

The Role of Intra-gastric Balloon Application in Non-Surgical Management of Obesity: Efficacy, Tolerance, and Complications

Muhsin ELÇİ¹, Berat EBİK²

Batı Hospital, General Surgery Department, Diyarbakir, Türkiye.

Gazi Yaşargil Training and Research Hospital, Gastroenterology Department, Diyarbakir, Türkiye.

ABSTRACT

This study aimed to evaluate the weight-loss efficacy, tolerability, and safety of intra-gastric balloon (IGB) therapy as a minimally invasive alternative for patients who do not undergo bariatric surgery. Between June 2022 and October 2024, liquid-filled IGBs were endoscopically placed in 56 patients (aged 18–65 years, BMI > 27 kg/m²) who had failed to lose weight through lifestyle modifications. Following the exclusion of cases involving intolerance and one patient who required early removal due to pregnancy, data from 51 patients (51% female; mean age 29.4 years; mean baseline BMI 34.8 kg/m²) were retrospectively analyzed at the 6-month follow-up. Results demonstrated significant weight loss, with mean weight decreasing from 103.4 kg to 89.3 kg (–14.1 kg), representing a 13.7% Total Body Weight Loss (TBWL) and 57.5% Excess Weight Loss (EWL). Optimal results were observed in the BMI 30–35 kg/m² subgroup (TBWL 17.4%, EWL 68.9%; p<0.05). While advancing age showed a statistically significant positive correlation with weight loss, this relationship was modest in clinical strength. The treatment was well-tolerated, with only a 7.2% intolerance rate and no major complications. In conclusion, IGB therapy is a safe and effective short-term intervention, providing optimal results in patients with a BMI of 30–35 kg/m² and showing a modest positive correlation with advancing age.

Keywords: Obesity. Intra-gastric balloon. Endoscopic bariatric therapy. Weight loss. Complications.

İntra-gastrik Balon Uygulamasının Obezitenin Cerrahi Dışı Yönetimindeki Rolü: Etkinlik, Tolerans ve Komplikasyonlar

ÖZET

Bu çalışma, bariatrik cerrahiye uygun olmayan hastalar için minimal invaziv bir alternatif olarak intra-gastrik balon (İGB) tedavisinin kilo verme etkinliğini, toleransını ve güvenliğini değerlendirmeyi amaçlamıştır. Haziran 2022 ile Ekim 2024 tarihleri arasında, yaşam tarzı değişiklikleri ile kilo vermeyi başaramayan 56 hastaya (18-65 yaş arası, VKİ > 27 kg/m²) endoskopik olarak sıvı dolu İGB yerleştirilmiştir. İntolerans vakaları ve gebelik nedeniyle erken çıkarma gerektiren bir hasta dışlandıktan sonra, 51 hastanın verileri (yüzde 51 kadın; ortalama yaş 29.4; başlangıç VKİ 34.8 kg/m²) altı aylık takip sonunda retrospektif olarak analiz edilmiştir. Sonuçlar anlamlı kilo kaybı göstermiştir: ortalama ağırlık 103.4 kg'dan 89.3 kg'a düşmüş (–14.1 kg), bu da %13.7 Toplam Vücut Ağırlığı Kaybı (TBWL:Total Body Weight Loss) ve %57.5 Fazla Kilolardan Kayıp (EWL:Excess Weight Loss) sağlamıştır. En iyi sonuçlar VKİ 30-35 kg/m² alt grubunda gözlenmiştir (TBWL %17.4, EWL %68.9; p<0.05). İlerleyen yaş, kilo kaybı ile istatistiksel olarak anlamlı pozitif korelasyon gösterse de, bu ilişki klinik düzeyde sınırlı kalmıştır. Tedavi, sadece %7.2 intolerans oranı ve majör komplikasyon görülmemesi ile iyi tolere edilmiştir. Sonuç olarak, İGB tedavisi, VKİ 30–35 kg/m² aralığındaki hastalarda iyi sonuçlar sağlayan ve ilerleyen yaşla birlikte sınırlı düzeyde pozitif korelasyon gösteren, güvenli ve etkili bir kısa vadeli müdahaledir.

Anahtar Kelimeler: Obezite. İntra-gastrik balon. Endoskopik bariatrik tedavi. Kilo kaybı. Komplikasyonlar.

