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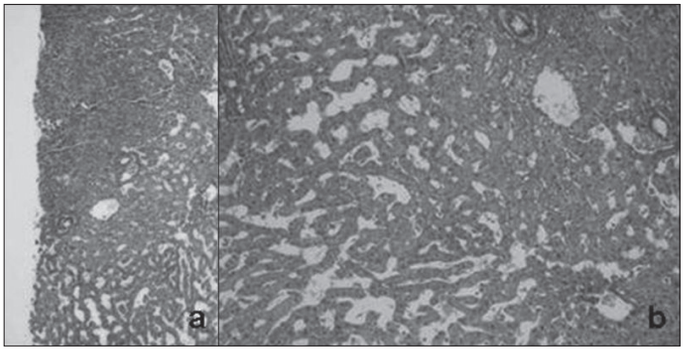

Figure 5. Dilatations of sinusoids around the central veins (Trichrome stain, a. x40 and b. x100)

Conclusion

This is a rare case of BCS that showed clinical features of HPS before clinical findings of liver dysfunction. Because of her deep cyanosis due to HPS, differential diagnosis with cyanotic congenital heart diseases, Eisenmenger syndrome and pulmonary hypertension was required.

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Late onset LIMA first branch steal syndrome after coronary artery bypass surgery

Koroner arter baypas cerrahisi sonrası geç ortaya çıkan LIMA ilk dal çalma sendromu

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Introduction

Left internal mammarian artery (LIMA) use for left anterior descending artery (LAD) in coronary artery bypass surgery (CABG) has been accepted as the first choice of graft due to its long term high patency rate (1). Histologically, the artery has a strong elastic membrane, which helps the vessel resist the atherosclerotic process (2). On the other hand, postoperative angina is not always related to arteriosclerotic coronary stenosis. Occasionally, an untied LIMA branch may redirect the blood flow toward the thoracic wall and can cause angina pectoris (3).

In this report, we present a patient who presented with late onset of angina pectoris related to the untied first branch of LIMA after CABG operation. The patient was operated using a minimally invasive technique.

Case report

A 71-year-old-male was admitted to our clinic with new onset of effort related angina pectoris. The patient had known hypertension, hyperlipidemia and coronary artery disease with a two-vessel coronary artery bypass surgery done (LIMA to left anterior descending artery (LAD), saphenous vein graft (SVG) to the second marginal branch (OM2)) 2 years ago. Reversible ST segment elevation in the anterior precordial leads was detected on exercise treadmill test electrocardiogram (ECG). The ejection fraction was 55% with no wall motion abnormalities noted. On control coronary angiography, new coronary artery lesions were not observed and LIMA-LAD, SVG-OM2 grafts were seen to be patent.

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However, LIMA had a narrow-sized lumen and an untied, well-developed first intercostal branch (Fig. 1). A reverse flow in LIMA was detected. This untied LIMA branch was suspected of causing coronary steal syndrome and was held responsible for the angina pectoris. During the angiography, attempts were taken to occlude this side branch, but the catheter could not be inserted into the vessel. The patient underwent operation. Under general anesthesia, a 6 cm long supraclavicular incision was performed. Subclavian artery was reached through this incision and LIMA, along with the first intercostal branch, was detected. The branch was temporarily clamped. Under conventional angiography, performed at the time of operation in the operation room, it was observed that the reverse flow in the LIMA disappeared. LIMA diameter increased in size with respect to the size seen in the previous angiography prior surgery. Therefore, LIMA branch was ligated with a hemoclip (Fig. 2). The postoperative period was uneventful. The angina pectoris disappeared and the patient was discharged home on postoperative 3rd day. No symptoms were observed at the 6th month follow-up.

