

## Laparoscopic Removal of Adjustable Gastric Band as an Isolated Procedure: Indications and Early Surgical Outcomes

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### Abstract

**Background:** Adjustable gastric band (AGB) is one of the earlier bariatric procedures that frequently require revision due to either failure or complications.

**Objectives:** To evaluate the indications and outcomes of laparoscopic removal of AGB as an isolated surgical procedure.

**Methods and Materials:** A retrospective review of charts for all patients who underwent laparoscopic removal of AGB was carried out. Patients who had other types of surgeries done during the same operation were excluded. Data about the indications of band removal and the early surgical outcomes were collected.

**Results:** Between January 2003 and October 2016, 1676 bariatric operations were done. Of those, 76 patients (4.5%) had laparoscopic removal of AGB and it was an isolated surgical procedure in 26 (34.2%) patients. The median age of this series was 39.5 years (19-67) and 73% were females. The indications for isolated LRGB were; weight regain in 12 patients (46%), slippage of band in 9 patients (34.5%), band migration in 3 patients (11.5%) and infection of band in 2 patients (7.5%). There was no conversion to open surgery and no mortality associated with the procedure. The procedures were done electively in all except 2 patients who had acute gastric obstruction secondary to band slippage. Twenty-one patients had short (<48 hours) hospital stay while 5 patients, 2 with obstruction and 3 with infected bands, required longer hospital stay.

**Conclusions:** Isolated Laparoscopic removal of AGB is safe and requires short hospital stay in majority of patients. The commonest indication was weight regain however complications were also frequent. This makes AGB not a preferred option as weight reduction procedure.

**Keywords:** Laparoscopic removal of gastric band; Adjustable gastric band; Weight regain; Band erosion; Band slippage

### Introduction

Weight reduction in obese patients is an effort to address the change in lifestyle. This method often fails in the morbidly obese patients and thus other options like pharmaceutical solutions or the use of bariatric Surgery should be considered. Bariatric surgeries are among the best treatment options for obesity due to high efficacy and sustained outcome [1,2]. Several trials and real-life reports have demonstrated the success of these operations in losing excess body weight (EBW) with an acceptable safety profile [3-5]. The response and rate of complications however varies between different bariatric procedures. Adjustable gastric band (AGB) was a very common bariatric procedure with a satisfactory short-term outcome [6,7]. Unfortunately, longer studies have shown a high rate of failure [8,9] and complications with a revision rate that exceeded 40% in some reported cohorts [10,11]. Removal of AGB is frequently done either through open technique or laparoscopically. Laparoscopic removal of AGB (LRGB) is required for several reasons including lack of adequate loss of EBW (failure) [12], band erosion [13], band infection [14], food intolerance [15],

band slippage [16], esophageal dysmotility [17], gastroesophageal reflux disease [18], pouch dilatation [19], and port infection [20]. Among the most common reasons for LRGB by far is weight regain or failure to lose satisfactory amount of EBW [21]. Less commonly, complications may necessitate LRGB in up to 25% [22]. The most common approach for removal of AGB is the laparoscopic approach while open technique might be needed in case of laparoscopic failure and/or previous upper abdominal surgeries [23]. Removal of AGB can be done in combination with other procedures like a second bariatric surgery or laparoscopic cholecystectomy but it can also be done as an isolated surgical procedure [24]. In case of complications, it is preferred to do LRGB as an isolated procedure while in patients with failure it can either be done simultaneously with other bariatric procedure or as a first step of staged operation [24]. In this series, we are describing the frequency and the indications of LRGB as an isolated procedure together with its early surgical outcomes.

### Materials and Methods

The medical records for all patients who underwent LRGB over the period from September 2003 to October 2016 were retrospectively reviewed. We included only patients who had isolated LRGB. Patients

who underwent simultaneous second bariatric surgeries or laparoscopic cholecystectomy were excluded. A single bariatric surgeon performed all operations. The data collected included demographics, indication for surgery, surgical technique used and early surgical outcomes. Ethical approval was obtained from the local Institutional review board. The descriptive analysis was performed using SPSS version 17.

## Results

From September 2003 till October 2016, a total of 1676 bariatric procedures were performed in Prince Sultan Military Medical City, a tertiary care centre in Riyadh. Of those 76 (4.5%) were LRGB. In 50 patients (75.8%) LRGB was done simultaneously with a second bariatric procedure and they were not included in the analysis while in 26 patients (34.2%) LRGB was done as an isolated surgical procedure (Table 1).

Type of surgery	No. of cases	Percentage (%)
All AGB Removal	76	100
Isolated AGB removal	26	34.2
Removal of AGB and RYGB	26	34.2
Removal of AGB and LSG	18	23.6
Removal of AGB and MGB	6	8

**Table 1:** Type of procedures in patients who underwent AGB removal.

The median age for isolated LRGB series was 39.5 years (19-67) and 73% of them were females. The median body mass index (BMI) was 33.4 (20.3-53.2) and the median duration from band insertion to removal was 6 years (1-14 years) (Table2).

