CORONARY-SUBCLAVIAN STEAL SYNDROME, TREATED BY BALOON-EXPANDABLE PERIPHERAL STENT. CASE REPORT

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Abstract

Patient K., male, 65 years old, suffering from type 2 diabetes, adhering to basic therapy, in year 2018 underwent isolated internal mammary bypass surgery for coronary artery disease. In 2022, due to a deterioration in general well-being in the form of stabbing pains behind the sternum, shortness of breath during physical exertion, pain and numbness of the left upper limb, he was scheduled for coronary angiography with shuntography. During routine shuntography through the left radial access, the presence of retrograde filling of the LIMA graft was established, indicating the presence of the phenomenon of coronary-subclavian steal. Elimination of hemodynamically significant stenosis of the left subclavian artery with a peripheral balloon-expandable stent led to successful remodeling of left coronary hemodynamics, relief of angina symptoms, and restoration of adequate blood flow in the left upper limb in the early postoperative period.

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Conflict of interest
The authors declare that they have no conflicts of interest

Keywords:
steal syndrome, CABG, LIMA, stent, bypass, reverse flow, shuntography

Тәж-бұғана асты ұрлау синдромын баллонмен-кеңейтілетін перифериялық стент қою арқылы емдеу. Клиникалық жағдай

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Аңдатпа

Науқас К., ер, 65 жаста, 2 типті қант диабетімен ауырады, негізгі терапияны ұстанатын, 2018 ж. коронарлық артерия ауруына байланысты маммаро-коронарлық шунттау операциясы жасалды. 2022 жылы төс сүйегінің артындағы шаншып ауыру, физикалық жүктеме кезінде ентігу, сол жақ көктамырішілік қуыстың ауырсынуы және жансыздануы түріндегі жалпы денсаулығының нашарлауына байланысты жоспарлы түрде шунтографиямен ЦАГ-ға жіберілді. Сол жақ радиалды жол арқылы жоспарлы шунтография кезінде коронарлық тұтасу құбылысының болуын көрсететін мама-коронарлық айналма трансплантаттың ретроградты пломбасының бар екені анықталды. Перифериялық баллонмен кеңейтілетін стентпен сол жақ бұғана асты артериясының гемодинамикалық маңызды стенозын жою, операциядан кейінгі ерте кезеңде сол жақ коронарлық артерия аумағында гемодинамиканың сәтті қайта құрылуына, стенокардия белгілерінің жеңілдетілуіне және сол жақ жоғарғы аяқтың адекватты қан ағымының қалпына келуіне әкелді.

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Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

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Лечение баллонно-расширяемым периферическим стентом синдрома коронарно-подключичного обкрадывания. Клинический случай

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Аннотация

Пациент К., мужчина 65 лет, страдающий СД2 типа, придерживающийся базовой терапии, в 2018г. перенес маммаро-коронарное шунтирование по поводу ИБС. В 2022г. в связи с ухудшением общего самочувствия в виде колющих болей за грудиной, одышки при физической нагрузке, болей и онемения левой в/к, в плановом порядке направлен на КАГ с шунтографией. В ходе рутинной шунтографии через левый лучевой доступ установлено наличие ретроградного заполнения мамаро-коронарного шунта,

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Конфликт интересов
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свидетельствующее о наличии феномена коронарного обкрадывания. Устранение гемодинамически значимого стеноза левой подключичной артерии периферическим баллонорасширяемым стентом привело к успешному ремоделированию гемодинамики в бассейне левой коронарной артерии, купированию клиники стенокардии и восстановлению адекватного кровотока в левой верхней конечности в раннем послеоперационном периоде.

Introduction

Coronary-subclavian steal syndrome (CSSS) is a pathological condition in which there is hemodynamic remodeling of the blood supply to the left upper limb through a previously created left internal mammary artery (LIMA) bypass in conditions of persistent atherosclerotic lesion of the left subclavian artery (LSA).

According to our data obtained during the literature review within the limitations of a PubMed, NCBI and Scopus search, initial publications on coronary-subclavian steal in the literature date back to the second half of the 1970s [1,2].

Literature data on the frequency of occurrence of the phenomenon of coronary-subclavian steal at the moment remain inaccurate and debatable. Tyras D.H et al. as part of an observational follow-up of 450 patients who underwent mammary coronary artery bypass grafting for the LAD from 1972 to 1977, of CVD described2 casesof CSSS, which was 0.4% in their sample of patients who underwent LIMA bypass surgery [2].CSSS is presumed to complicate 0.2–6.8% of patients with LIMA grafts. However, these data should be evaluated cautiously because recent studies suggest a significant underestimation of CSSS [3,4].

