



## ORIGINAL ARTICLE

## Complications of Endoscopic Bariatric Surgery

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## ABSTRACT

**Background:** Obesity is a serious problem for males and females around the world. World Health Organization have determined obesity when body mass index equal or above 30 Kg/m<sup>2</sup>, where obesity is classified into 3 classes including; class I for BMI ranged between 30-35Kg/m<sup>2</sup>, Class II for BMI ranged between 35-40 kg/m<sup>2</sup> and Class III for BMI over than 40 Kg/m<sup>2</sup>. This study was to study the Complications of Endoscopic Bariatric Surgery after different bariatric surgeries. **Methods:** This study was carried out in the Department of General Surgery in Zagazig University Hospitals and included 36 obese patients attending at zagazig university hospital fulfilling the inclusion criteria. **Results:** This study was conducted to study the Complications of Endoscopic Bariatric Surgery. This study included 36 patients; they were 26 females and 10 males (72.2% and 27.8% respectively). Their ages ranged from 29 to 60 years with a mean age of 47.52 ± 8.88 years. **Conclusion:** There is an increasing role for the endoscopist in the multidisciplinary treatment of obesity, particularly in the surgery complications. Since it prefers to use many techniques to overcome postoperative complications of Endoscopic Bariatric Surgery.

**Keywords:** body mass index, Bariatric Surgery, Endoscopic Surgery.

## INTRODUCTION

Obesity is a global epidemic that has significant impact on morbidity, mortality, and rising health care costs. It affects nearly one third of all adults and is responsible for >300,000 deaths annually in the United States alone [1].

Obesity is also an independent risk factor for many of the most common chronic diseases that afflict the population of developed nations, including hypertension, diabetes, coronary heart disease, and certain types of malignancies such as breast and colon cancer [2].

In severely obese patients with body mass index (BMI) >40 kg/m<sup>2</sup> or those with BMI>35 kg/m<sup>2</sup> with comorbid conditions who have failed prior medical intervention, bariatric surgery, a grade A recommendation, has been shown to be the most effective and

durable option that can reduce an individual's risk of premature death by 30% to 40% [3].

In particular, surgery is associated with a 77% resolution of disease in patients diagnosed with type 2 diabetes, 62% in those with hypertension, 84% in patients with obstructive sleep apnea, and 62% in those with hyperlipidemia [4].

The total number of metabolic and bariatric operations performed globally was 340,768, dominated by 46.6% Roux-en-Y gastric bypass (RYGB), 27.8% sleeve gastrectomy (SG) which has seen a marked increase in prevalence since 2008, 17.8% laparoscopic adjustable gastric banding (LAGB), and 2.2% biliopancreatic diversion/duodenal switch (BD/DS) [5].

Other operations include vertical banded gastroplasty and jejunoileal bypass, the latter of which has been largely abandoned due to

severe complications such as liver failure and cirrhosis, renal insufficiency, and abdominal malignancies in both short-term and long-term follow-up [6].

With increased use of laparoscopy and other advancements in surgical techniques, the overall mortality rate of bariatric surgery is <0.2%. Yet, approximately 4% to 10% of patients present for complications within the first 30 days after surgery and 9% to 25% present for evaluation of late complications [7].

Although some complications such as reflux and nutritional deficiencies can be managed conservatively, for those that require additional intervention, endoscopy is increasingly seen as a safer and more cost-effective approach over traditional surgical management [8].

Bariatric surgery has shown to be the most successful way to lose excess body weight for those patients that meet the criteria of morbidly obese. Although today's standard bariatric operations are quite safe, a number of complications may be encountered. Early in the experience of bariatric surgery, some of these complications required repeat surgery, which carries a greater rate of complications. The flexible endoscope has become a more aggressive tool with increased therapeutic potential to add to its diagnostic tradition. Many of the endoscopic treatments are associated with less morbidity and/or mortality. Some of the common complications after bariatric surgery will be reviewed in this article. We will discuss the current endoscopic options available prior to undergoing repeat surgical intervention [9].

Bariatric surgery is currently the most efficient therapy for the treatment of morbid obesity. With the rising prevalence of obesity and associated diseases, the number of bariatric procedures is increasing worldwide. The increase in the number of procedures performed has been associated with an increase in the volume of literature focusing on post-bariatric surgery complications [10]. This study was to study the Complications of Endoscopic Bariatric Surgery in patients who develop gastrointestinal leaks after different bariatric surgeries

## METHODS

This study was carried out in the General Surgery Department, Faculty of Medicine, Zagazig University Hospitals. The study INCLUDES thirty-six morbidly obese patients.

