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## Impact of obesity on the results of cardiac surgery in Egypt: Early outcomes on heart valve surgery

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### ABSTRACT

**Background:** Rheumatic heart disease is endemic in developing countries, but obesity is worldwide increasing. The aim of this work was to evaluate impact of obesity on the results of heart valve surgery.

**Methods:** This cohort prospective study was conducted on 500 patients with heart valve diseases requiring valve surgery at two centers: Cardiothoracic Surgery Department, Zagazig University Hospitals and General hospital in El Ahrar, Zagazig, Egypt from August 2013 to August 2016. Heart valve surgery patients were subdivided according body mass index (BMI) into 5 groups: non-obese group: BMI < 25; overweight group: BMI 25–29.9; class I obese group: BMI 30–34.9; class II obese group: BMI 35–39.9; and class III obese group: BMI ≥ 40.

Collected data were classified into: preoperative, operative, postoperative and follow up data.

**Results:** This study showed that there was no significant difference between the 5 groups regarding the following postoperative outcomes: exploration, arrhythmia, pacemaker insertion, tracheostomy and renal impairment. On the other hand, surgical site infection (SSI) had percentage in the 5 groups as follow: 0.9%, 5.4%, 7.4%, 9.1% and 50% respectively. A highly significant difference was found between non-obese group versus class III obese group, while there was significant difference between overweight group and class I obese group versus class III obese group.

**Conclusions:** This study found no obesity association with higher postoperative morbidity or mortality except for only SSI. So obesity had neutral effect on outcomes and the term Obesity paradox should be changed since the impact of obesity was just a parallax effect.

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## 1. Introduction

Rheumatic valvular heart disease, an important result to rheumatic fever, is still the most common acquired heart disease globally and is the main reason of cardiovascular death through the first five eras of natural life in evolving nations [1].

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The occurrence of overweight and obesity has extended extraordinary points, and the yearly speed of rise in most developed areas is significant [2].

There are further than 1 billion overweight adults and at least 300 million apparently obese [3]. The Middle East and North Africa area has the peak degrees of overweight and obesity of the unindustrialized world with effects for the whole disease load and native health facility capability [4].

Obesity is well recognized to be a hazard reason for the progress of diabetes mellitus (DM), hypertension, and coronary artery disease. It is as well supposed to be a hazard reason for preoperative morbidity and mortality with cardiac surgery, proved by its insertion in the Parsonnet system for stratification of danger for perioperative demise [5].

The body mass index (BMI) (kg/m<sup>2</sup>) assesses dietary grade, metabolic aberrations, and overall organ function of patients. Numerous readings have shown the impact of BMI on illness and death after cardiac surgery [6]. But, the importance of obesity in patients undergoing cardiac surgery remains blurred [7].

The objective of this study was: 1. To assess percentage of obese patient among heart valve surgical patients who were admitted during the period of the study at two centers: Zagazig University Hospitals, Cardiothoracic Surgery Department, and Zagazig General hospital, Zagazig, Egypt, 2. To study effect of obesity on the results of heart valve surgery and to study the difference of the consequences of heart valve surgery between obese and non-obese.

## 2. Methods

This cohort prospective study was conducted on 500 patients with heart valve disease requiring valve surgery at two centers: Cardiothoracic Surgery Department, Zagazig University Hospitals and General hospital in El Ahrar Zagazig General hospital, Zagazig, Egypt from August 2013 to August 2016.

Heart valve surgery patients were subdivided according body mass index (BMI) into 5 groups: non-obese group: BMI < 25; overweight group: BMI 25–29.9; class I obese group: BMI 30–34.9; class II obese group: BMI 35–39.9; and class III obese group: BMI ≥ 40.

**Inclusion criteria:** patients Aged 15–70 years, of both sexes and who had heart valve disease requiring valve surgery.

**Exclusion criteria** patients Aged <15 years and >70 years, patients with congenital heart disease excluding mitral valve prolapsed and bicuspid aortic valve requiring surgical intervention and patients associated with coronary artery disease requiring coronary artery bypass graft (CABG).

All patients were monitored routinely in the operating room during cardiac surgery. Cannulation techniques and cardiopulmonary bypass (CPB) were conducted as usual. Myocardial protection was done by antegrade warm blood cardioplegia repeated every 30 min. Sternal closure was done in a similar fashion in the 5 groups, mostly with seven simple wires. After the surgical procedure, patients were monitored in an intensive care unit (ICU) for at least 24 h. Strict control of blood glucose level was done during the first two postoperative days, by means of an intra-venous insulin infusion.

### 2.1. Tools of data collection

#### 1 Preoperative data:

- a. **Personal data:** Age, sex, weight, height, BMI and date of surgery.
- b. **Investigation (and lab):** chest X-ray, electrocardiography (ECG) complete blood picture, kidney function tests, liver function tests, prothrombine time, partial thromboplastine time, international normalized ratio (INR), lipid profile, respiratory functions, echocardiography, HB A1C and cardiac catheterization for patients if indicated.
- c. **History of:**
  - Cardiovascular system: hypertension, heart failure: New York Heart Association classes (NYHA), ischemic heart disease (IHD)
  - Respiratory system: Smoking, obstructive pulmonary disease (COPD), respiratory failure, and preoperative mechanical ventilation.
  - Neurological system: cerebrovascular accident as noticed by history of stroke with or without remaining defects
  - Renal system: preoperative dialysis or chronic renal failure,
  - Endocrine system: diabetes mellitus.
  - History of previous surgery.

#### 2 **Operative data:** Priority of procedure (urgent, emergent and elective), time of surgery: (First do, redo, and third-do surgery), type of surgery: (Mitral valve surgery, aortic valve surgery, tricuspid valve surgery and combined), operative time and ischemic time, CPB time, use of blood products, use intra-aortic balloon-pump (IABP) and use of inotropes.

#### 3 **Postoperative data:**

- Inotropic support (type and dose).
- Ventilation time.
- Length of ICU stay.
- Length of hospital stay.
- Lab: complete blood picture (CBC), kidney function test, liver function test, prothrombine time, partial thromboplastine time, and INR.

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