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The effects of the use of hyoscine-N-butylbromide during laparoscopic sleeve gastrectomy

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ABSTRACT

Objective: Hyoscine-N-butylbromide is used by some surgeons during laparoscopic sleeve gastrectomy (LSG) to loosen gastric smooth muscles and to provide a more effective LSG. However, evidence-based data on the effects of hyoscine-N-butylbromide in laparoscopic sleeve gastrectomy are limited and its effect on sleeve gastrectomy surgery and weight loss is unknown. The aim of this study was to analyze the effect of intraoperatively administered hyoscine-N-butylbromide on stomach resection volume, weight loss and complications seen in patients undergoing LSG.

Material and Methods: Patients who underwent laparoscopic sleeve gastrectomy due to morbid obesity were included in the study. Intraoperative hyoscine-N-butylbromide was administered to 52 patients (Group 1), not applied to the other 52 patients (Group 2). Age, sex, height, weight and body mass index (BMI) data of the patients were obtained retrospectively. The weight, BMI, percentage of total weight loss (TWL%) and percentage of excess weight loss (EWL%) of the patients were evaluated at postoperative third, sixth and 12th months.

Results: Resected gastric volume (p= 0.111), length of stapler line (p= 0.944), operation time (p= 0.383), hospitalization time (p= 0.494) and postoperative complications (p> 0.05) did not differ between Groups 1 and 2. However, frequency of intraoperative tachycardia (p< 0.001) and hypotension (p= 0.006) in Group 1 was significantly higher than in Group 2. TWL% and EWL% values were similar between the two groups at all-time points. Stapler line leakage was not observed in any patient during the postoperative period.

Conclusion: Intraoperative hyoscine-N-butylbromide use is not effective on weight loss postoperatively in patients undergoing LSG. Although hypotension and tachycardia occured in some of patients, none of the patients had complaints in the early or long-term postoperative period. The use of hyoscine-N-butylbromide during LSG is safe but does not have any effect on weight loss.

Keywords: Morbid obesity, hyoscine-N-butylbromide, laparoscopic sleeve gastrectomy, weight loss

INTRODUCTION

With the increase of incidence of obesity and obesity-related metabolic problems around the world, the rate of bariatric-metabolic surgery is also increasing. There are different types of procedures, but the most common surgical procedure is laparoscopic sleeve gastrectomy (LSG) (1). Although sleeve gastrectomy is a restrictive surgery, it has been shown to be effective not only in the treatment of obesity but also in the treatment of obesity-related comorbid diseases (2). However, the LSG technique is not exactly standardized, and there are still many controversial technical issues. One of these issues is the usage of intraoperative hyoscine-N-butylbromide (3,4).

As an antispasmodic drug, hyoscine-N-butylbromide has been shown to reduce contraction in the gastrointestinal tract during endoscopic procedures that facilitates these procedures (5). With the use of hyoscine-N-butylbromide, it can be thought that the stomach can be loosened and manipulated better during surgery, and thus more part of stomach can be resected. In a study conducted in Türkiye, it has been observed that 17% of surgeons routinely preferred to use hyoscine-N-butylbromide in all of cases during LSG, while 31% of surgeons preferred to use it in some of the cases (6). There is limited information about the usage of hyoscine-N-butylbromide during bariatric surgery. Although there are studies in the literature evaluating postoperative pain, nausea and vomiting with the use of hyoscine-N-butylbromide in LSG, there is no study evaluating the volume of resected stomach and weight loss with the use of hyoscine-N-butylbromide during LSG (7,8). The aim of this study was to analyze the effect of intraoperatively administered hyoscine-N-butylbromide on stomach resection volume, weight loss and complications seen in patients undergoing LSG.

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MATERIAL and METHODS

Patients who underwent laparoscopic sleeve gastrectomy due to morbid obesity, had a body mass index over 40 or had at least one comorbid disease related to obesity with a body mass index over 35 kg/m^2 were included in the study. Patients who underwent another operation in the same session, patients who underwent re-sleeve gastrectomy, patients who were sensitive to hyoscine-N-butylbromide, and those with cardiac disease, glaucoma, and prostatic hypertrophy for whom the use of hyoscine-N-butylbromide was not appropriate were not included in the study. Ethics committee approval was obtained for the study.

