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Our approach to early and late complications of laparoscopic sleeve gastrectomy patients

Laparoskopik sleeve gastrektomi hastalarımızın erken ve geç komplikasyonlarına yaklaşımımız

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Abstract

Purpose: Laparoscopic Sleeve Gastrectomy (LSG) is used as an effective surgical method in the treatment of morbid obesity. In our study, we investigated the early and late complications and treatment methods of our patients who underwent LSG.

Materials and methods: 390 patients between the ages of 18-70 who were operated between January 2016 and December 2020 were included in the study. Patient records were retrospectively scanned electronically and the results were recorded.

Results: Laparoscopic sleeve gastrectomy surgery was performed on 390 morbidly obese patients. Of the patients, 310 (78.1%) were female, 80 (21.9%) were male, with a mean age of 42.1 years (22-65) and 42.9 years (24-70) patients. Complications were observed in 22 (5.64%) patients with LSG. Ten (2.56%) of the patients developed complications in the early period, 9 (2.33%) developed complications in the late period, and 3 (0.75%) of them developed both early and late complications.

Early complications; Postoperative early anastomosis leakage in 4 (1%) patients, atelectasis in 2 (0.5%) patients, bleeding in 1 (0.25%) patient, dehydration in 1 (0.25%) patient, intra-abdominal collection in 1 (0.25%) patient, pleurosis in 1 (0.25%) patient was detected. Stent was applied to the patients with leakage, and the patient with bleeding was operated. Other patients received medical treatment.

Late complications; Minimal stenosis causing reflux in the incisura angularis was found in 5 (1.25%) patients, and trocar port hernia was found in 4 (1%) patients.

Early and late complication; Late complications were also observed in 3 (0.75%) patients who underwent stenting due to early leakage. Late pyloric stenosis was detected in 1 (0.25%) of these patients, gastric ulcers in 1 (0.25%) and esophagocardial stenosis in 1 (0.25%) patient. Patients with trocar port hernia and patients with severe symptomatic incisura angularis stenosis were treated surgically, while other patients were treated medically. No mortality was observed.

Conclusion: Laparoscopic sleeve gastrectomy, which is an effective method in the treatment of morbid obesity, can have serious early and late complications. For this reason, we believe that it will be safer to operate them in centers where necessary intensive care conditions and endoscopic interventions such as stenting can be performed quickly and reliably.

Key words: Laparoscopic sleeve gastrectomy, leak, stent, complication.

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Öz

Giriş: Laparaskopik Sleeve Gastrektomi (LSG) morbid obezite tedavisinde etkili bir cerrahi yöntem olarak kullanılmaktadır. Çalışmamızda LSG yaptığımız hastalarımızın erken ve geç dönem komplikasyonlarını ve tedavi yöntemlerini araştırdık.

Gereç ve yöntem: Ocak 2016-Aralık 2020 yıllarında 18-70 yaş arası opere edilen 390 hasta çalışmaya dahil edildi. Hasta kayıtları retrospektif olarak elektronik ortamdan taranarak kayıt edildi.

Bulgular: Morbid obezite olan 390 hastaya Laparoskopik sleeve gastrektomi (LSG) cerrahisi uygulandı. Hastaların 310'u (%78,1) kadın, 80'i (%21,9) erkek, yaş ortalamaları 42,1 (22-65) ve 42,9 (24-70) idi. LSG olan hastaların 22'sinde (%5,64) komplikasyon gözlendi. Hastaların 10'unda (%2,56) erken dönemde komplikasyon, 9'unda (%2,30) geç dönemde komplikasyon gelişirken, 3 (%0,76)'ünde hem erken hem de geç dönemde komplikasyon geliştiği tespit edildi.

Erken dönem komplikasyonlar; Yedi (%1,8) hastada postoperatif erken dönem anostomoz kaçağı, 1 (%0,25) hastada kanama, 2 (%0,5) hastada atelektazi, 1 (%0,25) hastada dehidratasyon, 1 (%0,25) hastada karın içi koleksiyon,1 (%0,25) hastada plörozi tespit edildi. Kaçak hastalarına stent uygulandı, kanama gözlenen hasta opere edildi. Diğer hastalara medikal tedavi uygulandı.

