BMJ Open Body mass index and outcomes of patients with laparoscopic adrenalectomy: a systematic review and meta-analysis protocol

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ABSTRACT

Introduction Recent advances in the field of medical imaging and minimal invasive surgery have improved the diagnosis and treatment of adrenal incidentalomas. Recent studies suggest increased morbidity and mortality among patients with obesity following laparoscopic adrenalectomy compared with patients without obesity. However, this claim remains to be ascertained. This review seeks to assess the outcome of patients with and without obesity after adrenalectomy.

Methods and design We will include cohort studies, case-control studies, cross-sectional studies and case series with more than 30 participants. EMBASE, Medline and Web of Science (Web of Science Core Collection, Current Contents Connect, KCI-Korean Journal Database, SciELO Citation Index, Russian Science Citation Index) will be searched for relevant abstracts of studies published between 1 January 2000 and 31 May 2019, without language restriction. The review will be reported according to the Preferred Reporting Items for Systematic Review and Meta-Analysis guidelines. After screening of abstracts, study selection, data extraction and methodological quality assessment, we shall assess the studies individually for clinical and statistical heterogeneity. Random-effect meta-analysis will be used to pool studies judged to be clinically homogenous. The Harbord's test and visual inspection of funnel plots will be used to assess publication bias. Results will be presented by country and region.

Ethics and dissemination Since primary data are not collected in this study, ethical approval is not required. This review is expected to provide relevant data on the impact of body mass index on the outcome of laparoscopic adrenalectomy. The final report will be published in a peer-reviewed journal.

PROSPERO registration number CRD42018117070.

Review status Preliminary searches.

INTRODUCTION

Obesity is a major public health problem worldwide.^{1 2} In fact, according to World Health Organization (WHO), the prevalence of people with a body mass index (BMI) ≥ 30 kg/m² has grown steadily in recent years—tripling since 1975.^{3 4} In 2016, adults with obesity represents 13% of the global population.³ The increase in the global prevalence of people

Strengths and limitations of this study

- This will be the first global systematic review summarising data on the association between body mass index and the outcome of laparoscopic adrenalectomy.
- Rigorous methods and robust statistical analysis will be used to minimise bias and provide accurate data.
- Only contemporary (2000–2019) evidence will be considered.
- No language restriction will be applied.

with obesity corroborates with the rising prevalence of diabetes, hypertension, dyslipidemia and cancers.³ Obesity is associated with significant morbidity and mortality in both medical and surgical patients.

The role of BMI greater than the normal range in the outcome of patients after surgery, in general, and after abdominal surgery in particular is unclear,^{1 5–12} with some studies suggesting a negative impact of high BMI on abdominal surgery.^{8 11 12} It is argued that patients with high BMI would have higher post-operative morbidity than those with a normal BMI.^{1 8 12} On the other hand, some studies evoke a beneficial role of obesity on postoperative mortality after digestive surgery, and this phenomenon has been named the 'obesity paradox'.^{6 7 9} Unfortunately, most of these studies either focused on surgery of intraperitoneal organs or a particular type of surgery (cancer surgery or bariatric surgery), leaving aside the surgeries of retroperitoneal structures and benign tumours.

Advances in the field of medical imaging have improved the diagnosis of adrenal incidentalomas and consequently, increased the indications of adrenalectomy.^{13 14} Moreover, the popularisation of minimal invasive surgery in recent years has made surgery of retroperitoneal structures much easier to perform in both patients with or without obesity.¹² However,

several recent studies suggest a difference in outcome between both categories following adrenalectomy.^{8 9 11 12} Until now, no study has examined the relationship between adrenal surgery and BMI at the global scene. Thus, the present systematic review and meta-analysis aims to assess the impact of BMI on the outcome of patients after adrenalectomy in order to provide relevant data to help policy-makers to implement effective strategy if necessary, to curb down the burden of postoperative complications in patients with obesity after laparoscopic adrenalectomy.

Review question

Is there an association between obesity and mortality rate, complication rate, readmission rate within 30 days, and length of hospital stay among patients with laparoscopic adrenalectomy?

Objectives

This systematic review and meta-analysis aims at:

1. Comparing the mortality rate after laparoscopic adrenalectomy between patients with and without obesity.
2. Comparing the complication rate after laparoscopic adrenalectomy between patients with and without obesity.
3. Comparing the mean length of hospital stay and the readmission rate within 30 days postsurgery after laparoscopic adrenalectomy between patients with and without obesity.

METHODS AND DESIGN

This systematic review and meta-analysis will be reported in conformity with the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines.¹⁵ The Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA-P) for protocol was used to report this protocol.¹⁶ The PRISMA-P checklist is attached as online supplementary file 1.

Criteria for considering studies for the review

Types of participants

We will include participants of all ages and gender who underwent laparoscopic adrenalectomy.