Considering the "independent samples t-test" before the study, it was calculated that the bidirectional p value was 0.05, the effect width was d= 0.72, 1-β= 0.95, and the number of patients in the groups was equal, at least 52 patients in both groups, making a total of 104 patients. Hyoscine-N-butylbromide was administered intravenously to one of the groups (Group 1) and no additional medication was applied to the other group (Group 2).

Body mass index (BMI) of all patients were recorded before the operation. The volume of the resected stomach during laparoscopic sleeve gastrectomy, stapler line length, greater curvature length, duration of surgery, presence of intraoperative tachycardia and hypotension, postoperative complications, and length of hospital stay were recorded. Patients' weight, BMI, percentage of total weight loss (TWL%), and percentage of excess weight loss (EWL%) were evaluated at the third, sixth, and 12th months. In order to calculate the resected stomach volume, a pressure gauge was placed inside the resected stomach and the specimen was inflated with saline to a pressure of 20 mmHg. The volume of saline filled into the resected stomach up to this pressure was considered as the volume of the resected stomach.

Surgical Techniques

All surgeries were performed by one of the two general surgeons using the same surgical technique in a single center. The operation was started at the fowler position under general anesthesia. The surgeon takes position between the legs of the patient. A 10 mm trocar is placed at the upper abdomen 1-2 cm above the umbilicus with the Hasson technique. Pneumoperitoneum is performed with 12 mmHg CO_2 insufflation. A 10 mm trocar is introduced at the right upper quadrant and a 12-mm trocar is inserted at the left upper quadrant. A 5 mm trocar is introduced at the left subcostal anterior axillary line. A 5 mm trocar is inserted at the sub-xiphoid area for the liver retraction. A 30° angled scope was used through the supraumbilical port.

First of all, intraabdominal exploration was performed. The stomach was decompressed via a nasogastric tube. Then, the gastroepiploic arch was ligated with a vessel sealing device (Ligasure™, USA). Omental dissection was performed close to the stomach until the angle of his was impaired by ligating the short gastric arteries superiorly and 2-4 cm proximal to the pylorus. The stomach was then lifted towards the anterior abdominal wall. Adhesions in the greater omentum and the posterior surface of the stomach and fundus were released with a vessel sealing device, paying attention to the left gastric artery and its branches, splenic vessels and the proximal part of the pancreas. The dissection was completed after separation of the gastrophrenic ligament and the left crus was completely visualized. Posterior crural approximation was performed with 3/0 silk suture in patients with hiatal hernia. Then, 36 french bougie was advanced into the stomach by the anesthesiologist. At this stage, in patients intended to use hyoscine-N-butylbromide, 20 mg of hyoscine-N-butylbromide was rapidly administered intravenously to the patient. Afterwards, it was ensured that the bougie was placed along the lesser curvature, and the stomach was transected starting from 2-4 cm proximal to the pylorus. Then, 50-100 mL of methylene blue was given through the bougie and the stapler line, which was applied with LSG and evaluated for leakage. Then, a Jackson-Pratt drain was placed along the stapler line and the operation was terminated.

Statistical Analysis

Statistical analyzes were performed using the SPSS version 20.0 (IBM®, Chicago, USA) package program. The conformity of the variables to normal distribution was examined using visual (histogram and probability graphs) and analytical methods (Shapiro-Wilk test). Descriptive statistics were expressed as mean and standard deviation, and numbers and percentages in nominal data. Normally distributed variables were analyzed with the independent samples t-test between the two groups, and the variables that were not normally distributed were analyzed with the Mann-Whitney U test between the two groups. Intra-group comparisons were analyzed with the spousal t-test and the Wilcoxon signed rank test. Nominal data were evaluated between the two groups using the Fisher's exact test or the Chi-square test. Comparisons with a p value below 0.05 were considered statistically significant in the statistical analyzes in the study.

RESULTS

A total of 104 patients, 52 patients in each group, were included in the study. Demographic data of the patients are shown in Table 1.

