

Case Report

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Midcab Facilitates Combined Curative Treatment in the High Risk Patient

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Abstract

Objective: Report of a high risk patient undergoing combined treatment of orthopedic and cardiovascular operations enabling a successful outcome through a minimally invasive approach.

Methods: We report the clinical presentation, medical record, strategies for decision finding and clinical images of a perioperative cardiac infarction during infectious complicated orthopedic re-do surgical treatment that was managed successfully in a 72-year-old female high risk patient via minimally invasive direct coronary artery bypass grafting

Results: Minimally invasive direct coronary artery bypass grafting represents an excellent revascularization option for patients who are at high risk for sternotomy and cardiopulmonary bypass related complications. This approach enabled the necessary following orthopedic operations and early mobilization of the obese patient resulting in weight loss, enhanced pulmonary function and cure of the infected focus. The minimal invasive coronary artery bypass grafting technique prevented sternal bone instability, infection and facilitated the use of physiotherapy and walking sticks after the orthopedic operation to replace an infected knee prosthesis. The patient could be discharged and presented during follow up in healthy condition with a decrease in body mass index and ability to be fully mobilized.

Conclusions: Minimally invasive direct coronary artery bypass grafting represents an excellent revascularization option for patients who are at high risk for sternotomy and cardiopulmonary bypass related complications. Especially patients who suffer from perioperative cardiac infarction who need urgent treatment are suitable for this approach as the internal mammary artery is used as a graft and no additional bypass graft material is needed. Most patients undergoing revascularization lack of suitable bypass material or require pre-operative evaluations of their vein material. Minimally invasive direct coronary artery bypass grafting shows superior results in the long time follow up when compared to angioplasty and stenting.

Keywords: Minimally invasive; Direct coronary artery bypass; Left anterior descending artery; Sternal instability; High risk patient; Hybrid revascularization

Introduction

Coronary artery bypass Surgery can be performed in the high risk patient less invasively by avoiding sternotomy and Cardiopulmonary Bypass (CPB). Off-pump coronary artery bypass surgery performed through an antero-lateral minithoracotomy termed Minimally Invasive Direct Coronary Artery Bypass Grafting (MIDCAB) is a suitable technique for this selected collective of multimorbid patients to prevent sternal wound complications with instability or cardiopulmonary bypass related difficulties especially in the presence of concomitant diseases [1].

Case Report

A 72-year-old female was admitted to our clinic in 2011 with the diagnosis of Perioperative myocardial infarction during explanation of a knee prosthesis following polyarthrosis due to a low grade infection three weeks after insertion of the endoprosthesis on the left side. The infection was caused by *Staphylococcus lugdunensis* and *Candida parapsilosis* and a Palacos spacer was inserted after initial debridement and explantation. Following immediately coronary angiography showed triple vessel disease with subtotal proximal occlusion of the right coronary artery, eccentric distal critical stenosis of the left main and proximal subtotal occlusion of the circumflex artery (Figure 1). The right coronary artery showed a proximal 95% stenosis with a distal 75% stenosis, the left main presented with 75% stenosis, the RIVA(LAD) showed a 50% proximal stenosis and a 75% stenosis in the distal part, the circumflex artery showed a proximal 95% stenosis.

The patency of the ITA was confirmed in the angiography. The patient presented with massive adipositas and a BMI of 42.2 (kg/m²) as well as several comorbidities including arterial hypertension, dyslipidemia, 100 pack years and *Diabetes mellitus* type II.

Due to recurrent thrombophlebitis, chronic venous insufficiency with surgical therapy, deep vein thrombosis and pathologically prolonged Allen Test the patient lacked of suitable graft material.

At admission ejection fraction was 55%, valvular disease was excluded by echocardiography and pulmonary hypertension was detected with a systolic pulmonary artery pressure of over 50 mm Hg.

With respect to the high risk profile and the unavoidable dependence on crutches or a walking frame in the postoperative course to mobilize the inactive patient as well as the high risk for sternal instability and infection due to the obese condition and mechanical exposure the indication for MIDCAB with single LAD revascularization and following interventional angioplasty of the other vessels under

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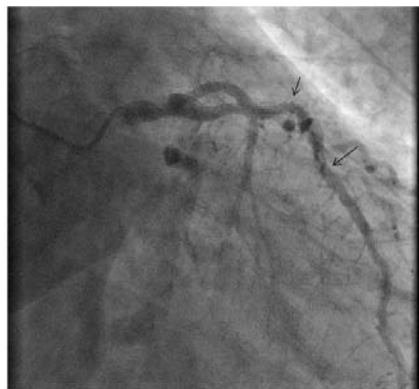


Figure 1: Preoperative angiography, demonstrating LM (left main) and left anterior descending coronary artery (LAD) stenosis, marked by arrows.

protection of the single LIMA- LAD bypass after recovery was set to facilitate necessary further treatment of the orthopedic infection site. The decision was made by a multidisciplinary council consisting of all involved disciplines.

