

Minimally Invasive Third Time Coronary Artery Bypass Grafting using Double Mini Access

Scopin II, Sigaev IY, Kazaryan AV*, Starostin MV, Keren MA, Morchadze BD, Pilipenko IV and Kydachev IF

A.N. Bakulev National Medical Research Center of Cardiovascular Surgery, Moscow, Russian Federation

***Corresponding Author:** Kazaryan AV, A.N. Bakulev National Medical Research Center of Cardiovascular Surgery, Moscow, Russian Federation.

Received: March 18, 2022; **Published:** March 30, 2022

Abstract

Re-coronary artery bypass grafting (re-CABG) remains a complex operation and is associated with a higher risk of morbidity and mortality compared to primary CABG. The characteristics of patients undergoing repeated surgical revascularization have changed over the past thirty years. They are mostly elderly patients with numerous comorbidities. Analyzing the literature, it can be noted that the frequency of re CABG in Europe and the USA ranged from 2 to 6%, with a tendency to decrease. Despite this trend, there is a unique group of patients who have undergone CABG for the third and even fourth time. These patients represent a special group that may increase in the coming years. In addition to demographic changes, there are also changes in the results of the various strategies used in reoperations. The use of mini access is one of the priorities in the surgical treatment of repeat patients. This clinical case demonstrates the possibility of a safe and complete third revascularization surgery (re-reCABG) coronary bypass of the LAD and RCA using double mini access: right-sided thoracotomy and lower mini-sternotomy.

Keywords: Repeat Coronary Bypass Surgery; Thoracotomy, MIDCAB, MICS

Introduction

To date, the number of patients requiring repeated interventions on the coronary arteries for shunt dysfunction or progression of coronary atherosclerosis is constantly increasing. However, the frequency of repeated coronary bypass grafting (re-CABG), after primary CABG, is 3% for up to 5 years, 11% - for up to 10 years and 17% - for 12 years after the primary CABG [1-3], significantly inferior to endovascular interventions. According to the data presented by the Cleveland Clinic, the ratio of re- CABG to primary CABG is constantly decreasing, and is 2-6% of the total number of CABG surgeries [4]. However, despite the current trend, there is a unique group of patients who have repeatedly undergone CABG (for the third and even fourth time) [5,6], with a mortality rate of 6 - 12%. Despite the relatively

large number of re-CABG, only a minimal number of patients are exposed to CABG for the third time (re- reCABG). These patients represent a special group that may increase in the coming years [7].

The purpose of this report is to present a clinical case of successful third coronary bypass surgery of RCA and LAD, using a double mini-access (right-sided thoracotomy and lower mini-sternotomy).

Patient Z., 58 years old, entered the department of the A.N. Bakulev National Medical Research with a clinical diagnosis: coronary heart disease, angina pectoris. Condition after LITA bypass grafting of the LAD, coronary artery bypass grafting of the right coronary artery (30.06.2014). Condition after re-CABG OM and DA of the left coronary artery (13.12.2014).

Upon admission to the hospital, they were concerned about typical complaints of anginal pain corresponding to 3 FC angina pectoris, as well as an increase in blood pressure figures, increased fatigue, swelling and pain in the lower extremities when walking up to 200 meters. In 2014, the patient underwent CABG (LIMA-LAD SVM-RCA surgery cardiopulmonary bypass (CPB). 2 months after discharge, he began to note the return of angina. 6 months after the initial operation, coronary angiograms was performed based on the results of which, it was decided to perform re-CABG OM and DA 13.12.2014. Repeated return of angina pectoris in 2016 was treated with medication. An angiogram performed in December 2019, in connection with the return of angina pectoris, showed the occlusion of the ITA, grafts to OM and RCA. The VSM to the DA functioned.

ECG

Sinus bradycardia with a heart rate of 58. Deviation of EOS to the left.

X-ray

Condition after sternotomy, CABG. Pulmonary fields, lung roots, sinuses, shadow of the heart within normal limits.

Echocardiography

Compaction of the aorta, flaps of the AV. Calcinos AV 1-2 st. Insufficiency AV 0-1 st. Dilatation of the cavities of both atria, LA and its branches. LV myocardial hypertrophy. The global contractility of the LV myocardium is satisfactory. Mild hypokinesis of the basal segment of the lower wall is determined. Violation of the diastolic function of the LV in type 2. Pulmonary hypertension 1 tbsp. Insufficiency MV 1-2 st., TV 1-2 st., LV 1-2 st.

CLINICAL DIAGNOSIS: CORONARY ARTERY DISEASE. Return of angina pectoris 3 FC. Status after CABG from 06.2014 State after redo CABG from 12.2014 NK2A. HSN 2 FC. Hypertension 3 st, risk 4.

