ORIGINAL ARTICLE

POSTOPERATIVE BLEEDING AFTER LAPAROSCOPIC GASTRIC-SLEEVE: WHAT OPTIONS DO WE HAVE?

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Abstract

Laparoscopic sleeve gastrectomy is a relatively simple procedure, but the complications can quickly become life-threating. The aim of this study was to investigate based on our experience when is best to follow a conservative protocol in postoperative bleeding after sleeve gastrectomy. The study is retrospective, we identified a number of 150 cases of sleeve gastrectomy, of which 18 has postoperative bleeding. A conservative approach with close observation (ultrasound, CT, Hb levels) was practiced in 10 cases and no surgical intervention was required. The recommendations are as follows: The first and obvious recommendation is to stop anticoagulants. The perigastric drainage should drain, if Hb levels go down an nothing is coming through the drain consider other sources of bleed or try to reopen the blocked drain. A blood cloth developed around the bleeder may maintain the active bleed due to local fibrinolysis, in these cases, one should take into consideration guided drainage (ultrasound/CT) and monitor Hb levels afterward. The presence of a small perigastric collection without clinical manifestation should be left as such. Take into consideration reintervention if: signs of hypovolemia are present (tachycardia, hypotension, profuse sweating), Hb below 7g/dL. The patient's clinical state should always play an important role in decision making.

Keywords*: laparoscopic sleeve gastrectomy, complications, laparoscopy*

Introduction

The incidence of obesity has been steadily increasing in recent years, so that in developed countries it is possible to speak of a real epidemic, with overweight patients worldwide accumulating about 600 million in 2018. Although this problem is increasing in importance and the population understands the risks that come with the extra weight, the rate of those who manage to reach a normal NMI only from the diet is still low. Starting from these observations bariatric surgery emerged as a real rescue with minimal risks and began to be adopted on a large-scale. With the increased usage the rate and variety of complications have increased accordingly [1].

One of the most important post-operative complications that are immediately life-threatening is a pulmonary embolism and anastomosis fistula. Other complications commonly encountered are postoperative bleeding that can reach an incidence of up to 4%. Taking into account the number of bariatric interventions that reach values up to 634,897 worldwide in 2018 according to IFSO data. At

this rate, it would take 43 years to operate all the obese patients in the world. According to the literature data, 3% of these interventions are diagnosed with postoperative bleeding [2].
By extrapolation, we reach a number of 19,000 postoperative hemorrhages per year after bariatric surgery. The bleeding sources encountered are a staple line, trocar hemorrhage, parietal hemorrhage, intraluminal hemorrhage, bleeding from the dissection areas [3, 4].
Out of this number of postoperative hemorrhages, up to 3% of them require surgical reintervention for hemostasis (approximately 600 reinterventions/year) [5].

Postoperative hemorrhage after laparoscopic longitudinal gastrectomy can be classified according to the origin as intraluminal or extraluminal. Extraluminal hemorrhages occur in the immediate postoperative period and required frequent surgical reinterventions while intraluminal hemorrhages can occur remotely from the surgical intervention and can be managed even by medical treatment such as antisecretory molecules after staple line ulcers [6].

The most common cause of bleeding is a long gastric staple line and was identified as the source in approximatively 20% of the reinterventions [7].

Also, the administration of non-steroidal anti-inflammatory treatments can decrease the production of prostaglandins and increases the incidence of postoperative bleeding [8].
Understanding and recognizing the clinical manifestations of this complication is essential for the early diagnosis and management of these life-threatening complications.

It should be kept in mind that these overweight patients do not tolerate very well a new surgical intervention to control hemostasis due to the associated comorbidities. In this line of thinking, a new trend is gaining more and more ground in stopping these postoperative hemorrhages – namely the use of tranexamic acid – the heparin antidote that can be used to prevent surgical re-intervention for hemostasis [9].

The purpose of our study was to evaluate what options might be available in the case of postoperative hemorrhage after laparoscopic longitudinal gastrectomies by the observations made on the cases operated in our clinic but also through a literature review.

Ethics: Analysis of the data had been approved by the Ethics Committee of the institution where the study had been conceived.

