

## THE DEVELOPMENT OF MIGRATION IN LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING AND THE APPROACH TO TREATMENT

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### ABSTRACT

**Objective:** Laparoscopic adjustable gastric banding (LAGB) application in the treatment of morbid obesity has many advantages. However, certain complications, such as intragastric migration, may occur. In the present study, the effects of such migration and surgical treatment methods were investigated.

**Methodology:** One hundred thirty-four patients underwent LAGB via the Pars Flaccida technique. Of the patients mean age was 27 years ( 18-54 ). Migration was suspected based on disappearance of the band-related stricture barium contrast examination of the stomach and duodenum. Migration was definitely diagnosed during gastroscopy.

**Results:** Migration was diagnosed in four (3%) of 134 patients, as well as in one case who underwent LAGB in another center. The follow-up time was 14 months (2-21) and, their mean body mass index (BMI) was 47 kg/m<sup>2</sup> (39-56). The band was removed in four patients, the opening formed in the stomach was sutured primarily. One of the patients underwent cholecistectomy and Roux-en-Y gastroenterostomy (RNYGE).

**Conclusions:** The development of migration after LAGB is a long-term complication. Gastric bands should be removed as soon as the migration is diagnosed. RNYGE in the same session, or new band application 3-6 months later.

**KEY WORDS:** Morbid obesity, Bariatric surgery, Laparoscopy, Band migration.

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### INTRODUCTION

Application of laparoscopic adjustable gastric banding (LAGB) has increasingly become more popular in the treatment of morbid obesity.<sup>1-3</sup>

This surgical method has the advantages of being a minimal invasive application, reversibility, and controllable weight loss. Furthermore, complications are rarely observed compared to other methods; band slippage, band opening, and migration are among the complications. Migration occurs when the band erodes the gastric wall and moves into the stomach. A migrated band both loses its functional efficacy and causes inflammation in the tissue where located.

Gastric band migration is encountered at different rates, ranging from 0.5-3.8%.<sup>4,5</sup> Acute and chronic inflammation and fibrosclerosis

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develop in patients who undergo reoperation for various reasons following gastric banding. It has been suggested that this reaction causes migration.<sup>6</sup>

In the present study, the patients who underwent gastric banding and had band migration as a complication, and the treatment methods performed, were analyzed.

## METHODOLOGY

LAGB was applied to 134 patients between September 2006 and June 2009. Of the patients, 101 were females, 33 were males, and the mean age was 27 years (range, 18-54 years). The mean body mass index (BMI) was 44 kg/m<sup>2</sup>. Bands with a maximum capacity of 9 cc were used for the patients. It was ascertained that the capacity of the band used in the other center was also 9 cc.

The patients were operated in accordance with the criteria of the International Federation for the Surgery of Obesity (IFSO). A multidisciplinary approach was used for the preoperative preparation. The surgeries were performed using the Pars Flaccida technique. Seven patients required open conversion due to hepatomegaly in four patients, perforation during dissection in two patients, and suspicion of gastric perforation because of the Veress needle in one patient.

The band types used, route of application, admission complaints, findings, and the fluid level in the band reservoir are presented in Table-I. The amount of fluid in the band reservoir and its monitoring were obtained according to anamnesis information of the case from the other center.

The patients generally complained of epigastric pain and port site infection. All of the patients underwent endoscopic examination, as well as a barium contrast gastroduodenal radiography. Gastric contents were observed in the port aspirates of three patients. The migration was noticed by observing the bands within the stomachs of four patients. However, in one patient the diagnosis was established by palpating the band in the jejunum during a laparotomy performed due to subileus (Figure-1). Two

patients had gonarthrosis and one patient had cholelithiasis as concomitant diseases.

A laparoscopy was performed under general anesthesia in all patients. The bands were removed by opening the locking mechanisms in four patients. The band causing closed perforation 110 cm distal to the ligament of Treitz was in the jejunum in one patient. The band was removed from the perforation space formed by blunt dissection (Figure 2). Moreover, numerous inflammatory areas and granulomas were observed in the stomach, duodenum, and jejunum of this patient.

## RESULTS

Band migration occurred in four (3%) of 134 patients. In addition, band migration was diagnosed in one patient who underwent LAGB in another center. The mean duration for the occurrence of band migration was 14 months (range, 6-22 months). The mean follow-up period of the patients in whom the band migration developed was 14 months (range, 2-21 months), and their mean BMI was 47 kg/m<sup>2</sup> (range, 39-56 kg/m<sup>2</sup>). When band migration was diagnosed, the mean BMI of these patients was 41 kg/m<sup>2</sup> and all of the patients had undergone laparoscopic adjustable gastric banding.

Three patients sought evaluation due to infection in the port area and revealed gastric contents by port reservoir puncture. At the two other patients was seen only port site infection

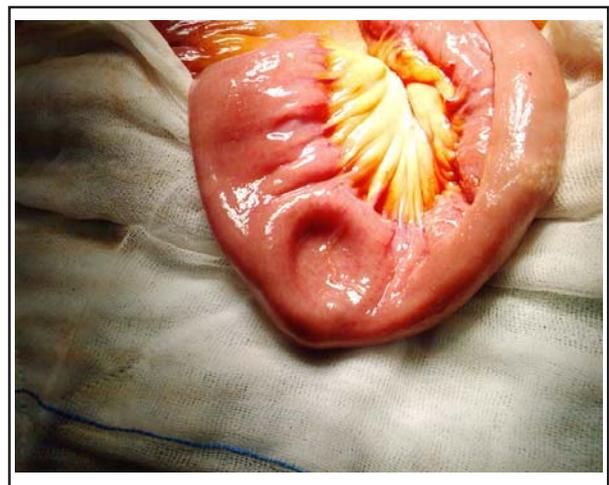


Figure-1: Silicone band in the jejunum.