Coronary-subclavian steal syndrome occurs during left arm exertion when, firstly, the LIMA is used during coronary artery bypass graft (CABG) surgery, and secondly, there is a high grade (>75%) LSA stenosis or occlusion proximal to the ostium of the LIMA [5].

The estimated incidence of subclavian artery stenosis is 2% in the general population, and 7% in patients with peripheral artery disease. When CABG is indicated in a patient with documented peripheral artery disease, the incidence of subclavian artery stenosis rises to 11.8% [4].

Clinical case

Patient K., male smoker, 65 years old, suffering from type 2 diabetes, adhering to basic therapy, in year 2018 under went isolated internal mammary bypass surgery for coronary artery disease. In 2020, due to the deterioration of general well-being and the resumption of symptoms of coronary heart disease (CHD) in one of the hospitals, selective polypositional coronary angiography (CAG) was performed in a planned fashion with the right common femoral access, where a subclinical lesion of the left coronary artery (LCA) trunk up to 40% was detected, the myocardial bridge of the middle third of the LAD without hemodynamically significant stenoses and non-functioning LIMA bypass. The patient was discharged for conservative treatment on an outpatient basis. In 2022, due to a deterioration in general well-being in the form of stabbing pains behind the sternum, shortness of breath during physical exertion, pain and numbness of the left upper limb, he was routinely admitted to inpatient treatment. In laboratory tests, there were a moderate cholesterolemia of 5.9 mmol/l, as well as an increase in glucose up to 10.7 mmol/l. Creatinine - 78.6 mcmol/L (N: 62-115), Urea - 5.3 mmol/L (N: 2,5-8,3). The rest of the parameters were normal. In the department, the cardiologist recommended CAG with shuntography, the patient was referred to the cathlab.

In our cathlableft radial access is routinely used for shuntography. After surgical field preparation and premedication, under local infiltration anesthesia, a puncture of the left radial artery was performed according to Seldinger. Next, a catheter on a conductor with moderate resistance in the proximal portion of the left subclavian artery was passed and installed at the ostium of the LCA. Then selective polypositional angiography was performed, showing the retrograde contrast media filling of the LIMA graft from the left anterior descending artery (LAD) into the LSA (Fig.1,2).

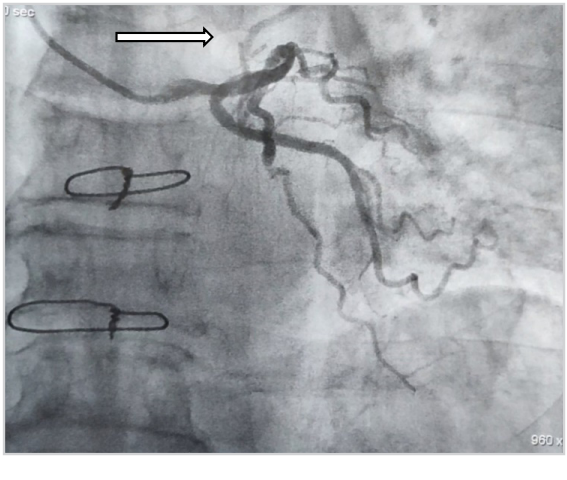

Figure 1.
LCA angiography, showing retrograde filling of the LIMA graft (arrow)

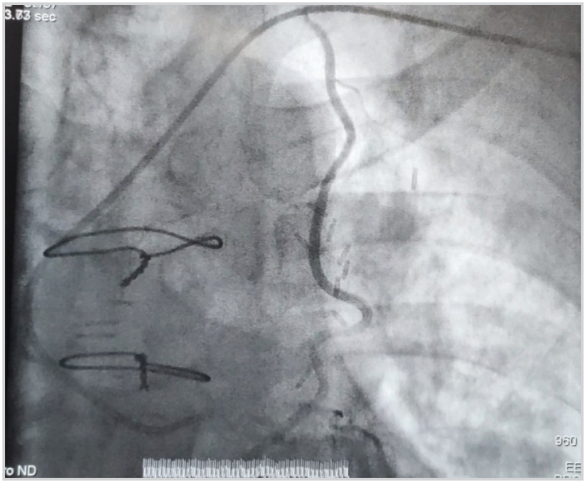

Figure 2.
Retrograde filling of the LIMA graft in the late arterial phase after contrast media injection in the LCA

Next, the catheter was passed and installed in the ostium of the ight coronary artery (RCA), where angiography was also performed, showing no significant lesion. Then the PigTail 5F catheter was delivered on a guide wire to the aortic arch and non-selective aortography performed, which showed a hemodynamically significant stenosis in the proximal portion of the LSA up to 85% (Fig.3); the distal bedremained passable.