EuroSCORE2,%: 8,17

Taking into account the data obtained and the results of computed tomography of the chest (according to CT, the fit of the right parts of the heart behind the sternum was less than 0.5 mm, (Figure 1), it was decided to perform re-reCABG through double access: right-sided thoracotomy and lower mini-sternotomy

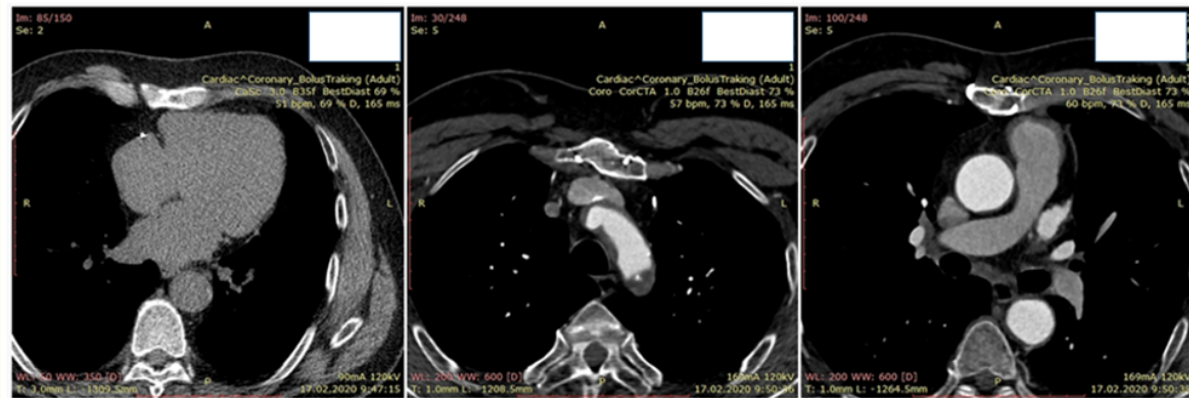


Figure 1: CT of the chest, with the fit of the right parts of the heart behind the sternum.

Stages of the operation:

1. catheterization of the common femoral arteries (for cannulation if necessary),
2. allocation of the radial arteries,
3. right-sided anterior thoracotomy, with the allocation of proximal part of the PITA (Figure 2),
4. cardiolysis of the right heart, lower mini-sternotomy with the allocation of the distal part of the PITA (Figure 3),
5. imposition of composite anastomosis of Ia with PITA (Figure 4),
6. imposition of distal anastomoses of RCA and LAD,
7. intraoperative flowmeter.



Figure 2: Right-sided anterior thoracotomy and inferior ministernotomy.



Figure 3: Lower ministernotomy with the allocation of the distal part of the right ITA.

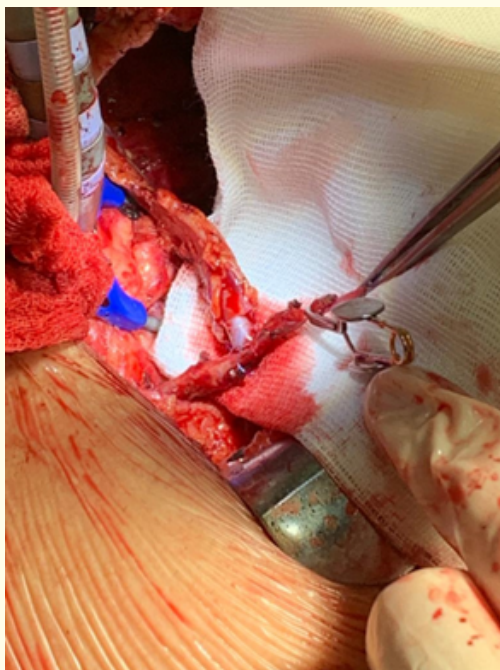


Figure 4: Imposition of composite anastomosis of aircraft RA with right ITA.

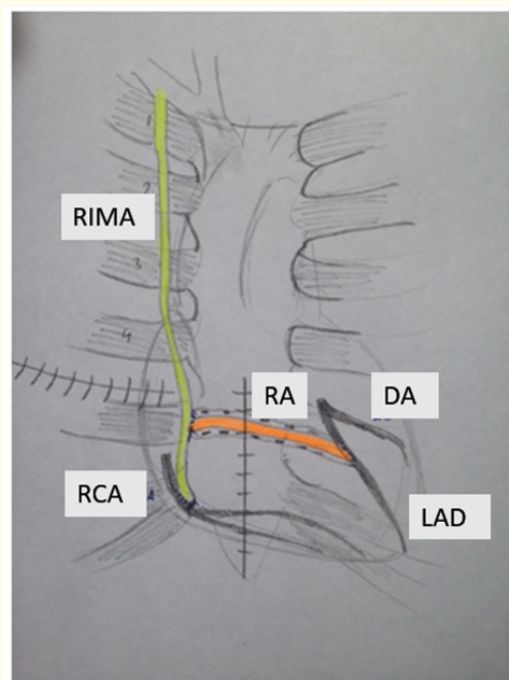


Figure 5: Scheme of operation.

