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Endoscopic Intra-gastric Botulinum Toxin-A for Obesity Treatment: Is It Effective?

Obezite Tedavisinde Endoskopik Mide Içi Botulinum Toksin-A Etkili mi?

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ABSTRACT

Introduction: Botulinum toxin A (BTX-A) is a powerful and long-acting inhibitor of muscle contractions in both striated and smooth muscles.BTX-A inhibits peristalsis by reducing the release of acetylcholine, which is responsible for gastric motility. Thus, it causes delay in gastric emptying, early satiety and weight loss.The aim of this study is to observe the effects of endoscopic intragastric injection of BTX-A in obese patients.

Methods: Intragastric botox injection was applied to 67 patients.The average age of these patients is 38 and the average body mass index is 32 kg / m2 (28-36).Firstly, patients underwent endoscopy with sedation. The three vials botulinium toxinA were diluted withserum sale. Endoscopically, a total of 300 units of botox were injected into the stomach. 200 ünits were injected into the gastric antrum in four rows in circular fashion and 100 units in to the fundus.The patients were followed up for 1 year. Patients were recorded prospectively body weight and early satiety. A toxic effect of BTX-A was observed in one patient.

Results: As a result of one-year follow-up, it was observed that the patients lost an average of 16kg (6-28). 85% of patients reported early satiety. Botulinium toxinA intoxication was considered in one patient.

Dsicussion and Conclusion: Endoscopic stomach botox injection can be applied to people who cannot have bariatric surgery or before bariatric surgery.We think that prospective randomized studies should be conducted in larger case series to evaluate statistically.

Keywords: endoscopy, botox, obesity

ÖZ

Giriş ve Amaç: Botulinum toksin A (BTX-A), hem çizgili hem de düz kaslarda güçlü ve uzun etkili bir kas kasılması inhibitörüdür. BTX-A, mide hareketliliğinden sorumlu olan asetilkolin salınımını azaltarak peristaltizmi inhibe eder. Mide boşalmasında gecikmeye, erken tokluk ve kilo kaybına neden olur. Bu çalışmanın amacı obez hastalarda endoskopik intragastrik BTX-A enjeksiyonunun etkilerini gözlemlemektir.

Yöntem ve Gereçler: 67 hastaya intragastrik botoks enjeksiyonu uygulandı.Bu hastaların yaş ortalaması 38 ve ortalama vücut kitle indeksi 32 kg / m2 (28-36) İlk olarak hastalara sedasyon ile endoskopi yapıldı. Üç şişe botulinium toksinA serum satışı ile seyreltildi. Endoskopik olarak mideye toplam 300 ünite botoks enjekte edildi. Dört sıra halinde mide antrumuna 200 ünite, fundusa 100 ünite enjekte edildi. Hastalar 1 yıl süreyle takip edildi. Hastalar prospektif olarak vücut ağırlıkları ve erken tokluklar kaydedildi. Bir hastada BTX-A'nın toksik etkisi gözlendi.

Bulgular: Bir yıllık takip sonucunda hastaların ortalama 16 kg (6-28) kilo verdiği görüldü. Hastaların% 85'i erken tokluk bildirdi. Botulinium toksin Bir hastada zehirlenme düşünüldü.

Tartışma ve Sonuç: Endoskopik mide botoksu enjeksiyonu bariatrik cerrahi geçiremeyen kişilere veya bariatrik cerrahi öncesi uygulanabilir.İstatistiksel olarak değerlendirmek için daha geniş vaka serilerinde prospektif randomize çalışmaların yapılması gerektiğini düşünüyoruz.

Anahtar Kelimeler: endoskopi, botoks, obezite

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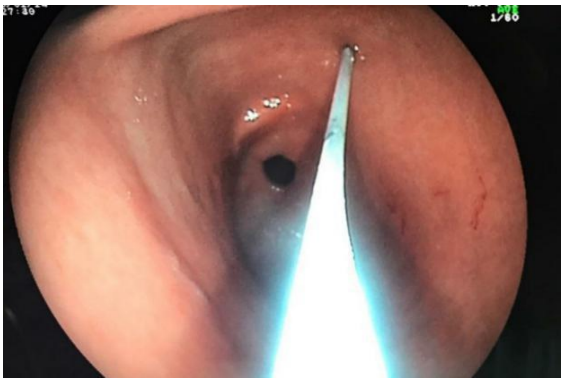
INTRODUCTION