Date Received: 21.October.2025

Date Accepted: 8.February.2026

Dr. Muhsin ELÇİ
Batı Hospital, Diclekent Mh. Kayapınar Cd.
No:80, 21070 Kayapınar, Diyarbakır
E-mail: opdmuhsinelci@gmail.com

AUTHORS' ORCID INFORMATION

Muhsin ELÇİ: 0000-0003-1926-9248,
Berat EBİK: 000-0002-0012-2505

Obesity is a complex and chronic disease characterized by a wide range of adverse metabolic and mechanical health effects, which lead to reduced life expectancy in affected individuals.¹ Defined by excessive adiposity, obesity is a multifactorial disorder associated with an increased risk of numerous health problems, including cardiovascular diseases, 13 types of cancer, type 2 diabetes mellitus, and obstructive sleep apnea.²⁻⁴ Obesity has reached pandemic proportions, with overweight and obesity currently affecting approximately 60% of the adult population. In childhood, one in three children—

specifically 29% of boys and 27% of girls—are overweight or obese^{5,6}.

Metabolic and bariatric surgery remains the most effective treatment for obesity and its related comorbidities when compared to non-surgical modalities. However, not all patients are suitable candidates for surgical intervention⁷. Furthermore, according to one study, only about 1% of eligible individuals actually undergo surgical treatment⁸.

Patients who do not meet the surgical criteria, have contraindications to surgery, or refuse surgical intervention may benefit from alternative therapeutic options. For such patients, intragastric balloons (IGBs) may serve as a viable short-term weight management strategy^{8,9}. Additionally, in patients with morbid obesity, IGB placement can be utilized preoperatively to reduce comorbidities and surgical risk prior to a definitive bariatric procedure.

The intragastric balloon is a minimally invasive, reversible, and repeatable treatment that induces weight loss by partially filling the stomach and delaying gastric emptying, thereby promoting early satiety. Consequently, it is considered an effective and safe short-term weight reduction method^{10–12}.

In this study, we aimed to evaluate the weight-loss efficacy and complications of IGB placement in patients who lacked a direct indication for bariatric surgery, those for whom surgical intervention posed an excessive risk, or those who declined surgery.

Materials and Methods

Between June 2022 and October 2024, intragastric balloon placement was performed in a total of 56 patients. Patients aged 18–65 years with a body mass index (BMI) >27 kg/m² who were unable to achieve weight loss through diet and exercise were included in the study. Exclusion criteria included pregnancy, moderate-to-severe hiatal hernia, gastrointestinal malignancy, a history of gastric bleeding, coagulopathy or active anticoagulant use, the presence of active gastric ulcers, decompensated organ failure, eating disorders, a history of gastric or esophageal surgery, previous antireflux surgery, other endoscopically detected pathologies, and alcohol dependence.

A fluid-filled intragastric balloon (MedSiI™ Intragastric Balloon, Brussels, Belgium) was placed endoscopically. Patients fasted for at least eight hours prior to the procedure. All procedures were performed under sedation anesthesia with the patient in the left lateral decubitus position. Initially, a diagnostic gastroscopy was conducted to exclude any contraindicating pathologies. The IGB was lubricated with a gel and introduced into the stomach. Subsequently, gastroscopy was repeated to verify the

proper positioning of the balloon, which was then inflated under direct visualization. Before disconnecting the external filling catheter, absence of leakage was confirmed. The catheter was detached, and the balloon was left in the stomach, completing the procedure. In all patients, balloons were routinely inflated with 500 ml of saline solution mixed with methylene blue. To ensure consistency, all endoscopic balloon placement procedures were performed by the same endoscopist. Immediately after the procedure, all patients received prophylactic intravenous proton pump inhibitor (PPI), ondansetron 8 mg, and hyoscine-N-butylbromide 20 mg.

For the first 72 hours post-procedure, patients were prescribed oral ondansetron (8 mg every 8 hours) and hyoscine-N-butylbromide (every 8 hours). Oral fluid intake was permitted beginning one hour after the procedure. During the first three days following balloon placement, patients were monitored via telephone follow-up. In cases where oral intake was not tolerated or dehydration was suspected, intravenous hydration and antiemetic therapy were administered.

