

# Adjustable Gastric Banding in a Multicenter Study in Turkey

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**Background:** Adjustable gastric banding (AGB) is a minimally-invasive approach which allows adjustment of gastric restriction.

**Methods:** The AGB was evaluated retrospectively in a consecutive series at 3 centers. From October 1998 to October 2001, 70 patients (49 women), mean age 34.3 years (18-59) with morbid obesity (preoperative mean BMI 45.2 kg/m<sup>2</sup>) underwent AGB. The open approach was employed in the first 35 patients. Laparoscopic placement was used in the second 35 patients. Complete follow-up has been obtained in all patients.

**Results:** Mean postoperative follow-up has been 18 months (12-39). Mean operative time was 120 minutes in the open approach and 150 minutes in the laparoscopic AGB. Mean hospital stay was 5 days after the open approach and 1.7 days after the laparoscopic surgery. The excess weight loss after 18 months was 59%. Incidence of early postoperative complications was 27.1%, including nausea and vomiting in 8 patients (5 in open approach, 3 in laparoscopic placement), wound infection in 10 patients (all 10 in open approach), and Wernicke's encephalopathy in 1 patient (open approach). Incidence of late complications was 28.5%, and included band migration in 2 patients (both by laparoscopic placement), pouch dilatation in 10 patients (6 in open approach, 4 in laparoscopic placement), incisional hernias in 4 patients (all by open approach), and port infections in 4 patients (all 4 in open approach).

**Conclusion:** AGB has been effective in achieving good weight loss to 3 years follow-up. The ability to adjust the degree of gastric restriction has enabled progressive weight loss.

**Key words:** Morbid obesity, bariatric surgery, gastric banding, laparoscopy, Turkey

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## Introduction

In a recent study, 22.3% of the Turkish population was obese (body mass index, BMI>30). Medical and dietary therapeutic approaches for massive obesity do not obtain acceptable long-term results, and surgery is the only therapeutic solution for this. Among the gastric restrictive procedures, the adjustable gastric band (AGB) is a minimally invasive approach which allows adjustment of the degree of gastric restriction. We prefer AGB for treatment of morbid obesity because of lack of metabolic complications, its reversibility and its postoperative adjustability.

## Materials and Methods

The AGB (Lap-Band<sup>®</sup>, INAMED, Santa Barbara, CA, U.S.A.) was evaluated retrospectively in a consecutive series, whose data were collected from three centers. From October 1998 to October 2001, 70 morbidly obese patients (21 men, 49 women) underwent AGB. Particular care was devoted to psychological profile, gastrointestinal endoscopy, hepatic echography, cardiovascular assessment and pulmonary function. Laboratory evaluation included complete blood count, serum multiple analysis, and serum cortisol and thyroid levels.

Patient mean age was 34.3 years (range 18-59), mean weight 125.4 kg (range 87-194), mean height 160.7 cm (140-185), and mean BMI 45.2 kg/m<sup>2</sup> (33-70). BMI was 35-40 kg/m<sup>2</sup> in 5.7% of patients, 40-45 in 44.3%, 45-50 in 22.8%, 50-55 in 17.3%, 55-

60 in 4.3%, 60-65 in 2.8%, and 65-70 kg/m<sup>2</sup> in 2.8% of patients.

The operation was carried out by an open approach in the first 35 patients and by laparoscopy in the last 35 patients. In all patients, antibiotic and thromboembolic prophylaxis was carried out: cefazolin sodium, 0.1/10 kg, and low molecular weight heparin (enoxaparin sodium) started 30 minutes before operation plus leg stockings. The calibration balloon was used in the last 50 patients. Patients started a semiliquid diet immediately after a contrast x-ray study of the gastroesophageal region on the first or second postoperative day.

Patients were seen after 4 weeks for initial filling of the band. Further filling was performed two or three times during the next 9 to 12 months, as clinically indicated. Follow-up visits were planned for every 3 months during the first postoperative year and every 6 months thereafter.

## Results

Mean operative time was 120 minutes (60-180) in the open approach and 150 min (90-240) in the laparoscopic approach. Postoperative hospital stay was 5 days after the open approach and 1.7 days after the laparoscopic.

Mean follow-up was 18 months (12-39). Average total weight loss was 7.06 kg/month for the first 3 months, 9.1 kg/month for the next 6 months, and reached an average total of 42.1 kg after 18 months. Mean excess weight loss was 50% and 59% after 12 and 18 months, respectively. The changes in BMI are shown in Table 1 and Figure 1.

The most frequent complication was dilation of the pouch with narrowing of the gastrogastic junction. There were 10 pouch dilatations (6 after the open approach, 4 after laparoscopic placement) (Table 2); the calibration balloon had not been used in these patients. In 6 of the 10 patients, conservative treatment of the pouch dilatation was successful. In 2 of the cases of pouch dilatation, the band was changed, and in 2 cases the band was removed laparoscopically.