Obesity prevalence has increased significantly in recent years. Obesity is accompanied by many additional diseases. Vascular diseases, hypertension, diabetes, gallstones, breast cancer, orthopedic problems and sleep apnea are the main diseases that accompany obesity and increase morbidity (1). These comorbidities are as high as 2-8% of public health costs as high as cancer treatment (2,3). Controlling high calorie intake and diet regimens in morbidly obese patients is not very effective in losing weight. Bariatric surgery is promising for these patients. However, surgical treatments are invasive procedures that can cause serious complications (4). It is thought that delaying gastric emptying by inhibiting gastric motility with BTX-A may cause long-term feeling of fullness (5,6). Acetylcholine is considered as the most important stimulating agent of both intrinsic and extrinsic nervous systems (7). BTX-A begins to take effect 2 to 3 days after in- jection, and this period can be extended up to 8 months (8). In a study on rads, BTX injected into the stomach wall has been shown to inhibit antral motility and reduce body weight and food intake (9). In addition, Ghrelin released from the antral region is thought to suppress the gastrointestinal hormone (10).

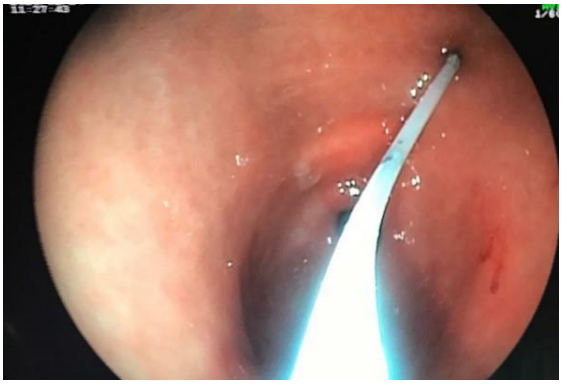
In this study, we aimed to analyze the data of obese patients who received endoscopic BTX-A injection within one year in the light of the literature.

MATERIAL AND METHODS

Endoscopic intragastric BTX-A injected sixty-seven patients (25 men, 42 women). The mean age of the patients was 38 (22-45). The average body mass index was 32 kg / m2 (28-36). There was no history of bariatric surgery or obesity, except one patient. A 52-year-old woman had a history of bariatric surgery (Sleevegastrectomy) two years ago. The procedure was applied since there was a 21 kg recovery history in the last 3 months. All patients had failed restricted dietary interventions. Consent form for the procedure was signed by all patients. Patients with peptic ulcers, serious cardiovascular problems, respiratory tract problems and pregnant women were not included. Patients were given iv midazolam at doses of 0.05-0.15 mg / kg for sedation. Routine endoscopic examination was performed on the stomach after sedation . The three vials botulinium toxinA were diluted with 6cc serum sale.. Endoscopically, a total of 300 units of botox were injected into the stomach. 200 ünits were injected into the gastric antrum in four rows in circular fashion and 100 units in to the fundus 5mm 23-G needle was used for endoscopic injection. The procedures took an average of 25 (15-30) minutes. Oral feeding of the patients was allowed 2 hours after the procedure (Picture 1, Picture 2). The patients were followed up for 6 hours. The patients were not given a special diet training or support. The patients continued their routine lifestyles. They were followed for 1 year. The mean follow-up was 13 (7-14) months. Body weight and satiety feeling of the patients were recorded. Body weight, pre-meal starvation and post-meal satiety score were asked. A visual scale scaled between 0 and 10 was used for this procedure. Patients were called for outpatient control every month.



Picture 1. Botulinium toxin injection to the stomach antrum region



Picture 2. Botilinium toxin injection to the pyrepylorik region

RESULTS

No complications related to endoscopy procedure were observed. One patient developed symptoms of fatigue, difficulty breathing, bilateral ptosis two weeks after the procedure. Muscle weakness was noted in the patient's neurological examinations. Imaging methods were evaluated as normal. Relative dyspnea was considered due to weakness in the respiratory muscles. The patient, whose oxygen saturation was normal, did not need respiratory support. Drug intoxication due to BTX is considered. Prostigmine, a cholinesterase inhibitor, was started in our patient. The dose of prostigmine tablet was adjusted to be given 60mg twice daily. Ptosis resolved in four weeks After 8 weeks, dyspnea symptom subsided. Muscle weakness and fatigue symptoms completely resolved at the end of 12th week. There was no significant difference in satiety scores after BTX injection (Table 1). In the 6-month follow-up of the patients, it was observed that the average decreased by 16 kg (6-26). The initial mean BMI of the cases decreased from 29 kg / m2 to 25 kg / m2 after 6 months . Initially, the median weight decreased to 87.3 kg and 80.3 after 3 months of follow-up ($P < 0.05$). As a result of the 6-month follow-up, it decreased to 77.3 ($P < 0.05$). While the feeling of full satiety was 8.4 at the beginning, it was 7.9 at the end of 1 month ($P > 0.05$).

