

Revisión

Preoperative weight loss in patients with indication of bariatric surgery: which is the best method?

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Abstract

Background: Surgery is the only effective treatment for people with a body mass index (BMI) greater than 40 Kg/m² or even greater than 35 Kg/m² when some diseases like diabetes or hypertension appear. In order to minimize surgical risk and improve postoperative results, preoperative preparation it's very important. "Acute" preoperative weight loss just before surgery plays a crucial role in that preparation and can be achieved through different ways like a low calorie diet, a very low calorie diet or with the use of an intragastric balloon. The advantages or particularities of every one of them will be summarized in this article.

Material and methods: Literature review of the benefits, risks and complications of preoperative weight loss through a low calorie diet, a very low calorie diet or intragastric balloon placement.

Results: Seven of thirteen initially selected reports from Medline search were considered relevant, including a total 371 patients (240 patients treated with low calorie diet, 90 with very low calorie diet and 41 cases of intragastric balloon placement). We found that weight loss was greater in patients with very low calorie diets and intragastric balloon groups but with a slightly increase in morbidity and cost.

Conclusion: Although there are no comparative studies, data from the literature results show that diets very low in calories are more effective and require less time than low-calorie diets and cheaper with fewer side effects than the intragastric balloon.

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Key words: *Preoperative weight loss. Low calorie diet. Very low calorie diet. Intragastric balloon.*

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PÉRDIDA DE PESO PREOPERATORIA EN PACIENTES CON INDICACIÓN DE CIRUGÍA BARIÁTRICA: ¿QUÉ MÉTODO ES MEJOR?

Resumen

Introducción: La cirugía es el único tratamiento efectivo para aquellas personas con un índice de masa corporal (IMC) superior a 40 kg/m² o incluso superior a 35 kg/m² cuando existen enfermedades asociadas como la diabetes o la hipertensión. La preparación preoperatoria de estos pacientes es fundamental para disminuir los riesgos del acto quirúrgico y mejorar los resultados postoperatorios. La pérdida "aguda" de peso previo a la cirugía, uno de los pilares fundamentales de dicha preparación, se puede conseguir por diferentes medios como son una dieta baja en calorías, una dieta muy baja en calorías o la colocación de un balón intragástrico. En el siguiente artículo analizaremos las ventajas e inconvenientes de cada uno de ellos.

Material y métodos: Revisión de la literatura de los beneficios, riesgos y complicaciones de la pérdida de peso preoperatoria mediante la dieta baja en calorías, la dieta muy baja en calorías o la colocación del balón intragástrico.

Resultados: Siete estudios fueron considerados relevantes, de los trece seleccionados inicialmente de la búsqueda en Medline, incluyendo un total de 371 pacientes (240 pacientes fueron tratados con una dieta baja en calorías, 90 con una dieta muy baja en calorías y a 41 se les implantó un balón intragástrico). La pérdida de peso fue mayor en los pacientes con una dieta muy baja en calorías y en los pacientes que se les colocó un balón intragástrico, sin embargo estos pacientes presentaron un ligero incremento en la morbilidad y los costes.

Conclusión: Aunque no existen estudios comparativos, los resultados de la búsqueda bibliográfica sugieren que las dietas de muy bajo contenido calórico son más efectivas y necesitan menos tiempo que las dietas de bajo contenido calórico, y más económicas y con menos efectos secundarios que el balón intragástrico.

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Palabras clave: *Pérdida preoperatoria de peso. Dieta baja en calorías. Dieta muy baja en calorías. Balón intragástrico.*

Abbreviations

N: Numbers.
WL: Weight Loss.
BMI: Body Mass Index.
LCD: Low Calorie Diet.
VLCD: Very Low Calorie Diet.
IB: Intra-gastric Balloon.

Introduction

It's nowadays well accepted that surgery is the best option for morbidly obese patients with BMI > 40 kg/m² or even with lower BMI (35-40 kg/m²) when pathological conditions such as type II diabetes mellitus or high blood pressure directly improve by weight loss.

After choosing the surgical technique to use (restrictive or malabsorptive) and after making appropriate pre-anaesthetic evaluation for the proper optimization of the patient in the context of a multidisciplinary team (surgeons, endocrinologists, psychologists, nutritionists) preparation of both physical and psychological aspects is essential.

