

Portomesenteric Vein Thrombosis after Laparoscopic Sleeve Gastrectomy

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Laparoscopic sleeve gastrectomy is a surgical procedure for patients who want to lose weight. An acute porto-mesenteric vein thrombosis is an infrequent but not rare complication in patients who undergo laparoscopic sleeve gastrectomy. In this article, we present a 40-year-old male patient with body mass index of 47 kg/m² was admitted for laparoscopic sleeve gastrectomy. The surgery took about 130 minutes without any hemorrhage. Full enoxaparin prophylaxis, early and full mobilization, and intermittent pneumatic compression stockings were all applied to prevent venous thrombosis. Unfortunately, he applied to our emergency department and diagnosed to have porto-mesenteric vein thrombosis. There was an approximately 60 cm necrotic jejunal segment between 10th and 70th cm after Treitz ligament and was resected. He was discharged on sixth post operative day with prescription of oral warfarin.

Key Words: Obesity, Bariatric surgery, Sleeve gastrectomy, Venous thrombosis

INTRODUCTION

Obesity is a growing problem on all over the world, including in our country. The prevalence of obesity continues to rise over the last three decades and is likely to remain on the rise [1]. Bariatric surgery is the most effective treatment of morbid obesity and depending on the type of operation; this surgery can also be effective in resolving diabetes [2]. Laparoscopic sleeve gastrectomy (LSG) is a surgical procedure for patients who want to lose weight. The operation significantly reduces the size of stomach, and the patient is left with a stomach that resembles a tube. The part of the stomach that is removed would ordinarily secrete ghrelin thus reducing appetite. Although the recovery period for such surgeries is often uneventful, our case was complicated by the development of an acute porto-mesenteric vein thrombosis (PMVT).

Acute PMVT is a rare complication that can occur after any major intra-abdominal surgery. PMVT is a life threatening condition that it must be identified and treated immediately [3]. In this article, we present a male obese patient who underwent a LSG and had PMVT. We also describe how his thromboprophylaxis and give our incidence of PMVT in obesity surgery and its mortality in our institution.

CASE REPORT

A 40-year-old male patient with body mass index of 47 kg/m² was admitted for LSG. The patient's coagulation statue was normal and platelet count was 218 000 platelets per microliter of blood, prothrombin time was 12.7 seconds, INR was 0.98 and activated partial thromboplastin time was 27.2 seconds. The surgery took about

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130 minutes without any hemorrhage. We tried to keep the operation setting of intra-abdominal pressure around 14 mmHg. We used to harmonic scalpel to ligature short gastric vessels. Intermittent pneumatic compression stockings applied before the general anesthesia on operation table and continued up to first post-operative day. He was mobilized 6 hours after the surgery. Enoxaparin 60 mg was injected subcutaneously before 12 hours after surgery and continued twice a day after 12 hours of surgery up to discharge from hospital on sixth post operative day. Enoxaparin 60 mg was also prescribed to use twice a day up to feel full mobilization at home.

Unfortunately, he applied to our emergency department with continuous abdominal pain, nausea and vomiting on the postoperative thirteenth day. His physical examination revealed generalized tenderness on all quadrants without any abdominal distention and rebound tenderness. His blood chemistry was not specific and detrimental but only CRP level was 12.5 mg/dl. The contrast enhanced portovenogram abdominal CT of the patient demonstrated thickened wall of jejunum and its mesentery and also the dilated SMV and portal vein and engorged venous vessels of small intestine, but no ascites, adhesion, intestinal obstruction. There was no sign of thrombosis in superior mesenteric artery and its branches. There were no any leakages of contrast material from the stapler line of the stomach and also from affected bowel segment (Fig. 1). The arterial and venous Doppler examination of superior mesenteric artery and vein also revealed no main trunk obstruction. Patient was diagnosed to have segmental intestinal ischemia secondary to venous obstruction.

Enoxaparin 80 mg was started to the patient subcutaneously twice a day.

