

Long-term Maintenance of Weight Loss Following Removal of Intra-gastric Balloon: A Brief Communication

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Abstract

Background: Obesity is a global epidemic with increasing prevalence. Bariatric endoscopy provides a novel method of weight loss intervention that is minimally invasive. Intra-gastric balloon (IGB) installation is one such intervention that results in temporary weight loss though its long-term applications remain controversial.

Method: Retrospective data was collected from 12 obese patients who underwent IGB placement for 6.5 months without structured outpatient behavioral support. Anthropomorphic measures were recorded at baseline, time of removal, and at telephone follow-up 4 ± 2.3 years. Successful IGB therapy was defined at maintenance of total body weight loss (TBWL) over 10% from baseline.

Results: Approximately 83% of patients had short-term weight loss at the time of removal with 25% demonstrating durable long-term maintenance of the TBWL goal.

Conclusion: IGB likely requires early intensive lifestyle intervention adjuncts to produce long-term results. It can be valuable in the short-term as a bridge to sustainable medical or surgical weight-loss programs.

Keywords: Intra-gastric balloon; Weight loss; Bariatric surgery; BMI; Morbid obesity

Introduction

Obesity and its associated morbidity and mortality is a global epidemic with increasing prevalence in Canada, with an estimated 27% struggling with obesity and weight loss [1]. Indications for bariatric endoscopy include body mass index (BMI) 30-39 or if less than 30 with >2 metabolic comorbid conditions; bariatric surgery for BMI >40 or <40 with multiple metabolic comorbidities. Installation of an intra-gastric balloon

for 6 months has become an accepted FDA approved technique for reversible non-surgical treatment for obese patients in search of weight loss intervention, primarily indicated as a "bridge" to a sustainable weight management program [2,3]. The long-term outcome of the procedure is still evolving and maintenance of lost weight once the balloon is removed remains controversial. Recidivism rates are in the range of 30-50% at 1 year and 66-78% at 5 years [4-6]. The research presented here was focused on the single intra-gastric balloon treatment, and durability of weight loss efficacy. Our aim is to determine if a mean of 6.5 months of IGB treatment provides sustained long-term weight loss maintenance after IGB removal in the absence of continuous outpatient support.

Methods

12 of 24 obese patients with a mean age of 40 years +/- 8.7 were successfully contacted. Anthropomorphic measurements were recorded at baseline, time of removal, and telephone follow-up. Successful long-term IGB therapy was defined as maintenance of total body weight loss of over 10% from baseline.

Results

At the time of balloon removal (mean of 6.5 months \pm 2.6) the following measurements were observed: BMI ($30\text{kg/m}^2 \pm 2.9$); mean percent of excess weight loss (%EWL) ($53\% \pm 35.9$); and percent total body weight loss (%TBWL) ($14\% \pm 6.1$). Telephone follow up occurred 4 ± 2.3 years after removal of the IGB. At that time, mean BMI was $34\text{kg/m}^2 \pm 5.9$, mean %EWL was $28\% \pm 34.3$, and mean TBWL% was $4\% \pm 8.4$. Three patients (25%) maintained a mean TBWL% of 16% (compared to mean TBWL% of 20% at removal), while five patients (41%) have kept a mean TBWL% of 4% (compared to a mean TBWL% of 13% at removal). Four patients (33%) returned to baseline body weight, 3 of whom reached the targeted 10% TBWL% at time of IGB removal. Overall, there were no long-term complications related to the IGB treatment though one patient in this study suffered from

unbearable nausea after initial balloon implantation and consequently underwent endoscopic IGB removal after 1 month. In the current study, 25% of participants were able to maintain their weight loss after removal of the IGB, while the remaining majority experienced partial or complete weight regain approximately 4 years from removal. These findings are limited in their generalizability given the small sample size, retrospective data, lack of controlled adjunctive lifestyle intervention, and lack of metabolic measures for comparison.

Discussion

Kotzampassi's group performed a similar study in 2012 with the BioEnterics Intra-gastric balloon following 500 participants for 5 years post intra-gastric balloon removal, finding that 23% retained the goal estimated weight loss percentage of >20%. They concluded that IGB can be effective for significant weight loss and prevention of weight regain at 5 years post-removal under the absolute prerequisite of patient compliance and behaviour changes in the early stages of treatment⁶. Moreover, another study looking at patient satisfaction with IGB and long-term weight regain with approximately 3 years follow-up showed that ~79% of patients regained their weight or resorted to further bariatric surgical measures and as such were not satisfied with IGB [7]. The caveat to note in this study is that lifestyle measures were not employed or controlled for and in fact, most patients in the study were using IGB as an alternative to diet and exercise programs as opposed to an adjunct. Intra-gastric balloon for those with a BMI>30kg/m² appears to be an effective adjunct to lifestyle intervention (caloric restriction diet, food/exercise diary, and encouragement to engage in regular exercise) to maximize weight loss in the short term and further promote maintenance in the long term.

In terms of pharmaceutical adjuncts, liraglutide was approved by the FDA for weight reduction in 2014 and has been studied retrospectively in conjunction with IGB, though was not shown to provide any benefit with respect to weight regain at 6 months post-removal [8]. William Ball's group in the UK published a retrospective study in 2019 assessing the effectiveness of IGB as a bridge to definitive surgery in 46 patients categorized as "super obese", which was defined as BMI>40 or BMI>35 with the comorbidities of metabolic syndrome. Their results show that 63% of their participants were able to progress safely to definitive bariatric surgery, noting that in those who failed or were intolerant of initial balloon placement, sequential IGB did not provide any additional benefit [9]. Sachdev et al., 2018 proposed that obese adolescents, that may be more amenable to lifestyle change than adults, may derive more benefit from IGB with respect to weight regain and metabolic outcomes. In their 12-participant study, weight loss at balloon removal was 5% of initial body weight however; this was not maintained in the majority at 2 years [10]. Despite weight regain in the majority, parameters of metabolic complications of obesity including diastolic blood pressure and HbA1c demonstrated persistent normalization. Notably, IGB related weight loss has not been shown to alter obesity related hormones such as peptide YY or adiponectin. In contrast, fasting ghrelin levels have been demonstrated to rise with IGB in-situ followed by a return

of fasting levels of ghrelin and leptin to baseline post-removal, which may correlate with decreased satiety and weight regain [11].

Conclusion

IGB treatment for obesity is an effective and safe non-invasive surgery, resulting in variable weight loss over a temporary period of time. However, once the IGB is removed, recidivism or weight regain is a significant problem for the long-term benefit of this procedure. IGB therapy has proven to be a long-term weight loss solution in only 25% of patients as opposed to 83% of patients who saw temporary success at the time of removal. Continuous multidisciplinary outpatient support in the form of psychotherapy, regimented exercise, and supervision by a dietician are necessary not only while the IGB treatment is in place in the early stages of therapy, but also after the balloon is removed to yield the best long-term benefit for these patients. IGB therapy can be extremely valuable as a short-term weight loss intervention, especially with the possible metabolic improvements, and to serve as a bridge to sustainable medical or surgical weight loss intervention reducing preoperative risks.

Disclosures

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