Figure-2: Removal of the band from the perforated part of the jejunum.

or gastric contents by port reservoir puncture. In all patients, the diagnosis was established based on the observation of the gastric band during gastroscopy.

Laparoscopy was performed in the patients with a diagnosis of band migration. During exploration, disseminated fibrosclerosis was observed around the band. Except for one patient, partial migration was present. After removal of the band, diluted methylene blue was administered through a nasogastric (NG) catheter, and the perforation sites were identified by observing the leakage through the intraperitoneal region. In four patients, the leakages that occurred after removal of the bands were sutured one-by-one with 3-0 polyglactin. The NG catheter was maintained for three days during the post-operative period and removed after controlling for leakage with methylene blue. In one patient, the band was taken out from the perforation space in the jejunum. The opening in the jejunum and the perforation space in the 4<sup>th</sup> part

Table-I: Bands used in patients, concomitant diseases, and the fluid level in the band reservoir

Patients	Band type	Concomitant disease	Fluid level in the band reservoir (cm <sup>3</sup> )
1	AMI	Cholelithiasis	5
2	Helioscopie	-	7
3	AMI	Gonarthrosis	4
4	AMI	Gonarthrosis	8
5	Cousin	-	6

of the duodenum was primarily closed with 3-0 polyglactin in a single layer. Cholecystectomy due to cholelithiasis, and subtotal gastrectomy and Roux-en-Y gastroenterostomy (RNYGE) was performed in this patient (Table-II).

## DISCUSSION

LAGB is a minimally invasive, efficacious, reliable, and reversible treatment method for morbid obesity. However, certain complications, such as band slippage, band opening, and band migration may occur.<sup>7-9</sup> Band migration generally occurs as a long-term complication. In the event of cessation of weight loss, and/or weight regain, and/or infection at the port site, band migration should be suspected. Migration is definitely diagnosed via gastroscopy. In the present study, band migration was diagnosed by performing gastroscopy due to port infection in four patients and weight regain after weight loss in one patient.

A migrated band perforates due to the effect of gastric contents and infection. Port puncture is a simple method leading to a definite diagnosis in a patient with a port site infection. In the present study, the gastric contents were

Table-II: Complaints and findings of the cases with band migration and the surgical procedures

Patients	Complaints and Findings	Operations
1	Port infection, Gastric contents with puncture	Cholecystectomy, Roux-en-Y gastroenterostomy
2	Port infection	Band removal+primary suturing
3	Gastric contents with puncture	Band removal+primary suturing
4	Port infection, Gastric contents with puncture	Band removal+primary suturing
5	Port infection	Band removal+primary suturing
	Gastric contents with puncture	

aspirated by means of a port reservoir puncture in four of five patients.

Various hypotheses have been introduced to explain gastric band migration. These hypotheses were gastric injury during band application;<sup>10</sup> infection around the band;<sup>11</sup> fluid injection more than the maximum band capacity;<sup>12</sup> and foreign body reaction against the band.<sup>13</sup> While some researchers have defended the hypothesis that infection around the band causes migration by enhancing the inflammatory process, some have defended the hypothesis that infection develops later in the band that contacts the gastric contents after migration.<sup>5</sup>

A migrated band should be removed by means of a laparoscopy and endoscopically using a band cutter.<sup>14,15</sup> In the present study, the bands were removed by means of a laparoscopy. Vertruyen and Paul<sup>16</sup> reported that migrated bands were removed laparoscopically in 10 (1.38%) of 727 patients that had undergone LAGB, and an 11-cm Lap-Band<sup>®</sup> was applied to the same patients after six months, with no complications observed.

A migrated band may cause obstruction in the intestinal system. Taskýn et al.<sup>17</sup> reported a case with duodenal obstruction caused by a migrated band. Egbeare et al.<sup>18</sup> reported a case in which the migrated band caused an obstruction and erosion, the so-called "cheese-wire effect," in the jejunum. Bueter et al.<sup>19</sup> reported a small intestine obstruction caused by the band in a 65-year-old patient. In the present study, the band was observed to have migrated through the distal end of the jejunum causing inflammation and a closed perforation.

After the removal of migrated band, a surgical procedure is needed for maintenance of obesity.<sup>20</sup> Whereas some researchers re-apply banding after 3-6 months waiting for the inflammation to heal, some researchers prefer to remove the band and apply a malabsorptive method, such as RNYGE during the same session. Suter et al.<sup>21</sup> reported band migration in 24 (6.8%) of 347 patients in whom they had applied gastric banding. They also reported that they applied RNYGE to 11 patients in the same session and to two patients after a few months, and the

outcomes of the study was similar to those of primary RNYGE.

## CONCLUSION

LAGB is a minimally invasive, efficacious, and a reversible treatment method for morbid obesity. However, complications, such as band slippage, pouch dilatation, and band migration may occur. The band should be removed as soon as migration is diagnosed. Either a malabsorptive procedure, such as RNYGE after the removal of the band or re-banding after 3-6 months, are required for the surgical management of morbid obesity.

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