Table 1. Demographic data of the patients

	Group 1 hyoscine-N-butylbromide (+)	Group 2 hyoscine-N-butylbromide (-)	p
Age (year) (avg ± SD)	36.5 ± 11.0	35.8 ± 13.3	0.786†
Sex			0.512††
Female, n (%)	36 (69.2)	39 (75.0)	
Male, n (%)	16 (30.8)	13 (25.0)	
Weight (kg) (avg ± SD)	122.8 ± 18.3	123.1 ± 17.4	0.939†
BMI (kg/m^2) (avg ± SD)	45.1 ± 5.5	45.6 ± 5.0	0.629†

*Independent t-test.
††Chi-square test.

Intraoperative tachycardia (p= 0.001) and hypotension (p= 0.006) were statistically significantly higher in Group 1. However, intraoperative problems due to hypotension and tachycardia were not observed in any of the patients. Hypotension and tachycardia were not observed in any of the patients in the postoperative period.

Resected stomach volume (p= 0.111), stapler line length (p= 0.944), greater curvature length (p= 0.097) were similar between the groups. Usage of hyoscine-N-butylbromide did not shorten the operation time (p= 0.383). Length of hospital stay (p= 0.494) was similar between groups. In Group 1, 30 patients had nausea and 10 patients had vomiting. In Group 2, 32 patients had nausea and nine patients had vomiting in postoperative period. Postoperative nausea rate (p= 0.689), vomiting rate (p= 0.800), nausea duration (p= 0,446), and vomit duration (p= 0.357) were similar between the groups (Table 2).

Leakage or postoperative bleeding was not observed in any of the patients. Mortality was not observed in any of patients.

In both groups, weight, BMI, TWL% and EWL% decreased significantly at third, sixth and 12th months of follow-up (Table 3). Yet, in comparison between the groups, weight, BMI, TWL%, and EWL% were statistically similar at all follow-ups (Table 4).

DISCUSSION

Our study is the first to analyze the effect of usage of hyoscine-N-butylbromide during LSG on the volume of the resected stomach, weight loss and complications in patients who underwent sleeve gastrectomy. In this study, the effect of intraoperative hyoscine-N-butylbromide injection on the resected stomach volume and weight loss up to 12 months postoperatively, and on BMI, TWL and EWL in patients who underwent laparoscopic sleeve gastrectomy was evaluated. No statistically significant difference was observed in terms of resected stomach volume and weight loss between the patients who received hyoscine-N-butylbromide and those who did not.

Table 2. Distribution and comparison of surgical-related features and complications among the groups

Parameters	Group 1	Group 2	p
Resected gastric volume (cc) (avg ± SD)	1430 ± 233	1363 ± 188	0.111†
Staple line lenght (cm) (avg ± SD)	27.7 ± 2.5	27.6 ± 3.0	0.944†
Greater curvature length (cm) (avg ± SD)	59.0 ± 4.3	57.7 ± 3.6	0.097†
Duration of surgery (min) (avg ± SD)	47.7 ± 7.3	49.5 ± 12.7	0.383†
Lenght of hospital stay (day) (avg ± SD)	3.6 ± 0.7	3.5 ± 0.6	0.494†
Intraoperative tachycardia (+), n (%)	41 (78.8)	1 (1.9)	<0.001††
Intraoperative hypotension (+), n (%)	8 (15.4)	0	0.006††
Postoperative nausea (+), n (%)	30 (57.7)	32 (61.5)	0.689†††
Postoperative nausea duration (day) (avg ± SD)	1.0 ± 0.2	1.1 ± 0.3	0.446†
Postoperative vomiting (+), n (%)	10 (19.2)	9 (17.3)	0.800†††
Postoperative vomiting duration (day) (avg ± SD)	1.1 ± 0.3	1.0 ± 0.1	0.357†

†Independent samples t-test.
††Fisher's exact test.
†††Chi-square test.

