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Changes in comorbidities and improvements in quality of life after LAP-BAND placement

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Abstract

Possibly the most important outcomes of bariatric surgery involve changes in obesity-related illness, quality of life (QOL), and psychologic well-being. Dramatic improvement or resolution of serious medical comorbidity accompanies the weight loss following laparoscopic adjustable gastric banding with the LAP-BAND (INAMED Health, Santa Barbara, CA). There are major improvements in the conditions of the metabolic syndrome, which is characterized by impaired glucose tolerance, dyslipidemia, and hypertension. Improvement in insulin sensitivity and pancreatic beta-cell function associated with weight loss induces remission in the majority of type 2 diabetics and reduces the risk of others developing type 2 diabetes. Improvement in dyslipidemia is characterized by raised high-density lipoprotein cholesterol and lower triglyceride concentrations. Together with lower blood pressure, these changes provide a substantial reduction in cardiovascular risk. Other medical conditions caused or aggravated by obesity are also significantly improved, including sleep apnea, daytime sleepiness, asthma, and gastroesophageal reflux. Weight loss is associated with improved fertility and more favorable pregnancy outcomes. All aspects of QOL improve substantially, especially physical disability, and post–weight-loss QOL measures approximate those of the general population. There are also major improvements in body image and reduction in depressive illness. These changes provide perhaps the most compelling data regarding the value of LAP-BAND surgery and underlie the great satisfaction experienced by patients.

Those who are severely obese (body mass index [BMI] >35) in our communities often suffer serious illness and physical and psychologic disability. Although the effects of obesity on the functioning, health, and quality of life (QOL) of obese subjects has been studied in detail, the impact of weight loss on these measures is less well documented. The most important outcomes of any weight loss program are those related broadly to health: disease control, disease prevention, and improvements in QOL and psychosocial status. The World Health Organization [1] has recognized this and recommended that study of the changes in health associated with weight loss should be a research priority. The aim of this report is to review the health effects that have been documented following weight loss after placement of the LAP-BAND (INAMED Health, Santa Barbara, CA).

The metabolic syndrome

It is increasingly recognized that disease related to the metabolic syndrome—type 2 diabetes and impaired glucose tolerance, dyslipidemia, and hypertension—provides the greatest health risk to overweight and obese subjects.

Type 2 diabetes and impaired glucose tolerance

Weight loss following LAP-BAND placement has a major impact on type 2 diabetes, with resolution or remission of diabetes in two thirds of patients and improved blood glucose control for the remainder [2–4]. In our study, obese subjects with impaired fasting glucose were all found to have normal fasting plasma glucose 2 years after surgery. In severely obese subjects without diabetes preoperatively and with a follow-up of more than 3,000 patient-years, we have not had a single patient develop type 2 diabetes [4]. Thus, weight loss dramatically reduces the risk of developing the disease. The improvement in diabetes with weight loss following LAP-BAND surgery is related to the dual effects of improvement in insulin sensitivity and pancreatic beta-cell function. As beta-cell function deteriorates over time in

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people with type 2 diabetes, a strong case can be made to use LAP-BAND surgery as an early intervention in severely obese subjects who develop type 2 diabetes. For obese patients with type 2 diabetes, weight loss provides benefit unequaled by any other therapy, and may prove to be the only therapy that substantially changes the natural history of the disease [2,4].

Dyslipidemia of obesity

Increased fasting triglyceride and decreased high-density lipoprotein (HDL)–cholesterol concentrations characterize the dyslipidemia of obesity and insulin resistance [5]. This dyslipidemic pattern is highly atherogenic, and the most common pattern associated with coronary artery disease [6]. Weight loss following LAP-BAND surgery produces substantial decreases in fasting triglyceride levels, an elevation of HDL-cholesterol levels to normal, and improved total cholesterol-to-HDL-cholesterol ratio [4,7,8].

Hypertension

There is evidence of a reduction in both systolic and diastolic blood pressure (BP) following LAP-BAND placement. Preoperatively, many patients are found to be hypertensive despite medical therapy. Not only is BP easier to control, but many patients are able to cease antihypertensive medications [3,4,8].

We have studied the outcome of 147 consecutive hypertensive patients at 12 months after LAP-BAND placement. Preoperatively, only 17 of these patients had BP within the normal range, all on therapy. Hypertension was present in 130 patients preoperatively; 101 of these were taking antihypertensive medications, and the remaining 29 were not on therapy. Mean BP for these patients was 156/97 mm Hg pre–LAP-BAND surgery. At 12 months after LAP-BAND placement, 105 patients had normal BP, 42 remained hypertensive, and only 42 were taking any antihypertensive medication at that time. Mean BP was 127/76 mm Hg. From these data, we found that 80 patients (55%) had resolution of the problem (ie, normal BP and taking no antihypertensive therapy), 45 patients (31%) were improved (less therapy and easier control), and 22 patients (15%) were unchanged.

Sleep disturbance and obstructive sleep apnea

A range of sleep disorders is associated with obesity. The most serious of these is obstructive sleep apnea (OSA). Severe obesity is the greatest risk factor for the development of sleep apnea, with a 10-fold increase in prevalence [9]. Excessive daytime sleepiness, a disabling and potentially dangerous condition, is common in the obese population and is not necessarily related to OSA [10,11]. Major improvements in sleep quality, excessive daytime sleepiness, snoring, nocturnal choking, and observed OSA with weight loss following LAP-BAND surgery have been reported [3,11].

