

Review

Outcomes after laparoscopic anti-reflux surgery related to obesity: A systematic review and meta-analysis

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ABSTRACT

Background: Laparoscopic Anti-Reflux Surgery (LARS) is an established alternative treatment to pharmacological therapy for patients with Gastro Oesophageal Reflux Disease (GORD), yet its safety and efficacy in obese patients is controversial. A systematic review and meta-analysis was performed to compare LARS related to obesity.

Methods: Embase, MEDLINE and the Cochrane Library (January 1970 to July 2017) were searched for studies reporting clinical outcomes of LARS in patient cohorts stratified by Body Mass Index (BMI). Data was grouped according to BMI, < 30 kg/m² (non-obese) and ≥ 30 kg/m² (obese). Primary outcome measures were reflux recurrence, operative morbidity, re-intervention (redo surgery and endoscopic dilatation), conversion to open surgery, and early return to theatre. Results were pooled in meta-analyses as Odds Ratios (OR).

Results: Thirteen eligible observational studies comparing LARS in non-obese (n = 6246) and obese (n = 1753) patients were identified. Recurrence of reflux was significantly lower in the non-obese cohort (OR 0.28, 95% C.I. 0.13 to 0.61, p = 0.001), however no significant differences were observed in rates of operative morbidity (OR 0.82, 0.54 to 1.23, p = 0.33), redo surgery (OR 0.94, 0.51 to 1.72, p = 0.84), endoscopic dilatation (OR 0.98, 0.45 to 2.17, p = 0.97), conversion to open surgery (OR 0.96, 0.50 to 1.85, P = 0.90), or early return to theatre (OR 0.77, 0.43 to 1.38, p = 0.39).

Conclusions: LARS can be performed safely in obese patients, but risks higher GORD recurrence. Clinicians and patients should be aware that obesity may adversely affect LARS outcome and careful consideration be given in the consent process inherent within the optimal management of GORD.

1. Introduction

Gastro oesophageal reflux disease (GORD) is among the commonest contemporary problems faced by medical practitioners. Precise details regarding its prevalence are unclear, but there remains a perception that it is rising, with reports commonly citing some 10–30% of the population in the western world [1]. The condition was first described in 1935 by the American gastroenterologist, Asher Winkelstein, although the classic symptoms were described earlier in 1925 [2,3].

Obesity in the West represents a contemporaneous increasing health concern. Data published as a part of the World Health Organization (WHO) study in 2014, indicated that 26% of adults in the United Kingdom were clinically obese with a Body Mass Index (BMI) greater than 30 kg/m² [2] [4]. Moreover, the worldwide prevalence has more than doubled between the years 1980–2014 [4]. Any reasonable

observer might therefore expect GORD and obesity to be related, and indeed pathophysiological theories for an association exist and include, increased intra-abdominal pressure, diminished lower oesophageal sphincter pressure, and reduced gastric motility, resulting in symptomatic GORD being up to three times more prevalent in obese patients [5–12].

Laparoscopic Anti-Reflux Surgery (LARS) has become an established alternative to lifelong pharmacological acid suppression, and in patients refractory to such therapy. A variety of fundoplication procedures, in which the stomach is used to reinforce a dysfunctional lower oesophageal sphincter at the gastro-oesophageal junction, have been shown to be both safe and effective, with the Nissen fundoplication reportedly the commonest performed [13–16]. LARS in obese patients however, has been a source of controversy in recent years, with experts citing poorer clinical outcomes in this patient cohort, not least because

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of the associated technical difficulties and the increased postoperative intra-abdominal pressure allegedly putting strain on the diaphragmatic hiatus. Certainly, the literature is conflicting, with no consensus regarding relative complication rates, recurrence of reflux, or para-oesophageal herniation. Given these controversies some surgeons have questioned the merits of LARS for GORD in the obese, and the aim of this study was to perform a systematic review and meta-analysis to compare the clinical outcomes of LARS related to obesity. The primary outcome measure was the relative incidence of recurrent reflux related to BMI. Secondary outcome measures were relative incidence of perioperative complications, re-intervention rates in the form of endoscopic dilatation or surgery, conversion to open surgery, and early return to theatre.

2. Materials and methods

2.1. Literature search strategy

A systematic review of the literature was carried out according to the Preferred Reporting Items for Systematic review and Meta-Analysis (PRISMA) [17]. Embase, MEDLINE, and the Cochrane Library databases were systematically searched from January 1970 to July 2017 for studies reporting clinical outcomes of laparoscopic anti-reflux surgery (LARS) in patient cohorts stratified by Body Mass Index (BMI). The following terms were used to identify studies: fundoplication, Nissen, Rossetti, Toupet, Lind, Guarner, Dor, Thal, reflux, obese, obesity, weight, BMI. Reference lists of retrieved articles were used to hand search and identify further potentially relevant articles.