Patients were prescribed daily oral PPIs starting one week prior to the procedure and continuing throughout the duration the balloon remained *in situ*. During the first 72 hours post-procedure, only liquid intake was permitted. Once nausea, vomiting, and cramping had substantially resolved—typically by the end of this period—patients were advanced to pureed foods and thick soups. A transition to a regular diet was permitted by the seventh day.

Patients who continued to experience persistent vomiting and cramping at the end of the fifth day were considered intolerant to the treatment; in such cases, the IGB was removed endoscopically under sedation anesthesia. For patients who tolerated the balloon and achieved satisfactory outcomes, elective removal was performed at the end of six months.

Following the procedure, all patients were enrolled in a structured lifestyle modification program. They were instructed to undergo regular dietary follow-up and were prescribed a high-protein diet with a caloric restriction of a maximum of 1500 kcal/day. Additionally, patients were encouraged to engage in a structured exercise program to optimize weight loss outcomes throughout the 6-month therapy period. Although these dietary and exercise regimens were recommended to all patients, no formal measurements or objective analyses were conducted to assess long-term patient adherence to these protocols.

This study was conducted as a retrospective clinical chart review. Data were collected from the medical records of patients who underwent IGB placement between June 2022 and October 2024. Informed consent was obtained from all participants for their inclusion in the study and for the use of their medical

Intra-gastric Balloon in Obesity Management

data for research purposes. The study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Ethics Committee of Gazi Yaşargil Training and Research Hospital (Approval No: 639; Date: September 19, 2025).

Data analysis was performed using IBM SPSS Statistics for Windows, version 26.0. Descriptive statistics were presented as mean \pm standard deviation (SD), minimum, and maximum values for continuous variables, while categorical variables were expressed as frequencies and percentages. The Independent Samples t-test was used to compare continuous variables between two groups (e.g., male vs. female). For comparisons involving more than two subgroups, One-Way Analysis of Variance (ANOVA) was applied, followed by the Tukey HSD post-hoc test where significant differences were identified. The relationships between continuous variables were evaluated using Pearson correlation analysis. A p-value <0.05 was considered statistically significant.

Results

One patient who did not attend the 6th-month follow-up experienced spontaneous deflation and expulsion of the balloon through vomiting at the 8th month; however, this event did not lead to any complications. Four patients who could not tolerate the procedure were excluded from the study. The balloon was removed early in one patient who became pregnant in the 10th week, and she was also excluded from the analysis. The data of the excluded patients were not included in the statistical analysis. Consequently, data from 51 patients were included in the study (Figure 1).

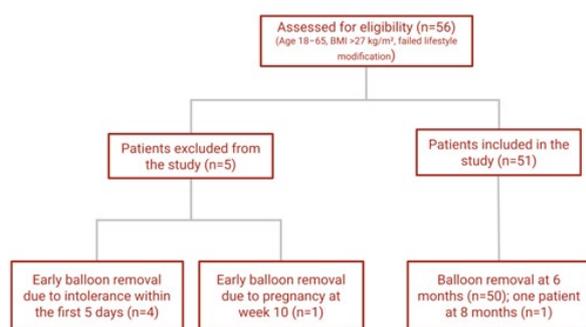


Figure 1.

Flowchart of the study population and follow-up

Table I presents the demographic and clinical characteristics of a total of 51 participants. The gender distribution was nearly equal, with 51% female and 49% male. Baseline body mass index (BMI) analysis revealed that 47.1% of participants were in the 30–35 kg/m² range, 33.3% had a BMI >35 kg/m², and 19.6% were in the 27–30 kg/m² range. The mean age of

participants was 29.4 years (range: 19–48 years). The mean height was 172.6 cm, the mean baseline body weight was 103.4 kg, and the mean weight at the 6-month follow-up was 89.3 kg. Accordingly, the mean BMI at six months was 29.8 kg/m², reflecting an average weight loss of 14.1 kg. The mean total body weight loss percentage (TBWL) was 13.7%, and the mean excess weight loss percentage (EWL) was 57.5%. A mean decrease of 4.6 kg/m² in BMI was observed, and the participants' mean excess weight was determined to be 28.6 kg.