Variables	N=26
Gender (male/female)	7/19 (27/73%)
Age (years)*	39.5 (19-67)
Weight (Kg)*	92 (52-184)
Height (cm)*	161 (155-187)
BMI (kg/m <sup>2</sup> )*	33.4 (20.3-53.2)
Duration of AGB (years)*	6 (1-14)
<b>Indications</b>	
Weight regain (AGB failure)	12 (46.1%)
Band slippage without obstruction	7 (27%)
Band slippage with obstruction	2 (7.7%)
Band erosion	3 (11.5%)
Band infection	2 (7.7%)
*Expressed as median and range.	

**Table 2:** Characteristics of patients who had isolated LRGB.

The most common indication for AGB removal was weight regain, reported in 12 patients (46.1%) with a BMI of 40-53 kg/m<sup>2</sup> at time of surgery. The procedure was done electively in this group of patients and it was considered a first stage procedure that was followed by laparoscopic sleeve gastrectomy in 2 patients, minigastric bypass in 3 patients and gastric bypass in 3 patients and those were done within 3-12 months after LRGB. The remaining 4 patients had lost to follow up. The indications for removal in the rest of the patients were related to complications of the bands. The BMI was lower than the previous group and in some patients; it was less than 25 kg/m<sup>2</sup>. Slippage of the band occurred in nine patients (11.8%) and 2 of them presented with acute stomal obstruction and required emergency admission and LRGB after stabilization. Gastric erosion by the band was found in 3 patients (11.5%) who presented with increasing abdominal pain and they were diagnosed endoscopically. Removal of the band was done electively in these patients. Infection complicated AGB in two patients (7.7%) and that was an indication for urgent removal of the bands. The infection was mostly at the site reservoir and did not respond to appropriate courses of broad-spectrum antibiotics.

There was no mortality in this series and surgical drain was required in 4 patients (2 with erosion and 2 with infected bands). Gastrograffin study was performed in all patients who had band erosion 2 days after operation and it did not show any leakage of contrast. One patient with band infection had persistent discharge from the wound at the reservoir site and was found to have a gastrocutaneous fistula for which he was re-admitted and underwent excision of the fistula under general anesthesia. Hospital stay was short (i.e. <48 hours) in 21 patients (80.8%) while in 5 patients (2 with band infection and 3 with band erosion) a longer hospital stay of 3-12 days, average of 5 days was required.

## Discussion

Although short-term studies on AGB demonstrated favourable efficacy and safety outcomes [4,25], longer studies however reported unacceptable high rate of failure and complications. Spivac reported 50% failure of AGB in achieving 25% or more EBW loss after 10 years of follow up compared to 10.7% in gastric bypass patients [9]. Similarly, Kazsa showed that 66% of patients failed to achieve 50% loss of EBW after 24 months of insertion with reoperation rate of 16.7% [26]. More recently Caradina reported a band survival rate of 65.8% and 53% at 10 and 15 years with EBW loss of 38.7% and 35.1% respectively [27]. A larger study by O. Brien that included 3227 patients showed a durable EBW loss of 47% at 15 years but revision rate was 26% [28]. The technique of AGB insertion may have an impact of band survival as shown in a recently published randomized controlled trial where patients who underwent AGB with fixation technique named gastro-gastro suture had less re-intervention rate for band retrieval or repositioning than those who did not have it (19.4% vs 11.3%; P = 0.013) [29].

Revisional bariatric surgeries for AGB were shown consistently to be safe and their efficacy was very similar to primary sleeve gastrectomy and gastric bypass [30,31]. Jennings showed a mean EBW loss of 59.5% in primary gastric bypass compared to 59.4% in revisional bypass [30]. Similarly, Silicchia reported a mean EBW loss of 78.5% and 78% in primary and revisional sleeve gastrectomy respectively [31]. Revisional surgeries can be performed as one-step or two-steps approach. A recent meta-analysis that included 11 studies and 1370 patients showed a comparable outcome from both approaches in term of complications, morbidity and mortality [24].

Isolated LRGB can be done as a first step procedure prior to another bariatric surgery or primarily for removal of band due to complications or patient's un-satisfaction. Although isolated LRGB has been reported in several AGB literatures, we opted to describe in details the indications and outcomes of this procedure. Our case series consisted of one third of patients who underwent removal of AGB. These patients had LRGB as an isolated surgical procedure while others had simultaneous conversion to other bariatric surgeries. Isolated LRGB was safe and feasible with no mortality or major morbidity and required short hospital stay even in patients who had band-related complications. As reported in previous studies, band failure with weight regain was the leading indication followed by different forms of complications of AGB. Band slippage was the commonest complication requiring band removal but gastric obstruction was evident in two out of mine patients only. The need for emergency intervention was limited to these 2 patients with obstruction together with 2 patients with band infection.

This approach may take longer time but on the other hand it can give the patient time to decide on going to another procedure or not. Additionally it is a better option for patients with complication where risk of infection at site of operation is high. The decision of doing single-step or two steps revision of AGB should be individualized according to patient preference, indication and the expertise of the surgeon.

This study have several limitations including the retrospective design, small sample size and the lack of control arm, but it highlighted important aspects about the safety of the procedure as an option for patients who will undergo revision of their AGB.

## Conclusion

In conclusion, isolated Laparoscopic removal of AGB is safe and requires short hospital stay in majority of patients. The commonest indication was weight regain however complications were also frequent. This makes AGB not a preferred option as weight reduction procedure.

## Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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