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Geç dönem komplikasyonlar; 5 (%1,28) hastada insisura angulariste reflüye sebeb olan minimal darlık, 4 (%1,02) hastada trokar yeri hernisi olduğu tespir edildi.
Erken ve geç komplikasyon; Erken dönemde kaçak nedeniyle stent uygulanan 3 (%0,76) hastada aynı zamanda geç dönem komplikasyonu da gelişti. Bu hastaların 1 (%0,25)'inde stent sonrası geç pilor stenozu, 1 (%0,25)'inde mide ülserleri ve birinde de 1 (%0,25) özofagokardial bileşkede darlık tespit edildi. Trokar yeri hernisi olan hastalar ve ciddi semptomlu insisura angularis darlığı olan hasta cerrahi olarak tedavi edilirken, diğer hastalar medikal tedavi uygulandı. Mortalite gözlenmedi.
Sonuç: Morbid obezite tedavisinde etkili bir yöntem olan LSG'nin erken ve geç dönemde gözlenebilecek ciddi komplikasyonları olabilir. Bu nedenle gerekli yoğun bakım koşulları ve stent gibi endoskopik girişimlerin hızlı ve güvenilir bir şekilde yapılabileceği merkezlerde opere edilmeleri daha güvenli olacağı kanısındayız.

Anahtar kelimeler: Laparoskopik sleeve gastrektomi, kaçak, stent, komplikasyon.

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Introduction

In recent years, people's choice of sedentary lifestyle, nutritional imbalance and consumption of non-organic foods have caused obesity to become widespread. Laparoscopic sleeve gastrectomy (LSG) method is the vertical resection of 75-90% of the stomach and the removal of cells that secrete ghrelin hunger hormone with this piece. In this way, both food intake and hunger feelings of the patients decrease in the postoperative period [1, 2].

LSG is the most frequently applied technique because it is shorter in duration, less challenging for the surgeon, and has a lower complication rate compared to other bariatric surgical treatments [3]. However, its complication may progress more seriously and may cause morbidity and mortality [4]. Our aim in this study is to retrospectively evaluate our LSG patients undergoing treatment in our clinic and to examine the course of our follow-up and treatment process in early and late complications.

Materials and methods

A total of 390 patients, aged 18-70 years, who underwent LSG due to morbid obesity in the Department of General Surgery, Health Sciences University, Bursa Yuksek Ihtisas Training and Research Hospital, between January 2016 and December 2020, were retrospectively analyzed.

Patients with a body mass index (BMI) of 40 kg/m² and above, or those with a BMI of 35-40 kg/m² and accompanying diseases (hypertension, diabetes mellitus, benign prostatic hypertrophy, asthma, coronary artery disease, congestive heart failure, obstructive sleep apnea, patients with hypothyroidism, chronic obstructive pulmonary disease) were operated. Endocrinology, psychiatry, chest diseases, cardiology and anesthesia consultations were obtained before the operation. First of all, the patients were included in a diet and exercise program under the guidance of endocrine physicians and a dietitian. A ten percent (10%) or more weight loss in a six-month medical, diet and exercise follow-up program is important in preventing health problems caused by obesity. However, if this rate is below 10% after the 6-month period, the morbid obesity surgery option can be preferred [5, 6].

In the preoperative period, upper gastrointestinal system endoscopy and upper abdominal ultrasonographic examination were performed in all patients. Before the operation, all patients and their relatives were informed in detail about the complications, side effects and expected benefits of the operation, and an informed consent form was obtained. Preoperatively, 1x0.6 IU of low molecular weight heparin (LMWH) was administered subcutaneously to all patients, and 1x0.6 IU of LMWH for 10 days postoperatively [7].

Leak test with methylene blue was performed after intraoperative resection and before oral initiation on postoperative 1st day. At least one drain was placed in the abdomen of all intraoperative patients. All patients wore compression stockings until postoperative mobilization. Preoperative prophylactic cephaloforin 1 gr/i.v was administered. All excised pieces were sent to pathology.

Patients; Age, gender, type of surgery performed, comorbidities, morbidity, mortality, early and late complications, examination and

treatment protocols in the follow-up processes, and length of stay in the intensive care unit were evaluated. In particular, the course of the early and late complications was examined.

Considerations in LSG technique

It is a laparoscopic stapler resection of the stomach from 2-5 cm proximal to the pylorus along the greater curvature and vertically 1 cm lateral to the esophagogastric junction, with a 32 F orogastric tube in the stomach. It is an irreversible process. Intraoperative considerations in LSG are as follows; not to leave a fundus pocket after resection, not to have a narrow segment between the incisura angularis and the stapler line, to use an orogastric tube during the procedure, and not to leave the antrum wide. With this procedure, 75-90% of the stomach volume is removed [8, 9].

Statistical analysis

Statistical analyzes were performed with IBM SPSS Version 24.0 for Windows. Numerical variables were calculated as mean (minimum-maximum). Categorical variables were evaluated as frequency (percentage).

Ethics committee approval of the study was received from Health Scinces University, Bursa Yuksek Ihtisas Training and Research Hospital Clinical Research Ethics Committee. This code of ethics has been complied with by us.