Table II examines the differences in weight loss performance between female and male participants. The mean absolute weight loss was 12.96 \pm 6.14 kg in women and 15.20 \pm 11.01 kg in men; however, this difference was not statistically significant ($t=-0.902$; $p=0.372$). Similarly, no significant difference was observed between females (14.44 \pm 6.79) and males (13.10 \pm 8.9) in terms of total body weight loss percentage (TBWL) ($p=0.549$). The most notable finding was observed in the excess weight loss percentage (EWL): the mean EWL was 64.61% in females and 50.15% in males. Females achieved a higher percentage of excess weight loss compared to males, and this difference approached statistical significance ($t=1.717$; $p=0.092$). Regarding BMI change, no significant difference was found between females (4.72 \pm 2.17 kg/m²) and males (4.59 \pm 3.24 kg/m²) ($p=0.869$).

Table I. Evaluation of Demographic and Clinical Variables

Qualitative Variables	Groups	n	%
Gender	Female	26	51.0
	Male	25	49.0
	27-30	10	19.6
Baseline BMI (kg/m ²)	30-35	24	47.1
	BMI >35	17	33.3
Quantitative Variables	Min-Max	Mean	SD
Age	19-48	29.49	7.51
Height (cm)	155-194	172.6	9.4
Initial Weight (kg)	78-170	103.4	21.4
Final Weight (kg)	64-170	89.3	22.3
Final BMI (kg/m ²)	23.5-57.4	29.8	6.7
Absolute Weight Loss (kg)	0-37	14.0	8.8
Ideal Weight (kg)	60-94	74.7	8.2
Excess Weight (kg)	9.7-96.0	28.6	17.7
TBWL, %	0-28.9	13.7	7.8
EWL, %	0-100	57.5	30.6
BMI Change (kg/m ²)	0-10.5	4.6	2.7

(TBWL: Total Body Weight Loss Percentage, EWL: Excess Weight Loss Percentage)

Table II. Comparison of 6-Month Outcomes by Gender

Variables	Female	Male	t	p
Absolute Weight Loss (kg)	12.96±6.14	15.20±11.01	-0.902	0.372
TBWL (%)	14.44±6.79	13.10±8.90	0.603	0.549
EWL (%)	64.61±27.63	50.15±32.38	1.717	0.092
BMI Change (kg/m ²)	4.72±2.17	4.59±3.24	0.165	0.869

(TBWL: Total Body Weight Loss Percentage, EWL: Excess Weight Loss Percentage)

Table III. Comparison of Intra-gastric Balloon Outcomes by Baseline BMI Groups

Variables	Absolute Weight Loss (kg)	TBWL (%)	EWL (%)	BMI Change (kg/m ²)
BMI 27-30 (kg/m ²)	7.40b±2.72	9.03b±3.34	69.62a±21.03	2.58b±0.96
BMI 30-35 (kg/m ²)	16.96a±5.96	17.44a±6.16	68.88a±25.7	5.76a±1.90
BMI >35 (kg/m ²)	13.88ab±12.21	11.41ab±9.55	34.38b±29.67	4.31ab±3.58
F	4.743	6.337	9.858	5.983
p	0.013*	0.004*	<0.001*	0.005*

(TBWL: Total Body Weight Loss Percentage, EWL: Excess Weight Loss Percentage)

Table III evaluates the efficacy of intra-gastric balloon placement according to participants' baseline body mass index (BMI) categories. Significant differences were observed among the three BMI groups (27–30, 30–35, >35 kg/m²) in terms of absolute weight loss, total body weight loss percentage (TBWL), excess weight loss percentage (EWL), and BMI change ($p < 0.05$).

The most notable finding was in the 30–35 kg/m² BMI group, which achieved the highest mean absolute weight loss of 16.96 ± 5.96 kg; this difference was statistically significant ($p=0.013$). This subgroup also demonstrated the highest TBWL (17.44±6.16%) and BMI change (5.76±1.9 kg/m²). Regarding EWL, both the 27–30 and 30–35 kg/m² BMI groups showed high percentages of change (69.62% and 68.88%, respectively), whereas the >35 kg/m² BMI group had a markedly lower EWL of 34.38% ($p < 0.001$).

Table IV examines the relationships between age and weight loss parameters, including absolute weight loss, TBWL, EWL, and BMI reduction. The findings indicate that age is a statistically significant, yet low-to-moderate, factor in the weight loss process. A weak positive correlation was observed between age and absolute weight loss ($r=0.321$; $p=0.022$), suggesting that weight loss slightly increases with age. Similarly, a significant and slightly stronger correlation was found between age and TBWL ($r=0.361$; $p=0.009$). Correlations between age and both EWL and BMI change were also significant ($p < 0.05$); notably, BMI reduction showed a moderate positive correlation with age ($r=0.347$).