Materials and Methods

The study is retrospective. The cases were retrieved from the General surgery clinic of the Emergency Clinical Hospital, Prof. Dr. Agrippa Ionescu, Bucharest, Romania. We identified a number of 150 laparoscopic sleeve gastrectomy cases, of which 18 had postoperative bleeding (27%). The patients were operated using the same staple devices, cartridges, and technique by 2 surgeons with identical preoperative and postoperative management protocols. No other techniques (oversewing) or devices besides clips were used during the resection of the stomach. The gastric pouch was calibrated using a 34 Fr. Fauchet tube. The data were retrieved from patients charts and intraoperative laparoscopic movies. The data was collected in a Microsoft excel 2018 spreadsheet. The statistical analysis was obtained using the IBM SPSS V.20 program. A conservative approach with close observation (ultrasound, CT, Hb levels) was practiced in 10 (55%) cases and no surgical intervention was required while 8 (45%) required reintervention.

Results

We identified a number of 150 cases over a 4-year period (01.01.2015 – 01.01.2019) operated for morbid obesity which benefited from laparoscopic sleeve gastrectomy. The average BMI of the patients was 38.9 kg/sqm with a standard deviation of 5.6 kg/sqm.

The group consisted mainly of women n=93 and men n=57. The average age of the group was 43 years with a standard deviation of 3 years.

On average the resection line was started with 2 green cartridges followed with 4-5 blue cartridges. The staple line was not oversewed in any of the cases, if bleeders were identified clips were applied. We did not identify any correlation between the average BMI of the patients with postoperative bleeding and patients with postoperative bleeding (p=0.8).

All of the patients had a postoperative drain placed along the gastric resection line which was removed on day 2 postoperative.

A number of 18 patients were diagnosed with postoperative bleeding based on the amount of blood drained (above 200ml) and hemoglobin values (a drop of 1 g). Of these, reintervention was required in 8 cases due to the failure of conservative treatment.

Of the 8 cases operated, the source was identified in 5 cases distributed as such: 3 on the staple line, 2 along the pylorus region and 1 along the fornix. The other sources were the resected gastroepiploic ligament n=1, and the trocar orifices n=1.

The average reintervention time was 40 min. with a standard deviation of 18 minutes. If the bleeders were not identified do not increase operative time, extract all of the blood cloths, lavage, and drain (Figure 1, Figure 2).

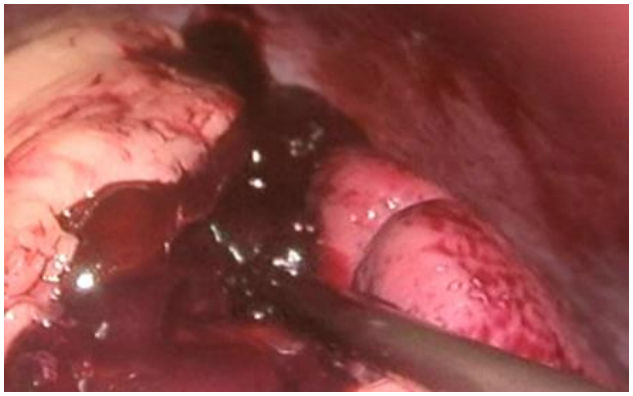

Figure 1 – The difficulty in identifying a single millimetric bleeder due to the abundant residual blood and blood clots

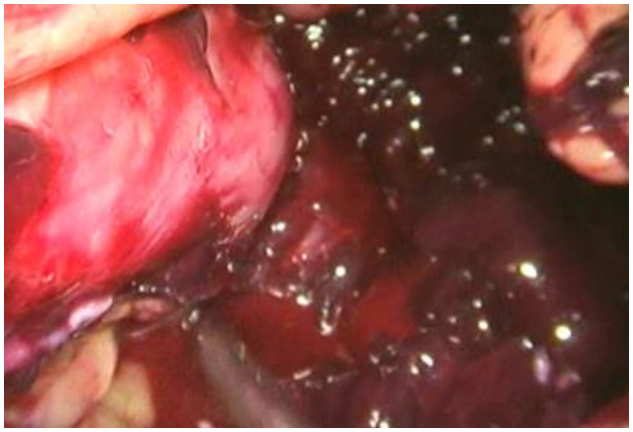

Figure 6 – The difficulty in identifying a single millimetric bleeder due to the abundant residual blood and blood clots

The bleeders were stopped either by electrocoagulation in the case of the trocar bleed and gastro-epiploic ligament bleed while clips were applied along the resection line of the stomach (Figure 3). Avoid using electric devices on the staple line as they can cause tissue necrosis and increase the risk of fistula.

