

Coronary-subclavian steal syndrome after CABG treated by stent implantation into the left subclavian artery: should coronary angiography routinely show the left internal thoracic artery?



Zespół podkradania wieńcowo-podbojczykowego po CABG leczony implantacją stentu do lewej tętnicy podobojczykowej – czy angiografia wieńcowa powinna rutynowo uwidaczniać lewą tętnicę piersiową wewnętrzną?

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Abstract

The use of the left internal thoracic artery (LITA) has been a golden standard in surgical revascularization of myocardium. Analyzing a case of a 52-year-old woman operated non-electively due to the left main stem stenosis with undiagnosed stenosis of the left subclavian artery, the authors try to answer the question if LITA should be routinely shown on coronary angiography. Due to the worsening clinical state after coronary artery by-pass grafting (CABG), the patient was taken back to the cath lab for the re-do angiography. It revealed a critical stenosis of the left subclavian artery, which was managed by stent implantation. This treatment brought relief from angina and neurological signs.

Key words: coronary-artery bypass surgery, LITA, coronary-subclavian steal syndrome.

Streszczenie

Stosowanie lewej tętnicy piersiowej wewnętrznej (LITA) jest „złotym standardem” w chirurgicznej rewaskularyzacji mięśnia sercowego. Analizując przypadek 52-letniej kobiety operowanej w trybie pilnym (ang. *non-electively*) z powodu zwężenia pnia głównego lewej tętnicy wieńcowej z niezdiagnozowanym zwężeniem lewej tętnicy podobojczykowej, autorzy próbują odpowiedzieć na pytanie, czy LITA powinna być rutynowo uwidaczniana podczas angiografii wieńcowej. Z powodu pogorszenia stanu klinicznego po wykonaniu pomostowania aortalno-wieńcowego (CABG), pacjentka została z powrotem przeniesiona do pracowni cewnikowania w celu wykonania powtórnej angiografii (re-do). Wykazała ona krytyczne zwężenie lewej tętnicy podobojczykowej, opanowane poprzez implantację stentu. Leczenie to przyniosło ulgę w dusznicy i objawach neurologicznych.

Słowa kluczowe: operacja pomostowania aortalno-wieńcowego, LITA, zespół podkradania wieńcowo-podbojczykowego.

Background

The left internal thoracic artery (LITA) is a graft of choice in surgical revascularization of myocardium, especially in younger patients with the left main stem stenosis. The lack of significant clinical improvement in these patients may result from the coronary-subclavian steal syndrome (CSSS), which was first reported by Hargola and Valle [1, 2]. If the anastomosis of LITA to the left anterior descending (LAD) artery is non-obstructive, the stenosis of the left subclavian artery may be a reason for persistent myocardial ischemia due to insufficient

blood flow through LITA. In some patients the operation may even aggravate the clinical state due to the steal syndrome. In the study we present a case of a 52-year-old woman operated non-electively due to the left main stem stenosis, in whom in spite of the operation no clinical improvement was observed.

Case report

A 52-year-old woman was referred to non-elective CABG due to the left main stem stenosis diagnosed on coronary angiography (Fig. 1). Before the angiography she had an ecg

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exercise test done and it was strongly positive at the load of 3 METS. The operation involved cardio-pulmonary by-pass and two grafts were performed: one arterial of LITA to the LAD and one venous to the circumflex artery (relatively small and non-dominant vessel). In spite of the revascularization the patient continued presenting with fatigue and an angina even at small efforts requiring the use of nitrates. Additionally, after 3 months she started to complain of vertigos and

disequilibrium but the laryngological consultation did not reveal any disorders. Because of progressing worsening of the clinical state (angina class III according to CCS), the patient was referred to repeat the ecg exercise test, which was strongly positive at 3 METS. Then she had urgent coronary angiography performed which showed properly functioning grafts and the critical stenosis of the left subclavian artery just next to its origin from the aortic arch (Fig. 2). In order