Table IV. Correlation Analysis Between Age and Weight Loss Parameters

Variables	Age
Absolute Weight Loss (kg)	$r = 0.321$ $p = 0.022^*$
TBWL (%)	$r = 0.361$ $p = 0.009^*$
EWL (%)	$r = 0.304$ $p = 0.030^*$
BMI Change (kg/m ²)	$r = 0.347$ $p = 0.013^*$

(TBWL: Total Body Weight Loss Percentage, EWL: Excess Weight Loss Percentage)

Discussion and Conclusion

In a 1999 study by Weiner, intra-gastric balloon placement was performed in super-obese patients to induce preoperative weight loss. It was hypothesized that reducing intra-abdominal fat mass would facilitate the surgical technique and decrease preoperative risks. He also noted that balloon placement could provide insight into post-surgical adherence, suggesting that patients who do not lose weight with a balloon may have eating disorders. Furthermore, balloon therapy may also serve as a bridge in patients with delayed surgery appointments or age-related surgical limitations, but who require rapid weight reduction. As a result, none of the patients who underwent preoperative balloon placement required conversion to open surgery. The balloon remained in situ for an average of 16.8 weeks. During the first week, a 30%

Intra-gastric Balloon in Obesity Management

reduction in appetite was observed, which gradually returned to baseline over 12-weeks period¹³.

Delayed gastric emptying is widely considered one of the mechanisms through which intra-gastric balloons exert their effect. However, in a study by Markus, MRI imaging in a patient with an intra-gastric balloon demonstrated no delay in gastric emptying after intake of both liquid and solid foods¹⁴.

In Alhashemi's 2024 study, IGB placement resulted in a mean total body weight loss (TBWL) of 14.7%.¹⁵ In Genco et al.'s 2005 study, which included data from 2,515 patients, the mean excess weight loss (EWL) was 33.9%, and the mean BMI reduction was 4.9 kg/m².¹⁶ In a multicenter study including 1,770 patients using a swallowable intra-gastric balloon, mean weight loss at 4 months was 13.5 kg, mean EWL was 67%, mean BMI reduction was 4.9 kg/m², and mean TBWL was 14.2%.¹⁷ A 2017 meta-analysis reported TBWL as 12.8%,¹⁸ while Fittipaldi-Fernandez et al. reported a TBWL of 18.4%.¹⁹ In a 2023 study comparing 6–12-month balloon treatment with endoscopic sleeve gastropasty, TBWL at 6 months in the balloon group was 15.8%.²⁰ Another 2024 study reported EWL of 78% in patients with BMI<30 kg/m².¹³

Although TBWL values across these studies were relatively similar (12.8–18.4%), reported EWL values varied widely (33.9–78%). In our study, TBWL was 13.7%, consistent with the literature, and EWL was 57.5%, which falls within the broad range reported. Variability in EWL across studies may be due to demographic differences, such as differences in baseline BMI. Wiggins et al. reported significantly higher EWL in patients with BMI<30 kg/m².¹³ In our data, EWL was significantly higher in the BMI 25–30 and BMI 31–35 kg/m² groups compared to the BMI>35 kg/m² group ($p<0.001$).

Similarly, in our study, TBWL was highest in the BMI 30–35 kg/m² group ($p = 0.004$). While Ienca et al. found no association between TBWL and baseline BMI, Wiggins reported the highest TBWL (11.7%) in the BMI 35–39 kg/m² group.^{8,17}

Regarding absolute weight loss, some studies reported the greatest absolute weight loss in patients with BMI>45 kg/m² (13.6 kg), while others found that higher baseline weight was associated with greater absolute weight loss without significant differences in %TBWL.⁸ In the present study, however, absolute weight loss was highest in the BMI 30–35 kg/m² group ($p=0.013$). TBWL ($p=0.004$) and BMI reduction ($p=0.005$) were also highest in this group. The highest Excess Weight Loss (EWL) was observed in the BMI 27–30 kg/m² group. Although the absolute weight loss in this group was lower compared to other groups, the EWL percentages reached higher values due to the lower initial total body mass and lower baseline excess weight in these patients.