Gastric band migration occurred in 2 patients (both after laparoscopic placement). Endoscopy confirmed the diagnosis of gastric band migration

**Table 1.** Change in BMI at time-intervals after AGB

BMI (kg/m <sup>2</sup> )	Preop (%)	3 Mons (%)	6 Mons (%)	12 Mons (%)	18 Mons (%)
<40	5.7	41.4	55.7	72.8	78.5
40-45	44.3	24.3	37.1	25.7	20
45-50	22.8	27.2	5.7	-	1.5
50-55	17.3	4.3	1.5	1.5	-
55-60	4.3	-	-	-	-
60-65	2.8	2.8	-	-	-
65-70	2.8	-	-	-	-
Mean BMI	45.2	41.4	38.3	34.6	32.8

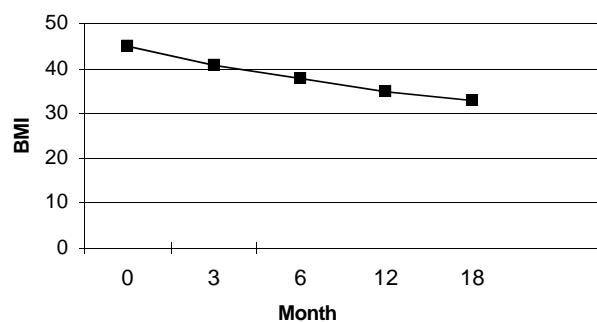
through the anterior wall of the stomach. These bands were removed by a combined laparoscopic and endoscopic procedure. Microbiologic specimens showed no evidence of infection.

Port infection occurred in 4 patients (all after the open surgical approach). After the culture results and antibiotherapy, the ports were changed without recurrence.

In 10 patients, all operated via the open approach, wound infection occurred, and wound dressings were needed. All healed satisfactorily. However, in 4 of these patients, who had had the open approach, incisional hernias occurred. All these hernias were later repaired successfully with polypropylene mesh.

In 4 patients (2 at the open surgery, 2 at laparoscopy), cholecystectomy was performed for symptomatic cholelithiasis.

One patient operated with the open approach had severe vomiting for 1 week after the operation. Physical examination showed no abnormalities except neurological signs consisting of ataxia, disorientation and diplopia. These findings were con-



**Figure 1.** BMI and time after surgery.

**Table 2.** Postoperative early and late complications

Complications	Patients (n)	%
<b>Early Complications</b>	<b>19</b>	<b>27.1 %</b>
Nausea and vomiting	8	11.4 %
Wound infection*	10	14.2 %
Wernicke's encephalopathy	1	1.4 %
<b>Late Complications</b>	<b>20</b>	<b>28.5 %</b>
Gastric band migration	2	2.8 %
Port infection*	4	14.2 %
Incisional hernia*	4	5.7 %
Dilated pouch	10	5.7 %

\* All were in the open surgical group.

sistent with Wernicke's encephalopathy. After intravenous administration of vitamin B<sub>1</sub> (thiamine), all neurological signs slowly decreased.

## Discussion

Early reports of gastric banding described generally satisfactory results.<sup>1-3</sup> With the addition of the laparoscopic approach, a tiny pouch created above the lesser sac, secure anterior fixation, and delayed band filling, the results have improved remarkably. Our laparoscopic operative time has decreased with experience, and presently is about the same as in the classic laparotomy (about 2 hours).

Like Meir and Van Baden,<sup>4</sup> we have had 2 cases of late gastric erosion. Intra-gastric band migration is likely due to unrecognized operative abrasions of the gastric wall, caused by the instruments or by coagulation, possibly associated with over-inflation and excess compressive action by the band.<sup>5</sup>

In our series, pouch dilatation occurred in 10 patients. Since we now position all bands higher (just below the gastroesophageal junction and always above the lesser sac), this complication has not occurred. The creation of a pouch size <15 ml, together with sound anterior fixation, are important.

Wernicke's encephalopathy is known to be associated with chronic alcoholism, severe hyperemesis gravidarum, total gastrectomy and long-term intravenous hyperalimentation if thiamine is not included.<sup>6,7</sup> However, with severe continued vomiting, it

can develop fairly rapidly after gastric restriction.<sup>8</sup> After prompt intravenous administration of vitamin B<sub>1</sub> (thiamine), all neurological signs slowly resolved.

In our patients undergoing the laparotomic approach, wound infection occurred in 10 patients, 4 of whom developed incisional hernias. This did not occur with the laparoscopic approach.

Our early results show similar weight loss to the more invasive vertical banded gastroplasty. The AGB achieved good weight loss at 3 years. The ability to adjust the band to achieve different degrees of gastric restriction has enabled progressive weight loss thus far.

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