Weight Loss Across Different BMI Profiles: Post-Endoscopic Intragastric Balloon Evaluation

Redução de Peso em Diferentes Perfis de IMC: Avaliação Pós-Colocação Endoscópica de Balão Intragástrico

Pérdida de Peso en Diferentes Perfiles de IMC: Evaluación Posterior a la Colocación Endoscópica del Balón Intragástrico

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REVISA

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RESUMO

Objetivo: A obesidade é uma condição crônica de origem multifatorial, com alta prevalência e impacto substancial na saúde pública, especialmente devido ao aumento da morbimortalidade precoce. No Brasil, os índices vêm crescendo, geralmente associados a doenças crônicas como hipertensão e diabetes tipo 2. O Índice de Massa Corporal (IMC) ainda é amplamente utilizado para estimar a adiposidade corporal, embora tenha limitações. O tratamento da obesidade exige uma abordagem multiprofissional. Entre as alternativas terapêuticas para casos refratários ao tratamento clínico, destaca-se o balão intragástrico (BIG), um método endoscópico temporário com efeito mecânico de restrição alimentar. Este estudo visa analisar a eficácia do BIG na perda de peso em pacientes com diferentes faixas de IMC atendidos em um hospital de Porto Velho (RO) entre 2010 e 2024. A base teórica foi construída a partir de literatura científica indexada e documentos técnicos nacionais e internacionais publicados entre 2013 e 2024. Os dados clínicos foram obtidos de banco institucional, com garantia de confidencialidade e anonimato. A análise estatística dos resultados permitiu confrontar os achados com a literatura vigente, possibilitando uma avaliação crítica sobre a efetividade do BIG como estratégia complementar no tratamento da obesidade em diferentes contextos clínicos.

Descritores: Balões Intragástricos; Emagrecimento; Endoscopia; Índice de Massa Corporal.

ABSTRACT

Objective: Obesity is a chronic condition of multifactorial origin, with high prevalence and significant public health impact, especially due to increased early morbidity and mortality. In Brazil, obesity rates are rising and frequently associated with chronic diseases such as hypertension and type 2 diabetes. Body Mass Index (BMI) remains widely used to estimate body fat, despite individual limitations. Effective management requires a multidisciplinary approach. Among alternative therapies for cases resistant to conventional treatment, the intragastric balloon (IGB) stands out as a temporary endoscopic method with mechanical food restriction. This study aims to evaluate the effectiveness of IGB in weight reduction among patients with varying BMI profiles treated at a hospital in Porto Velho (RO) between 2010 and 2024. The theoretical framework was based on scientific literature from databases such as PubMed, SciELO, LILACS, and official guidelines and documents published between 2013 and 2024. Clinical data were obtained from an institutional database, ensuring confidentiality and anonymity. Statistical analysis of the outcomes allowed comparison with current literature and enabled a critical discussion on the effectiveness of IGB as a complementary strategy in obesity treatment across different clinical scenarios.

Descriptors: Intragastric Balloons; Weight Loss; Endoscopy; Body Mass Index; Obesity

RESUMEN

Objetivo: La obesidad es una enfermedad crónica de origen multifactorial, con alta prevalencia y un impacto relevante en la salud pública, especialmente por el aumento de la morbimortalidad precoz. En Brasil, los índices de obesidad crecen de forma constante, frecuentemente asociados a enfermedades crónicas como hipertensión arterial y diabetes tipo 2. El Índice de Masa Corporal (IMC) se utiliza ampliamente para estimar la adiposidad corporal, aunque presenta limitaciones. El tratamiento exige un enfoque multidisciplinario. Entre las alternativas terapéuticas para casos resistentes al tratamiento clínico convencional, se destaca el balón intragástrico (BIG), un método endoscópico temporal con función mecánica de restricción alimentaria. Este estudio tiene como objetivo evaluar la efectividad del BIG en la reducción de peso en pacientes con diferentes perfiles de IMC tratados en un hospital de Porto Velho (RO), entre los años 2010 y 2024. La fundamentación teórica se construyó a partir de literatura científica indexada y documentos técnicos publicados entre 2013 y 2024. Los datos clínicos fueron extraídos de una base institucional, garantizando la confidencialidad y anonimato. El análisis estadístico permitió confrontar los resultados con la literatura actual y generar una discusión crítica sobre la efectividad del BIG en distintos contextos clínicos.

Descriptores: Balones Intragástricos; Pérdida de Peso; Endoscopía; Índice de Massa Corporal; Obesidad.

ORIGINAL

Introduction

Obesity is recognized as a multifactorial chronic disease, characterized by the excessive accumulation of adipose tissue that compromises health and is associated with several comorbidities, such as type 2 diabetes mellitus (DM2), arterial hypertension (SAH) and dyslipidemias. Its classification is carried out through the body mass index (BMI), which allows stratifying individuals into overweight (BMI ≥ 25), obesity grade I (BMI ≥ 30), grade II (BMI ≥ 35) and grade III (BMI ≥ 40). The continuous increase in the prevalence of obesity in the world is a serious public health problem, requiring effective and safe therapeutic strategies [1].