Table 3. Data of patients' weight, BMI, TWL% and EWL%

		Baseline	Third month	Sixth month	12th month	p†	p††	p†††
Group 1								
	Weight (kg) (avg ± SD)	122.8 ± 18.3	95.7 ± 16.2	85.0 ± 14.9	76.4 ± 13.9	<0.001	<0.001	<0.001
	BMI (kg/m^2) (avg± SD)	45.1 ± 5.5	35.3 ± 5.3	31.4 ± 5.0	27.0 ± 7.1	<0.001	<0.001	<0.001
	TWL% (avg ± SD)		22.0 ± 3.9	31.1 ± 5.0	38.0 ± 6.9		<0.001	<0.001
	EWL% (avg ± SD)		51.7 ± 13.1	71.8 ± 17.1	87.0 ± 18.0		<0.001	<0.001
Group 2								
	Weight (kg)	123.1 ± 17.4	96.4 ± 14.3	83.7 ± 1.7	76.1 ± 11.6	<0.001	<0.001	<0.001
	BMI (kg/m^2)	45.6 ± 5.0	35.7 ± 4.7	30.9 ± 3.8	28.1 ± 3.9	<0.001	<0.001	<0.001
	TWL% (avg ± SD)		21.5 ± 4.8	21.5 ± 4.8	37.9 ± 7.1		<0.001	<0.001
	EWL% (avg ± SD)		49.3 ± 13.8	49.3 ± 13.8	86.2 ± 17.0		<0.001	<0.001

*Paired samples t-test.
†Baseline third month.
††Third month-sixth month.
†††Sixth-12th month analysis.

Table 4. Comparison of weight, BMI, TWL% and EWL% between the groups

		Group I	Group II	p
Weight				
	Baseline	122.8 ± 18.3	123.1 ± 17.4	0.939
	Third month	95.7 ± 16.2	96.4 ± 14.3	0.807
	Sixth month	85.0 ± 14.9	83.7 ± 1.7	0.651
	12th month	76.4 ± 13.9	76.1±11.6	0.919
BMI				
	Baseline	45.1 ± 5.5	45.6 ± 5.0	0.629
	Third month	35.3 ± 5.3	35.7 ± 4.7	0.629
	Sixth month	31.4 ± 5.0	30.9 ± 3.8	0.582
	12th month	27.0 ± 7.1	28.1 ± 3.9	0.339
TWL%				
	Third month	22.0 ± 3.9	21.5 ± 4.8	0.543
	Sixth month	31.1 ± 5.0	31.8 ± 5.4	0.515
	12th month	38.0 ± 6.9	37.9 ± 7.1	0.960
EWL%				
	Third month	51.7 ± 13.1	49.3 ± 13.8	0.380
	Sixth month	71.8 ± 17.1	72.6 ± 14.4	0.818
	12th month	87.0 ± 18.0	86.2 ± 17.0	0.818

*Independent samples t-test.

The purpose of the use of hyoscine-N-butylbromide during LSG is to loosen the stomach, thus facilitating stomach manipulation, and the idea of removing a wider stomach volume with the relaxation of the stomach. Hyoscine-N-butylbromide is an anticholinergic drug with high affinity for parasympathetic muscarinic receptors on smooth muscle cells of the gastrointestinal tract. Intravenous form of hyoscine-N-butylbromide is preferred in gastroscopy and colonoscopy

because it reduces contraction and provides better visualization of the mucosa (9). It has been shown that the duration of colonic intubation time is shortened in patients premedicated with hyoscine-N-butylbromide for colonoscopy (10). However, in our study, it was observed that the use of hyoscine-N-butylbromide did not affect the duration of surgery. Therefore, contrary to the benefit seen in colonoscopy procedures, it is not possible to say that LSG is easier or faster in patients treated with hyoscine-N-butylbromide.

One can think that loosening the stomach will lead to wider stomach resection so patient will lose more weight. In order to analyze this, we compared the resected stomach volumes between the groups in our study. No statistical difference was detected between the groups for resected stomach volume. In order to detect efficacy of usage of hyoscine-N-butylbromide during LSG on resected stomach volume, it is better to measure ratio of resected stomach to whole stomach rather than measuring volume of resected stomach. However, it is technically difficult to measure the whole stomach volume before operation so we just measured the volume of the resected stomach that gives us information about the differences between the groups.

