Archives of Cardiovascular Disease (2014) **107**, 540—545

Available online at ScienceDirect www.sciencedirect.com

Elsevier Masson France EM|consulte www.em-consulte.com/en

CLINICAL RESEARCH

Results of elective cardiac surgery in patients with severe obesity (body mass index ≥ 35 kg/m^2)

Résultats de la chirurgie cardiaque programmée chez les patients avec une obésité sévère (indice de masse corporelle ≥ 35 kg/m^2)

Ilir Hysi[a,*], **Claire Pinçon**[b], **Laurent Guesnier**[a], **Laurence Gautier**[a], **Carlos Renaut**[a], **Hervé Géronimi**[a], **Laurent Jasaitis**[a], **Olivier Fabre**[a]

[a] *Department of Cardiac Surgery, Lens Hospital and Bois Bernard Private Hospital, Lens, France*
[b] *Department of Biostatistics, UDSL, Lille, France*

Received 4 June 2014; received in revised form 16 June 2014; accepted 20 June 2014
Available online 17 September 2014

KEYWORDS
Morbidity;
Obesity;
Surgery;
Cardiac

Summary
Background. — The increasing number of obese patients eligible for cardiac surgery requires risks and benefits to be balanced in this population.
Aims. — To study the results of cardiac surgery in severely obese patients (body mass index [BMI] ≥ 35 kg/m^2).
Methods. — In this retrospective study of 3564 patients undergoing elective cardiac surgery between 2004 and 2012, the population was divided into two groups: BMI 20—34.9 kg/m^2 (n = 3282) and BMI ≥ 35 kg/m^2 (n = 282). Patients with BMI < 20 kg/m^2 were excluded due to the well-known increased mortality risk. The primary endpoint was 90-day mortality. A multivariable analysis was performed to identify prognostic factors.
Results. — Among our patients, 58.2% and 27.7% underwent isolated coronary or valvular surgery, respectively; 9.7% had combined valvular and coronary surgery and 4.4% had other procedures. Severely obese patients were younger: 62.5 ± 9.3 years vs 67.8 ± 10.7 years (P = 0.0001). Overall 90-day mortality was 4.0%. Severe obesity did not influence postoperative mortality. In the multivariable analysis, the interaction between preoperative renal failure and severe obesity was an important mortality prognostic factor (hazard ratio: 11.17; P = 0.03).

Abbreviations: BMI, body mass index; CPB, cardiopulmonary bypass; GFR, glomerular filtration rate; HR, hazard ratio.

* Corresponding author. UCCA, centre hospitalier de Lens, 99, route de la Bassée, BP 118, 62302 Lens cedex, France.
E-mail address: ilirhysi@gmail.com (I. Hysi).

http://dx.doi.org/10.1016/j.acvd.2014.06.004

Mediastinitis rates were similar between groups in non-diabetic patients; in diabetic patients, severe obesity was associated with higher mediastinitis rates ($P = 0.002$). Superficial wound infections were higher in severely obese patients ($P = 0.003$).
Conclusion. — Elective cardiac surgery in severely obese patients was not associated with increased perioperative morbimortality, but had a higher superficial wound infection risk. Nevertheless, severe obesity itself should not be a contraindication to elective surgery.

MOTS CLÉS
Morbidité ;
Obésité ;
Chirurgie ;
Cardiaque

Résumé
Contexte. — L'augmentation des patients obèses éligibles à la chirurgie cardiaque nécessite de mieux étudier la balance bénéfices—risques.
Objectif. — Étudier les résultats de la chirurgie programmée chez les patients obèses sévères (indice de masse corporelle [IMC] $\geq 35\,kg/m^2$).
Méthodes. — Il s'agit d'une étude rétrospective de 3564 patients opérés entre 2004 et 2012. La population a été divisée en deux groupes : IMC : 20—34,9 kg/m^2 ($n = 3282$) et IMC $\geq 35\,kg/m^2$ ($n = 282$). Les patients avec un IMC $< 20\,kg/m^2$ ont été exclus en raison d'un surrisque bien établi dans la littérature. Le critère de jugement était la mortalité à 90 jours.
Résultats. — Respectivement, 58,2 % et 27,7 % des patients ont eu une chirurgie coronarienne ou valvulaire ; 9,7 % une chirurgie combinée et 4,4 % d'autres procédures. Les patients obèses sévères étaient plus jeunes : $62,5 \pm 9,3$ ans vs $67,8 \pm 10,7$ ans ($p = 0,0001$). La mortalité à 90 jours était de 4,0 % et non influencée par l'obésité sévère. L'association insuffisance rénale préopératoire et obésité sévère était de mauvais pronostic (HR : 11,169 ; $p = 0,03$). Les taux de médiastinite étaient comparables entre les groupes, chez les non-diabétiques, alors que chez les diabétiques l'obésité sévère était associée à plus de médiastinites ($p = 0,002$). Les infections des cicatrices étaient plus élevées chez les patients obèses sévères ($p = 0,003$).
Conclusions. — La chirurgie cardiaque programmée chez des patients obèses sévères n'accroît pas la morbi-mortalité périopératoire. Elle présente un risque plus élevé d'infection de la cicatrice. Néanmoins, l'obésité sévère en soi ne devrait pas être une contre-indication à cette chirurgie.

Background

Recent data from the World Health Organization showed that worldwide obesity has nearly doubled since 1980 [1]. In 2008, 35% of adults (> 1.4 billion) aged ≥ 20 years were overweight and 11% (> 200 million men and nearly 300 million women) were obese. Being overweight/obese is nowadays the fifth leading risk of global death and at least 2.8 million adults die each year as a result of being overweight or obese.

The proportion of obese patients eligible for cardiac surgery is following the same upwards trend, which raises the issue of the perioperative risk of this population. Low body mass index (BMI $< 20\,kg/m^2$) is an independent factor that affects morbidity and mortality negatively after cardiac surgery [2,3]. On the other hand, the relationship between obesity and operative outcomes is unclear. Some authors have reported that obesity negatively affects operative mortality in patients undergoing valvular surgery [4], while others have suggested the existence of an 'obesity paradox', with such patients having a better survival rate than normal-weight patients [5,6].

The consequence of severe obesity (BMI $\geq 35\,kg/m^2$) in perioperative care after cardiac surgery is an interesting issue. The EuroSCORE risk calculation in this patient group might be incomplete in predicting operative mortality, as it does not take into account the weight of the patients. The present study aims to evaluate perioperative morbidity and mortality in severely obese patients undergoing elective cardiac surgery.

Methods

Population

This was a retrospective study carried out using a prospective database of 3564 patients undergoing elective cardiac surgery between January 2004 and December 2012. All patients gave written consent to inclusion of their medical information in our institutional database and to the use of this information for research purposes. The study was approved by the Institutional Review Board of the French Society of Thoracic and Cardio-Vascular Surgery (CERC-SFCTCV-2013-8-2-22-12-38-Hyll).

Patients were divided into two groups according to their BMI: group I ($n = 3282$), $20\,kg/m^2 \leq BMI \leq 34.9\,kg/m^2$; group II ($n = 282$), BMI $\geq 35\,kg/m^2$. Patients with a BMI $< 20\,kg/m^2$ were deliberately excluded due to their established increased mortality risk, as reported unambiguously in the literature. Overweight ($25\,kg/m^2 \leq BMI \leq 29.9\,kg/m^2$) and