

# Splenic and Concomitant Liver Abscess After Laparoscopic Sleeve Gastrectomy

Marcello Avallone, MD, Angelo Iossa, MD, Pietro Termine, MD, Gianfranco Silecchia, MD, PhD

Division of General Surgery and Bariatric Center of Excellence, Department of Medicosurgical Sciences and Biotechnology, La Sapienza University of Rome, Latina, Italy (all authors).

## ABSTRACT

**Introduction:** Laparoscopic sleeve gastrectomy (LSG) is a safe and effective procedure for losing weight and gaining control of obesity-related comorbidities. However, it is associated with postoperative complications such as bleeding, leak, and midgastric stenosis. Splenic and hepatic abscesses have been reported as unusual and rare complications after primary LSG. We report a case of splenic and concomitant hepatic abscesses after primary LSG, successful minimally invasive management, and midterm follow-up.

**Case Description:** We report a complex case of splenic abscess with satellite hepatic abscess plus splenic thrombosis (0.1%) diagnosed 67 days after LSG. This unusual complication was managed by a minimally invasive approach (spleen sparing) with complete resolution after 35 days. After 18 months of follow-up, the patient showed complete resolution of the splenic and liver abscesses and progressive loss of excess weight.

**Conclusion:** In high-volume centers, rare and life-threatening complications such as splenic and hepatic abscesses may be observed. The minimally invasive approach could represent an effective option of avoiding splenectomy in selected cases.

**Key Words:** Splenic and hepatic abscess, Sleeve gastrectomy, Complications, Thrombosis.

**Citation** Avallone M, Iossa A, Termine P, Silecchia G. Splenic and concomitant liver abscess after laparoscopic sleeve gastrectomy. CR<sup>SLS</sup> e2017.00071. DOI: 10.4293/CR<sup>SLS</sup>.2017.00071.

**Copyright** © 2018 by SLS, Society of Laparoendoscopic Surgeons. This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported license, which permits unrestricted noncommercial use, distribution, and reproduction in any medium, provided the original author and source are credited.

Avallone Marcello and Iossa Angelo contributed equally to this work.

Disclosure: none reported.

Informed consent: Dr. Avallone declares that written informed consent was obtained from the patient for publication of this study/report and any accompanying images.

Address correspondence to: Marcello Avallone, MD, Bariatric Center of Excellence, La Sapienza University of Rome, Via F. Faggiana 1668, 04100, Latina, Italy. Telephone: +393384856243, Fax: +3907736513333, E-mail: Marcello\_avallone@libero.it

## INTRODUCTION

Bariatric surgery is the best choice for treatment of morbid obesity, and its severe comorbidities in the long term.<sup>1</sup> Recently, it was reported that 546,368 laparoscopic sleeve gastrectomies (LSGs) had been performed worldwide; of those, 171,548 surgeries were performed in 2013, indicating a steep increase of 37% from 2003 to 2013. These values indicate that LSG is the most commonly performed bariatric/metabolic procedure in the United States and Europe.<sup>2</sup> However, it should be noted that LSG is associated with complications (in ~5% of cases),<sup>3</sup> such as bleeding, gastric fistula, and strictures (usually median gastric stenosis). Splenic and liver abscesses are rare complications after LSG. The former has been reported in 3 cases,

whereas the latter has been reported in 7 cases until May 2017. Our report will add to the literature describing rare complications of LSG.

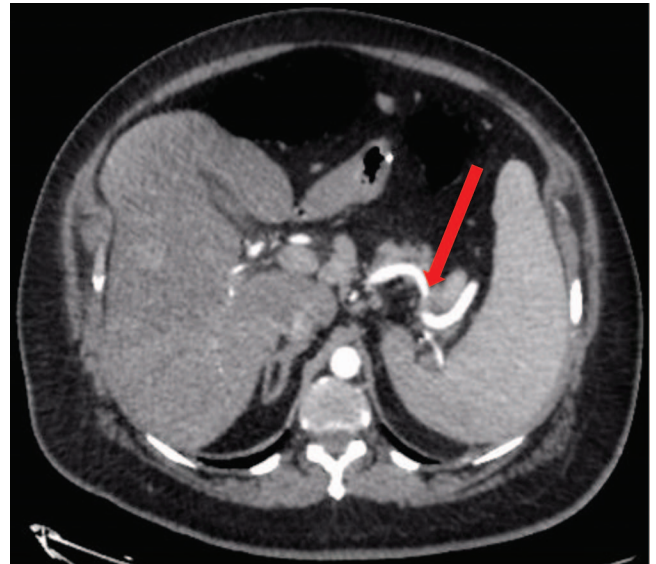
## CASE REPORT

A 52-year-old woman with a diagnosis of class III obesity (body mass index [BMI] of 44.2 kg/m<sup>2</sup>), complicated by severe arthrosis that worsened her ability to engage in normal daily activities and a long history of dietary failure was referred to our Obesity Center by her general practitioner for bariatric surgery screening. Her surgical history included laparoscopic surgery for a gynecological problem in 2003, with an uneventful postoperative course. An evaluation was performed by a multidisciplinary team

