was well-filled with collateral structures. The lesions were not suitable for angioplasty. Meanwhile we found a sound femoro-popliteal artery segment and iliac arteries though there were critical stenoses in the trifurcation artery. Thinking that repeating cross-femoral bypass may cause steal phenomenon, we did not consider this option. We got the ischemic rest pain under control with heparin and dextran infusion, and narcotic analgesics.

Our initial plan was to do an abdominal aorta-right common femoral artery bypass. But considering the fact that the patient had a history of typical rest angina twice in the last month along with the ischemic ST-T changes observed on the electrocardiogram, we assessed the case to be risky for coronary angiography and cardiac issues. We noticed critical stenosis in the proximal left anterior descending artery (LAD) and right coronary artery distal (at the beginning of the posterior of the descending coronary artery on the right; PDA).

Considering the high cardiac risk of an individual peripheral intervention to the patient with ischemic rest pain and a probable need for a vascular intervention before healing process is complete in case of coronary bypass surgery alone, we decided to perform a combined coronary and peripheral surgery. Having informed the patient about the risks, we got the patient's consent for the operation.

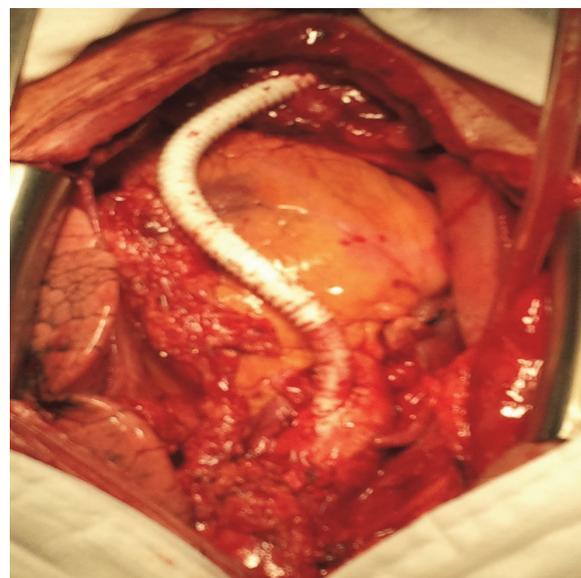
#### -Surgical technique

First, we performed median sternotomy under general anaesthesia. We administered saphenous vein graft through the right leg and the left internal mammary artery (LIMA). Then we placed the aortic caval cannulas, antegrade, and retrograde cardioplegia cannulas. We started the cardiopulmonary bypass and the patient was cooled. Following the cooling, we placed a cross clamp on the aorta while protecting myocardial antegrade and retrograde by cold blood cardioplegia. Proximal and distal anastomoses of coronary artery bypass (LIMA-LAD, Ao-PDA) were performed under mild hypothermia at 32°C. The proximal of the 8mm-ringed PTFE graft that would be used in anastomosis for the right common femoral artery was anastomosed with a 5.0 polypropylene to the ascending aorta during the cross-clamping (Figure 1). Then we removed the cross-clamp and separated the patient from cardiopulmonary bypass uneventfully. PTFE graft remained on the anterior of the heart along the mediastinum. After passing beneath the xiphoid, the graft was pushed in down to the level of umbilicus between the anterior abdominal wall and rectus sheath (Figure 2).

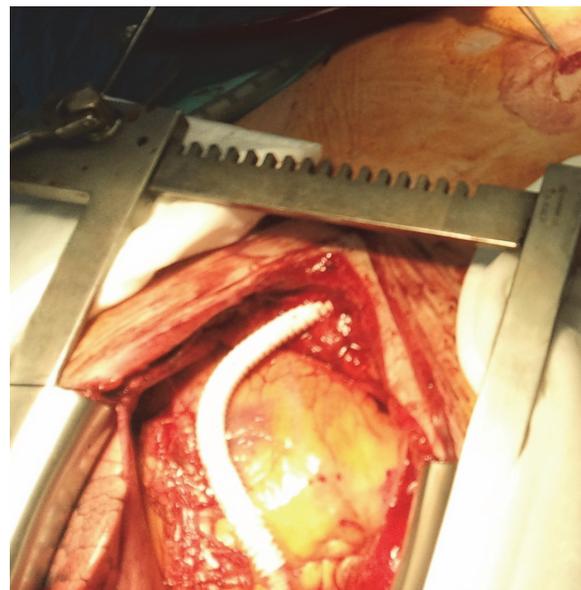
At this level, the graft was brought to the inguinal region through a more superficial tunnel using femoral incision. Then we opened the old synthetic PTFE graft that was previously placed in the right femoral region and the

new graft was anastomosed with a 5.0 polypropylene to the right common femoral artery (Figure 3).