The impact of age on weight loss outcomes was also analyzed. Although the correlations were statistically significant, age was only modestly associated with absolute weight loss ($p=0.022$), TBWL ($p=0.009$), EWL ($p=0.030$), and BMI reduction ($p=0.013$). These results suggest that while advancing age may correlate with improved outcomes, the strength of this relationship remains weak-to-moderate.

Regarding gender differences, a 2023 study comparing 6–12-month balloon therapy with endoscopic sleeve gastropasty reported 83.9% female participants, with no difference in TBWL between genders.²⁰ Another study included 87% female patients but did not analyze the effect of gender on weight loss.⁸ In contrast, the gender distribution in our study was nearly equal (51% female vs. 49% male). No significant differences were observed between genders in absolute weight loss, TBWL, or BMI reduction. However, EWL tended to be higher in female patients, approaching statistical significance ($p=0.092$).

The youngest patient in our study was 19 years old. Intra-gastric balloon therapy, commonly used in adults, has increasingly been applied in adolescents with low risk^{21,22}.

Although intra-gastric balloon placement is minimally invasive, relatively easy to learn, and safe, early post-procedure tolerance can be challenging. Weiner et al. reported¹³ an intolerance rate of 6.6%, Alhashemi¹⁵ reported 9.7%, a multicenter study¹⁷ with 1,770 patients reported 2.9%, Fittipaldi-Fernandez¹⁹ reported 6.1%, and another study reported 10.2%.²⁰ In a meta-analysis²³, early balloon removal due to intolerance was 7.5%, and another study reported 4.3%.⁸ In our cohort of 56 patients, one balloon was removed early due to pregnancy, and 4 patients required early removal due to intolerance, yielding a 7.2% early removal rate.

Most complications associated with intra-gastric balloons are mild and transient (<3%)^{24,25}. Serious complications are rare and include spontaneous rupture, gastrointestinal ulceration and bleeding, spontaneous hyperinflation, balloon migration, bowel obstruction, and acute pancreatitis.^{1,23,27} In Alhashemi's study, spontaneous deflation occurred in 2% of patients, and pancreatitis in 3%, leading to balloon removal¹⁵. Genco et al. reported a 2.8% complication rate, including 5 cases of gastric perforation, 2 of which were fatal; 4 of these patients had a history of prior gastric surgery¹⁶. In a multicenter study, spontaneous deflation occurred in 0.6%, small bowel obstruction in 0.17%, gastric dilation in 0.06%, pancreatitis in 0.06%, gastric perforation in 0.06%, and gastric outlet obstruction in 0.06%.¹⁷ Another study reported spontaneous balloon rupture in 0.7%, gastric outlet obstruction in 0.08%, and gastric perforation in 0.08%.⁸

Close follow-up is a key factor in achieving success with intragastric balloons. A 2024 study of 1,100 patients showed that those who coordinated closely with the procedural team and attended follow-ups more frequently achieved greater weight loss⁸. Lopez-Nava et al. conducted a prospective study including 962 patients comparing balloon therapy and endoscopic sleeve gastropasty, examining predictors of 1-year success. They concluded that adherence to follow-up programs, rather than the procedure type, was the strongest predictor of weight loss success.²⁶

In this study, the efficacy of intragastric balloon therapy on weight loss and the factors influencing its success were evaluated. Our findings indicate that the intragastric balloon is a safe and effective intervention, achieving the most favorable weight loss outcomes particularly in patients with a BMI of 30–35 kg/m². The mean TBWL of 13.7% and mean EWL of 57.5% observed in our cohort are consistent with previously reported data in the literature.

An increase in weight loss with advancing age suggests that the procedure is also effective in older patients. No significant gender-related differences were observed. The early intolerance rate was 7.2%, and no serious complications occurred, supporting the safety of the intragastric balloon with a low complication profile.

Our findings represent 6-month follow-up data; therefore, the results should be interpreted as an indicator of short-term efficacy rather than long-term weight maintenance.

In conclusion, the intragastric balloon represents an effective, minimally invasive, and reversible non-surgical option for weight management. It may serve as a bridging therapy for patients who are not suitable candidates for bariatric surgery or those awaiting surgery. Sustained weight loss depends largely on regular follow-up and patient compliance.