The patient underwent isolated minimally invasive revascularization of the Left Anterior Descending (LAD) artery using the left Internal Thoracic Artery (ITA) as graft via an antero-lateral left sided thoracotomy (Figure 2). The skin incision was made in the submammary fold and the intercostal space prepared using the bipolar bowie, then the ITA was carefully dissected and harvested as skeletonized graft over the full length. After incision of the pericardium pacer wires were installed and the heart stabilized with an octopus. The LAD was incised and a 2.25 mm shunt carefully inserted. The anastomosis was sewn end to side with the ITA and showed a good flow of 75 ml with a pulsation index of 1.8 after removal of the bulldog clamp. The pericardium was closed as well as the fascia and the skin. The further postoperative course was affected by a local wound infection due to fat tissue necrosis and several vacuum assisted wound debridements with final successful outcome. The patient could be discharged two weeks after operation.

The patient completed several courses of antibiotics and could finally undergo surgery with implantation of a Stryker TS knee prosthesis (Figure 3). At 6 months CT scan follow up the patient presented at our clinic in at most improved condition with tremendous weight reduction of 20 kilos, mobilized on a walking stick and without shortness of breath anymore (Figure 4).

Discussion

Coronary bypass surgery can be performed less invasively by avoiding cardiopulmonary bypass (CPB) and sternotomy as beating heart bypass surgery performed through a minithoracotomy with safe and good postoperative results but patient selection is a crucial criteria for this technically challenging operation [2]. As reported in recent studies high risk patients with severe stenosis of the LAD appear to benefit from ITA grafting in form of the MIDCAB procedure and as in this case combined with a hybrid approach of a two step revascularization together with following angioplasty [3]. Also the right timing of the hybrid procedure is mandatory to optimize surgical and PCI results [4]. In this specific setting the outcome of the cardiovascular intervention determined in addition the further course of the orthopedic infection and was a necessary prerequisite for the following operation of the knee joint.

In this case the patient was compromised by several risk factors and

concomitant diseases to develop deep sternal wound infection, sternal instability and mediastinitis or even neurological complications [5]. The body mass index of 42.2 (kg/m²) represents beyond doubt the necessity for early postoperative mobilization disregarding the therapeutic need after knee prosthesis implantation for extensive specific physiotherapy. The use of crutches, walking sticks or a walking frame was in the forefront set. Despite the vast effort the patient developed fat tissue necrosis and could be treated effectively, sternal infection and instability could be prevented facilitating the necessary following treatment [6]. The MIDCAB approach may be more painful initially, but results in quicker recovery of lung function demonstrating another benefit of the ministernotomy compared with traditional sternotomy for high risk patients [7]. In our case the patient received at the end of the procedure regional infiltration anaesthesia with lidocaine to overcome early postoperative pain. Compared with MIDCAB, LAD stenting is associated with higher repeat revascularization rates in diabetic patients [8]. MIDCAB has become a safe operation with low postoperative mortality and morbidity especially in the high risk patients with favourable short-term and long-term results. If the right collective of patients is selected it is a very good alternative compared to both Percutaneous Coronary Intervention (PCI) and conventional surgery. Patients who cannot undergo traditional coronary revascularization via median sternotomy and cardiopulmonary bypass because of their risk profile benefit from this therapy approach and can be treated in an optimal way [9]. In general the minimally invasive bypass grafting

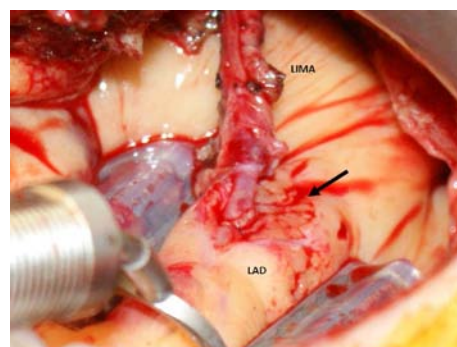


Figure 2: Intraoperative (left sided thoracotomy) view minimally invasive direct coronary artery bypass grafting with left internal mammary artery grafted to the left anterior descending coronary artery.



Figure 3: X – Ray of the knee prosthesis Stryker TS, left side.

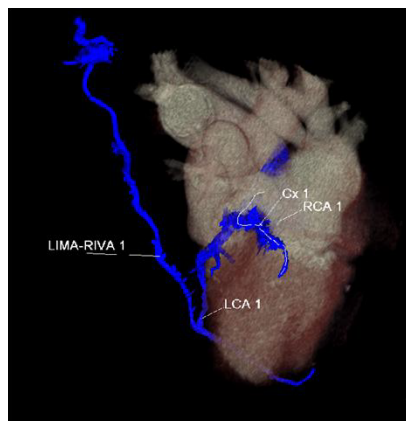


Figure 4: 6 months follow up, 3 D CT scan reconstruction, open LIMA – LAD bypass.

technique of a totally occluded LAD is almost always possible and even chronic occlusion is not a negative predictor for outcome. Minimally invasive bypass grafting of the LAD can be considered the treatment of choice for chronically occluded left anterior descending arteries [10].

In high-risk patients with predictable complications affecting perioperative morbidity and mortality the MIDCAB procedure represents the accurate technique of choice and can improve exercise tolerance or facilitate hybrid strategies and necessary following surgical treatments .

Conclusion

In high-risk patients with predictable complications affecting perioperative morbidity and mortality the MIDCAB procedure represents the accurate technique of choice and can improve exercise tolerance or facilitate hybrid strategies and necessary following surgical treatments .

Technical advances in conduit harvesting, stabilization, cardiac

positioning devices, have made this procedure more standardized and replicable. This has resulted in reduced morbidity as a consequence of less invasive approaches making it the method of choice for the high risk patients collective.

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