

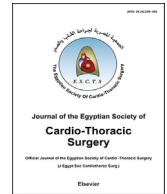
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Short term outcome of conventional versus off-pump coronary artery bypass grafting for high-risk patients

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ABSTRACT

Background: Off-pump coronary artery bypass grafting (OPCAB), avoiding the use of cardiopulmonary bypass, has attracted the interest of an increasing number of surgeons and patients, and has assumed an increasing role in surgical practice. Whether OPCAB has better outcome in high-risk patients as compared to Conventional coronary artery bypass grafting (C-GABG) remains to be confirmed. We describe an analysis of early clinical outcomes of high-risk coronary artery disease (CAD) patients, subjected to both techniques.

Methods: We studied 450 patients with additive EuroSCORE of ≥ 5 on admission. Patients were divided into 2 groups; Group A was assigned for patients underwent conventional C-CABG, and Group B for patients underwent OPCAB. Data, including gender, age, demographic variables and postoperative complications were extracted from the medical records.

Results: Both groups were matched with regard to age, gender, smoking, Diabetes mellitus, dyslipidemia, renal hemodialysis and the mean Euro-Score. We demonstrated a decrease in the incidence of early postoperative atrial fibrillation and renal failure in the Off-pump group. However, we recorded no statistical difference of neurologic complications, acute myocardial infarction or early mortality between the two groups.

Conclusions: We recommend OPCAB in high-risk CAD patients, as this technique may carry potential benefits without compromising their clinical outcomes.

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1. Introduction

Coronary artery bypass grafting (CABG), using cardiopulmonary bypass (CPB) with cardioplegic arrest and aortic cross-clamp, has been the standard procedure for surgical revascularization. Off-pump coronary artery bypass grafting (OPCAB),

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avoiding the use of CPB, has attracted the interest of an increasing number of surgeons and patients, and has assumed an increasing role in surgical practice especially meeting the challenges posed by the progressive evolution of percutaneous procedures [1].

Since the development of OPCAB in the 1960s and its reintroduction in the 1990s, it was expected to reduce inflammatory response, myocardial injury and the incidence of serious postoperative morbidity and mortality [2]. Despite its promising results, several randomized trials comparing OPCAB and C-CABG have failed to demonstrate any significant differences in mortality, stroke, myocardial infarction, or new renal failure. These randomized controlled trials were conducted in relatively low-risk patients [3,4].

In high-risk Coronary Artery Disease (CAD) patients, surgical myocardial revascularization often produces poor results leading to significant mortality and morbidity [5]. An increasing data are demonstrating the benefit of OPCAB, and the resulting decreases in surgical mortality and morbidity, particularly in this group of patients [5–8].

On the contrary, another randomized clinical trial demonstrated that mortality seemed higher after OPCAB; besides, no significant difference in major adverse cardiac and cerebrovascular events was found between OPCAB and CABG in patients with a high-risk operative profile [9]. Management of high-risk patients remains unclear. Whether OPCAB has better outcome in high-risk patients as compared to CABG remains to be instituted. We described this study of early clinical outcomes of high-risk CAD patients, comparing the results of C-CABG with OPCAB.

2. Patients and methods

From December 2009 to January 2015, 1345 consecutive patients suffering from CAD underwent primary isolated CABG in King Faisal Specialist Hospital and research Center in Jeddah, Saudi Arabia and Naser Institute, Cairo Egypt, were investigated. Patients were considered to be high-risk if they had a preoperative Standard Additive Euro-score of ≥ 5 on admission. All diseased vessels with a diameter of ≥ 1 mm were completely revascularized. Individual surgeons made their technique selections based on their experience and preference.

Using the propensity score-matching method, high-risk patients with similar pre-operative characteristics were selected. A total of 450 patients with high-risk stratification according to additive EuroSCORE were selected. We carried out a comparative analysis of patients underwent C-CABG and those who underwent OPCAB with regard to their early clinical outcomes.

2.1. Clinical data collection

Our patients were divided into two groups; Group A included patients underwent C-CABG (260 patients), and Group B was assigned for patients underwent OPCAB (190 patients).

Data, including demographic variables, gender, age, and postoperative morbidity and mortality were collected from patients medical records. All patients were received to the telemetry floor for monitoring after discharging from ICU during their hospital stay.

2.2. The exclusion criteria

We excluded patients with cardiogenic shock requiring emergency surgery, concomitant cardiac or noncardiac surgical procedures, history of stroke or transient ischemic attack (TIA) within one month. We also excluded patients with radiographic evidence with a diseased (porcelain) ascending aorta.

We had 14 patients intraoperatively switched to on-pump after been initially planned for OPCAB due to hemodynamic instability. Another 5 cases were performed off-pump after had been allocated for on-pump due to heavily calcified ascending Aorta. Those patients were excluded from the study to avoid potential bias.

2.3. Operative technique

Standard median sternotomy was done for all patients. The coronary anatomy was assessed for assignment to OPCAB or C-CABG. Pedicled Left internal mammary artery and saphenous vein grafts were harvested.

2.3.1. On-pump technique

After the standard median sternotomy, CPB was established with a single two-stage right atrial cannulation and an ascending aorta cannulation. Heparinization with 3 mg/kg to get an activated clotting time >480 s. Heparin reversal with 1 mg protamine sulfate/1 mg heparin before coming off the pump. Patients were then cooled to 32 °C.

The type of cardioplegic solution and method of delivery, proximal (aortic or composite) and distal (single or sequential) anastomoses, and the medication regimen were chosen according to the participating institute clinical practice.

2.3.2. Off-pump technique

The pericardium was retracted using three deep sutures, and we placed sponges under the heart. This was aimed for a better exposure of lateral and posterior vessels.

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