This study included 36 as the expected number of patients attending at zagazig university hospital fulfilling the inclusion criteria is about 6 months (36/6months) and all of them will be included in the study as a comprehensive sample. Both sexes are included. Age 18 – 60 years, patients BMI score was  $\geq 40 \text{ kg/m}^2$  or greater regardless of the comorbidities, patients BMI score was  $\geq 35 \text{ kg/m}^2$  having comorbidities underwent bariatric surgery. Written informed consent was obtained from all participants and the study was approved by the research ethical committee of Faculty of Medicine, Zagazig University. The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans Toxic shocked patients not candidate for interventional procedure, Patient with post bariatric surgery complications on conservative treatment.

### Statistical analysis

Data were collected, tabulated and analyzed by SPSS 20, software for Windows. The significance level was set at  $P < 0.05$ .

## RESULTS

The current study was conducted to study the Complications of Endoscopic Bariatric Surgery after different bariatric surgeries. The total number of patients was 36 patients; table 1., showed that their ages ranged from 29 to 60 years with a mean age of  $47.52 \pm 8.88$  years, table 2., showed that study patients were 26 females and 10 males (72.2% and 27.8% respectively). Table 3., showed symptoms distribution among studied groups distribution, in which abdominal pain was 44.4%, Nausea and vomiting was 22.2%, profound weight loss and mal absorption 19.4% and Failure to lose weight 13.9%, as regarding endoscopic features undetected (normal) 30.6%, Stenosis and stricture 25%, leak 19.4%. erosion 8.3% and bleeding, Ulcer & stenosis & Visceral fistula were 5.6%.

Table 4., showed that revision and inspection 36.1% and dilatation were 30.6%, this intervention were once in 91.7% and repeated 8.3%. Table 5., showed that 11.1% were

complicated (2 cases with bleeding and 2 cases with perforations) and complicated cases were significantly higher regarding age.

**Table 1. Age distribution of studied groups (N=36)**

	Age
<b>Mean± SD</b>	<b>47.52±8.88</b>
<b>Median (Range)</b>	<b>46.5 (29-60)</b>

**Table 2. Sex distribution among studied groups**

Sex	N		%	
	Male	10	27.8	
Female	26	72.2		
<b>Total</b>	<b>36</b>	<b>100.0</b>		

**Table 3. Symptoms and endoscopic features distribution among studied groups distribution**

		N	%
<b>Symptoms</b>	<b>Abdominal pain</b>	<b>16</b>	<b>44.4</b>
	<b>Failure to lose weight</b>	<b>5</b>	<b>13.9</b>
	<b>Nausea and vomiting</b>	<b>8</b>	<b>22.2</b>
	<b>Profound weight loss and mal absorption</b>	<b>7</b>	<b>19.4</b>
<b>Macroscopic features</b>	<b>Normal</b>	<b>11</b>	<b>30.6</b>
	<b>Bleeding</b>	<b>2</b>	<b>5.6</b>
	<b>Erosion</b>	<b>3</b>	<b>8.3</b>
	<b>Leak</b>	<b>7</b>	<b>19.4</b>
	<b>Stenosis</b>	<b>9</b>	<b>25.0</b>
	<b>Ulcer &amp; stenosis</b>	<b>2</b>	<b>5.6</b>
	<b>Visceral fistula</b>	<b>2</b>	<b>5.6</b>
	<b>Total</b>	<b>36</b>	<b>100.0</b>

**Table 4. Management distribution among studied group**

		N	%
<b>Management</b>	<b>Clip and suture</b>	<b>2</b>	<b>5.6</b>
	<b>Dilatation</b>	<b>11</b>	<b>30.6</b>
	<b>Nutritional support</b>	<b>5</b>	<b>13.9</b>
	<b>Revision</b>	<b>13</b>	<b>36.1</b>

	<b>Stent</b>	<b>5</b>	<b>13.9</b>
<b>Intervention</b>	<b>Once</b>	<b>33</b>	<b>91.7</b>
	<b>Repeated</b>	<b>3</b>	<b>8.3</b>
	<b>Total</b>	<b>36</b>	<b>100.0</b>