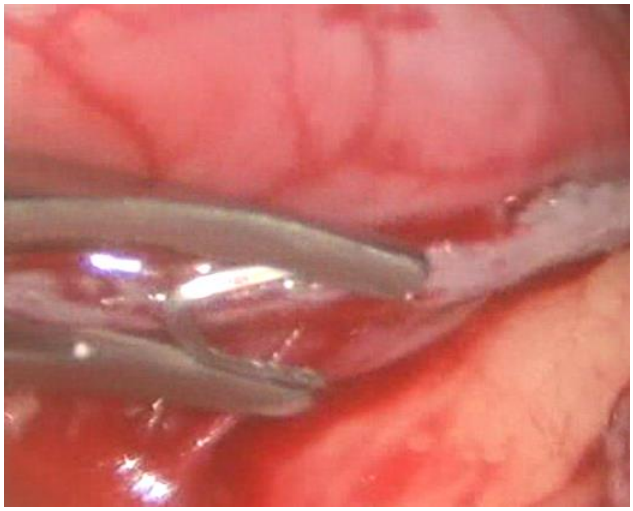

Figure 3 – Bleeding along the suture line-which can easily be resolved with a titanium clip

In all of the cases were the bleeders were not identified, we did an abundant lavage of the peritoneal cavity with subsequent drainage. Also, all of the blood clots were extracted (Figure 4).

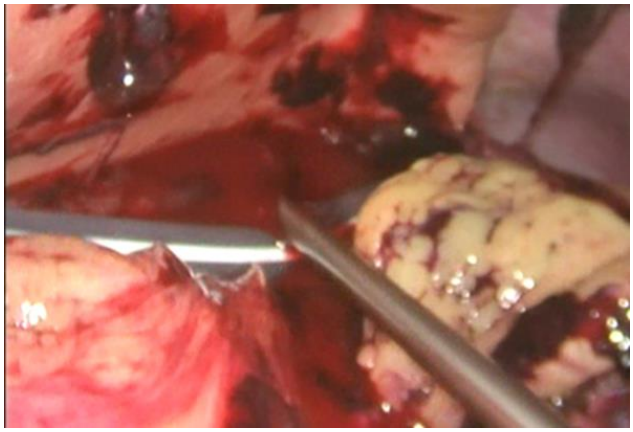

Figure 4 – Demonstrates a drain placed directly along with the bleeding source, which was blocked by blood cloths. The decision to operate in this case was taken solely on the decreasing values of hemoglobin. The absence of the blood on the drainage bag does not mean there is no active bleeder inside

Discussions

The stomach has a rich blood supply which derives from 2 vascular arches with multiple

vascular anastomoses reason why it is exposed to secondary hemorrhages.

Regarding the source of these hemorrhages, there are a number of discussions, they most often originate starting the staple line in the case of laparoscopic longitudinal gastrectomy. But they can also arise from the trocar the transection of the gastro-epiploic ligament at the level of the large gastric or the short gastric vessels. These vessels are usually transected and electrocoagulated with energy devices but they can open in the postoperative period. Prophylaxis of these bleeding sites is therefore essential - it is important to verify the trocar holes - when removing the trocars from the abdominal wall the optic device should be held in place for a few seconds on holes to see if a vessel reopens when the pressure is released after removing the trocar. When dissecting the large curvature of the stomach, the diameter of the coagulated and resected vessels with electrical devices must be properly assessed and the vessels that may require a titanium clip should be selected and clipped. Usually, the maximum diameter of the vessels closed by these devices is 7 mm maximum. Their correct use is also important: tension should not be put on the electrocoagulated tissue, nor should the tissue be cut before the devices complete its vascular sealing cycle [10].