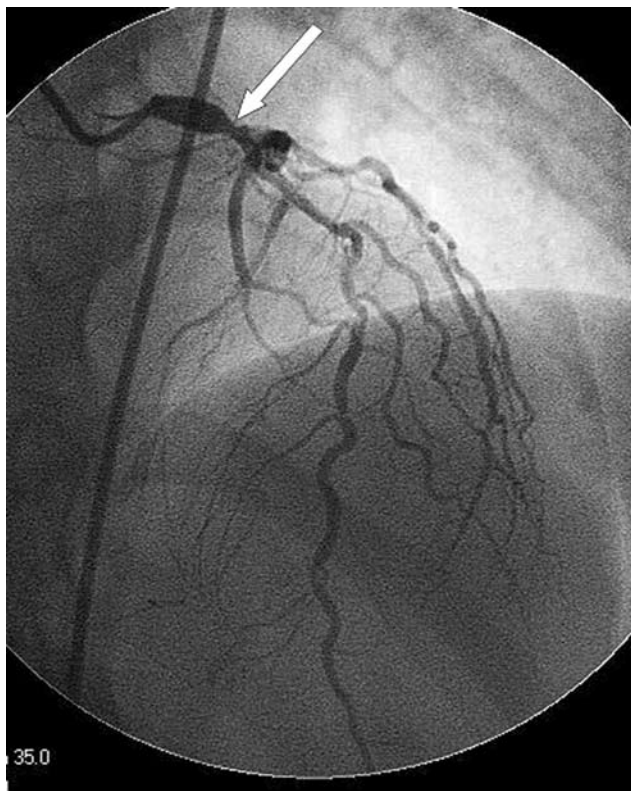


Fig. 1. Preoperative coronary angiography (the arrow indicates critical stenosis of the left main stem)

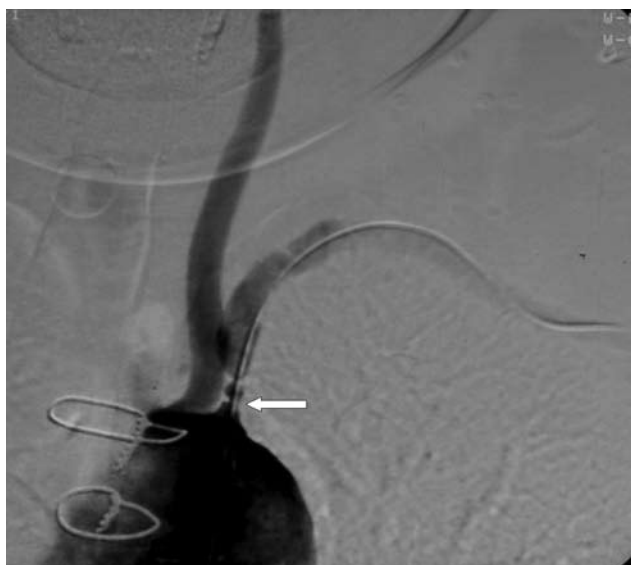


Fig. 2. Critical stenosis of the left subclavian artery in its origin from the aortic arch (arrow)



Fig. 3. Dissection (arrow) of the left subclavian artery in the lesion area after an attempt of balloon dilatation