Among the non-surgical therapeutic strategies for weight loss, the intragastric balloon (BIG) stands out, a silicone device that is introduced endoscopically into the stomach and filled with saline solution and sterile methylene blue solution, promoting a feeling of early satiety. This method is mainly indicated for patients with a BMI between 30 and 40 kg/m², who have not been successful with lifestyle changes alone. BIG works by reducing the available gastric space, delaying gastric emptying, and stimulating mechanoreceptors responsible for appetite control[2].

The procedure for placing the intragastric balloon is minimally invasive, performed in an outpatient setting, with an average duration of 20 to 30 minutes, under intravenous sedation. After its introduction, the balloon remains in the stomach for a period of up to six months or, in more recent models, up to 12 months, and is later removed by a new endoscopy. During this period, multidisciplinary follow-up is essential to ensure adherence to the meal plan and promote nutritional and behavioral re-education [3].

Evidence indicates that the effectiveness of BIG may vary according to the degree of initial obesity. Patients with class I and II obesity tend to have better rates of weight loss and weight maintenance after removal of the device, compared to individuals with class III obesity. Thus, BMI stratification is essential in the analysis of therapeutic response [4].

Understanding the impact of BIG on weight reduction among different BMI profiles is essential to enhance its clinical indication. This analysis enables more personalized and evidence-based interventions, optimizing clinical outcomes. In addition, it contributes to the formulation of public policies aimed at tackling obesity with low-risk and cost-effective resources. Current studies reinforce the relevance of BIG as an intermediate alternative between conservative and surgical measures [5].

Method

This is an observational, analytical, cross-sectional and quantitative study, using secondary data from the Prontocordis Hospital, located in Porto Velho, Rondônia, Brazil, aimed at analyzing weight loss in patients with different body mass index (BMI) profiles undergoing obesity treatment with an intragastric balloon (BIG). Because it uses only anonymized data already consolidated in an institutional database, the research fits the criteria for exemption from submission to the Research Ethics Committee, as established by CNS Resolution No. 510/2016.

At the same time, the reading and selection of articles, theses and studies for the composition of this research was carried out, as a way of comparison of results and formulation of the research. The analysis and interpretation of the studies was conducted between July 2023 and September 2024, with a selection of indexed

publications between the years 2010 and 2024, to contemplate both the evolution of therapeutic approaches and contemporary evidence on the use of BIG. The databases used were PubMed**,** SciELO, LILACS**,** Medline**,** VHL and the Google Scholar search site. The descriptors used included: "*intragastric balloon*", "*obesity*", "*weight loss*", "*body mass index*", "*high BMI*", "*intragastric balloon*", "*weight loss*", "*obesity treatment*" and "*BMI profile*", combined with the Boolean operators AND and **OR**, in Portuguese, English and Spanish.

Empirical or theoretical studies addressing the use of BIG in adults with different degrees of obesity, published in the delimited period, in the languages cited, and in peer-reviewed journals were included. Duplicate productions were excluded, as well as studies that did not directly relate the intervention to weight loss stratified by BMI. The selection of articles was carried out by two independent reviewers, by reading the titles, abstracts and, subsequently, the full texts.

Quantitative data collection was carried out by extracting information from the Hospital's clinical database, covering the period from 2013 to 2024. The variables analyzed included: age, gender, initial BMI, degree of obesity, presence of comorbidities, length of stay of the BIG, and percentage of weight loss at the end of treatment. The data was organized and tabulated in Microsoft Excel 2019, ensuring standardization and quality control.

The analysis was conducted using the content analysis technique with a thematic approach**,** in order to identify patterns of response to treatment according to BMI stratification. For the organization, coding and categorization of qualitative data from the literature, the ATLAS.ti 22.2 software was used. The quantitative data were analyzed using descriptive statistics, and the results were later discussed in the light of the scientific evidence identified in the literature review, allowing a critical and integrated interpretation of the findings.

Results

The analysis included 101 patients treated between 2010 and 2024, all of whom underwent obesity treatment with an intragastric balloon and followed up for a minimum period of six months. It was found that all individuals who kept the device for the recommended time showed weight reduction at the end of the treatment, demonstrating the effectiveness of the intervention in weight loss.

Regarding comorbidities associated with obesity, 13.9% of the patients (n=14) had both systemic arterial hypertension (SAH) and type 2 diabetes mellitus (DM2), while 14.9% (n=15) had only DM2 and 17.8% (n=18) had only SAH. Clinical stratification allowed us to observe the effects of the treatment on the evolution of these conditions as well.

