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The safety and efficacy of bariatric surgery for obese, wheelchair bound patients

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ABSTRACT

INTRODUCTION The aim of this study was to evaluate outcomes of bariatric surgery performed in order to improve mobility in patients with severe mobility limitations.

METHODS Patients with severe mobility impairment (wheelchair bound) who underwent laparoscopic Roux-en-Y gastric bypass (LRYGB) or laparoscopic adjustable gastric banding (LAGB) surgery to improve their mobility were included in this study. Patients were identified between July 2009 and October 2011 using an electronic prospective bariatric database. Mobility was assessed by questionnaire during clinic follow-up appointments.

RESULTS Fifteen patients (11 female, 4 male) with a mean age of 48 years (range: 26–71 years) and a mean body mass index of 46kg/m^2 (range: 33–54kg/m^2) were included. Seven patients (47%) underwent LAGB and eight (53%) LRYGB. The aetiologies of mobility impairment included advanced osteoarthritis (*n*=6), spinal conditions (*n*=4), severe bilateral leg oedema and ulceration (*n*=2), advanced rheumatoid arthritis (*n*=2) and traumatic paraplegia (*n*=1). The mean length of hospital stay was 3.8 days. There was no mortality. One patient was lost to follow-up. Of the remaining 14 patients, the mean excess weight loss percentage at a mean of 18.5 months postoperatively was 48% (68% for LRYGB, 20 months; 29% for LAGB, 17 months). Ten patients reported improved mobility. Reduced pain, improved independence and ability to transfer were most commonly cited. Four patients reported no improvement in mobility (three LAGB patients, one LRYGB patient).

CONCLUSIONS Bariatric surgery can safely improve mobility and quality of life in obese patients with severe mobility impairment. Our paper supports the idea that severe mobility impairment should be considered an indication for bariatric surgery in selected patients. LRYGB demonstrated better weight loss and mobility improvement than LAGB. Larger studies are required to establish robust selection criteria for surgery in this group.

KEYWORDS

Bariatric surgery – Laparoscopy – Roux-en-Y gastric bypass – Mobility limitation

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The 2009 *Health Survey for England* identified that 22% of men and 24% of women were obese.[1] It is predicted that by 2025, 47% of men and 36% of women will be obese. The rise in obesity will adversely impact patients' health, mobility and economic status.[2,3] A study involving 18,584 non-institutionalised individuals from across 11 European countries identified that obese patients (body mass index [BMI] ≥30kg/m^2) were significantly more likely to suffer with arthritis and arthralgia, and to have difficulty walking 100 metres than their counterparts.[3]

Obesity is a risk factor for osteoarthritis,[4] diabetes, cardiovascular disease and various malignancies.[5] Obese patients experience poorer health related quality of life.[6] Furthermore, obesity is increasing the economic burden through healthcare costs and lost productivity,[7] in part owing to consequent mobility impairment.

Bariatric surgery has grown immensely over recent years and it is considered the superior treatment for morbid obesity[8–10] as it results in significant and sustained weight loss.[11] Moreover, bariatric surgery significantly influences the management of type 2 diabetes mellitus and hypertension.[12,13] Postoperatively, morbidly obese patients with osteoarthritis report significant improvements in their mobility[14,15] and arthralgia.[16]

Few studies have investigated the effects of laparoscopic Roux-en-Y gastric bypass (LRYGB) or laparoscopic adjustable gastric banding (LAGB) surgery on mobility and/or quality of life of patients with advanced pre-existing mobility impairment. Currently, mobility is not an indication for bariatric surgery according to National Institute for Health and Care Excellence guidelines.[17]

The primary aim of this study was to assess weight loss in patients undergoing LAGB and LRYGB with advanced pre-existing mobility impairment requiring wheelchair use. The secondary aim was to assess the safety of these procedures in this patient subgroup.