During the conservative treatment, his abdominal pain and blood chemistry get worse and he was admitted to an emergency diagnostic laparoscopy on 20 hour of his conservative management. There was an approximately 60 cm necrotic jejunal segment between 10th and 70th cm after Treitz ligament. During operation, we found necrotic small bowel with thickened and engorged wall. We did not find any ascites, signs of bowel obstruction and leakage at the stapler line of the stomach. After resection and anastomosis of jejunum, enoxaparin and oral warfarin were ordered during the hospitalization. He was discharged on sixth post operative day with prescription of oral warfarin up to six month. Specimen pathology reported edematous and hemorrhagic congestion of small bowel with widespread thrombosed venous vessels.

His body mass index was 47 kg/m² before the operation and is 31.9 kg/m² nowadays. He lost 62% of excess body weight in one year. He describes the resolving of his co-morbidity problems belongs to obesity. We also measured blood chemistry of the patient after the second operation to exclude the other factors that predispose to PMVT and we found that protein C antigen was 100.03%, protein S antigen was 95.42%, factor V was 27.9%, anti-thrombin-III antigen was 0.25 g/L, anti-thrombin III activity was 84.5%, both anti-cardiolipin antibodies IgM and G were negative, and lupus anti-coagulants antibodies were also negative.

From January 2013 to June 2018, 512 patients operated due to obesity in our institution and 350 were LSG. Only



Fig. 1. The contrast enhanced portovenogram abdominal CT of the patient demonstrates thickened wall of jejunum and its mesentery on both (A) and (B). In addition, CT portovenogram is showing the dilated SMV and engorged venous vessels of small intestine on (A) and the dilated portal vein on (B).

one patient had PMVT complication and he is on life. The incidence of PMVT is 0.19% in all obesity surgery and 0.28% in LSG without any mortality.

DISCUSSION

Obesity is associated with an increased risk of thromboembolic events. The hypercoagulable state and an increased intraabdominal pressure during the laparoscopic surgical procedure may cause to the development of thrombus. The hypercoagulability is attributed to metabolic syndrome, which is associated with increased release of fibrinogen and coagulation factors [4]. Jamal et al. [5] reported rates of thromboembolic events for gastric bypass, sleeve gastrectomy, gastric banding and revisional procedures were 1.1, 2.9, 0.2 and 6.4%, respectively. They revealed advanced age, higher BMI and those undergoing open or revisional surgery are high risk of postoperative thromboembolic events [5].

PMVT is an uncommon surgical complication secondary to laparoscopic bariatric surgery. In addition to previously mentioned risk factors to thromboembolic events, the mechanical or thermal effect of laparoscopic surgeries could be associated with PMVT [6]. PMVT in LSG was first reported in 2009 by Berthet et al. [7]. Caruso et al. [8] reported only one PMVT case in their 2854 patients whose underwent LSG for morbid obesity. They also revealed 62 cases of PMVT after LSG with a prevalence of 0.52% (ranging from 0.2 to 1.81%) and a mortality rate of 1.61% in selected 18 studies [8]. The incidence of PMVT is 0.19% in all obesity surgery and 0.28% in LSG in our institution without any mortality.

PMVT can be a life-threatening complication and present with non-specific signs and symptoms; thus it must be identified and managed promptly. Presenting symptoms can be mild or severe, and rapid recognition is important. Like our patient, patients who sustain PMVT usually present non-specific abdominal pain but, less commonly, nausea, vomiting, diarrhea or gastrointestinal tract bleeding may also be present [9]. The mortality rate of acute PMVT can range from 20% to 50% [10]. If the disease treated early with anticoagulation and intravenous fluids, the progression of the disease can be limited [3].