Type of exposure

Obesity will be defined in this study as to BMI ≥ 30 kg/m².⁴

Type of comparator

Patients without obesity will be considered as comparator (BMI < 30 kg/m²).⁴

Types of outcomes

We will consider studies reporting the following outcomes with enough data to compute these estimates:

- Mortality rate after laparoscopic adrenalectomy;
- Complication rate after laparoscopic adrenalectomy;
- Length of hospital stay and the readmission rate within 30 day postsurgery after laparoscopic adrenalectomy.

We will exclude studies in which relevant data are impossible to extract even after contacting the corresponding author.

Types of studies

We will include cohort studies, case-control, cross-sectional studies and case series with more than 30 participants. Studies reporting data on open surgical procedure, letters to the editor, case reports, narrative reviews, commentaries, perspectives and editorials will be excluded.

Research strategy for identifying relevant studies

The search strategy will be conducted as discussed below.

Bibliographic database searches

Relevant articles published on laparoscopic adrenalectomy will be identified by searching EMBASE, Medline and Web of Science (Web of Science Core Collection, Current Contents Connect, KCI-Korean Journal Database, SciELO Citation Index, Russian Science Citation Index) from 1 January 2000 to 31 May 2019. Text words and medical subject heading terms related to laparoscopic adrenalectomy and obesity will be used including: 'laparoscopy', 'celioscopy', 'obesity', 'overweight' and 'adrenalectomy'. The online supplementary file 2 shows the full search strategy for PubMed, which will be adapted to fit with other databases. No language restriction will be applied. For articles published in a language other than Spanish, English and French, an experienced translator in the concern language will be contacted for translation.

Searching for other sources

We will scan the references of all relevant articles for additional data sources missed during our search, and their full texts will be retrieved. References of pertinent reviews will also be scanned.

Selection of studies for inclusion in the review

Two reviewers (CD and NVA) will independently evaluate the studies obtained from the searches, using an assessment form to ensure that the selection criteria are reliably applied. These reviewers will screen the titles and abstracts of papers obtained, after which the full texts of potentially eligible papers will be retrieved by at least one reviewer. The two reviewers will independently review the full text of each potentially eligible study, compare their results and resolve any discrepancy by the arbitration of a third reviewer (JJB). For duplicates studies published in more than one report, the one reporting the largest sample size will be considered. Studies with inaccessible full text either online or from the corresponding author will be excluded.

Assessment of methodological quality and reporting of data

The methodological quality of included studies will be assessed using the Risk Of Bias In Non-randomised Studies—of Interventions tool.¹⁷

Data extraction and management

All citations identified after implementation of the searched strategy will be imported inside the Endnote software. All records obtained from various databases will be combined in a single Endnote library, and the duplicates will be removed. Thereafter, a data extraction form will thereafter be used to collect information on the surname of the first

author, year of publication, country where the study was conducted, study design, study area (rural vs urban), age groups (children, adolescent, adult, elders), sample size, mean or median age, gender, specific characteristics of the study population, mean BMI, indication of adrenalectomy, duration of surgery, mortality rate, complication rate, type of complication, length of hospital stay and readmission rate. For multinational studies, the data will be reported for the individual countries. Where it is impossible to disaggregate data for such studies by country, they will be presented as a single study, and the individual countries which participated in the study will be reported.

Data synthesis and analysis

To measure the association between obesity and outcomes, we will perform meta-analyses using the random-effects method of DerSimonian and Laird to pool weighted OR or absolute mean difference.¹⁸ Heterogeneity will be assessed and quantified using the χ^2 test on Cochrane's Q and I² statistic, respectively.¹⁹ I² values of 25%, 50% and 75% will be considered to represent low, medium and high heterogeneity, respectively. We will assess the presence of publication bias by visually inspecting funnel plots and using the Harbord's test.²⁰ Where necessary, meta-regression and subgroup analyses will be performed to investigate the possible sources of substantial heterogeneity using the age of patients, country and the study methodological quality. The findings will be summarised narratively in case of substantial clinical heterogeneity. The inter-rater agreement for study inclusion between investigators will be assessed using Cohen's κ coefficient.²¹ Data analyses will be done using the 'meta' package of the statistical software R (V.3.5.1 (14 August 2014), The R Foundation for statistical computing, Vienna, Austria). This systematic review protocol was registered under the review number CRD42018117070 in the International Prospective Register of Systematic Reviews.

Presentation and reporting of results

The study selection process will be summarised using a flow diagram. Data from individual studies will be presented in summary tables and forest plots, where appropriate. The quality scores and risk of bias for each eligible study will be reported accordingly.

Patient and public involvement

Patients and/or the public were not directly involved in this study.

Potential amendments

Any amendment in the review process will be reported for transparency.

Ethics and dissemination

Since primary data are not collected in this study, ethical approval is not required. This review is expected to provide relevant data on the impact of BMI on the outcome of laparoscopic adrenalectomy. The final report will be published in a peer-reviewed journal.

Contributors CD had the idea. CD and JJB designed and conceived the protocol. CD drafted the manuscript. VNA and JJB participated in the critical revision of the manuscript for methodology and intellectual content. CD and JJB are the guarantor of the review. All authors approved the final version of this manuscript.

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