

## Management of Acute Bleeding Post Laparoscopic Sleeve Gastrectomy

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### Abstract

**Introduction:** Bariatric procedures are widely spreading nowadays, laparoscopic sleeve gastrectomy is one of the most commonly performed Bariatric operations, post-operative bleeding is being a serious and a common event of this operation.

**Materials and methods:** A retrospective analysis was performed for 80 out of 1500 patients, who underwent laparoscopic sleeve gastrectomy (LSG) in the period between March 2015 and August 2017. The rate of hemorrhagic complications was 5.3%, the mean age was 38.5 ( $\pm$  8.718349), and the mean BMI was 40 ( $\pm$  3.780856)

**Results:** Source of bleeding was mostly intra-abdominal of which 95% of 76 patients, while intra-luminal bleeding represented only 5% of 4 patients. While in the intra-abdominal bleeding, 54 were there which had bleeding from the staple line, in 8 cases the bleeding was from the omentum, while 4 bled from the gastro-pancreatic adhesions, 4 bled from short gastric vessels, and in 6 patients the bleeding was from the trocar entry site.

**Conclusion:** Early re-laparoscopy after post-LSG bleeding is diagnostic and therapeutic, and decreases both morbidity and mortality of patients.

**Keywords:** Bariatric surgery; Diabetes therapy; Laparoscopic sleeve gastrectomy; Mini gastric bypass

### Introduction

Postsurgical complications after sleeve gastrectomy can be divided into early and delayed. Hemorrhage is considered to be one of the most common early complications after sleeve gastrectomy [1]. Possible causes include lengthy staple line and the change in intra-gastric pressure. Another important risk factor for increased postoperative bleeding is preoperative low molecular weight heparins used for prevention of venous thromboembolism [2-4]. Chronic bleeding in LSG however is very uncommon and related to ulcers that may develop within the remnant stomach. Incidence of hemorrhage post LSG has been reported in 1.1–8.7% of cases [5]. Postoperative bleeding can be classified based on bleeding site into intra-luminal bleeding (ILB) into the gastrointestinal tract or intra-abdominal bleeding (IAB) into the abdominal cavity [6-8]. Intraluminal bleeding from the staple line usually presents with an upper gastrointestinal bleed as hematemesis or later on melena stools, in addition to tachycardia and hypotension. Management of intraluminal bleeding was conservative [9]. Intra-abdominal hemorrhage presents in the abdominal cavity and early indication of intra-abdominal bleeding will be through the abdominal drain [10]. Intra-abdominal bleeding usually presents with a serial drop in serum hemoglobin levels and/or signs of tachycardia or hypotension. Common sources for intra-abdominal bleeding include the gastric staple line, spleen, liver or abdominal wall at the sites of trocar entry [11,9]. An increased risk of hematoma developing and abscess formation is found as a result. Early bleeding through drains or NG tube is called a sentinel bleed and it usually can occur within hours of surgery [12-15].

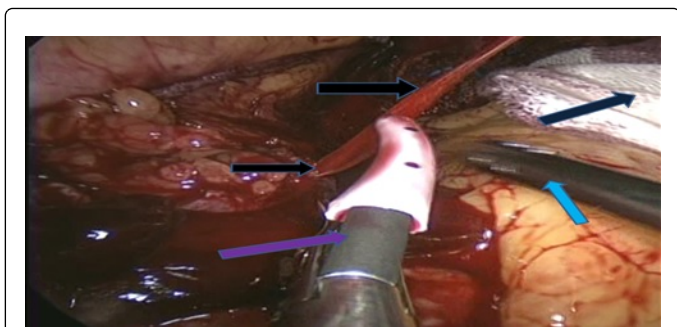
### Materials and Methods

This is a retrospective analysis of 1500 morbidly obese patients who were collected from General Surgery Department at Ain Shams university hospitals (El-Demerdash hospital) [16]. The patients underwent laparoscopic sleeve gastrectomy (LSG) in the period between march 2015 till August 2017. An aggregate of 80 patients out of the 1500 presented by post LSG bleeding within the first 6 hours. According to the clinical presentation, bleeding was classified into 2 groups: **Group I:** Intra-abdominal: this comprised 76 patients out of the 80. They presented with tachycardia ( $>100$  b/m), hypotension ( $<90/60$  mmHg), increase in the drainage volume ( $>100$  cc/hr), and abdominal pain [17,18]. While 6 out of the 38 patients bled from the trocar insertion site. **Group II:** Intra-luminal bleeding: 4 patients out of the 80 patients presented with hematemesis and melena in addition to tachycardia and hypotension.

