Abstract: P5291

Is the obesity paradox in cardiac surgery really a myth?: effect of body mass index on early and late clinical outcomes

Authors:
L M Burgos¹, JC Espinoza¹, A Gil Ramirez¹, L Seoane¹, JF Furmento¹, F Berton¹, R Baro Vila¹, L Villalba¹, PR Miranda¹, L Polero¹, MA Cracco¹, D Navia¹, MN Benzadon¹, ¹Cardiovascular Institute of Buenos Aires (ICBA) - Buenos Aires - Argentina,

Topic(s):
Obesity

Introduction: Obesity has been considered a risk factor for cardiovascular death and for poor outcomes from a variety of surgical procedures, recent studies suggest that overweight (OW) and obese (OB) patients may paradoxically have a better prognosis in cardiac surgery (CS) compared with patients with normal body mass index (BMI). We aimed to investigate the obesity paradox and assess the effect of BMI on early and late clinical outcomes after CS

Methods: A retrospective cohort study of consecutive patients undergoing CS from January 2007 to January 2019 was carried out. Patients were divided into 4 groups defined by BMI: underweight (UW) (=18.5 kg/m²): 0.5%, n=27; normal weight (NW) (18.5-25 kg/m²): 25.7%, n=1393; OW (25-30 kg/m²): 44.7%, n=2423; OB (=30 kg/m²): 29.1%, n=1576. Multivariable analyses was used to compare the outcomes among the different BMI groups. Overall 1-year survival of BMI categories were determined by the Kaplan-Meier method.

Results: We included 5419 patients (72% male, mean age 65.8 +/- 12.1). The BMI groups were significantly different regarding pre-surgical variables, UW patients were statistically more comorbid and severe clinical presentation. Categorical mortality was 7% in UW, 5.2% in NW, 3.2% in OW, 4.3% in the OB group, P=0.016. The risk of death according to BMI exhibited a reverse J-shaped curve. Low cardiac output syndrome, medical and surgical bleeding and longer hospital stay was more frequent in the UW group (P<0.05), and mediastinitis, hyperglycemia and prolonged mechanical ventilation in OB group (P<0.05). Univariable regression detected the following significant predictors of in-hospital mortality: Age, female, non-elective surgery, non isolated coronary surgery, vascular peripheral disease, chronic obstructive pulmonary disease, severe left ventricular fraction ejection, chronic renal disease, anemia, stroke, myocardial infarction, heart failure and BMI categories (P<0.05): NW (odds ratio (OR), 1.49; 95% CI, 1.09 - 1.9, P=0.01), in contrast, OW had a significantly lower risk of death (OR 0.66 IC 95% 0.5-0.88, P=0.005), with no statistical significance in the UW and OB categories. After adjusting for other risk factors at the multivariate analysis, BMI as a continuous variable was not an independent predictor of in-hospital mortality. One-year follow-up was completed in 95%, during this period 223 (4.12%) died. The analysis of unadjusted long-term mortality did not show a significant difference between BMI categories (P log rank = 0.16).

Conclusion: In our population OW patients had lower mortality and better outcomes after cardiac surgery. However, when other preoperative variables are taken into account, BMI did not have independent effect on in-hospital and one-year mortality, questioning the existence of an "obesity paradox". Its effect on mortality could be indirect, being mediated through other comorbidities.
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