The operation was performed according to the method of minimally invasive myocardial revascularization: the right internal thoracic artery (PITA) was bypassed by RCA, the radial artery (RA) was bypassed by LAD with the imposition of composite anastomosis with PITA, using double mini-access (Figure 5). Intraoperative flowmeter showed good blood flow rates for shunts. The postoperative period is smooth. The patient was discharged on the 10th day after surgery.

Discussion

Despite the fact that drug and endovascular treatment have proven effective in the treatment of patients who have undergone CABG, the need for re-CABG remains, because endovascular methods are less effective in patients with functioning, but stenosed venous shunts [8]. When performing re-re CABG, surgeons face exactly the same tasks and difficulties as with re-CABG. These include the progression of atherosclerosis in the coronary arteries, conduit deficiency, the danger of repeated re-sternotomy, extensive adhesions in the mediastinum, the presence of functioning grafts, bleeding, the need for blood products and difficulties in achieving complete revascularization [9]. The use of minimally invasive techniques (MIDCAB and MICS) using mini-accesses (without sternotomy), refusal of artificial circulation and partial cardio lysis can prevent these problems in patients requiring repeated surgical myocardial revascularization [10]. The choice of graft for re-re CABG is also a serious problem. Complete arterial revascularization during the third CABG certainly seems to be the most logical, from the point of view of preventing the next second operation in the near future.

Conclusion

Despite the decreasing number of re-CABG in the world, there is a special group of patients in whom it is possible and justified to conduct re-CABG for the third and even fourth time. In our opinion, each patient who is a candidate for re-re CABG requires a thorough

follow-up examination and balanced multidisciplinary decision-making, taking into account all the risks and the expected benefits of a potential intervention. The use of minimally invasive techniques during repeated operations reduces the risk of complications associated with re-sternotomy and damage to functioning shunts.

Conflict of Interest

Conflict of interest is not declared.

Financing

The study did not have sponsorship.

Bibliography

1. Accola KD., *et al.* "Multiple reoperative coronary artery bypass grafting". *The Annals of Thoracic Surgery* 52.4 (1991): 738-743.
2. Cosgrove DM., *et al.* "Predictors of reoperation after myocardial revascularization". *The Journal of Thoracic and Cardiovascular Surgery* 92.5 (1986): 811-821.
3. Weintraub WS., *et al.* "In-hospital and long-term outcome after reoperative coronary artery bypass graft surgery". *Circulation* 92.9 (1995): 50-57.
4. Sabik JF., *et al.* "Value of internal thoracic artery grafting to the left anterior descending coronary artery at coronary reoperation". *Journal of the American College of Cardiology* 61.3 (2013): 302-310.
5. Watanabe G., *et al.* "Third-time coronary artery revascularization". *The Journal of Thoracic and Cardiovascular Surgery* 41.3 (1993): 163-166.
6. Brenowitz JB., *et al.* "Coronary artery bypass grafting for the third time or more. Results of 150 consecutive cases". *Circulation* 78.2 (1988): 1166-170.
7. Mujanovic E., *et al.* "Aorta no-touch technique for third time coronary artery bypass grafting (re-re-CABG)". *BHSURGERY* 2 (2012): 54-57.
8. Grondin CM., *et al.* "Reoperation in patients with patent atherosclerotic coronary vein grafts: a different approach to a different disease". *The Journal of Thoracic and Cardiovascular Surgery* 87.3 (1984): 379-385.
9. FitzGibbon GM., *et al.* "Coronary bypass graft fate. Angiographic study of 1,179 vein grafts early, one year, and five years after operation". *The Journal of Thoracic and Cardiovascular Surgery* 91.5 (1986): 773-778.
10. Tabata S., *et al.* "Minimally Invasive Direct Coronary Artery Bypass Grafting for Third-Time Coronary Artery Revascularization". *Annals of Thoracic and Cardiovascular Surgery* 13.6 (2007): 417-420.

Volume 6 Issue 4 April 2022

©All rights reserved by Kazaryan AV., et al.