At this point, the old PTFE graft was ligated. In the early postoperative period, the right lower extremity arterial pulses of the patient were palpable. After following the patient in the intensive care unit for a day, we sent the patient to the service. Free of any complaints during his stay in the hospital, the patient was discharged on the postoperative sixth day.



**Figure 1.** The proximal anastomosis of the ascending aorta-right common femoral artery bypass



**Figure 2.** Passing the synthetic graft beneath the xiphoid during the ascending aorta-right common femoral artery bypass.



**Figure 3.** The distal anastomosis of the ascending aorta-right common femoral artery bypass

## DISCUSSION

As a major risk factor for cardiovascular mortality, DM is known to increase risk of death 2-4 times more compared to patients without the disease. In such patients, 70-80% of DM-related deaths are due to cardiovascular diseases (3). Our patient had Type 2 diabetes along with peripheral arterial disease and coronary artery disease. However, in our case, we regulated blood sugar with medical treatment.

In peripheral vascular surgery, the most common cause of early and late mortality is the presence of coronary artery disease (4). Therefore, precautions against postoperative myocardial infarction must be taken while treating peripheral arterial disease. In case there is severe coronary artery disease, this issue should be treated first (2,5). However, in cases with severe coronary artery diseases accompanied by peripheral artery diseases that require urgent intervention, combined surgery can be considered (6).

The major disadvantage of combined intervention is the burden the two separate procedures cause to the patient. However, applying procedures that do not result in additional increase in mortality and morbidity may provide a more rapid recovery. In our case, assuming that they would increase invasiveness of the combined surgery through a possible abdominal incision, we avoided applying attempts like aorta-femoral bypass or ilio-femoral bypass, both of which use abdominal aorta or iliac artery as a source of inflow. More to the point, we also did not prefer one sided axillo-femoral bypass that uses axillary artery as a source of inflow due to its low patency. The technique we used does not result in a significant increase in risks in bypass surgery. Using the ascending aorta as a source of inflow actually eliminates the need for intra-abdominal surgeries. In this way, the revascularisation of the extremity is carried out only by adding femoral incision to the incisions made for coronary bypass surgery that is already taking place as a part of the process. Another

asset of the technique is the total operation and anesthesia time, both of which remain within rather acceptable limits. For the time being, it is difficult to talk about an adequate amount of reliable data about the medium-to-long-term patency of this technique or whether the technique increases infection rates because there are not many long series of ascending aorta-femoral bypass procedures that use ascending aorta as the source of inflow as far as combined surgeries of coronary bypass and femoral bypass are concerned. However, the data in the literature are encouraging (7). Nevertheless, we adopted this combined method believing that it would respond to the needs of the patient without increasing the risk of neither morbidity nor mortality. Indeed, we did not observe any infection during the follow-up while also the patient's complaints were improved. The check-up 18 months after the discharge showed that the graft was still open and there was pulse in the right lower extremity. Besides the patient did not suffer from any cardiac issues.

The best graft, also known as coronary artery bypass graft, is internal thoracic artery. However it is unsuitable for use as a bypass graft in aorta-iliac obstructions due to the fact that it provides the extremities on the side of the congestion with vital collaterals. One of the advantages of this combined method is that it enables the use of internal thoracic artery as a graft thanks to the revascularisation it brings about (7). The most important drawback of the method, however, is the difficulties the extra anatomic PTFE graft may cause during a possible redo coronary bypass surgery or laparotomy. The surgery team should be warned about the procedures prior to such interventions.

As a result, we believe that the techniques described above should be kept in mind as a surgical option in patients with coronary artery diseases in addition to peripheral arterial diseases and in cases where a second coronary artery bypass seems impossible.

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