Available online at www.sciencedirect.com

The Surgeon, Journal of the Royal Colleges of Surgeons of Edinburgh and Ireland

www.thesurgeon.net

Review

Comparison of laparoscopic adjustable gastric banding (LAGB) with other bariatric procedures; a systematic review of the randomised controlled trials

P.D. Chakravarty [a], E. McLaughlin [a], D. Whittaker [a], E. Byrne [a], E. Cowan [a], K. Xu [a], D.M. Bruce [b], J.A. Ford [a,*]

[a] University of Aberdeen, Section of Population Health, Polwarth Building, Foresterhill, Aberdeen AB25 2ZD, UK
[b] Department of General Surgery, Aberdeen Royal Infirmary, UK

ARTICLE INFO

Article history:
Received 2 November 2011
Received in revised form
7 February 2012
Accepted 7 February 2012
Available online 8 March 2012

Keywords:
Laparoscopic adjustable gastric banding
Bariatric surgery
Systematic review

ABSTRACT

Background: Bariatric surgery can provide efficient weight loss and improvement in obesity-related co-morbidities in adults. Laparoscopic adjustable gastric banding (LAGB) comprised 30.3% of all bariatric procedures between 2009 and 2010 in the UK. This review evaluates the level 1 evidence for change in co-morbidities, quality of life (QoL) and weight provided by LAGB compared with other bariatric procedures.

Method: Systematic literature search of MEDLINE, EMBASE and CENTRAL (1988 to May 2011) was performed. Only randomised controlled trials (RCTs) were included. Studies with non-surgical comparators, open gastric banding procedures or adolescent participants were excluded. Primary outcome was change in co-morbidities. Secondary outcomes included QoL, weight loss, complications, operation time and length of stay.

Results: Five RCTs met the inclusion criteria. Vertical banded gastroplasty, sleeve gastrectomy and gastric bypass were compared to LAGB. Co-morbidities were reported in two studies and QoL in one. LAGB was comparable to other procedures for both of these outcomes. All five trials showed LABG to be effective in weight loss, however all comparative procedures resulted in greater weight loss. Operative time and length of hospital stay were significantly shorter with LAGB. Short-term complications were found to be consistently lower in the LAGB group. Evidence was divided with respect to long-term complications.

Conclusion: Co-morbidities and QoL are poorly reported and showed no difference between LAGB and other bariatric procedures. Evidence suggests that LAGB is not the most effective surgical procedure to reduce weight. LAGB is associated with lower early complications and shorter operative time and length of stay, and therefore may be preferable to patients.

* *Corresponding author*. Tel.: +44 (0)1224 559 441; fax: +44 (0)1224 554 580.
E-mail address: John.ford@abdn.ac.uk (J.A. Ford).

1479-666X/$ – see front matter
doi:10.1016/j.surge.2012.02.001

Introduction

Obesity is a twenty-first century pandemic. According to the Scottish Health Survey (2008), 27% of adults in Scotland are currently obese, increasing to an estimated 41% by 2030.[1] It is not surprising that in Scotland obesity costs the NHS an estimated £171 million annually.[2] Most of this expenditure is associated with increased prevalence of diabetes, cardiovascular disease, musculoskeletal disease and malignancy. Obesity is primarily managed in primary care with non-surgical interventions such as lifestyle and behaviour interventions. However, as these fail and weight continues to increase, management may include pharmacological intervention and/or surgery. Bariatric surgery, compared with lifestyle interventions, results in a greater decrease in cardiovascular risk factors,[3,4] and achieve higher remission of type 2 diabetes.[5] A large Swedish observational study found a 29% reduction in mortality in patients who underwent bariatric surgery compared with conventional management.[6]

The number of bariatric procedures has been steadily increasing.[7,8] The National Bariatric Surgery Register reported that laparoscopic adjustable gastric banding (LAGB) currently represents 30.3% of all bariatric procedures carried out in the UK.[8] Compared with open adjustable gastric banding, the laparoscopic technique has resulted in shorter hospital stay and fewer re-admissions.[9] Some have even suggested that, with proper patient selection, LAGB could be performed in an outpatient setting.[10]