Methods

Patients with a specific cause of advanced mobility impairment (defined as the inability to walk unaided and needing a wheelchair) and who were operated on between July 2009 and October 2011 were identified using the Chelsea and Westminster Hospital prospective bariatric database. Suitability for surgery was assessed by the multidisciplinary team, consisting of specialist psychologists, dieticians, medical and anaesthetic teams. The choice between LAGB and LRYGB was based on patient preference. The patients' weight was recorded at 6 weeks as well as 3, 6, 9 and 12 months, and then annually. The perceived effects of surgery on patient mobility were assessed by asking the patients whether they thought their mobility had improved compared with how it was prior to surgery. If the answer was 'yes', they were asked how they felt their mobility had improved. Otherwise, they were asked how they thought their mobility had deteriorated since the surgery.

Differences between the LAGB and LRYGB groups were evaluated using chi-squared testing. A p-value of <0.05 was considered statistically significant. Data were entered into SSPS® (SPSS, Chicago, IL, US).

Results

Fifteen patients fulfilled the inclusion criteria for the study (Table 1). The most common mobility impairment was advanced osteoarthritis (6/15) and spinal conditions (5/15) including spinal muscular atrophy, spina bifida, cervical spondylosis, spinal stenosis and traumatic paraplegia. Two patients had severe lower limb rheumatoid arthritis. One patient had chronic venous insufficiency with bilateral venous ulcers and one had chronic bilateral cellulitis.

One surgeon (EE) operated on 12 patients. Three patients were operated on by two other bariatric surgeons in the department (GB and JS). One patient was lost to follow-up.

Seven patients underwent LAGB and eight had LRYGB. The mean preoperative BMI was 46kg/m^2. The mean operating time was 2.6 hours and the mean length of hospital stay was 3.8 days. Patients undergoing LAGB had significantly lower mean operating times (107 minutes, standard deviation [SD]: 33.12 minutes) than those undergoing LRYGB (197 minutes, SD: 21.96 minutes) (p=0.002).

Table 1 Patient demographics

	LAGB (n=7)	LRYGB (n=8)	Combined (n=15)
Mean age in years (range)	51 (27–71)	45 (26–66)	48 (26–71)
Male-to-female ratio	3:4	1:7	4:11
Mean preoperative BMI in kg/m^2 (range)	45 (33–54)	46 (40–54)	46 (33–54)

LAGB = laparoscopic adjustable gastric banding; LRYGB = laparoscopic Roux-en-Y gastric bypass; BMI = body mass index

Two patients (2/15, 13%), one from each group, developed early postoperative chest infections that required intravenous antibiotics. Five patients (5/8) in the LRYGB group had delayed postoperative complications. One patient underwent a laparoscopy for an internal hernia at three months. Another with rheumatoid arthritis and long-term steroid use was diagnosed with a marginal ulcer at six weeks; this patient was managed with proton pump inhibitors. Three patients developed gastrojejunal anastomotic strictures requiring balloon dilation, with one requiring multiple dilations.

In the LAGB group, the mean excess weight loss percentage (%EWL) at an average of 17 months postoperatively was 28.5% (range: +34–75%). One patient who underwent LAGB had substantial weight gain (+34%). In the LRYGB group, at an average of 20 months postoperatively, the mean %EWL was 68% (range: 37–114%).

Ten patients (10/14, 71%) reported improvement in their mobility status and were satisfied with the postoperative outcome. Six (6/7, 86%) who underwent LRYGB and four (4/7, 57%) who had LAGB reported improved mobility. Six patients (6/14, 43%) reported improved confidence in their ability to transfer and mobilise. Five (5/14, 36%) reported improvement in mobility mainly owing to the significant reduction in pain. There was no association between the aetiology of mobility impairment and improvement in postoperative mobility. Four patients (4/14, 28%) experienced no improvement in their mobility. Three of these underwent LAGB; one of them gained significant weight and the other two experienced no improvement despite good weight loss. Both of the latter patients suffered from spinal problems with muscle wasting. One patient with spina bifida who underwent LAGB reported improvement in his ability to transfer and push the wheelchair despite minimal weight loss (3% EWL).