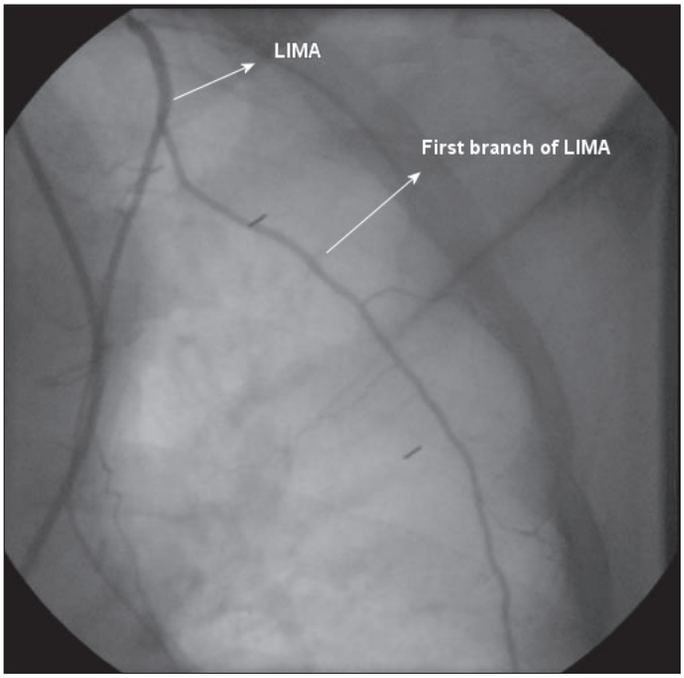

Figure 1. Angiographic view showing LIMA and the first branch
LIMA - left internal mammarian artery

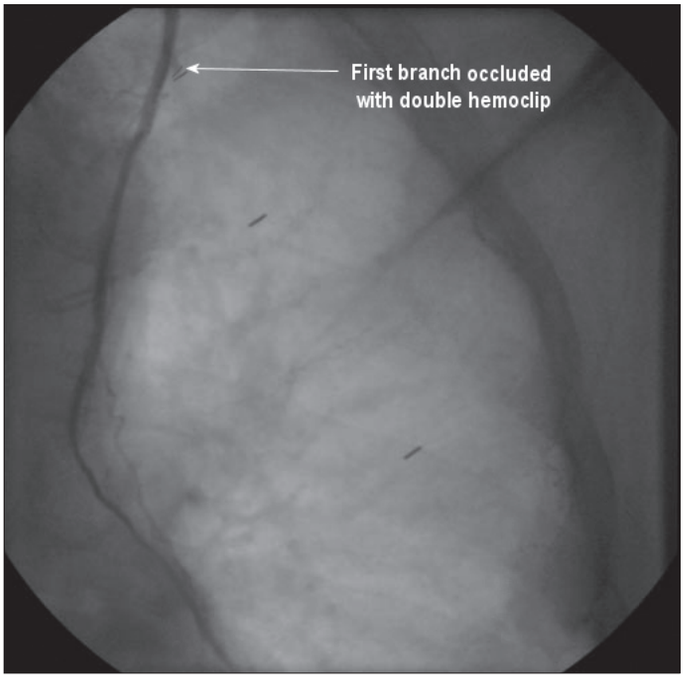

Figure 2. Angiographic view of the first branch-hemoclipped

Discussion

LIMA is widely accepted as the gold standard graft for revascularization of the LAD. Nevertheless, there have been ongoing debates on the existence of first branch steal syndrome where some authors claim that the untied side branches of LIMA may cause steal syndrome whereas some others disagree (3-6).

Use of minimally invasive methods in CABG procedures has gained popularity in the recent years. The likely obstacles of this method involve the technical difficulties in reaching the proximally located branches and leaving them unoccluded. The reported rate of patent LIMA first branch after CABG is 10-20% (7). The blood flow pattern in LIMA-LAD graft is primarily determined by the coronary artery resistance and the systemic blood pressure. Particularly in patients whom advanced coronary artery resistance leads to slow flow pattern in LAD, the LIMA branches that are left untied may cause coronary steal syndrome. In addition, vasodilatation in the run-off of these untied branches may induce the steal phenomenon as well (7).

In our case, we could not detect any coronary occlusion in the angiography, but we determined reverse flow in LIMA. The clinical and the angiographical findings made us suspicious of steal syndrome. After surgical occlusion of the branch, the reverse flow pattern disappeared angiographically; in the early postoperative period the ECG changes and symptoms abandoned, hence approved our diagnosis. We do not perform myocardial single photon emission computed tomography (SPECT). This may be accepted as a limitation. On other hand, there is no perfect test in medicine, including myocardial SPECT, to achieve differential diagnosis between steal syndrome and other possible causes.

When occlusion of a branch that causes steal syndrome cannot be achieved with angiographic intervention, surgical approach should be the choice of treatment. However, in a patient with history of previous CABG with median sternotomy, second operation via sternotomy may lead to many complications and may increase morbidity. On these occasions, supraclavicular approach, which is less invasive and technically easier than sternotomy may be preferred. The nerves (vagal nerve and phrenic nerve), thoracic duct or LIMA itself may damage during surgery via supraclavicular approach, but with meticulous dissection, these complications can be avoided.

Conclusion

Although there is no consensus on the description and the possible effects of the steal syndrome, we believe that the surgeon should keep this syndrome in mind and ligate all the side branches while harvesting the LIMA.

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