In these cases we initiated fluid resuscitation, performed laboratory tests (CBC and coagulation profile) and also pelvi-abdominal ultrasound examination if feasible [19]. Patients with poor response to fluid resuscitation were returned to operating room (OR) for urgent Re-laparoscopy to identify the source of bleeding.

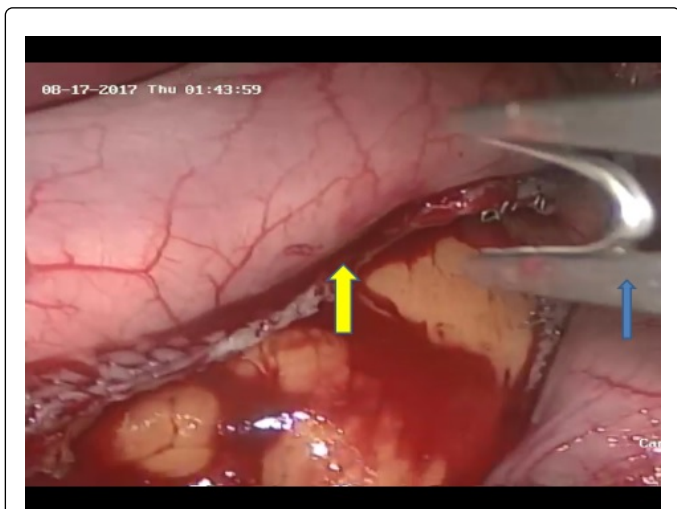
### Management

Whereas 36 patients underwent urgent Re-laparoscopy to identify the source of bleeding. Diagnostic laparoscopy is considered to be an excellent option to allow direct visualization and to identify the bleeding source [8]. It also allows evacuation of the hematoma and a thorough washout to prevent formation of an abscess (Figure 1).



**Figure 1:** Control of omental spurter using ligasure, suction and gauze.

After insertion of ports, thorough and meticulous exploration was done after evacuation of the hematoma. Intra-operative packing to help control bleeding and allow hemostasis. Packing can be done with inserting gauze to help to identify the bleeding source [20,21]. Suction and irrigation can also help us to identify the source of bleeding and allow for the application of a clip, cauterizing the bleeding points, or application of under-running sutures (Figure 2).



**Figure 2:** Clipping of bleeding staple line.

## Results

Independent demographic variables were sex, age, body mass index (BMI), and co-morbidities (Table 1)

Independent Variable	Count	Percentage (%)
Male	30	37.5
Female	50	62.5
Total	80	100

**Table 1:** Independent variables according to gender.

This table shows that most of the patient were females as they represented 62.5%, while the male patients only 37.5% (Table 2).

Independent Variables	Number	Range	Mean	± SD
Age	80	24-55	38.5 years	8.718349
BMI	80	35-45	40 kg/m <sup>2</sup>	3.780856

**Table 2:** Independent Variables according to age and BMI.

The table shows that the mean age was 38.5 years ( $\pm$  8.718349), while the mean BMI was 40 kg/m<sup>2</sup> ( $\pm$  3.780856). A total of 36 patients underwent urgent re-laparoscopy to identify the source of bleeding (Table 3 and Figure 3).

- 54 cases bled from the suture line.
- 8 cases bled from the omentum (gastrocolic ligament).
- 4 cases bled from gastro-pancreatic adhesions.
- 4 cases bled from short gastric (upper polar) vessels.
- 6 patients had bleeding from the trocar site bleeding (to exclude other sources of bleeding).

### Group I:

- Bleeding from suture line was managed by: under running sutures to all 54 patients, 14 patients with omental fixation as a patch, and 40 patients without omental fixation. Some clips application was needed.
- Bleeding from omentum was managed by cauterization and clipping of bleeding points and ligation of right gastro-epiploic vessels below the pylorus.
- Bleeding from gastro-pancreatic adhesions was managed by ligation and clipping of the bleeders.
- Bleeding from short gastric (upper polar) vessels was managed by ligation and clipping of the vessels.
- Bleeding from port site: 4 patients were managed conservatively by compression (using Elasto-plast) and 2 patient needed re-laparoscopy to exclude other causes of bleeding, and the bleeding was controlled by widening of port site and cauterizing the bleeder (Figures 4 and 5).