DISCUSSION

Treatment of botulinum toxin A has started to be used safely in almost all medical branches, especially in aesthetic surgery, in recent years. According to bariatric surgery, there is no surgical procedure and it is easy to apply. In the stomach, the contraction rings originate from the antrum, sweeping the gastric contents into the pylorus and duodenum. BTX-A injection inhibits antral muscles and delaying gastric emptying. The purpose of endoscopic intragastric BTX-A injection is to reduce the rate of gastric emptying and to increase the feeling of fullness (7,11).

Although our study suggested intragastric BTX-A injection in the treatment of obesity, the results we obtained from our scale were not significant in terms of feeling of satiety. Since weight loss due to placebo effects was observed in the first month after the procedure, we did not take the 1st month values in our study, we considered the 3rd and 6th months values. BTX-A treatment can be repeated to continue weight loss, but we do not know about the consequences of repeated injections.

In our cases, we performed an injection towards the proximal, starting at a distance of about 3 cm from the pylorus. In our cases, we performed an injection towards the proximal, starting at a distance of about 3 cm from the pylorus. In response to the risk of intravenous injection, excessive drug injection to one point was avoided. We believe that the injection into the pylorus region will theoretically relax the sphincter and increase the rate of gastric emptying. Also, the disruption of the pylorus sphincter can theoretically cause bile reflux. In the antral wall, 200 units of BTX-A were injected circularly in four rows, with 6 points per row, for a total of 24 points. In fundus, 100 units were injected to 12 points. Every 100 units were diluted with 6 cc isotonic solution and the process was tried to be done homogeneously. Our goal here is to reduce the repulsive peristaltic movement in the antrum. Higher BTX-A doses may be required to more effectively delay gastric emptying. In this case, the clinical be- nefit of BTX-A injections increases in obese people. However, there is insufficient information on whether higher doses are to be well tolerated (15) .

In a randomized and controlled study by Park et al., Gastric BTX-A injections have been clearly shown to be effective in reducing body weight and preventing gastric emptying. The body weight of the BTX-A group was shown to decrease significantly compared to the saline and control groups one week after the procedure (21). In the study of Rollnik et al., people were followed up for 4 months after endoscopic intragastric (Botox 100 U equivalent) DysportTM 500 U injection. As a result, they found that the food intake was 67.5% and they lost an average of 9 kg. They did not provide any information about gastric emptying times (16).

Endoscopic BTX-A therapy may be a viable option for those who are not candidates for bariatric surgery due to potential reversibility and lower intraoperative and postoperative risks of procedure.

This method also reduces the risk of surgery by supporting preoperative weight reduction and controlling comorbidities such as type 2 diabetes, dyslipidemiaand hepatic steatosis (17,18,19,20).

In our study, the body weights of 7 patients treated with BTX were stable. The average weight loss of all patients was 16 kg. The average weight loss of men was 18 kg, and women were 15 kg. This difference was not statistically significant. Although there was some increase in early satiety (8.5 to 8 on the scale scored out of 10), it was not statistically significant. One of the shortcomings in our study is the inability to exclude individuals' eating habits, periodic lifestyle differences and psychogenic effects after the procedure.

The effect of hormonal differences observed between sexes is controversial and should probably be taken into consideration.

CONCLUSION:

Endoscopic intragastric injection of BTX-A may be an alternative treatment in patients at high surgical risk. In order to obtain evidence-based results on the role of botulinum toxin in the treatment of obesity, it is necessary to conduct more detailed placebo-controlled analyzes in which other factors are excluded.

Ethics Committee Approval: Sakarya University Clinical Research Ethics Committee (date:29.05.2021 and no:2021/325)
Authors' contributions: E.E. designed the study, collected the data, performed analysis and wrote the paper
Conflict of Interest: There is no conflict of interest.
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Informed Consent: This study was conducted with a retrospective design.

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