THE IMPACT OF SEX DIFFERENCE ON THE EARLY OUTCOME OF CORONARY ARTERY BYPASS GRAFTING IN PATIENTS WITH HIGH BODY MASS INDEX

Thesis

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Contents

Abstract

Background

Gender has been reported to be an independent risk factor for coronary artery bypass grafting (CABG) Cardiac Risk Evaluation. The effect of the body size on the CABG outcome is less clear. There is ongoing debate about obesity as a risk factor for adverse outcomes after cardiovascular procedures.

Patients and Methods

In sixty patients with high body mass index (BMI) (>35) subjected to isolated CABG surgery (30 males, 30 females) aged 35–65 years, with Coronary Atherosclerosis all sixty were studied for early postoperative mortality and early outcome.

Results

The females study group showed significantly higher mortality (20%) compared to the males study group (0%) with a p value of 0.010. And also showed significantly longer hospital stay (29.8 ± 42.48) compared to the males study group (13.4 ± 5.05) with a p value of 0.040.

Conclusion

Gender can be considered an independent risk factor for mortality and postoperative stay in morbidly obese patients undergoing CABG operation.

Keywords & Abbreviations

CABG
BMI
Gender

List of Abbreviations

ACC American College of cardiology
ACPB After Cardiopulmonary Bypass
AHA American heart association
AF Atrial Fibrillation
ASE American Scociety Of Echocardiography
BCPB Before Cardiopulmonary Bypass
BMI Body Mass Index
BT Bypass Time
CABG Coronary artery bypass grafting
COPD Chronic Obstructive Pulmonary Disease
CPB Cardio Pulmonary Bypass
CT Cross clamp time
CVP Central Venous Pressure
Cx Circumflex artery
EF Ejection Fraction
IMA Internal mammary artery
Kg Kilogram
LAD Left Anterior Descending
LIMA Left internal mammary artery
M Metre
MAP Mean Arterial Blood Pressure
mmHg Millimeter Mercury
MPAP Mean Pulmonary Artery Pressure
NGT Naso Gastric Tube
NYHA New York Heart Association
OT Operative Time
PDA Posterior Descending Artery
RCA Right coronary artery
RIMA Right enternal mammary artery
SD Standard Deviation
STS Society of thoracic surgeons

List of Tables

List of Figures

INTRODUCTION

Introduction

Obesity has been considered a major risk factor in patients undergoing coronary artery bypass graft (CABG) surgery ***(Eagle et al.1999) and (Parsonnetet al.1989)***. The Parsonnet risk stratification scoring system gives a score of 3 points for patients with a body mass index (BMI) of greater than 35 kg/m2 ***(Parsonnet et al.1989).*** A fair number of severely obese patients with coronary artery disease are therefore not referred by cardiologists, and have their operations either postponed and are advised to lose weight, or are sometimes even turned down by surgeons due to the perception of the supposedly high risk involved when undergoing CABG. However, there does not appear to be much evidence in the literature to support the assumptions that obese patients fare poorly compared to non-obese patients after CABG ***(Parsonnetet al. 1989)***.

In recent years, there has been data published from several institutions suggesting that the risks of undergoing CABG in obese patients may be no different than in the non- obese, especially with regards to mortality, although an increased risk of wound infections and atrial fibrillation have been highlighted. However, the relationship of obesity and the risk of adverse outcomes is still unclear due to the small number of patients in several of these studies ***(Brandt et al.2001), (Fasol et al 1992)., (Prasad et al. 1991), (Ranucciet al. 1999) and (Koshal et al. 1985)***.