One patient with bilateral knee osteoarthritis lost 57% EWL at 35 months following LRYGB and yet reported worsening mobility due to increased knee pain. One patient who underwent LRYGB was lost to follow-up.

Discussion

This case series investigated patients who underwent bariatric surgery for advanced mobility impairment, secondary to various pathologies. The mean BMI in the LRYGB group was higher than that of the LAGB patients. All patients in the LRYGB group lost weight whereas following LAGB weight loss was less marked and one patient gained weight.

There is scanty evidence in the literature with regard to the effect of bariatric surgery on patients with significant mobility impairment. However, preoperative mobility impairment in obese patients is well documented. The Longitudinal Assessment of Bariatric Surgery study identified that 48% of obese patients had objectively defined mobility impairment and 16% used a walking aid.[18] One study of 2,845 patients demonstrated that a history of being overweight and/or obese

in midlife or earlier was associated with an increased risk of incident mobility impairment in normal weight individuals between 70 and 79 years.[19] These findings are relevant to our study population, who have pre-existing mobility impairment; timely bariatric surgery may prevent further deterioration in mobility in later life.

Several studies have demonstrated improvements in mobility following the effects of weight loss.[15,20] A small study investigating 28 morbidly obese individuals after LRYGB reported less disability and impairment in as few as 3 weeks following surgery.[21] The Arthritis, Diet and Activity Promotion Trial randomised obese individuals with symptomatic knee osteoarthritis into groups with the aim of assessing the effect of weight loss on their mobility.[14,15] Groups included restricted diet, exercise, exercise with the addition of a restricted diet and healthy lifestyle (control group). The exercise and diet group experienced the most weight loss as well as the greatest improvements in walking distance and stair climbing time. This group reported significantly less knee pain than the other groups, which may have improved mobility.[16]

Another trial randomised patients with symptomatic knee osteoarthritis to a low energy diet or a control diet.[22] Weight reduction of 10% improved function by 28%, based on the WOMAC® (Western Ontario and McMaster Universities) osteoarthritis index. A small prospective study in obese patients who were treated either with surgery (LAGB or LRYGB) (n=25) or by medical management (n=20) reported significantly better walking speed, quality of life and perceived functional limitation in the cohort treated with surgery.[23] The postoperative reduction in arthralgia experienced by patients with severe arthritis may be explained by the results of a study that found that for each pound of weight lost, there is a fourfold reduction in the load exerted on the knee per step.[24]

The findings in our study are consistent with those in the literature; the majority of patients (10/12, 83%) who lost weight following surgery reported reduction in their joint pain and/or greater ease in transferring and mobilising. Patients included in this study underwent bariatric surgery with the aim of improving their mobility. To our knowledge, this has not been discussed previously in the literature. This study has demonstrated that surgery for this group of patients is safe and the subsequent weight loss can improve mobility. It is especially interesting that the majority of patients lost enough weight to influence their mobility despite their inability to exercise.

This study has a number of strengths. It was performed in a busy tertiary bariatric centre. The database was maintained prospectively and the multidisciplinary team was consistent throughout the study period.

The study limitations include the small patient cohort. However, this is representative of the number of patients with such advanced mobility impairment. A further limitation is the absence of randomisation, and the unavoidable selection bias that results from the patients selecting between LAGB and LRYGB. This may be indicative of the patients' motivation to lose weight. Moreover, the study was retrospective, and the underlying causes of mobility impairment and baseline mobility varied widely. Further research at a multicentre level is required to validate these results.

Conclusions

The present study suggests that bariatric surgery in patients with significant pre-existing mobility impairment leads to safe weight loss, improves mobility and quality of life. Mobility impairment should be considered an indication for surgery for this group of patients while further studies are performed to validate this. LRYGB was shown to result in significantly more weight loss than LAGB and this should therefore be discussed with patients when discussing surgical options.

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