Fig. 4. Insertion of a stent (arrow) into the left subclavian artery

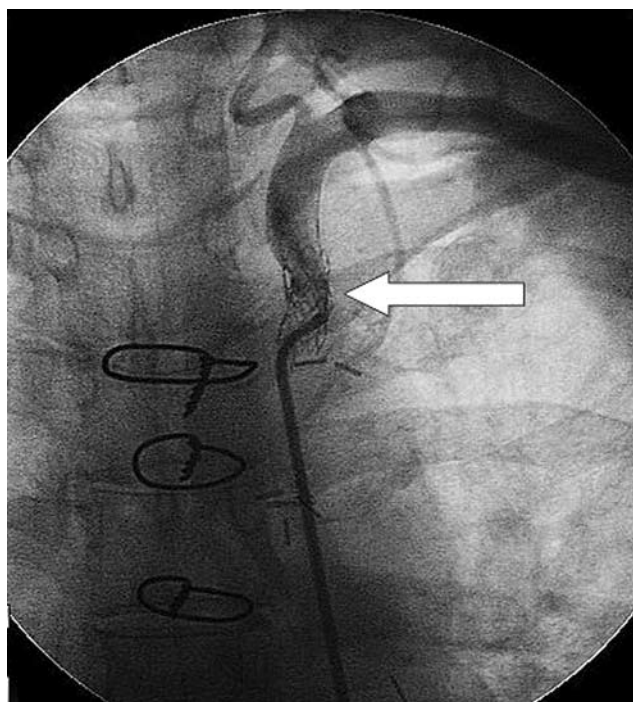


Fig. 5. Stent (arrow) in the left subclavian artery – angiographic image

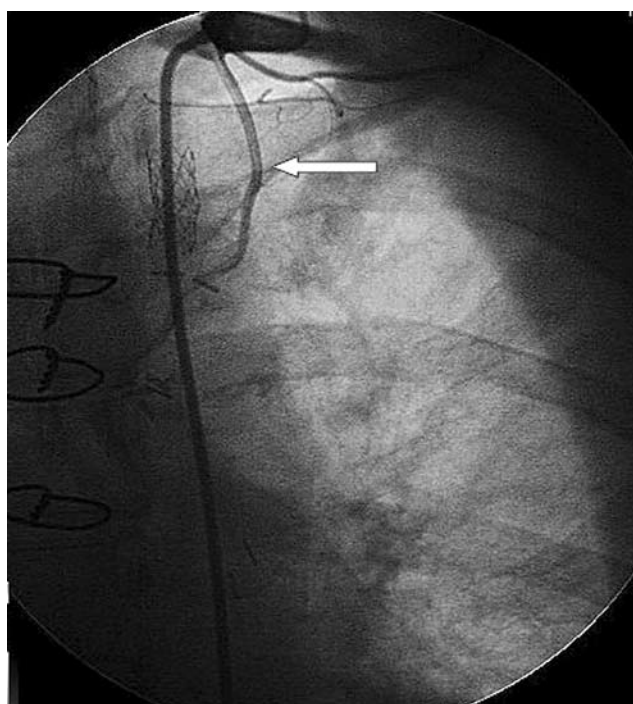


Fig. 6. Properly working LITA (arrow) – angiographic image

to assess the blood flow in brain supplying arteries, Doppler ultrasonography was performed and it did not reveal significant atheromatous lesions. The key finding of this examination was the reverse flow in the left vertebral artery. The patient was referred to percutaneous transluminal angioplasty (PTA) of the left subclavian artery. The artery was dilated with a 6-mm diameter balloon. Control angiography showed intimal dissection of the dilated portion of the artery and

that is why a stent Genesis-Cordis 7X18 mm was implanted. The next control angiography showed good results of the angioplasty and a change of the flow direction in the left vertebral artery into the physiological one. The subclavian steal syndrome was cured. After three days of hospitalization the patient was discharged in good clinical condition free from vertigos, disequilibrium and angina. A follow-up ecg exercise test after 3 months did not show any ischemia of anterior, apical and septal wall of the left ventricle.

Discussion

The CSSS is observed in about 0.5-1.1% of patients undergoing CABG operation. Undiagnosed CSSS in patients referred to LITA-LAD anastomosis will not yield a clinical improvement and what is more may even lead to worsening. That is why preoperatively the patients should have bilateral measurement of arterial pressure on upper extremities. The difference of pressure values on both arms higher than 20 mm of mercury may suggest a possibility of postoperative CSSS occurrence. These patients should have Doppler ultrasonography of brain supplying arteries performed preoperatively [3-6]. Some authors [5, 7] believe that a scan showing the left subclavian artery with LITA originating from it should be taken routinely during each coronary angiography.

Throughout the decades the patients with CSSS have been treated surgically, usually by performing aorto-subclavian, carotid-subclavian or carotid-auxiliary grafts. These methods, however, in the patients after CABG with LITA-LAD anastomosis are technically challenging (due to adhesions, abnormal anatomical relations etc.) and carry a much higher operative risk [5, 8]. Currently, PTA is the method of choice in cases such as the one presented in this study. This method is safe, highly effective and long-term results are encouraging, especially in patients with stents implanted [3, 9, 10]. The rate of re-stenosis after angioplasty in aortic arch branches is relatively low and ranges from 1% to 5% [6].

The essential issue, however, is to diagnose a stenosis in the left subclavian artery and manage it before planned CABG involving the use of pediculated LITA. PTA, similarly to other invasive methods, may potentially be complicated by some adverse effects like hematoma in the arterial puncture area, thrombosis and/or dissection in the lesion area, extravasation of contrast material, arteritis, pseudoaneurysm and vertebral artery or LITA embolism. Nevertheless, the rate of complications does not exceed 1% [6].

The presently reported case is the first such a spectacular example of PTA efficiency in our institution and we believe that this method can be recommended as a golden standard in patients in whom preoperative diagnostics did not allow to avoid CSSS after CABG.

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