Asthma

A positive relationship between asthma and obesity has been demonstrated in a recent study by Young and colleagues [12]. Certainly, the physiologic changes of obesity on lung function would aggravate asthma. We have reported major improvement, even remission, of asthma following LAP-BAND surgery [13]. Our study demonstrated improvement in all measured aspects of asthma, including symptoms, severity, need for asthma medications (including corticosteroids), and hospital admissions. The asthma severity score fell from 44.5 before operation to 14.3 at 12 months after operation ($P < 0.005$). It is hypothesized that improved respiratory mechanics [14] and possibly a reduction in gastroesophageal reflux following LAP-BAND placement [15] may contribute to the improvement in asthma.

Gastroesophageal reflux

Several studies have now demonstrated that the LAP-BAND is an effective treatment for gastroesophageal reflux disease [15–17]. We have now studied 82 patients with moderate or severe disease, and 1 year after LAP-BAND placement, 89% have no symptoms and are receiving no treatment for gastroesophageal reflux [15].

However, reports have not always been favorable [18,19]. It is essential for the LAP-BAND to be placed correctly and adjusted appropriately to achieve an optimal outcome. Low band placement or failure to recognize and repair a hiatus hernia at the time of placement may exacerbate or induce gastroesophageal reflux. In addition, postplacement prolapse and overtightening of the band may cause reflux. Properly positioned and adjusted, the LAP-BAND effectively treats gastroesophageal reflux disease and morbid obesity simultaneously [15,17,20].

Ovarian dysfunction, infertility, and pregnancy

Obesity, especially central obesity, is associated with ovulatory dysfunction and infertility. In premenopausal women, weight loss significantly reduces active testosterone by reducing total testosterone and increasing the proportion of bound testosterone due to increased sex-hormone-binding globulin. This change usually restores normal ovulation and often fertility. Women are advised to use contraception during the active weight loss phase following LAP-BAND placement, usually for the first year. However, studies reporting pregnancy after LAP-BAND placement report un-

expected pregnancies in previously infertile women [21–23]. These studies also report the value of the adjustability of the band, enabling reduction of gastric restriction in early pregnancy to reduce the impact of any hyperemesis and to allow more favorable nutritional conditions for normal fetal development. Weight gain is advised in all pregnancies, with the advised weight gain based on prepregnancy BMI [24]. The LAP-BAND provides a mechanism during pregnancy to allow appropriate weight gain and can be readjusted, if necessary, to prevent excessive weight gain [21]. We also found the cesarean section rate and the incidence of gestational diabetes and hypertension to be reduced.

Quality of life

Improvement in QOL is one of the most gratifying outcomes of bariatric surgery. A number of studies clearly demonstrate major QOL improvements following LAP-BAND surgery [25–29]. We reported a large prospective study of QOL after LAP-BAND surgery, which used the Medical Outcomes Trust Short Form-36 (SF-36). The SF-36 is a reliable, broadly used instrument that has been validated in obese people. In our study, 459 severely obese subjects had lower scores compared with community normal values for all 8 aspects of QOL measured, especially the physical health scores. LAP-BAND surgery provided a dramatic and sustained improvement in all measures of the SF-36. Improvement was greater in those with more preoperative disability, and the extent of weight loss was not a good predictor of improved QOL. Mean scores returned to those of community normal values by 1 year after surgery and remained in the normal range throughout the 4 years of the study. It is significant that patients who required revisional surgery during the follow-up period achieved the same improvement in measures of QOL [25]. Similar improvements in QOL have been demonstrated in patients having LAP-BAND surgery for previously failed gastric stapling [28].

Body image

Severely obese patients usually have normal pride and investment in their appearance and presentation [30,31], but they evaluate their appearance as being very poor. With society's stigmatization of obesity, there is great psychologic impact. Weight loss following LAP-BAND surgery produces major improvements in self-evaluation of appearance but does not restore community normal levels. The extent of the improvement in appearance is related to the percent of excess weight loss. The discrepancy between one's pride and investment in appearance and presentation and one's self-evaluation of appearance is lower with weight loss, reducing psychologic stress [31].

Depression

The nature of the relationship between obesity and depressive illness remains unclear, with data more suggestive of a positive relationship rather than the "fat and jolly" hypothesis. Many studies have shown an increase in the prevalence of depression and mental illness in obese subjects, including children [31,32]. Although affecting severely obese subjects generally, younger subjects, women, and those with poor body image experience the greatest burden [33]. Improvement in depression has been reported following significant weight loss after bariatric surgery and following behavioral and dietary interventions. In a study of 50 subjects with type 2 diabetes, a major reduction in depression, as measured with the Beck Depression Inventory (BDI), was reported 1 year after LAP-BAND surgery. The BDI score, at 16.3 ± 7 preoperatively, improved to 9.6 ± 8 ($P = 0.009$) 1 year after surgery. In addition to improvements in depression following LAP-BAND surgery, it has been demonstrated that a history of depressive illness does not have an adverse effect on weight outcome following surgery [34,35].

Conclusion

Severe obesity is accompanied by increased mortality, medical morbidity, impaired QOL, and psychosocial disturbance. Surgical intervention using the LAP-BAND has provided a safe and effective method of achieving and sustaining significant weight loss for the majority of severely obese subjects. There is a growing body of evidence demonstrating the powerful beneficial effect of sustained significant weight loss following LAP-BAND surgery on obesity comorbidity and QOL. This evidence provides perhaps the most compelling data regarding the value of LAP-BAND surgery.

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