Protocol-based and optimized pre-, per- and post-operative care may minimize the rate of PMVT complications in bariatric surgery. Early mobilization and pneumatic compression stockings are the non-pharmacological measures applied in current practice to prevent thromboembolic events. Low molecular weight heparin is helpful to prevent PMVT. However, no clear guidelines about the optimal dose, duration and type of heparin are currently available. Although low molecular weight heparin, pneumatic compression and early and full mobilization all applied to our patient, PMVT was happen. Some feasible and effective protocols and guidelines are needed to decrease such complication. Caruso et al. [8] concluded short course antithrombotic prophylaxis (< 10 days) could increase the risk of this complication and recommend a postoperative prophylaxis with sodium enoxaparin 40 mg subcutaneously once a day for 4 weeks. In this regard, the Enhanced Recovery After Surgery (ERAS) inspired a feasible protocol for bariatric patients, showed favorable outcomes includes quitting the smoking before administration, scheduling thromboprophylaxis before the operation day, postoperative day and even discharging of patients with prescription of thromboprophylaxis, and also early full mobilization [11].

In conclusion, PMVT is an infrequent but not rare complication in patients who undergo LSG. Although the all preventive measures are applied to patient, we can come across to PMVT. New studies in regarding patient and procedure-related risk factors are required to develop new management plan to control PMVT.

REFERENCES

1. Wang Y, Beydoun MA, Liang L, Caballero B, Kumanyika SK. Will all Americans become overweight or obese? estimating the progression and cost of the US obesity epidemic. *Obesity (Silver Spring)* 2008;16:2323-30.
2. Li JF, Lai DD, Ni B, Sun KX. Comparison of laparoscopic Roux-en-Y gastric bypass with laparoscopic sleeve gastrectomy for morbid obesity or type 2 diabetes mellitus: a meta-analysis of randomized controlled trials. *Can J Surg* 2013;56:E158-64.
3. Leung E, Sorensen GB. Laparoscopic sleeve gastrectomy complicated by mesenteric vein thrombosis, abdominal compartment syndrome and pulmonary emboli: case report. *Int J Biomed* 2015;5:162-6.
4. Ay C, Tengler T, Vormittag R, et al. Venous thromboembolism--a

- manifestation of the metabolic syndrome. *Haematologica* 2007;92:374-80.
5. Jamal MH, Corcelles R, Shimizu H, et al. Thromboembolic events in bariatric surgery: a large multi-institutional referral center experience. *Surg Endosc* 2015;29:376-80.
 6. Salinas J, Barros D, Salgado N, et al. Portomesenteric vein thrombosis after laparoscopic sleeve gastrectomy. *Surg Endosc* 2014;28:1083-9.
 7. Berthet B, Bollon E, Valero R, Ouaisi M, Sielezneff I, Sastre B. Portal vein thrombosis due to factor 2 leiden in the post-operative course of a laparoscopic sleeve gastrectomy for morbid obesity. *Obes Surg* 2009;19:1464-7.
 8. Caruso F, Cesana G, Lomaglio L, et al. Is portomesenteric vein thrombosis after laparoscopic sleeve gastrectomy related to short-course prophylaxis of thromboembolism? A monocentric retrospective analysis about an infrequent but not rare complication and review of the literature. *J Laparoendosc Adv Surg Tech A* 2017;27:987-96.
 9. Goitein D, Matter I, Raziel A, et al. Portomesenteric thrombosis following laparoscopic bariatric surgery: incidence, patterns of clinical presentation, and etiology in a bariatric patient population. *JAMA Surg* 2013;148:340-6.
 10. Morasch MD, Ebaugh JL, Chiou AC, Matsumura JS, Pearce WH, Yao JS. Mesenteric venous thrombosis: a changing clinical entity. *J Vasc Surg* 2001;34:680-4.
 11. Matłok M, Pędziwiatr M, Major P, Kłęk S, Budzyński P, Małczak P. One hundred seventy-nine consecutive bariatric operations after introduction of protocol inspired by the principles of enhanced recovery after surgery (ERAS®) in bariatric surgery. *Med Sci Monit* 2015;21:791-7.