Results

LSG surgery was performed on 390 morbidly obese patients. Of the patients, 310 (78.1%) were female, 80 (21.9%) were male, with a mean age of 42.1 (22-65) years and 42.9 (24-70) years patients. The mean preoperative BMI was 44.3 kg/m² in female patients and 43.4 kg/m² in male patients. The mean hospital stay was 6 (5-34) days.

Complications were observed in 22 (5.64%) of the operated patients. It was determined that 10 (2.56%) of the patients developed complications in the early period, 9 (2.33%) had complications in the late period, and 3 (0.75%) developed both early and late complications. No mortality was observed in any of the patients who had complications.

Early complications; Postoperative early anastomosis leakage in 4 (1%) patients, bleeding in 1 (0.25%) patient, atelectasis in 2 (0.5%) patients, dehydration in 1 (0.25%) patient, intra-abdominal collection in 1 (0.25%) patient, pleurosis in 1 (%) patient 0.25) was detected in the patient. A patient with early-stage atelectasis complication was male. The other nine patients were found to be women. The mean age was 39.4 (27-54) years. The mean BMI was 45.1 (41-57) kg/m². Stent was applied to the patients with leakage, and the patient with bleeding was operated. Other patients received medical treatment.

Late complications; Minimal stenosis causing reflux in the incisura angularis was detected in 5 (1.25%) patients, and trocar port hernia was detected in 4 (1%) patients. Only one patient with trocar port hernia was male. The other eight patients were women. The mean age was 45.3 (25-68) years. The mean BMI was 47.3 (43-57) kg/m². Patients with trocar port hernia and patients with severe symptomatic incisura angularis stenosis were treated surgically, while other patients were treated medically.

Early and late complication; Late complications also developed in 3 (0.75%) patients who underwent stenting due to early leakage. Of these patients, late pyloric stenosis was found in 1 (0.25%), gastric ulcers in 1 (0.25%) and esophagocardial stenosis in 1 (0.25%). All of these patients were women. The mean BMI was 42.6 (41-46) kg/m². The patient who developed late pyloric stenosis after the stent was treated with botox, the patient with extensive gastric ulcer was treated with medical treatment, and the patient with stenosis in the esophagocardial junction was treated with balloon and stent (Table 1).

Discussion

People with a BMI of 30 and above are known as obese [10]. Obesity is a disease that puts the person in a difficult situation both in the socioeconomic field and in terms of inviting additional diseases. People resort to traditional, medical methods to get rid of this health problem. Those who cannot find a solution try bariatric surgery options. Surgical methods such as Laparoscopic Roux-en-Y gastric bypass, Laparoscopic mini gastric bypass, LSG, Laparoscopic biliopancreatic diversion-duodenal switch, Laparoscopic gastric band are available. Laparoscopic sleeve gastrectomy

Table 1. Complication distribution of patients with LSG

No	Age	Gender	BMI (kg/m^2)	Early complication	Late complication	Treatment
1	25	F	41	Stapler line leak	Widespread ulcerated lesions	Stent+Medical
2	32	F	46	Stapler line leak	Pyloric stenosis	Stent+Botox
3	46	F	42	Stapler line leak		Stent
4	30	F	41	Stapler line leak	Stenosis at the esophagocardial junction	Stent+Balloon+stent
5	32	F	42	Stapler line leak		Stent+ Surgical
6	27	F	45.3	Stapler line leak		Stent
7	53	F	45	Stapler line leak		Stent
8	40	F	57	Bleeding from the staple line		Surgical + Fluocell
9	54	M	47	Atelectasis		Medical
10	49	F	46	Atelectasis		Medical
11	28	F	41	Intra-Abdominal Collection		Medical
12	27	F	41	Dehydration		Medical
13	38	F	44.7	Pleurısy		Medical
14	41	F	43		Trocar port hernia	Surgical
15	51	F	54.4		Trocar port hernia	Surgical
16	52	F	45		Trocar port hernia	Surgical
17	68	M	46		Trocar port hernia	Surgical
18	41	F	43		Incisura angularis stenosis	Medical
19	25	F	46.8		Incisura angularis stenosis	Medical
20	51	F	44.1		Incisura angularis stenosis	Medical
21	40	F	57		Incisura angularis stenosis	Surgical
22	39	F	47.2		Incisura angularis stenosis	Medical

is the most common nowadays [11, 12]. In the literature, 28%-72% of the patients who underwent LSG were reported to be women [13]. In our study, this rate was found to be 78.1%.

In recent years, LSG has been preferred in bariatric surgery because it is not a compelling method for the surgeon, and it is safe and effective [14]. However, the ease of the procedure compared to other bariatric surgery does not eliminate the difficulty of LSG complications. Even if the incidence of early and late complications after LSG is low, follow-up and treatment in an established center is important to reduce the risk of mortality and morbidity. LSG mortality rate has been reported as 0.19% [15]. No mortality was observed in our study.