Women who undergo coronary artery bypass grafting (CABG) have been previously shown to be at an increased risk of peri-operative mortality and morbidity when compared with men ***(Eagle et al. 1999) and (Parsonnet et al. 1999). (Birkmeyer et al. 1998) ,(Engelman et al.1999) and (Schwann et al.2001***). Numerous explanations for this disparity have been proposed. Some investigations have argued that female sex is independently associated with a poor peri-operative outcome (***Parsonnetet al. 1989)and***(***Engelman et al.1999***). As such numerous risk models developed to predict the operative

mortality associated with CABG have included female gender as a risk factor (***Moulton et al.1996) and (Brandt et al.2001***). Conversely, other investigators have argued that sex differences in outcomes can be largely attributed to co-morbid conditions more prevalent in females such as such as smaller coronary arteries and underutilization of arterial grafts. Moreover, almost all studies have demonstrated that women are older at time of surgery, present at a more acute and symptomatic stage of disease and have a higher incidence of congestive heart failure and diabetes. These factors have been consistently associated with a poor outcome and confound any comparison between men and women (***Fasol et al. 1999),(Prasad et al. 1991), (Ranucci et al.1999), (Koshal et al1985)., (Wynne-Jones et al. 2000), and (Mangram et al.1999***).

Given the association of female sex with a poor peri-operative outcome, many clinicians have adopted a cautious approach towards the management of women with coronary artery disease (***Prasad et al.1991***). As such concerns are being raised that the perception of a worse outcome after CABG in women has resulted in a delayed treatment of women with coronary artery disease which has increased peri-operative mortality and morbidity and accentuated any real differences that may exist (***Prasad et al.1991***).

Due to the need for increased understanding of the disparity in outcomes between men and women, contemporary data on gender outcomes following isolated CABG were evaluated using the Australasian Society of Cardiac and Thoracic Surgeons (ASCTS) Cardiac Surgery Database. The aim is to increase understanding on this important issue by adjusting for the relevant confounding patient and treatment-related factors.***(Saxena et al, 2006)***

The **body mass index** (**BMI**), or **Quetelet index**, is a measure of relative weight based on an individual's mass and height.(***Eknoyan, Garabed 2007).***

The BMI is used in a wide variety of contexts as a simple method to assess how much an individual's body weight departs from what is normal or

desirable for a person of his or her height. There is however often vigorous debate, particularly regarding at which value of the BMI scale the threshold for *overweight* and *obese* should be set, but also about a range of perceived limitations and problems with the BMI.

The **ACC/AHA Practice Guidelines (ACC/AHA Guidelines for Coronary Artery Bypass Graft Surgery: Executive Summary and Recommendations) stated that** female sex was an independent risk factor for mortality and morbidity after CABG. More recent studies have suggested that women on average have a disadvantageous, preoperative clinical profile that accounts for much of this perceived difference. In other words, the issue is not necessarily sex itself but the comorbid conditions that are particularly associated with the later age at which women present for coronary surgery. Thus, CABG should not be delayed in or denied to women who have appropriate indications ***(Engelman et al.1999)***.

Aim of the Study

In this study, we aimed to assess the effect of gender on in-hospital morbidity and mortality in patients with high BMI (>35) undergoing isolated CABG at our institution, the Department of Cardiothoracic Surgery Cairo University.

REVIEW OF LITERATURE

Introduction to Coronary Artery Bypass Grafting (CABG)

Historical Background

Following the history of myocardial revascularization worldwide, one can clearly conclude that it passed progressive sequential steps. In 1962, a cardiac surgeon by the name of Sabiston conducted the first unsuccessful saphenous vein graft from the ascending aorta to the distal right coronary artery and the patient died 3 days later. The technique was then pioneered by the Argentinian René Favaloro and others at the Cleveland Clinic Ohio USA in the late 1960s. The next major development was in 1970, when the internal mammary artery was used as a bypass conduit to the coronary arteries. By the mid 1970s, many centers in the United States, Australia, and Europe were performing CABG with low peri-procedural mortality, and a high rate of pain relief ***(Pollick et al 1993)*** and ***(Keenan and Chou 1998).***

The first minimally invasive cardiac surgery/coronary artery bypass grafting was performed on January 21, 2005, at what was then The Heart Institute of Staten Island by a highly trained team led by Dr. Joseph McGinn.

Between (1972) and (1984)several randomized trials compared medical and surgical therapy for the treatment of atherosclerotic CAD. The two major trials, the Coronary Artery Surgery Study (CASS),***(Eagle et al., 2004)*** and the European Coronary Surgery Study (ECSS)demonstrate the greatest survival benefit of revascularization to be among those patients at highest risk. ***(Hawkes et al., 2006)***