Further, a peripheral 9.0x27.0 mm balloon-expandable stent was delivered, positioned and implanted at 12 atm (Fig.4). At control angiography, the patency of the LSA was restored (Fig.5), antegrade filling of the LIMA graft was recorded; in the LAD at the level of the middle third, there was a competing blood flow from the LIMA bypass; the distal bedremained passable (Fig.6).

Figure 3.
Non-selective aortography, showing fairly significant stenosis of the proximal portion of LSA

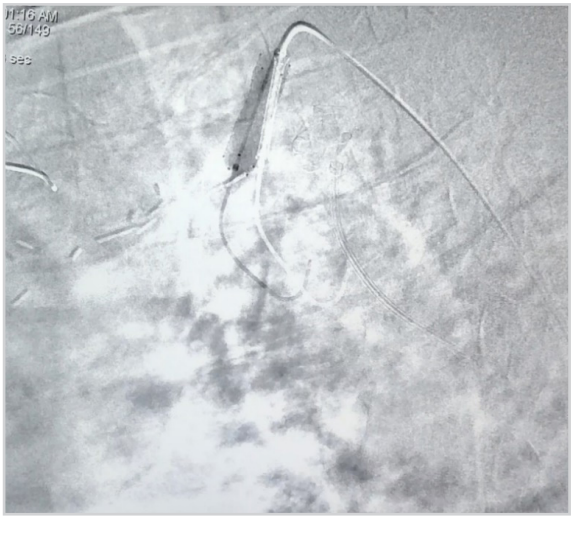

Figure 4.
Peripheral 9.0x27.0 mm baloon-expandable stent deploymentin the proximal lesion of LSA

Figure 5.
Poststenting aortography, showing good stent expansion, and antegrade filling of LSA

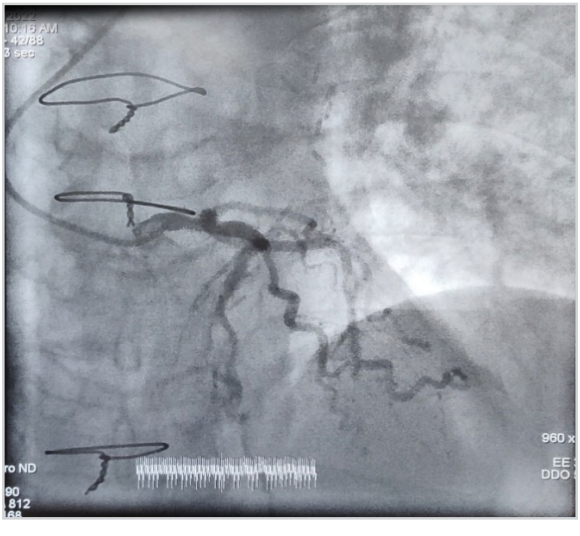

Figure 6.
Poststenting LCA angiography, showing hemodinamic remodeling of the blood flow

Thus, in the course of routine shuntography through the left radial access, a diagnostic catheter passed through the stenotic area of the left subclavian artery provoked wedging, obturating the lumen of the latter. This circumstance made it possible to establish the presence of retrograde filling of the LIMA graft, indicating the presence of the phenomenon of CSSS.

According to the ultrasound of the brachiocephalic vessels, insignificant stenoses of the common carotid arteries and the orifices of the internal carotid arteries on both sides were revealed. An antegrade blood flow was established in the vertebral arteries on both sides. Lesion of the left subclavian artery at ultrasound admission was not detected due to the difficult accessibility of the proximal portion of LSA for visualization by this research method [6].

In the postoperative period, there were a regression of angina pectoris and weakness in the left upper limb, laboratory tests were also without negative dynamics. The patient was discharged for further treatment at optimal medication therapy and dual antiplatelet therapy on an outpatient basis.

Discussion

The 2017 ESC guidelines recommend percutaneous balloon angioplasty with stenting as first-line treatment for subclavian artery and brachiocephalic trunk stenosis or occlusions [7,8]. Surgical revascularization should only be considered after failed endovascular treatment in low-surgical-risk patients [9]. The 2021 ACCF/AHA guidelines endorse both open surgical and endovascular methods as reasonable first-line choices for revascularization [9,10]. Angioplasty with stent support should be first-line therapy given wider indications range, proven long-term efficacy, decreased morbidity and mortality [8].

Coronary-subclavian steal syndrome is an underestimated and easily overlooked complication of LIMA grafting with potential undesirable outcome. In patients with a LIMA graft and ischemia in the LAD territory, CSSS should be suspected. Accurate diagnosis is often challenged by a variable clinical presentation and a low level of suspicion. Meticulous vascular exam can lead to early recognition of CSSS and preventive treatment.

Since endovascular treatment is easily accessible with excellent outcome, the importance of increasing awareness through prompt and expeditious clinical examination needs to be emphasized [4].

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