

**Early post operative results of On pump versus Off pump coronary artery bypass surgery in High risk patients**

***Thesis***

***Presented by***

**Abdallah Mohamed Osama Mahfouz**

**(M.B.B.Ch. M.Sc. Gen. Surgery, Cairo)**

**In Partial Fulfillment of**

**M.D. Degree in Cardiothoracic Surgery**

***Supervised By***

**PROF. DR. MOSTAFA Mohamed Radwan**

**Professor and Chairman of Cardiothoracic Surgery**

**Faculty of Medicine – Cairo University**

**Assistant PROF. DR. Yehia Balbaa Anwar**

**Balbaa**

**Assistant Professor of Cardiothoracic Surgery**

**Faculty of Medicine – Cairo University**

**DR. Mohamed Ibrahim Ahmed Swaylam**

**Lecturer of Cardiothoracic Surgery**

**Faculty of Medicine – Cairo University**

***Faculty of Medicine - Cairo University 2003***

# Early post operative results of On pump versus Off pump coronary artery bypass surgery in High risk patients

## **Rationale And Background**

A successful and reproducible surgical approach for coronary artery revascularization to relieve anginal pain has evolved in the past three decades. Cardiopulmonary bypass (CPB) with cardioplegic arrest has satisfied the surgeon's need for a still and soundly bloodless field. **(Favaloro 1998, Keshetty et al 2000)**

In the past decade, the idea of lessening the invasive aspect of coronary surgery led to the development of new techniques based on the abandon of the cardiopulmonary bypass (Off-pump coronary artery bypass OPCAB). **(Jegaded and Mikaeloff 2001)**. Which caused a general regression towards the initial technique of coronary bypass in the era preceding the use of CPB. Off pump Myocardial revascularization was first performed in 1967 by Kolesov at the territory of the anterior vessels of the heart (LAD), the RCA or the diagonals. **(Kolesov 1976)**. Favaloro (in 1968) used it mainly to the RCA. **(Favaloro 1968)**. Later on, this technique was abandoned when CPB & cardioplegic cardiac arrest began to be safely used. **(Weinschelbaum et al 2000)**.

In spite of the remarkable advances implemented in coronary artery bypass surgery, the treatment of patients with coronary artery disease having severe left ventricular dysfunction still poses a particularly important challenge as perioperative mortality can range up to 37% with high morbidity. **(Christakis et al 1992)**.

## **Hypothesis**

Nowadays it is a well known fact that CPB is associated with substantial morbidity and complication risks. **(Roach et al 1996)**. CPB requires full heparinization, induces a whole body inflammatory response, and generates micro emboli. **(Ascione et al 2000, Diegeler et al 2000)**. Diffuse systemic inflammatory responses during and after CPB has been strongly linked to disrupting the coagulation cascade, fibrolysis and hence more post operative bleeding. **(Yokoyama et al 2000)**. Therefore it can be concluded that procedures that do not use CPB are likely to prevent these unwanted events. Consequently it can also be logically concluded that if CPB can be avoided (OPCAB), a reduction in perioperative morbidity and mortality is anticipated **(Jansen et al 1998)**.

Initially the beating heart operative technique was deemed to be more technically demanding, however, the recent introduction and continuous improvement in coronary mechanical stabilizers has considerably improved the feasibility and the outcome of these procedures. Although the beating heart operative technique was shown to be a suitable alternative to conventional CPB operations in selected patients carrying high surgical risk, it has not been considered on a systemic basis for the majority of patients. **(Moshkovitz 1995)**.

In the recent literature OPCAB was reported to be of favourable results. **(Czemy et al 2001)**. Many studies suggested that in selected patients OPCAB was a safe procedure that yielded a short term cardiac outcome comparable to that with on pump CABG. **(Diederik et al 2001)**.

## **Objective**

Although some recent studies have shown favourable results of OPCAB in patients with severe left ventricular dysfunction and EF as low as 30% (Cazemy et al 2001), the need for more studies investigating the short term results of this technique in high risk patients is still essentially required. In this study we aim at evaluating the role of OPCAB in high risk patients and whether its early outcome is truly superior to on pump CABG in terms of morbidity and complications.

## **Patients and methods**

This study includes 50 patients with high risk coronary artery disease, patients will be divided into two groups, Group (A) 25 patients will undergo on pump CABG and Group (B) 25 OPCAB. All the patients subjected to this study are High risk patients.

### **Inclusion criteria:**

Patient is considered as high risk if he has one or more of the following criteria:

1. EF < 35%
2. Left main disease > 75%
3. Unstable angina

### **Exclusion criteria**

1. Associated valvular disease
2. Associated aortic aneurysms
3. Redo coronary artery bypass cases
4. Complicated ischemic heart disease, i.e. Ischemic VSD or Left ventricular aneurysms
5. Associated congenital heart disease requiring surgical correction

### **Methodology:**

**All patients will be investigated by:**

(A) Pre-operative:

- 1) ECG
- 2) Echocardiography
- 3) Coronary angiography
- 4) Lab investigations (CBC, liver and kidney functions, coagulation profile, CK, and CK-MB)

(B) Intra-operative:

All patients will be submitted to CABG surgery through a median sternotomy, where the following items will be assessed:

- 1) Cross clamp time and total cardiopulmonary bypass time.
- 2) The resumption of normal rhythm, and whether it occurred spontaneously or after DC shock.
- 3) Weaning off CPB and the need to prolonged support on the bypass.
- 4) The need for inotropic support.
- 5) ECG changes in the form of ischemia or arrhythmia.
- 6) Patients Hb% and the need for blood transfusion.
- 7) The need to revert from OPCAB to CPB.
- 8) The need for an Intra Aortic Balloon.

(C) Post-operative:

All patients will be followed up post operatively for the following:

#### **Immediate post operative (During ICU Stay)**

- 1) Haemodynamics of the patient.
- 2) Blood loss.
- 3) Ventilatory support.
- 4) Total ICU stay
- 5) Inotropic support

- 6) Need for Intra Aortic Balloon
- 7) The level of creatine kinase (CK) and its isoenzyme (CK-MB) immediately after the patient arrives to the ICU and then after 24 hours post operatively, and the level of serum Troponin will be done if needed
- 8) The incidence of any neurological events during ICU stay.
- 9) Labs (CBC, liver and kidney functions and coagulation profile)

**The patients will be followed up after one week for the following:**

- 1) 12 leads ECG
- 2) CK & CK-MB
- 3) 2D Echo
- 4) Post operative complications as embolic, cerebral, renal, hepatic, etc...

**The patients will be followed up after 3 & 6 months post operatively by:**

- 1) Echocardiography
- 2) Follow up of complications if any