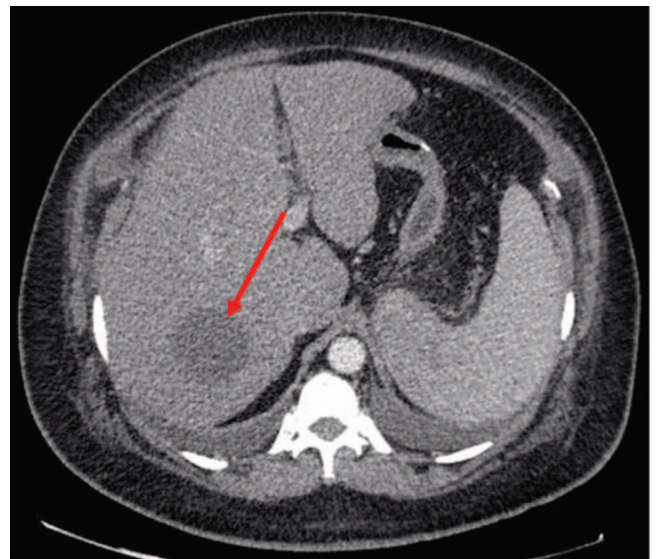
(psychologist, registered dietician, pneumologist, cardiologist, anesthesiologist, and endocrinologist), and the patient appeared motivated to undergo surgical treatment. Preoperative upper gastrointestinal endoscopy showed no significant findings, and the pathologist ruled out *Helicobacter pylori* infection. Counseling by a registered dietician and a psychologist indicated that the patient was a candidate for LSG, and the patient underwent the procedure on November 2015. The postoperative period was uneventful, and the patient was discharged from the hospital 2 days after the surgery in good condition with normal blood test results. Her postoperative dietary program included a liquid diet for 2 weeks, a soft diet for the next 2 weeks. After the first postoperative month, she was instructed to start a solid diet under the supervision of a registered dietician. She took protein supplements of 450 kcal/day (GH protein-PromoPharma, San Marino, California, USA) and 1 tablet per day of a vitamin supplement (Bariatric-Bioitalia, Srl, Sarno, Italy), containing vitamin A (800  $\mu\text{g}$ ), vitamin B<sub>1</sub> (1.65 mg), vitamin B<sub>2</sub> (2.1 mg), iron (30 mg), vitamin E (12 mg), and vitamin B<sub>12</sub> (3.75  $\mu\text{g}$ ). Her postoperative check-up at 1 month showed good weight loss (–15 kg; excess weight loss, 17%), a normal X-ray with Gastrografin contrast (Bracco Diagnostics Inc., Monroe Township, New Jersey, USA), and consistent improvement in her ability to perform daily physical activities.

In January 2016 (ie, 67 days after the surgery), the patient was admitted to our bariatric unit because of abdominal pain and fever (38°C), which had started 3 days before without any other clinical symptoms. The abdominal physical examination revealed right and left upper quadrant tenderness. The blood tests showed normal white blood cell (WBC) count (9.8 mm<sup>3</sup>; 87% neutrophils) and a high level of C-reactive protein (CRP; 31.0 mg/dL; normal level, <1 mg/dL). To rule out the presence of a very late leak, a spiral computed tomographic (CT) scan with oral and intravenous (IV) contrast medium was performed. The CT scan demonstrated the presence of a 36 × 17-mm splenic abscess of the upper pole with concomitant hepatic (7th segment, 47 mm maximum diameter) abscess. In addition, a splenic vein thrombosis extending 75 mm was found (**Figures 1 and 2**) without signs of a staple line leak.