The most important and feared leakage complication seen in the staple line with LSG, which is generally close to the angle of sensation, was reported at a rate of 1.5-2.4% in studies [16-18]. In our study, postoperative leakage was found to be 1.8%. Leakage in the staple line after LSG is a complication that develops due to the material used or ischemic causes. The clinical picture of leakage due to the material used emerges in a day or two, and leakage due to ischemia occurs in 5-7 days [19].

Stenosis of the incisura angularis, placing the stapler close to the esophagus, bending the stomach after creating a vertical staple line with staplers are among the causes of leakage. Since leakage complication is extremely important in terms of mortality and morbidity, many technical approaches have been tried to prevent this complication, but a method to prevent this complication has not been demonstrated yet [19]. No ischemic complications were detected in our patients with leakage.

Negative leak tests, both intraoperative and early postoperatively, do not mean that leakage will not develop later [20]. Leak tests performed with methylene blue on the intraoperative and postoperative 1st day of our patients were negative.

If stent is applied in leaks within ten days postoperatively, a success rate of 83-94% is achieved. Himpens et al. [21] reported that the fistula was closed with the first stent in 19 of 29 cases and with the second stent in five cases. For this reason, early stenting in leaks is extremely important in terms of mortality [22]. In fact, stent was applied to all of our leaky patients and we did not have any mortal patients. In addition, percutaneous drain was not placed in our leaky patients, since there was no widespread collection in the abdomen. In one of our patients, a drain was surgically placed due to the development of sepsis findings.

The incidence of bleeding after LSG ranges from 1.16% to 4.94% [23]. Generally, bleeding can occur from the staple line, as well as from gastric brevis arteries, anterior abdominal wall, and omentum [24]. In our 1 (0.25%) patient, bleeding complication was detected from the staple line. The bleeding focus was cauterized and fluocele was applied. In studies, trocar port hernia was found to be 0.5-2% in non-obese patients [25]. This rate was found to be 1% in our patients.

Trocar port hernia can be seen in the early and late stages. It is usually associated with either omentum or small bowel strangulation in early-stage trocar port hernias [26]. Late trocar port hernia usually occurs after weakening. Smoking, diabetes mellitus, chronic obstructive lung disease, wound infection and obesity are predisposing factors for late trocar port hernia [27-31]. Our trocar port hernias were seen in the late period. Smoking was detected in only 2 of our cases with trocar port hernia.

In the studies performed, it was emphasized that there was no significant difference in terms of trocar port hernia between the closure of the trocar port site with suture and its closure after laparoscopic bariatric surgery [32]. The port sites of our patients were closed with sutures.

It is emphasized that the incidence of stenosis after LSG varied between 0.1% and 3.9% [33, 34]. LSG strictures can result from either a narrow tube used or a staple line misalignment. Stenosis can be prevented if the calibration tube is distal to the stomach staple line while stapling straight. It is also effective in pulling the stomach tissue to be cut from the side symmetrically while punching. Asymmetric pulling may cause stenosis [35]. In our LSG patients, a 32 F calibration gastric tube was used.

Patients with LSG may experience symptoms such as nausea, occasional vomiting, dysphagia,

and regurgitation due to stenosis. Depending on the stenosis status and symptoms of these patients in gastroscopy, medical treatment, balloon dilatation, stent placement, surgical Roux-en Y or Gastrojejunostomy options can be used. Shnell et al. [36] reported the benefit of balloon dilatation as 44% in strictures after LSG.

There is a possibility of ulcerated lesion and stenosis-related stenosis after stent [35]. Ulcerated lesions in one patient, pyloric stenosis in another, and esophagocardial stenosis in another patient were found to be stented. Due to minimal stenosis in our 4 patients with LSG, medical treatment and nutrition recipe were sufficient in terms of cure. One of our patients had a gastrojejunostomy operation due to severe symptoms.

In conclusion, LSG is a morbid obesity treatment method that can have early and late complications in postoperative period. Therefore, close follow-up and case-specific effective medical and/or endoscopic treatments are very important in the management of these complications.

Conflict of interest: No conflict of interest was declared by the authors.

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Contributions of the authors to the article

A.K.T. and M.A.Ü. jointly formulated the main idea and hypothesis of their study called ‘Our Approach to Early and Late Complications of Our Laparoscopic Sleeve Gastrectomy Patients’. A.K.T. developed the theory and organized the material and method section. A.K.T. and M.A.Ü. made the evaluation of the data in the results section together. The discussion part of the article was written by A.K.T., reviewed by M.A.Ü., made necessary corrections and approved. In addition, all authors discussed the entire study and approved the final version.