

Extensive LAD endarterectomy with beating heart, vein patch reconstruction of LAD in an 85-year-old patient via MIDCAB approach

Maciej Rachwalik^{1,2}, Neil Roberts², Josephine Anna Wright², Vaja Chandrasekeran¹

¹Department of Cardiac Surgery, Medical University, Wrocław

²Department of Cardiothoracic Surgery, St. George's Hospital, London

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Abstract

We present a complex case of an 85-year-old woman with advanced coronary artery disease, renal failure and poor left ventricular function. The patient was unsuitable for percutaneous coronary intervention due to a complex and long stenotic lesion in the LAD artery. She underwent minimally invasive direct coronary artery bypass (MIDCAB). Before grafting, extensive endarterectomy of 4-5 cm length was required. This was performed on the beating heart via the MIDCAB incision and the artery was then reconstructed with a venous patch prior to grafting.

We discuss the potential benefits of the MIDCAB approach in the elderly and illustrate the feasibility of the technique despite complex coronary anatomy and poor LV function.

Key words: MIDCAB, coronary artery bypass grafting, endarterectomy, perioperative infarction.

Introduction

After some isolated cases of direct myocardial revascularization performed by Goetz [1] in 1961 and years later by Kolesov [2], without cardiopulmonary bypass, myocardial revascularization was standardized by Favaro [3] and others using cardiopulmonary bypass and cardioplegic arrest. In 1981 Benetti in Argentina [4] and Buffolo in Brazil [5] working separately began the clinical application of beating heart revascularization. A landmark event in this field occurred when Benetti proposed a small left thoracotomy to graft the left internal thoracic artery to the LAD artery [6], and the technique received the acronym MIDCAB, meaning minimally invasive direct coronary bypass. This technique was widely applied and popularized by Calafiore [7] and could be considered as a natural evolution of the off-pump technique, as it

Streszczenie

Celem pracy jest przedstawienie złożonego przypadku 85-letniej kobiety z zaawansowaną chorobą wieńcową, niewydolnością nerek i upośledzoną wydolnością lewej komory. Pacjentka nie została zakwalifikowana do przeszłokórnej rewaskularyzacji z powodu znacznego i długotrwałego zwężenia gałęzi międzykomorowej przedniej (LAD). Chorą poddano zabiegowi małego inwazyjnego pomostowania tętnic wieńcowych (MIDCAB – ang. *minimally invasive direct coronary artery bypass*). Śródoperacyjnie stwierdzono konieczność wykonania rozległej (4–5 cm) endarterektomii LAD, po czym dokonano rekonstrukcji naczynia poprzez naszytą łaty żyłnej.

W niniejszej pracy przedstawione zostały potencjalne korzyści wynikające z przeprowadzenia zabiegu MIDCAB u osoby starszej, pokazano także możliwość zastosowania tej techniki mimo zaawansowanej choroby wieńcowej i słabej wydolności lewej komory.

Słowa kluczowe: MIDCAB, zabieg pomostowania aortalno-wieńcowego, endarterektomia, zawał okołoperacyjny.

highlighted the minimal-access potential of coronary revascularization.

The MIDCAB approach has gained popularity as it provides the gold standard LIMA-LAD graft and avoids median sternotomy. The limited access incision is attractive both cosmetically and to reduce post-operative morbidity in high-risk patients.

We present the case of an 85-year-old woman who was admitted to our hospital with CCS class 4 anginal symptoms. She had poor left ventricular function and chronic renal impairment. She was unsuitable for PCI due to the long and complex nature of her LAD stenosis (Fig. 1). She also had chronically occluded right coronary and circumflex vessels. Her treatment options were therefore standard multi-vessel CABG, MIDCAB or medical therapy. She was thought too high

Address for correspondence: Maciej Rachwalik, MD, Department of Cardiothoracic Surgery, St. George's Hospital, Cranmer Terrace, London SW17 0QT, Email: mrach@wp.pl



Fig. 1. Coronary angiogram showing nature of left anterior descending artery

risk for standard multi-vessel CABG and hence we opted for a MIDCAB approach.