Parameters		Number	Percentage (%)	
Source of bleeding -80	Intra-abdominal	Suture line	54	67.5
		Omentum	8	10
		Pancreatic adhesion	4	5
		Gastric vessels	4	5
		Trocar site	6	7.5
	Intra-luminal	4	5	

**Table 3:** Source of bleeding.

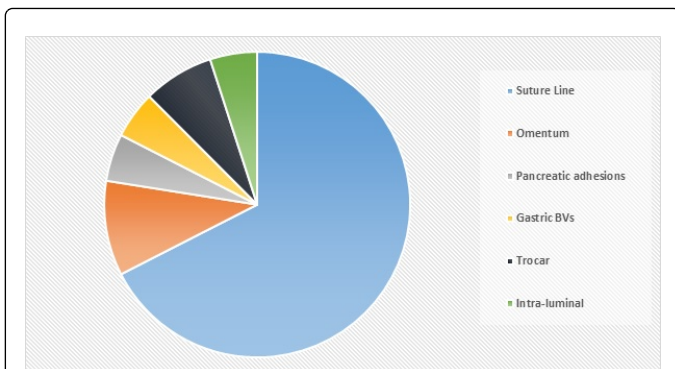


Figure 3: Source of bleeding.

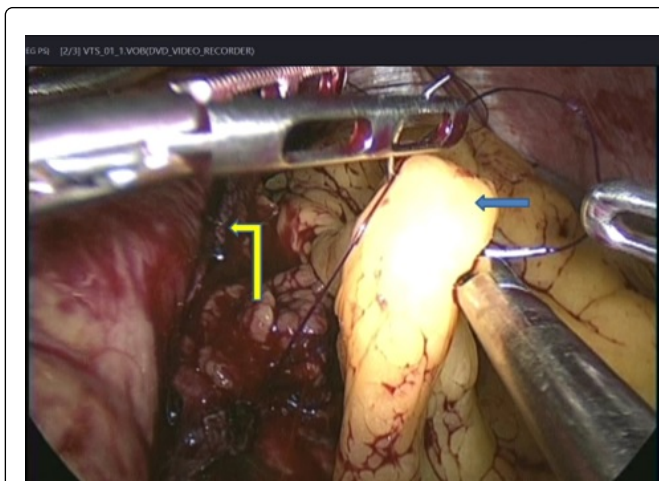


Figure 4: Under running sutures using omental patch in bleeding staple line.



Figure 5: Omental patch fixation covering the whole staple line.

Group II:

Patients usually bled from staple line, and they were managed conservatively using:

- Fluid resuscitation.
- Folley's catheter insertion to monitor urine output.
- Blood transfusion.
- Follow-up of hemoglobin and hematocrite.

## Discussion

Post-operative bleeding is certainly the most common and early complication. Usually it occurs during the first or second postoperative day. It was found that the most common and major early complication is certainly the post-operative bleeding, which can occur in up to 16% of patients, with reported average of 3.6% [22]. We found that our early intervention has decreased the hospital stay, decreased the risk of infection, decreased risk of blood transfusion, and speeded up the patient recovery and normal lifestyle comeback.

The age range was between 24-55 years with mean 41.2, this was agreed by Michael who found the same mean age. Our results also found that the female gender was more than the male gender, and that mean BMI > 41 kg/m<sup>2</sup> where it was 47.3 kg/m<sup>2</sup>.

In our study the incidence of post-operative bleeding was 5.2% while it was found that the incidence of hemorrhage post-LSG has been reported in 1.1-8.7% of cases [6]. It was reported that the incidence ranged between 0 and 4.4% [1]. Another incidence was found that hemorrhagic complications (HC) after LSG is up to 4.94%. Later it was found that the risk of post-operative bleeding has been reported to be between 1 and 6% after LSG [13].

In our study 80 patients out of the 1500 presented by post LSG acute bleeding within the first 6 hours. It was found that the postsurgical complications after sleeve gastrectomy can be divided into acute and chronic [23]. It was found that acute or early post-operative bleeding usually occur within 12-48 hours after surgical procedure [1]. It was showed that late and chronic bleeding will usually present more than 42 days after the procedure [17,9].

## Conclusion

Early re-laparoscopy after post-LSG bleeding is diagnostic and therapeutic, and decreases both morbidity and mortality of patients.

## Conflict of Interest

No any type of conflict of interest or financial support.

## Ethical Approval

An approval from all participants in the study was obtained.

## Informed Consent

Informed consent was obtained from all individual participants included in the study.

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