Among the patients with SAH and DM2, 5.9% of the total (n=6) achieved complete remission of both diseases. In 3.0% of the cases (n=3), there was isolated improvement of diabetes, and in 2.0% (n=2), there was remission of hypertension alone. Among patients with only DM2, 9.9% of the total (n=10) had normalization of glycemic levels. As for the isolated SAH carriers, 13.9% (n=14) demonstrated adequate blood pressure control at the end of the follow-up.

During treatment, no serious complications or relevant clinical complications related to the use of BIG were identified. However, in two cases (2.0%), the device was removed before the expected time, due to persistent gastrointestinal discomfort.

In terms of anthropometric parameters, the mean initial weight of the sample was 121.16 kg, reducing to 103.83 kg at the end of the treatment, which represents an average loss of 17.33 kg per patient. The mean body mass index fell from 42.55 kg/m² to 36.46 kg/m², indicating a significant improvement in the participants' obesity after the intervention with an intragastric balloon.

Discussion

Obesity is a chronic disease of high prevalence in Brazil. It is estimated that more than 6.7 million Brazilians live with this condition, and approximately 863 thousand already have class III obesity, that is, BMI ≥ 40 kg/m² [6]. In Porto Velho (RO), according to Vigitel 2019, the prevalence of obesity was 21.6% among men and 18% among women[7].

Its etiology is multifactorial, involving complex interactions between genetic, environmental, and behavioral factors. Changes in modern lifestyle, such as sedentary lifestyle, stress, and ultra-processed eating patterns, contribute to this panorama[8]. Genetic mechanisms also affect satiety, metabolism, and body fat deposition[9].

Excess weight is directly associated with severe comorbidities, such as type 2 diabetes mellitus, systemic arterial hypertension, and dyslipidemias, in addition to increasing overall cardiovascular risk10. Thus, the management of obesity requires a multidisciplinary approach focused on health promotion and metabolic risk reduction.

The classification of obesity by body mass index (BMI) is limited, since it does not distinguish lean mass from body fat. Therefore, complementary methods, such as bioelectrical impedance, waist circumference, and densitometry, are recommended for a more accurate assessment[11].

Therapeutic options range from behavioral changes, with dietary re-education and physical activity, to drug therapies, endoscopic procedures such as the intragastric balloon (BIG) and, in severe cases, bariatric surgery. In patients with a BMI > 40 kg/m², clinical treatment alone tends to be ineffective, and it is necessary to consider more incisive approaches[12].

The BIG is a silicone device filled with saline solution, inserted endoscopically into the stomach, promoting early satiety by reducing the available gastric space and delaying emptying13. The volume used varies between 450 and 700 mL, adjusted according to the patient's anatomy14.

In addition to the mechanical effect, BIG stimulates hormones such as GLP-1 and PYY and activates vagus nerve receptors, intensifying satiety signals in the central nervous system15. It is estimated that this approach allows a loss of 14 to 19 kg over a six-month period, with a significant reduction in associated comorbidities[16].

The indication for BIG includes patients with a BMI ≥ 27 kg/m² who did not respond to clinical treatment, as well as patients with contraindications or refusal to bariatric surgery, or in preoperative preparation to reduce anesthetic-surgical risk[17].

It is a safe and minimally invasive procedure, with a low complication rate. Nausea, vomiting, and epigastric pain are common and self-limiting adverse effects. In persistent cases, therapeutic readaptation or, possibly, early removal of the balloon is necessary[18].

The success of treatment depends on continuous multidisciplinary follow-up, especially with nutritional and psychological support. The diet evolves from liquid to solid over 30 days, and the practice of physical activity is recommended three weeks after the procedure, if there are no complications[19].

Final Thoughts

It is concluded that the use of BIG represents an effective, safe and minimally invasive therapeutic alternative in the management of obesity, especially in patients who have not been successful with traditional clinical approaches. The intervention demonstrated a significant impact on the reduction of body weight and BMI, in addition to contributing to the remission of associated comorbidities, such as hypertension and type 2 diabetes.

Considering the multifactorial complexity of obesity and its repercussions on public health, BIG is a promising tool, especially when inserted in an expanded therapeutic plan. Its effectiveness, however, depends directly on a careful selection of candidates for the procedure, on the appropriate technical execution and, above all, on the patient's adherence to sustained changes in lifestyle.

Therapeutic success with the use of BIG requires multidisciplinary follow-up, including nutritional, psychological, and clinical support, to ensure the maintenance of the results achieved. The device, by itself, does not constitute a definitive solution, but rather a complementary resource that should be integrated into long-term strategies for obesity control.

Despite occasional complications, which are usually mild and self-limiting, the tolerability rate of BIG is high. These findings reinforce its value as a treatment option for patients with contraindications to bariatric surgery or who wish to avoid more invasive surgical procedures.

Therefore, BIG should be considered as part of a comprehensive and personalized approach, aimed at health promotion and the prevention of chronic diseases associated with obesity. The continuity of well-designed clinical studies will be essential for the improvement of indications, techniques, and post-procedure follow-up.

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