



Simultaneous Intra-gastric Balloon Removal and Laparoscopic Sleeve Gastrectomy for the Super-Super Obese Patients—a Prospective Feasibility Study

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Abstract

Background The aim of the study was to prospectively evaluate the feasibility and clinical efficacy of a strategy of performing simultaneous balloon removal and sleeve gastrectomy in the super-super obese patients.

Methods Forty consecutive super-super obese patients underwent intra-gastric balloon insertion followed by simultaneous balloon removal and sleeve gastrectomy 6 months later.

Results Balloon insertion resulted in a reduction in mean body mass index from 69.3 ± 1.4 to 62.3 ± 1.3 kg/m². Simultaneous balloon removal and sleeve gastrectomy was achieved in 39 cases. There were no operative mortality and no leaks. Six months following sleeve gastrectomy, the mean BMI of the cohort had fallen to 54.1 ± 1.2 kg/m².

Conclusions Simultaneous balloon removal and sleeve gastrectomy in the super-super obese patients is feasible as a single-stage procedure with good perioperative outcomes.

Keywords Intra-gastric balloon · Sleeve gastrectomy · Super-super obese

Introduction

Despite advances in the perioperative management of patients with morbid obesity undergoing bariatric surgery,

these patients present significant anaesthetic and surgical challenges. This is particularly true of the super-super obese patients (i.e. patients with a BMI of over 60) who typically have significant levels of medical co-morbidity and a body habitus which makes surgery technically demanding. As a consequence of this, a number of authors [1, 2] have advocated staged procedures to ensure weight loss (and hence improved perioperative outcomes) prior to definitive surgery. In our institution, we have offered intra-gastric balloon insertion for a 6-month period as a bridging procedure before sleeve gastrectomy for all super-super obese patients. Although this is a well-described approach, there is no consensus as to the optimum timing of the delay between balloon removal and the performance of definitive surgery. In an attempt to reduce the number of interventions for these high-risk patients, we initiated a policy of offering simultaneous single-stage balloon removal and laparoscopic sleeve gastrectomy to all super-super obese patients. The purpose of this prospective study was to evaluate the feasibility and efficacy of this surgical strategy.

Methods

Our institution is a high-volume specialist tertiary referral bariatric centre performing over 300 primary and revision bariatric procedures per year. Between June 2009 and June 2011, a total of 40 patients with super-super obesity (BMI > 60) were referred to our institution for management of their morbid obesity. All of these patients were discussed at a multidisciplinary team meeting and offered the option of intra-gastric balloon insertion for a 6-month period as a bridging procedure followed by balloon removal and concomitant sleeve

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gastrectomy as a single-stage procedure. Prior to balloon insertion, all patients were reviewed by a dietician and commenced on a calorie-restricted diet.

Surgical Protocol

An upper GI endoscopy was performed under general anaesthesia, and an intra-gastric balloon (BIB) was inserted and inflated with 600 ml of saline and methylene blue under endoscopic vision. Assuming the balloon was tolerated, this was kept in situ for a minimum period of 6 months; following which, a repeat upper GI endoscopy was performed under general anaesthesia and which point the balloon was deflated and removed. The stomach was then inspected, and a decision was made as to whether it was appropriate to proceed to sleeve gastrectomy—the only contraindication to proceeding to surgery was the presence of active gastric ulceration. Assuming surgery was feasible, four ports were inserted, a pneumo-peritoneum was established and the right gastro-epiploic vessels were divided 5 cm proximal to the pylorus and dissection continued proximally to the gastro-oesophageal junction using a harmonic scalpel. A 34-French bougie was then placed transorally into the stomach under direct vision, and a gastric tube was fashioned over the bougie using an endoscopic stapler (Endo GIA, Covidien) with green cartridges and tissue staple line reinforcement (Duet). The suture line was tested for leak using methylene blue, and the stomach specimen was removed through the supra-umbilical trocar site.

Immediately following surgery, patients were transferred to a specialised upper GI ward. Liquid diet was typically commenced the day following surgery. If there were any clinical suspicions of leak, a CT scan of the abdomen with oral contrast was performed in order to assess the integrity of the staple line. Following discharge from hospital, all patients were regularly followed up in an outpatient clinic. The minimum follow-up period of the cohort was 6 months.

Analysis

The pre-, peri- and post-operative outcomes of the patients were prospectively recorded. Data were expressed as mean (\pm standard error) or median (with ranges and interquartile ranges in parentheses) as appropriate.