Included within the physical preparation, are chest physical therapy, increased physical activity and preoperative weight loss. The first two subjects are achieved at the first visit with something so simple and so complex at once like to urge the patient to cease the use of cigarette, manage and teach how to use a spirometer and encourage increasing aerobic physical activity such as easy walking.¹

The main subject for patient optimization before surgery is acute weight loss. A 10% absolute weight loss will immediately translate into a reduction of visceral, central and abdominal fat. Also causes an improvement of both, cardiovascular and thromboembolic risk factors, a reduction of chronic pro-inflammatory status associated with obesity and an improvement in the patient's respiratory mechanics.²

When this weight loss occurs in the months just before surgery, a decrease in liver volume has been demonstrated during surgery, which can be objectified using imaging techniques such as ultrasound or CT. It is also significant a decrease in the visceral fat volume, and a thickening of the omentum and the abdominal wall.³

All of these anatomical changes should lead to an easy technique procedure, with less surgical time and a lower incidence of intraoperative (bleeding) and/or postoperative (anastomotic failure) complications. This preoperative weight loss, it could even be interpreted as a predictor of postoperative weight loss success by detecting better motivated patient and more compliant to a protocol.⁴

The most important and controversial aspect of the preparation of morbidly obese patients before surgery is the preoperative or acute weight loss. There are different methods like low calorie diet, very low calorie diet and the placement of an intra-gastric balloon.

Literature review is not very helpful because of the lack of good evidence-based studies, short in number of cases, control-cases studies, most of them retrospective without comparing different methods. Another

bias is that weight loss is reported in different ways (percentage of weight loss, percentage of excess of weight loss, percentage of excess of BMI loss).

The objective of this work is to show the reasons why in our daily practice and in common with the Endocrinologist of our bariatric unit we decided to use a very low calorie diet in order to get the acute preoperative weight loss before surgery.

Material and methods

Relevant studies were identified by computerized searches of MEDLINE, and review of bibliographies of selected articles. We use preoperative weight loss, low calorie diet, very low calorie diet, intra-gastric balloon and bariatric surgery as keywords. We included in the search reviews, meta-analysis, clinical trial, randomized controlled trial and practice guideline. We included spanish and english articles. 13 had significative reports on preoperative weight loss and their impact in bariatric surgery. An analysis was performed comparing the different methods to preoperative weight loss like low calorie diet, very low calorie diet and the placement of an intra-gastric balloon and their benefits, risks and complications in morbidly obese patients before surgery.

Low calorie diet

One of the methods employed to reach this preoperative weight loss is a low calorie diet, that is, between 800 and 1,200 kcal/day, achieved by reducing the daily amount of carbohydrate or fat maintaining a 50% minimum protein intake (there are many options available). They must comply with current legislation (European legislation LCD 96/8/EC) and be supervised by a dietitian-nutritionist with a special focus and integration into the multidisciplinary team required for these patients.

Very low calorie diet

The very low calorie diet (600 kcal/day) is achieved from commercially available specialities in different forms (envelopes for smoothies or soup 200 kcal each). They have a very tight composition, high protein (50 g of high biological value protein), with 13.5 grams of fat and 67.5 grams of carbohydrates, plus vitamins and trace elements. Daily intake of two litres of water It is recommended, because its main side effect is constipation. Treatment duration longer than 8 to 10 weeks of is not recommended unless the supervision of an endocrinologist, to monitor both the liver and the kidney function.

Intra-gastric balloon

The use of an intra-gastric balloon before surgery has been studied especially in super obese patients

Table I
Comparing studies of weight loss with a low calorie diet

	Year	Type of study	N	WL	WL > 5%	WL > 10%
Alvarado et al.	2005	retrospective	90	7.25% (0-23%)	70%	18%
Alger-Mayer et al.	2008	retrospective	150	9.5% (3.7-29.7%)	75%	43%

Table II
Comparing studies of weight loss with a very low calorie diet

	Year	Type of study	N	Follow-up	WL	WL > 5%	WL > 10%
Fris et al.	2004	prospectively	40	2 weeks	4.1% (3.5-4.7%)	50%	1%
Lewis et al.	2006	prospectively	18	6 weeks	15.1% (9.6-21.1%)	100%	100%
Colles et al.	2006	prospectively	32	12 weeks	10.6% (0.7-19%)	100%	100%

(Body mass index above 50 and even 60 kg/m²). For its placement requires an upper gastrointestinal endoscopy under sedation or general anaesthesia, which has to be repeated for its withdrawal, six months after its placement. There are some contraindications to its use as the presence of ulcerative disease or previous gastric surgery. Complications occurred in 10% (desufflation, migration, vomiting) requiring sometimes the early withdrawal before reaching its target⁸. Complication are directly related to the presence of a foreign body into the stomach lumen (with a volume of 500 cc).

