

Pre-operative HbA1c as a Predictor of Early Sternal Wound Infection of Diabetic CABG Patients

Thesis

Submitted for Partial Fulfillment of Master Degree in
Cardiothoracic Surgery By

Mohammed Farahat Helmey Hassan

M.B., B.CH

Faculty of Medicine – Fayoum University

Under Supervision of

Prof. Dr. Tarek Ahmed Nossier

Professor of Cardiothoracic Surgery Faculty
of Medicine – Cairo University

Prof. Dr. Ahmed Nabil Khallaf

Assistant Professor of Cardiothoracic Surgery Faculty
of Medicine – Fayoum University

Dr. Hossam Fathy Ali Sayed

Lecturer of Cardiothoracic Surgery Faculty of
Medicine –Cairo University

**Faculty of Medicine
Cairo University 2016**

SUMMARY

Myocardial revascularization has been an established mainstay in the treatment of CAD for almost half a century. Coronary artery bypass grafting (CABG), used in clinical practice since the (1960s), is arguably the most intensively studied surgical procedure ever undertaken, while percutaneous coronary intervention (PCI), used for over three decades, has been subjected to more randomized clinical trials (RCTs) than any other interventional procedure.

Coronary artery bypass grafting (CABG) has shown to be superior to medical therapy, demonstrating significant clinical improvement and long-term survival. There are major risk factors for postoperative complications and late death after CABG. However, recent studies have shown that early postoperative survival after CABG has improved as a result of advances in surgical techniques, myocardial protection strategies, anesthesia, and postoperative pharmacological and mechanical support.

The long-term benefit of CABG is maximized with the use of arterial grafts; specifically the ITA. Available grafts include internal thoracic and radial arteries. All except the radial artery can remain connected to their anatomical inflow or be used as free graft, with the aorta or another graft as inflow.

Diabetes mellitus (DM) is one of the most important diseases in the modern society and represent not only a medical but also social problem. In industrialized countries, the prevalence of DM is 2% - 4% in the general population, and up to 10% in the age group over 65, its incidence showing an increasing tendency.

Clinical experiences from (CABG) in patients with diabetes mellitus (D M) particularly those insulin treated are that the operation is more technically demanding because of extensive coronary artery pathology and results inferior regarding both survival and complication compared To patients without D M.

Hemoglobin A1C was first separated from other forms of hemoglobin by **Huisman and Meyering** in 1958 using a chromatographic column.

HbA1c is a molecule that results from the non-enzymatic glycation of hemoglobin at the valine residue. Its concentration is dependent on both the lifespan of erythrocytes and plasma glucose concentration. Because the average lifespan of erythrocytes in humans is approximately 100 to 120 days, the HbA1c level reflects the glycemic state of the previous 3 to 4 months.

HbA1c level > 6.5% is consistent with a diagnosis of diabetes and a level of 5.7% to 6.4% with pre diabetes. Recent guidelines recommend an HbA1c target aiming for a value of below 7.0% .

Postoperative Sternal wound infection particularly Mediastinitis after open heart surgery is an infrequent, but potentially a devastating complication with high morbidity, prolonged hospitalization, increased costs, as well as increased mortality.

The reported incidence of mediastinitis after coronary artery bypass grafting (CABG) is 0.4 to 4%.

Thus, there is a critical need to identify patients undergoing cardiac surgery who are at risk for major infections and to develop effective interventions to prevent these infections.

This study presents analysis the relationship between preoperative HbA1c levels and postoperative outcomes including Sternal wound infection following coronary artery bypass graft (CABG) in diabetic controlled and non-controlled patient groups.

This prospective comparative observational study was conducted on 50 diabetic patients underwent CABG operation on cardiopulmonary bypass or off-

pump in Al-Kasr Al- Ainy University Hospital, Cairo University. It was divided into 2 groups: **Group 1:** 25 Patients with serum HbA1c values below 7%, **Group 2:** 25 patients with serum HbA1c values 7 or more. HbA1c levels had been drawn prior to surgery in all patients undergoing CABG surgery as part of their routine pre-operative investigation.

WE found the following

Uncontrolled DM with Elevated hemoglobin A1C level (Hb A1C > 7) was strongly associated with obesity and depressed LV function and adverse events after coronary artery bypass grafting and increase the risk of:

- Prolonged ICU stay.
- Pneumonia.
- Wound infection (mediastinitis) result in Increased incidence of mortality
- Increase Total hospital length stay

The most important predisposing risk factors of Sternal wound infection are:

- Uncontrolled diabetes mellitus (HbA1c >7 %)
- Obesity BMI >30 increase risk of sternal wound infection
- Prolonged post-operative ventilator more than 10h increase the risk of mediastinitis.
- Prolonged ICU stay more than 3day
- Post-operative pneumonia (chest infection) increases the risk of mediastinitis