Bariatric procedures such as gastric banding, sleeve gastrectomy (SG) and vertical banded gastroplasty (VBG) are primarily restrictive procedures. Primary VBG is now rarely performed. The aim of these procedures is to reduce stomach capacity in order to quicken satiety and reduce food intake. Gastric bypass procedures are a mixture of restrictive and malabsorptive methods whereas duodenal switch and biliopancreatic diversion are predominantly malabsorptive procedures. The aim of these procedures is to reduce absorption by shortening gastrointestinal transit time. Generally speaking, procedures with a malabsorptive component are more complex but may provide superior weight loss. There are several important outcomes for patients undergoing bariatric surgery. From a patient's perspective, weight loss may not be the most important outcome. Other outcomes such as present and future co-morbidities, operative risks, self-perception and functioning, may be more important. These outcomes are undoubtedly associated with weight loss, but not in a linear relationship; a small degree of weight loss, may improve an individual's self-perception substantially. Trials have tended to focus on degree of weight loss without adequate assessment of outcomes such as change in co-morbidities and quality of life. These outcomes incorporate weight loss, but also include other important outcomes.

Recent SIGN guidelines[11] recommend bariatric surgery in patients with a body mass index (BMI) of more than 35, the presence of one or more severe co-morbidities, which would be expected to improve with weight reduction, and evidence of completion of a structured weight management program which did not significantly improve co-morbidities. SIGN does not recommend one procedure over another. In this review we evaluate the level one evidence for LAGB compared with other surgical procedures. In particular we focus on co-morbidities and quality of life outcomes associated with each procedure.

Methods

A systematic review of the randomised controlled trials (RCT) was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) statement.[12] All RCTs comparing LAGB and any other surgical procedure were included. Non-adult studies, open gastric banding procedures and trials that reported surrogate end points, such as plasma ghrelin levels, were excluded. There were no exclusions based on language, band type or publication status. The primary outcome was change in co-morbidities. Comorbidity was defined as any obesity-related systemic disease reported at baseline and follow-up. Secondary outcomes included improvement in quality of life, mean change in BMI or percentage excess weight loss (EWL%), complications, length of hospital stay and operation time. Only quality of life measures assessed on a validated quality of life questionnaire were included.

Eligible studies were identified through MEDLINE, EMBASE, CENTRAL and clinicaltrials.gov. Literature search included studies from 1988 to June 2011. Literature search was performed by two authors independently (EMcL and JF). The following search strategy was used for MEDLINE and EMBASE; step 1 gastric banding (exp)/laparoscopic gastric band$/laparoscopic adjustable gastric band$/LAGB, step 2 randomized controlled trial$/controlled study/controlled clinical trial.mp/random allocation.mp/randomization/double blind$.mp/single blind$.mp, step 3 combine 1 AND 2. Articles identified from "other sources", were found by screening the references from included studies and review articles. All titles were screened and studies excluded if obviously not relevant. If there was any doubt concerning the eligibility of a study the abstract and full text were reviewed.

Data were extracted by one author and double checked by a second (EMcL and DW/EC). Any difference in selected studies or data extraction was resolved by adjudicating senior author (JF). Study authors were contacted in the case of unpublished trials. Extracted data included; study objectives, inclusion/exclusion criteria, method of randomisation, blinding, number of participants, patient demographics, length of follow-up, mean change in BMI, EWL%, complications, hospital stay and operation time. Study quality was assessed using Cochrane risk of bias criteria. Data were assessed for statistically pooling of results through meta-analysis.

Results

Literature search

Literature search identified 801 papers after de-duplication (Fig. 1). Excluded studies are shown in Table 1.[9,10,13–31] Five trials (seven published articles) were suitable for