Results

Preoperative Characteristics

Of the 40 patients, all initially consented to the above protocol. There was no incidence of balloon intolerance; however, one patient having tolerated balloon for 6 months

declined the option of sleeve gastrectomy altogether. Of the remaining 39 patients, there were 10 males and 29 females with a mean age of 45 ± 1.4 years. The initial BMI of the cohort was 69.3 ± 1.4 ; however, following commencement of a calorie-restricted diet, the mean BMI of the cohort immediately prior to balloon insertion dropped to 69.1 ± 1.0 . In terms of obesity-related co-morbidities, 18 had hypertension, 11 had type II diabetes, 12 had sleep apnoea, 10 had lymphoedema and 5 had ischaemic heart disease. All 39 patients tolerated balloon for a 6-month period by which point the mean BMI of the group had fallen to 62.3 ± 1.3 .

Post-operative Outcomes Following Sleeve Gastrectomy

Of the cohort of 39 patients, all underwent single-stage balloon removal and laparoscopic sleeve gastrectomy. The mean total operating time for the combined procedure was 80 ± 10 min. In terms of post-operative outcomes, there were no operative mortalities. In terms of morbidity, there was one case of chest infection. Two patients underwent CT scans with oral contrast to exclude a leak and one patient underwent a Doppler ultrasound of the calves to exclude a deep vein thrombosis; however, all of these investigations were negative.

The median length of hospital stay was 3 days (range 1–11 days). There were no readmissions, and none of the patients required revision surgery within 6 months of surgery. Six months following sleeve gastrectomy, the mean BMI of the whole cohort had fallen to 54.1 ± 1.2 .

Discussion

This study confirms both the feasibility and efficacy of performing intra-gastric balloon insertion followed by simultaneous balloon removal and sleeve gastrectomy for the super-super obese patients. With respect to the first stage of our protocol, balloon insertion was tolerated in our entire cohort and resulted in a reduction in BMI from 69 to 62. These results compare favourably with previous studies. For example, Milone et al. [1] have shown in the super obese patients that balloon insertion is associated with a 7 % intolerance rate and an excess weight loss of 24 %. In terms of the second stage of our protocol, all of our consenting patients were able to undergo successful simultaneous balloon removal and laparoscopic sleeve gastrectomy (LSG). The reason for choosing LSG was based on the relative technical simplicity of this procedure and the fact that LSG may be easily revised to another procedure in the future. Our rationale for adopting a simultaneous procedure was to minimise the number of anaesthetic episodes our patients would require, which was an outcome we were keen to achieve given their high levels of co-morbidities.

Although there have been no studies examining whether there should be a delay between balloon removal and performance of sleeve gastrectomy, this issue has been addressed by a number of studies examining the conversion of other restrictive procedures such as gastric banding and vertical band gastroplasty to sleeve gastrectomy. Whilst there is some debate on this subject, the majority of authors [3–5] advocate performing a staged sleeve gastrectomy to allow gastric healing and hence reduce the incidence of perioperative complications. With respect to balloon removal, it could be argued that performing a staged sleeve gastrectomy some weeks following balloon removal would allow the gastric wall oedema associated with the presence of an in situ balloon to resolve. This may in turn reduce the risk of the staple line leak and allow the fashioning of a narrower calibre sleeve (which in turn would lead to more rapid weight loss). Our data do not however appear to support this concept—the morbidity and leak rate of our cohort was in fact much lower than those reported in other studies on revision sleeve gastrectomy [6] and indeed lower than previously published series of primary sleeve gastrectomies for the non-super obese patients [7]. Moreover, in terms of weight loss, our cohort achieved a reduction in mean BMI of over 8 kg/m² in only 6 months. We attribute these excellent short- and medium-term results to a combination of our technique of endoscopic examination of the stomach prior to balloon insertion to exclude active ulceration: the use of a narrow bougie and the use of an endoscopic stapler with green staple cartridges and staple line reinforcement. It should be noted that this particular product has now been withdrawn and we are currently using its successor product (Tri-Staple, Covidien) with black staple cartridges.

We acknowledge that there are some limitations to this study. For a start, we accept that the size of our cohort of super-super obese patients is small; however, it should be noted that this represents the totality of practice in a high-

volume specialist bariatric centre. In addition, the follow-up period of our study was limited. Nonetheless, the prospective nature of our study, the standardised surgical strategy and our comprehensive follow-up protocol, adds considerable weight to the validity of our findings. In summary, we have shown that balloon insertion followed by simultaneous balloon removal and sleeve gastrectomy in the super-super obese patients is a feasible option with excellent perioperative outcomes and good medium term results.

Conflict of Interest All contributing authors declare that they have no conflicts of interest.

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