**Off-pump Coronary Artery Bypass Grafting in a Patient with Severe Ischemic Cardiomyopathy: A Case Report**

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This case report does not contain identifiable patient information, and therefore informed consent was not required.

**ABSTRACT**

Ischemic cardiomyopathy is characterized by left ventricular dysfunction secondary to coronary artery disease. This case highlights a 68-years-old male with an ejection fraction. Of 15% and triple-vessel coronary artery disease. The patient underwent off-pump coronary artery bypass grafting to mitigate the risks associated with cardiopulmonary bypass. Despite persistent postoperative left ventricular dysfunction, the patient recovered uneventfully and was discharged five days later. This case underscores the feasibility of off-pump coronary artery bypass grafting in high-risk patients with severely reduced ejection fraction.

**INTRODUCTION**

Ischemic cardiomyopathy (ICM) is a condition characterized by an ischemic damage to the myocardium, leading to heart’s inability to pump blood effectively1. ICM is typically present with left ventricular dysfunction in the context of coronary artery disease (CAD), which is known to be the main cause of Heart failure (HF)2. Left ventricular dysfunction in ICM can be a consequence of large infarct size, myocardial stunning, changes in hemodynamics and neurohormonal activation or even inflammation3. Here, we present a case of a 68-year-old male patient with ejection fraction of 15%, diagnosed with ICM and referred to undergo off-pump coronary artery bypass grafting (OPCAB).

**CASE DESCRIPTION**

A 68-year-old male with a body mass index of 35.9 Kg/m2 presented with ICM and an EF of 15%. He had a history of COVID-19 and type 1 cardiorenal syndrome but was non-diabetic and abstinent from alcohol. Preoperative echocardiography revealed global hypokinesia, chamber dilation, mild valvular regurgitation, and diastolic dysfunction. He had a 40% surgical risk and a 30% likelihood of requiring renal replacement therapy.

A chest CT showed ground-glass opacities suggesting pneumonia, while abdominal ultrasound revealed gallstones and benign prostatic hyperplasia. Carotid duplex imaging identified a partially calcified plaque without stenosis. Preoperative labs indicated anemia, renal dysfunction, vitamin D deficiency, elevated inflammatory markers, and high D-dimer levels.

Preoperative optimization involved the use of continuous furosemide and pulmonary vasodilators to alleviate volume overload and reduce central venous pressure, stabilizing the patient’s hemodynamics. The patient subsequently underwent a 3-hour and 45-minute off-pump coronary artery bypass grafting (OPCAB) for triple-vessel disease. Regional anesthesia via epidural block minimized systemic effects, while an intra-aortic ballon pump and vasopressor maintained stable blood pressure within a range of 92/62 to 110/62 mmHg. Due to anatomical challenges, the radial artery was used for grafting to the left anterior descending artery (LAD), with saphenous vein grafts employed for other vessels. The procedure was completed without intraoperative complications. Postoperatively, the patient spent 64 hours in intensive care with inotropic support, after which he was extubated without complications. Despite persistent preoperative left ventricular dysfunction with an ejection fraction of 15%, the patient remained hemodynamically stable and was discharged on postoperative day five.

**DISCUSSION**

In patients with very low ejection fraction (EF), coronary artery bypass grafting (CABG) presents with significant challenges, but advancements in surgical techniques and perioperative management have improved outcomes in such high-risk cases. In our case, we successfully managed a patient with ischemic cardiomyopathy and an extremely low ejection fraction (EF) of 15%, undergoing off-pump CABG. The patient’s perioperative management was crucial in preventing complications and ensuring a good recovery.

Patients with severely reduced EF face increased perioperative risks, including hemodynamic instability and organ dysfunction4. For this patient, a meticulous preoperative assessment allowed for risk stratification and optimization before surgery. Inotropic support, careful fluid management, and comprehensive monitoring ensured hemodynamic stability, helping the surgical team anticipate challenges associated with such a low EF.

We performed an OPCAB procedure, which avoided the complications of cardiopulmonary bypass (CPB), such as systemic inflammatory response and fluid overload. Throughout the procedure, the patients blood pressure was stabilized by the use of vasopressors (e.g., noradrenaline and dobutamine) which maintained adequate cardiac output. Consistent with previous case report involving a patient with severely impaired left ventricular function and ejection fraction of 15%, the patient also had increased risk of perioperative complications, however yet stable intraoperative hemodynamics were achieved using inotropic support, contributing to a favorable outcome5. Post operative care for this patient included, continuous monitoring and inotropic support to maintain sufficient cardiac output, the patient experienced no major complication postoperatively, due to effective pain management and intensive care monitoring, the echocardiogram post-surgery showed no significant changes in left ventricular function, which was anticipated due to the severity of the preoperative condition. The literature supports that CABG in patients with very EF, though high risk, can result in improved outcomes if myocardial viability is present. Studies such as the STICH trail and its extension have demonstrated a long-term survival benefit in patients with ischemic left ventricular dysfunction who undergo surgical revascularization. The decision to proceed with CABG is often influenced by the presence of viable myocardium, as revascularization can significantly improve ventricular function in such patients 6,7.

**CONCLUSION**

OPCAB is a feasible approach for patients with severe ICM and low ejection fraction. Careful perioperative planning and management were critical to the successful outcome. This case underscores the potential of OPCAB in improving outcomes for high-risk cardiac surgery patients.

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