Researcher Contribution Statement:

Idea and design: G.U., I.K.; Data collection and processing: I.K., K.A., B.A.; Analysis and interpretation of data: I.K., G.K., C.Ç.; Writing of significant parts of the article: I.K., K.A., G.U.

Support and Acknowledgement Statement:

--"The studies included in this article were supported by TÜBİTAK under project number 111X222"

— We would like to thank biologist Ayşe Fatma for her support in histological staining.--

Conflict of Interest Statement:

--The authors of the article have no conflict of interest declarations. or

--There is a conflict of interest statement of the authors of the article. (A conflict of interest statement should be added).

Ethics Committee Approval Information:

Approving Committee: Gazi Yaşargil Training and Research Hospital

Approval Date: 19.09.2025

Decision No: 639

References

- Wharton S, Lau DCW, Vallis M, et al. Obesity in adults: a clinical practice guideline. *CMAJ*. 2020;192(31):E875-E891. doi:10.1503/cmaj.191707
- GBD 2015 Obesity Collaborators, Afshin A, Forouzanfar MH, et al. Health Effects of Overweight and Obesity in 195 Countries over 25 Years. *N Engl J Med*. 2017;377(1):13-27. doi:10.1056/NEJMoa1614362
- Lauby-Secretan B, Scoccianti C, Loomis D, et al. Body Fatness and Cancer--Viewpoint of the IARC Working Group. *N Engl J Med*. 2016;375(8):794-798. doi:10.1056/NEJMs1606602
- Brock JM, Billeter A, Müller-Stich BP, Herth F. Obesity and the Lung: What We Know Today. *Respiration*. 2020;99(10):856-866. doi:10.1159/000509735
- Noncommunicable diseases: risk factors. In: Global Health Observatory [website]. Geneva: World Health Organization; 2021. Available from: <https://www.who.int/data/gho/data/themes/topics/noncommunicable-diseases-risk-factors>. Accessed October 24, 2025
- Childhood Obesity Surveillance Initiative (COSI) factsheet: highlights 2015–17. Copenhagen: WHO Regional Office for Europe; 2018. Available from: <https://apps.who.int/iris/handle/10665/341189>. Accessed October 24, 2025.
- Wilson R, Aminian A, Tahrani AA. Metabolic surgery: A clinical update. *Diabetes Obes Metab*. 2021;23 Suppl 1:63-83. doi:10.1111/dom.14235
- Wiggins T, Sharma O, Sarfaraz Y, Fry H, Baker J, Singhal R. Safety and Efficacy of 12-Month Intra-gastric Balloon-Series of over 1100 Patients. *Obes Surg*. 2024;34(1):176-182. doi:10.1007/s11695-023-06953-0
- Jamal MH, Al-Kanawati N, ElAbd R, et al. A Study Examining the Orbera365 Intragastric Balloon Safety and Effects on Weight Loss. *Obes Surg*. 2021;31(12):5342-5347. doi:10.1007/s11695-021-05729-8
- Jamal MH, Almutairi R, Elabd R, AlSabah SK, Alqattan H, Altaweel T. The Safety and Efficacy of Procedureless Gastric Balloon: a Study Examining the Effect of Elipse Intragastric Balloon Safety, Short and Medium Term Effects on Weight Loss with 1-Year Follow-Up Post-removal. *Obes Surg*. 2019;29(4):1236-1241. doi:10.1007/s11695-018-03671-w
- Hering I, Dörries L, Flemming S, et al. Impact of preoperative weight loss achieved by gastric balloon on peri- and postoperative outcomes of bariatric surgery in super-obese patients: a retrospective matched-pair analysis. *Langenbecks Arch Surg*. 2022;407(5):1873-1879. doi:10.1007/s00423-022-02472-1
- Kotinda APST, de Moura DTH, Ribeiro IB, et al. Efficacy of Intragastric Balloons for Weight Loss in Overweight and Obese Adults: a Systematic Review and Meta-analysis of Randomized Controlled Trials. *Obes Surg*. 2020;30(7):2743-2753. doi:10.1007/s11695-020-04558-5
- Weiner R, Gutberlet H, Bockhorn H. Preparation of extremely obese patients for laparoscopic gastric banding by gastric-balloon therapy. *Obes Surg*. 1999;9(3):261-264. doi:10.1381/096089299765553133
- Juchems MS, Uyak D, Ernst AS, Brambs HJ. Monitoring gastric filling, satiety and gastric emptying in a patient with gastric balloon using functional magnetic resonance imaging-a feasibility report. *Clin Med Case Rep*. 2008;1:41-44. Published 2008 May 22. doi:10.4137/ccrep.s781
- Alhashemi M, Alkhamis A, Jamal M, et al. Safety and Effectiveness of Two Different Fluid-Filled Intragastric Balloons: A Single Center Experience. *Obes Surg*. 2024;34(12):4482-4489. doi:10.1007/s11695-024-07524-7