**Table 5. Complication after intervention**

		<b>N</b>	<b>%</b>
<b>Complication</b>	<b>No</b>	<b>32</b>	<b>88.9</b>
	<b>Bleeding</b>	<b>2</b>	<b>5.6</b>
	<b>Perforation</b>	<b>2</b>	<b>5.6</b>
<b>Overall</b>	<b>Not</b>	<b>32</b>	<b>88.9</b>
	<b>Complicated</b>	<b>4</b>	<b>11.1</b>
	<b>Total</b>	<b>36</b>	<b>100.0</b>

## DISCUSSION

Obesity is a serious problem for males and females around the world. World Health Organization have determined obesity when body mass index equal or above 30 Kg/m<sup>2</sup>, where obesity is classified into 3 classes including; class I for BMI ranged between 30-35Kg/m<sup>2</sup>, Class II for BMI ranged between 35-40 kg/m<sup>2</sup> and Class III for BMI over than 40 Kg/m<sup>2</sup> [11].

Patients with BMI score  $\geq 35$  or greater who have comorbidities or those with BMI score  $> 40$ , regardless of co-morbidities, are regarded as morbidly obese [12].

Morbid obesity is associated with a number of comorbidities like coronary artery disease, peripheral vascular disease, hypertension, cardiomyopathy, dyslipidemia, chronic sleep apnea, diabetes mellitus (type-2), gastroesophageal reflux disease, osteoarthritis, gallbladder stones and chronic asthma, in addition to an increased incidence of various cancers such as those of the uterus, breast, colon, and prostate [13].

Bariatric or weight loss surgery is the only treatment for morbid obesity that confers definitive weight loss at long-term follow-up. In addition to weight reduction there is a strong possibility of amelioration or even cure of various co-morbid conditions associated with obesity. However, bariatric operative

approaches may fail from functional or technical reasons especially in an un-experienced hand, causing inadequate weight loss or severe complications [14].

The most complications after bariatric surgery are DVT, pulmonary embolism, atelectasis, peritonitis, gastrointestinal leak, wound infection, dehiscence and seromas, incisional hernia and skin redundancy, cholelithiasis, stoma obstruction, marginal ulceration, intestinal obstruction, failure of weight loss and nutritional complications [15].

However, the surgical intervention may cause a high-risk factor for many patients whom suffering from high comorbidities and thus a. from this point, endoscopic therapy can be a good option for the relive of postoperative complications related to bariatric surgery. Endoluminal treatment for peri-procedural complications must be done for patients after bariatric surgery to minimize morbidities [16].

Mahmoud et al. [17], found that there was no significance difference in post-operative complications in bariatric surgery. The patients with certain problems in which endoscopic therapy is the better solution, so the endoscopic surgery will most familiar and have high prevalence for patients undergoing bariatric surgery.

Regarding failure to lose weight, the ratio of weight recidivism is about 10%-20%. Endoscopic therapies were advanced to provide a clear evaluation to the anatomy and therapeutic intervention. Endoscopy reduce the size of the stoma of the gastrojejunal anastomosis by injecting a four quadrant endoscopic of sodium morrhuate in the seroma, leading to formation of scar which reduce the size of the stoma effectively [18].

Regarding band erosion, the late of intragastric band migration process, can cause weight increase, infections and satiety, although patients don't appear any symptoms. The band must be removed to avoid complications. Surgical process by the laparoscopic transabdominal considered the classic method. However, endoscopic removal can be done after the extraction of the adjustable port by subcutaneous exploration. This endoscopic surgery is the best solution to avoid high morbidity [19].

The management of post-operative anastomotic leaks by using the endoscopic stents is the best method. The stents omitting the site of leakage from the secretions of esophago-gastric, prevent contamination and healing the leak site [20].

Farnik et al. [21], demonstrated that the application of over-the-scope clip (OTSC) in patients who have iatrogenic perforation and postoperative leakage and have spontaneous rupture of the upper GI tract give a good result in the rate of success, decrease the hospital stay or treatment period with small complications, in comparing to fully covered SEMS insertion. However, it is difficult to suspect this result for the treatment of post-bariatric leak, as there are no cases of post-bariatric surgery in the study.

### CONCLUSION

There is an increasing role for the endoscopist in the multidisciplinary treatment of obesity, particularly in the surgery complications. Since it prefers to use many techniques to overcome postoperative complications of Endoscopic Bariatric Surgery

### Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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