2.2. Data extraction

A standardized protocol was used for all data extraction by two authors (TA, AL) and discussion amongst all authors was used to reach agreement regarding discrepancies encountered. The following information was obtained from each study: first author, year of publication, study design, number of subjects undergoing LARS stratified by BMI, perioperative complications, conversion to open surgery, early return to theatre, need for redo surgery or endoscopic dilatation, recurrence of reflux symptoms, and mean follow up.

All included studies stratified patients into cohorts according to the recognized WHO BMI classification. Data from all of these studies were extracted and re-organised into two broader categories for the purpose of meta-analyses: non-obese (BMI < 30) versus obese (BMI ≥ 30).

2.3. Inclusion and exclusion criteria

Studies comparing outcomes of LARS related to patients' BMIs were included. Studies that did not report outcomes, experimental studies, case reports and unpublished data from conference abstracts were excluded. Studies not stratifying patients using the WHO BMI classification were excluded.

2.4. Outcomes of interest

Outcome measures examined included post-operative recurrence of reflux, perioperative complications, need for re-intervention by redo surgery and endoscopic dilatation, rates of conversion from laparoscopic to open surgery, and return to theatre during the index admission.

Reflux recurrence was measured either subjectively, through the reporting of clinical symptoms, or objectively utilizing methods such as 24-h pH studies, oesophageal manometry, barium swallow and gastroscopy. A number of studies used both subjective and objective measures to define recurrence. Publications that reported reflux using various validated scoring systems were excluded as meta-analysis of this data was not possible.

2.5. Statistical analysis

The meta-analysis was performed in accordance with the Cochrane Collaboration and PRISMA guidelines using Review Manager 5.3 (The Nordic Cochrane Center, The Cochrane Collaboration, Copenhagen, Denmark) Dichotomous variables were analysed using Odds Ratio (OR). Due to the anticipated heterogeneity of the data, a Mantel–Haenszel random-effects model was used during statistical analysis of all meta-analyses. The pooled ORs were reported with 95% confidence intervals (CI). The point estimate where OR was considered statistically significant was $p < 0.05$ and where the 95% CI did not span 1. The Newcastle-Ottawa Scale was used to evaluate the quality of non-randomized cohort studies [18]. This examines studies using three domains, assessing the methodology of patient selection, comparability of cohorts, and finally outcome assessment and follow up. A star scoring system correlates with study quality. At least seven stars from a maximum of nine were deemed to indicate a high-quality study.

2.6. Heterogeneity and publication bias

The I^2 value was used to assess heterogeneity, quoted for each meta-analysis. Publication bias was assessed using Funnel Plots, with asymmetry implying either recall or publication bias [19].

3. Results

The full texts of 35 publications were obtained; 13 of these were cohort studies that met criteria for review (Fig. 1). Statistical analysis was carried out on 7999 patients who had undergone therapeutic laparoscopic anti-reflux surgery, of whom 6246 patients were non-obese and 1753 patients obese.

3.1. Characteristics of included studies

Six of the included studies were retrospective cohort studies [20–25] and seven were prospective cohort studies [26–32]. Table 1 summarizes the study characteristics. Six studies that investigated recurrence of reflux symptoms following LARS were included in the meta-analysis [20,22,24–26,29]. Eight studies explored perioperative complications [21–23,26–28,30,31], eight studies reported on the need for

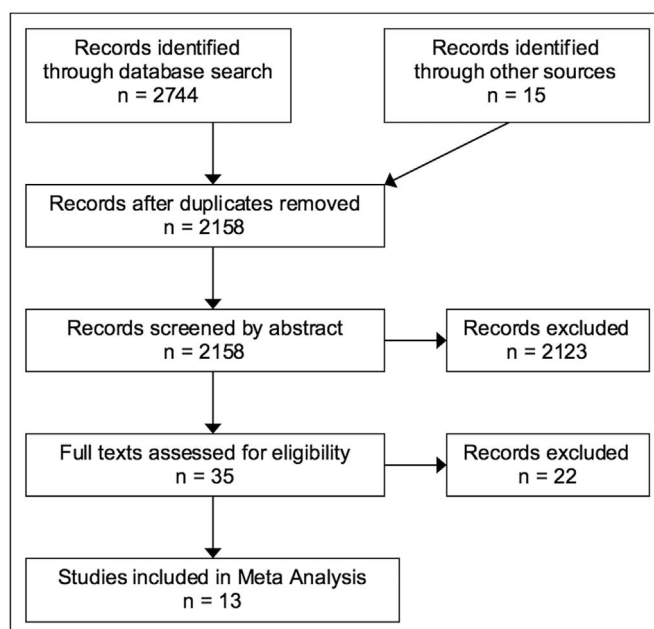


Fig. 1. Identification of eligible studies.

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