Surgical technique

To achieve a satisfactory aesthetic result the surgical incision was made below the infra-mammary crease. Left anterior thoracotomy was performed through the fifth intercostal space (standard MIDCAB). The pleural space was entered and the LIMA retractor was used (MAKE MODEL). The LIMA pedicle was harvested to a length of approx 15-17 cm for tension-free anastomosis.

Proximal occlusion of the LAD was obtained by fixing a bulldog clamp two centimetres above the initial incision in the coronary vessel. After the incision of the LAD, high-grade narrowing was detected by a probe which was placed distally to the incision. The distal part of the LAD was occluded and endarterectomy was the only option to achieve satisfactory run-off. The arteriotomy was extended distally on the top of the vessel for a length of 3.5-4.5 cm. The whole plaque was removed using a Watson-Chain dissector and forceps (DeBakey).

Vein patch reconstruction of the endarterectomised LAD was required as there was insufficient LIMA length to reconstruct the LAD distally. After this the reconstructed artery was incised and the mammary artery graft was stitched to the LAD with a regular 7-0 propylene suture (Fig. 2). Proximal occlusion was released and the mammary pedicle was attached to the surface of the myocardium.

Heparin was not fully reversed with protamine because of the long endarterectomy and reconstruction of the LAD. The incision was closed in the usual fashion, first with pericostal sutures and then completing the other layers of tissue.

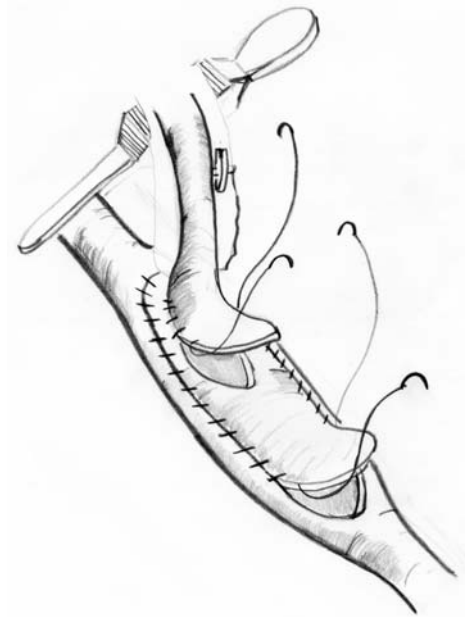


Fig. 2. Operative scheme illustrating vein patch and subsequent left internal mammary anastomosis. Illustration made by first author (MR)

Sedation was stopped and patient was extubated two hours postoperatively. Due to the patient's advanced age we elected not to commence warfarin, but instead we used dual antiplatelet therapy with aspirin and clopidogrel.

Discussion

MIDCAB is a well recognized surgical technique; however, it is mainly used in isolated LAD lesions in young patients or in those for whom a hybrid procedure is intended. Undoubtedly, this kind of surgical approach (left fourth or fifth intercostal space) is less traumatic to the patient, and causes minor pulmonary deterioration compared to median sternotomy [8, 9]. Traditional sternotomy generates a restrictive pattern of breathing with decline of spirometric parameters to 60% of the preoperative values on the 5th postoperative day [10].

LAD endarterectomy with vein patch reconstruction has been described by other groups with good short and mid-term results [11]. Beating heart endarterectomy is infrequently performed because of difficulties involved with the technique. Appropriate stabilization of the heart and good visualization of the vessel are essential. Both were achieved in this case via the MIDCAB approach. Endarterectomy is associated with a higher incidence of perioperative myocardial infarction due to massive scarification of the intima of the coronary vessel. We used the following techniques to minimize the risk of such an adverse event: surgical enlargement of the LAD with venous patch using the no-touch technique (i. e. no use of probes after the endarterectomy), only partial reversal of the heparin with low dose protamine, and early introduction of antiplatelet drugs such as aspirin and clopidogrel.

This case illustrates that complex LAD disease unsuitable for PCI, combined with elderly age and poor left ventricular function, can be satisfactorily treated with a minimally invasive technique with no significant adverse effects and good outcomes. The MIDCAB approach should be considered for high-risk surgical patients if no other revascularisation strategy is feasible in symptomatic patients even in the presence of complex anatomy and significant co-morbidity.

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