Results

We chose 7, of the 13 studies initially selected, for the analysis. We excluded report studies and the studies that included less than 10 patients. The selected studies included a total of 371 patients. Low calorie diet was used in 240 patients (64.7%), 90 used very low calorie diet (24,3%) and 41 used intragastric balloon (11%). We found that weight loss was greater in patients with very low calorie diet and intragastric balloon placement, but these patients had increased morbidity and cost than low calorie diet (table IV).

Low calorie diet

We found 2 studies with these diet, both was retrospective and included 240 patients, one from Alvarado (2005) and one from Alger-Mayer (2008). Patients

could get weight loss between 7-9% of initial weight,⁴ although the percentage of patients who lose 10% or more does not exceed 40%.⁵ The main disadvantages of these diets are their extended duration, requiring a minimum of 6 to 12 weeks, and the tight control of the patients required (table I).

Very low calorie diet

Three of this works were considered significant, all of them prospective and included 90 patients (40 was from Fris paper, 18 from Lewis paper and 32 from Colles paper). The length of the treatment had a wide range (between 2-12 weeks). The average weight loss is about 10%, even with losses of 15% of initial weight.⁶ Even almost 100% of patients lose between 5-10% of the absolute weight⁷ (table II).

Intragastric balloon

The results of this device were reported in two studies in superobese patients. Both were prospective and included 41 patients, 10 had a BMI > 65 kg/m² (Alfalah, 2006) and 31 had a BMI > 55kg/m² (Frutos, 2007). The intragastric balloon reaches a loss of more than 10% of initial weight in more than 90 % patients.⁹ Complication were directly related to the presence of a foreign body into the stomach lumen, but mortality rate was less than 1%. The follow up was 6 months. Early withdrawal was reported in 3 patients (7.3%) (table III).

Table III
Comparing studies of weight loss with an intragastric balloon

	Year	Type of study	N	Follow-up	WL	Complications	Early Withdrawal
Alfalah et al.	2006	prospectively (BMI > 65)	10	6 months	7%	10% (vomiting)	10% (1/10)
Frutos et al.	2007	prospectively (BMI > 55)	31	6 months	12.7%	9,6%	6.3% (2/31)

Table IV
Comparing benefits and costs of low calorie diet, very low calorie diet and intragastric balloon placement

	Duration	WL > 10%	Complication	Cost
LCD	++	–	–	€
VLCD	+	++	+	€€
IB	++	++	++	€€€

Conclusion

Acute preoperative weight loss just before surgery plays a crucial role in the preparation of morbidly obese patients with indication of bariatric surgery. It can be reached following a low calorie diet, a very low calorie diet or with intragastric balloon placement. Which of these methods should be chosen for the weight loss in these patients?

It is not easy to answer this question because when we reviewed the literature we found that most studies do not have adequate statistical power (they are retrospective or have small sample size) have biases like comparing different surgical techniques, different lost weight measures (absolute weight or percentage of excess weight) or differ in the length of treatment.

Although there is no comparative study between these three methods, seems logical that very low calorie diet are more effective and require less time than low-calorie diets and cheaper and with fewer side effects than the intragastric balloon (table IV).

Regardless of the method used, most of the studies agree that only can be show a decrease in liver volume and a reduced operating time in patients with preoperative weight loss¹⁰ without being able to objectify a smaller presence of complications (like bleeding or fistulas) or any relationship with postoperative weight loss.¹¹

The meta-analysis published by Livthis, just found 15 articles (of 909 screened papers) reporting preoperative weight loss but related to postoperative outcomes and without comparison among them.¹²

Thus, despite the widespread use and the supposed benefits and advantages of preoperative weight loss, if we try to be guided by scientific evidence, the only recommendation (grade II) we can find is from The American Society of Clinical Endocrinologists, the Obesity Society and American Society of Metabolic and Bariatric Surgery claiming that such weight loss only affects in the decrease of liver volume and technical issues arising from it.¹³

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