Intragastric Balloon in Obesity Management

16. Genco A, Bruni T, Doldi SB, et al. BioEnterics Intragastric Balloon: The Italian Experience with 2,515 Patients. *Obes Surg.* 2005;15(8):1161-1164. doi:10.1381/0960892055002202
17. Ienca R, Al Jarallah M, Caballero A, et al. The Procedureless Elipse Gastric Balloon Program: Multicenter Experience in 1770 Consecutive Patients. *Obes Surg.* 2020;30(9):3354-3362. doi:10.1007/s11695-020-04539-8
18. Kumar N, Bazerbachi F, Rustagi T, et al. The Influence of the Orbera Intragastric Balloon Filling Volumes on Weight Loss, Tolerability, and Adverse Events: a Systematic Review and Meta-Analysis. *Obes Surg.* 2017;27(9):2272-2278. doi:10.1007/s11695-017-2636-3
19. Fittipaldi-Fernandez RJ, Zotarelli-Filho IJ, Diestel CF, et al. Intragastric Balloon: a Retrospective Evaluation of 5874 Patients on Tolerance, Complications, and Efficacy in Different Degrees of Overweight. *Obes Surg.* 2020;30(12):4892-4898. doi:10.1007/s11695-020-04985-4
20. Kozłowska-Petriczko K, Pawlak KM, Wojciechowska K, et al. The Efficacy Comparison of Endoscopic Bariatric Therapies: 6-Month Versus 12-Month Intragastric Balloon Versus Endoscopic Sleeve Gastropasty. *Obes Surg.* 2023;33(2):498-505. doi:10.1007/s11695-022-06398-x
21. De Peppo F, Caccamo R, Adorisio O, et al. The Obalon swallowable intragastric balloon in pediatric and adolescent morbid obesity. *Endosc Int Open.* 2017;5(1):E59-E63. doi:10.1055/s-0042-120413
22. Nobili V, Della Corte C, Liccardo D, et al. Obalon intragastric balloon in the treatment of paediatric obesity: a pilot study. *Pediatr Obes.* 2015;10(5):e1-e4. doi:10.1111/ijpo.268
23. ASGE Bariatric Endoscopy Task Force and ASGE Technology Committee, Abu Dayyeh BK, Kumar N, et al. ASGE Bariatric Endoscopy Task Force systematic review and meta-analysis assessing the ASGE PIVI thresholds for adopting endoscopic bariatric therapies. *Gastrointest Endosc.* 2015;82(3):425-38.e5. doi:10.1016/j.gie.2015.03.1964
24. Muniraj T, Day LW, Teigen LM, et al. AGA Clinical Practice Guidelines on Intragastric Balloons in the Management of Obesity. *Gastroenterology.* 2021;160(5):1799-1808. doi:10.1053/j.gastro.2021.03.003
25. Telem DA, Ghaferi AA. Gastric Balloons for Weight Loss in 2020. *JAMA.* 2020;324(21):2206-2207. doi:10.1001/jama.2020.14862
26. Lopez-Nava G, Asokkumar R, Rull A, Corbelle F, Beltran L, Bautista I. Bariatric endoscopy procedure type or follow-up: What predicted success at 1 year in 962 obese patients?. *Endosc Int Open.* 2019;7(12):E1691-E1698. doi:10.1055/a-1007-1769
27. Alqabandi O, Almutawa Y, AlTarrah D, Alhajeri M, Jamal MH, Almazeedi S. Intragastric balloon insertion and pancreatitis: Case series. *Int J Surg Case Rep.* 2020;74:263-267. doi:10.1016/j.ijscr.2020.08.043