Bleeding from the staple line has multiple etiologies. One can identify factors that are directly dependent on the patient such as coagulation disorders or tension jumps in the immediate postoperative period. Other patient-independent factors are the size of the cartridges used. Proper cartridge selection is essential to prevent bleeding from the staple line - too large staples pierce the gastric wall and do not provide efficient hemostasis while the small staples do not penetrate the entire thickness of the gastric wall and do not allow a complete closure after resection predisposing the patient to subsequent bleeding [11].

Incomplete triggered staples and tissue resection or ischemia of the gastric wall can also play a role in increasing the incidence of subsequent bleeding.

Various techniques have been devised and developed to prevent bleeding from the gastric suture such as the staple line suture thread after stapling, the use of biological materials in the primate suture such as the bovine pericardial membrane or the burial suture burial. The efficiency of these methods is, however, questionable [12].

The results provided by these techniques were inconsistent so the use of biological materials represented by the bovine pericardium membranes produced a reduction of postoperative bleeding but due to the thickening of the mechanical suture, the rate of postoperative gastric fistulas increased (feared complication with few therapeutic resources and often fatal). Also, the cost of these materials is a high one not to be neglected [13].

Preoperative factors associated with increased bleeding rates such as liver pathologies, coagulopathies, hypertension, overweight should be investigated in the postoperative period and corrected before surgery.

Angelis et al. also pointed out the importance of blood pressure control so at the end of the surgical intervention, it is recommended to increase the systolic blood pressure to 140 mmHg values while simultaneously reducing the pressure of the pneumoperitoneum to observe the so-called silent bleeders [14].

Another recommendation is related to the drainage fitting that does not seem to influence the rate of postoperative bleeding identification [15].

With this statement, we do not agree because there were situations when clots existed on in the tube that prevented drainage which allowed in the immediate postoperative period to identify bleeding that had no impact on the hemoglobin values. This finding allowed the adoption of a prophylactic strategy such as reducing blood pressure levels and adjusting the doses of anticoagulant accordingly. Also, the removal of blood from the source of bleeding impedes the process of local fibrinolysis and facilitates the formation of a local clot.

Regarding the time of reintervention, it should be observed because these patients tolerate new intubation and pneumoperitoneum. As we have observed in our series, identification of the bleeding site it is difficult due to the volume of blood in the abdominal cavity. Of great importance is the clinical condition of the patient. From the observations from the studied group we can make the following recommendations when

postoperative bleeding is suspected or confirmed:

The first and obvious recommendation is to stop anticoagulants. The perigastric drainage should drain, if Hb levels go down and nothing is coming through the drain consider other sources of bleed or try to reopen the blocked drain (lavage with physiologic serum or retract de drain 1-2 cm and observe). A blood cloth developed around the bleeder may maintain the active bleed due to local fibrinolysis, in these cases, one should take into consideration guided drainage (ultrasound/ CT) and monitor hemoglobin levels afterward. The presence of a small (no more than 2-3 cm in diameter) perigastric collection without clinical manifestation should be left as such. Take into consideration reintervention if signs of hypovolemia are present (tachycardia, hypotension, profuse sweating), hemoglobin levels below 7 g/dL.

When monitoring hemoglobin levels take into consideration the overall state of hydration or dehydration of the patient as it offers false results.

The patient's clinical state should always play an important role in decision making.

If the decision to undergo surgery has been taken, once inside the peritoneal cavity observe where the cloth because of that where bleeder should be. Pay close attention to the gastric resection staple line and the trocar hole. If no bleeder is identified make sure to extract all the blood cloths, lavage the entire peritoneal cavity with serum and drain.

Recent studies recommend the use of Tranexamic-acid as a treatment alternative in patients with postoperative bleeding if they are hemodynamic stable [9]. If there is no response (tachycardia, hypotension, hemoglobin levels decrease) reoperation should be taken into account [9].

Conclusion

Postoperative bleeding in bariatric patients is a serious complication and rapid diagnosis and treatment are of utmost importance. Serious thought should be given to reintervention as these patients do not tolerate well a reoperation. New treatment strategies have been brought forward such as tranexamic acid but prophylaxis remains the mainstay objective. Correct selection of cartridges and staple length, intraoperative control of blood pressure, preoperative treatment of comorbidities, correct use of electrocoagulation devices at dissection can contribute to a decrease of postoperative hemorrhages.

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