In our study, the usage of hyoscine-N-butylbromide had no effect on postoperative nausea and vomiting ratios. There is a study in the literature analyzing the effect of hyoscine-N-butylbromide usage for postoperative nausea and vomiting ratios during LSG. In that study, it has been detected that postoperative nausea and vomiting ratios did not change (7).

In our study, the usage of hyoscine-N-butylbromide did not have an effect on either shortening duration of the operation or increasing weight loss of the patient. In addition, no adverse effects were observed due to the use of hyoscine-N-butylbromide. Although hypotension and tachycardia occurred in some of patients, none of the patients had complaints in the early or long-term postoperative period. As a result, the usage of hyoscine-N-butylbromide during laparoscopic sleeve gastrectomy is safe.

CONCLUSION

Usage of hyoscine-N-butylbromide during LSG does not change the resected stomach volume, after one-year follow-up, the amount of weight loss of the patients was not higher than the patients in whom hyoscine-N-butylbromide was not used. The use of hyoscine-N-butylbromide during LSG is safe but does not have any effect on weight loss.

Ethics Committee Approval: This study was approved by Health Sciences University Antalya Training and Research Hospital Clinical Research Ethics Committee (Decision no: 18/13, Date: 08.08.2019).

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ORİJİNAL ÇALIŞMA-ÖZET
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Laparoskopik sleeve gastrektomi sırasında hiyosin-N-bütilbromit kullanımının etkisi

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ÖZET

Giriş ve Amaç: Hiyosin-N-bütilbromit, bazı cerrahlar tarafından laparoskopik sleeve gastrektomi (LSG) sırasında mideyi gevşeterek daha efektif bir ameliyat yapma amacıyla kullanılır. Fakat bununla ilgili literatürde kanıta dayalı bilgi sınırlıdır ve bu ilacın kilo kaybı üzerine etkisi belirsizdir. Bu çalışmanın amacı LSG ameliyatında intraoperatif hiyosin-N-bütilbromit kullanımının rezeke edilen mide, kilo kaybı ve komplikasyonlara etkisini araştırmaktır.

Gereç ve Yöntem: Çalışmaya morbid obezite sebebiyle LSG uygulanan hastalar dahil edildi. Elli iki intraoperatif hiyosin-N-bütilbromit uygulanan hasta Grup 1, 52 hiyosin-N-bütilbromit uygulanmayan hasta Grup 2 olarak kabul edildi. Hastaların yaş, cinsiyet, boy, kilo, vücut kütle endeksi (VKİ) bilgileri kayıt edildi. Ameliyat sonrası üçüncü, altıncı ve 12. ayda hastaların kilo, VKİ, toplam kilo kaybı yüzdesi (%TKK), fazla kilo kaybı yüzdesi (%FKK) kayıt edildi.

Bulgular: Rezeke edilen mide hacmi (p= 0,111), stapler hattı uzunluğu (p= 0,944), ameliyat zamanı (p= 0,383), hastanede yatış süresi (p= 0,494) ve ameliyat sonrası komplikasyonlar (p> 0,05) iki grupta da benzerdi. Grup 1'de intraoperatif taşikardi (p< 0,001) ve hipotansiyon (p= 0,006) daha sık görüldü. TKK ve FKK yüzdeleri tüm takip zamanlarında iki grup arasında benzer orandaydı. Stapler hattından sızıntı hiçbir hastada izlenmedi.

Sonuç: LSG uygulanan hastalarda intraoperatif hiyosin-N-bütilbromit kullanımı, kilo kaybı üzerine etkisizdir. Hiyosin-N-bütilbromit kullanılan hastalarda ameliyat sırasında hipotansiyon ve taşikardi görülse de, hiçbir hastada erken ve geç dönemde buna bağlı bir problem görülmemiştir. LSG uygulanan hastalarda intraoperatif hiyosin-N-bütilbromit kullanımı güvenlidir fakat kilo kaybı üzerine bir etkisi yoktur.

Anahtar Kelimeler: Morbid obezite, hiyosin-N-bütilbromit, laparoskopik sleeve gastrektomi, kilo kaybı

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