Doppler ultrasonography confirmed splenic vein thrombosis with a reduced flow in the portal venous system. The patient underwent thrombophilia screening that was found to be negative. The pathogenetic hypothesis of the following events was probably related to splenic infarction secondary to dissection of the short gastric vessels, infection, septic embolus in the splenic–portal stream, splenic vein and segmental hepatic thrombosis, and splenic and hepatic



**Figure 1.** Splenic vein thrombosis (red arrow).



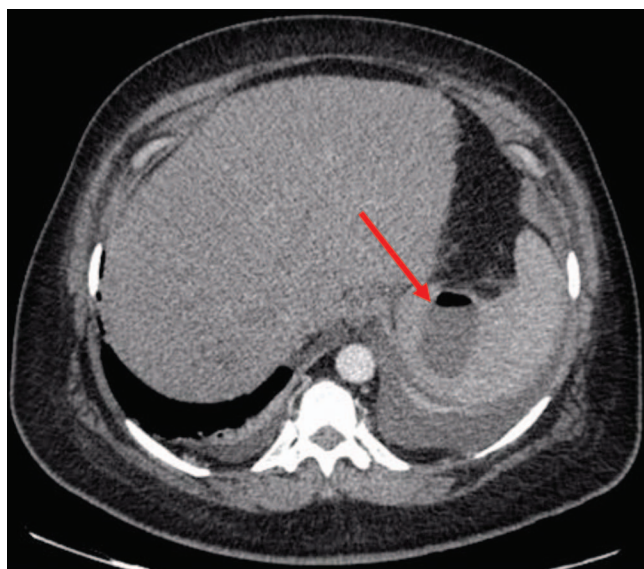
**Figure 2.** Hepatic abscess (47 mm) in segment VII (red arrow).

abscess. Empirical antibiotics, proton pump inhibitor (PPI), and a high dose of low-molecular-weight heparin (LMWH) were started: piperacillin/tazobactam 4.5 g and meropenem 1 g IV every 8 hours, PPI 30 mg twice a day, and LMWH 6000 IU subcutaneously, twice a day.

The patient fasted for 10 days, supported by parenteral nutrition (Periven 1920 mL [Fresenius Kabi AG, Bad Homburg, Germany]; 100 mL/h; 1400 kcal/day). After 10 days of IV antibiotic therapy, a CT scan revealed a reduction in splenic vein thrombosis and liver abscess without changes in the

splenic abscess (**Figure 3**). The blood test showed normal white blood cell (WBC) count ( $7.5 \text{ mm}^3$ ) and a reduction in CRP level (11 mg/dL). The CT scan demonstrated a clear perfusion line in the spleen, showing the upper pole replaced by the abscess and the remnant parenchymal tissue with normal perfusion and radiological pattern. The liver abscess was reduced in size by the medical treatment. A diagnostic laparoscopy was performed with a 5-mm optical trocar in the left subcostal site for pneumoperitoneum creation and 3 operative trocars (one 5 mm in the midline and two 12 mm: 1 in the left midclavicular line and 1 in the epigastrium). Extensive adhesiolysis by means of ultrasonography (Harmonic; Ethicon Endo-Surgery Inc., Cincinnati, Ohio, USA) represented the first step toward safely controlling the splenic pole and showed the abscess in a large, normal spleen parenchyma.

The fibrotic capsule of the abscess was opened, the abscess was completely drained, and the residual cavity was washed, showing the ischemic area below. Homeostasis was obtained with Surgiflo Hemostatic Matrix (8 mL; Ethicon Endo-Surgery Inc.), and an 18-French drain was left in place. The CT scan performed 2 weeks after surgery confirmed the resolution of the splenic abscess and reduction of the liver abscess. One month after laparoscopic drainage, a Doppler sonographic scan demonstrated the complete resolution of the splenic vein thrombosis and the hepatic and splenic abscesses. The antibiotic (piperacillin/tazobactam, 4.5 g) was discontinued after 25 days. The patient was discharged after



**Figure 3.** Splenic abscess (35 mm) in the upper pole (red arrow).



**Figure 4.** Resolution of splenic and liver abscesses.

35 days. LMWH 6000 IU was prescribed subcutaneously twice a day for 2 months and the PPI 30 mg once a day with progressive reintroduction of a regular diet.

After 18 months of follow-up, loss of 56% of excess weight (height, 1.68 m; initial weight 125 kg, actual weight 88 kg) was achieved. The patient underwent a sonographic examination at 6 months and a CT scan at 1 year. No recurrence of the abscess or of the splenic–portal thrombosis was observed (**Figure 4**).

## DISCUSSION

In 2017, Abdelhadi et al.<sup>4</sup> published 2 cases of liver abscess and 2 cases of splenic abscess occurring after the LSG procedure. The liver abscesses developed after a gastric leak (managed by endoscopic stenting) and were treated using antibiotic therapy and percutaneous drainage in 1 case and laparoscopic drainage in the other. The splenic abscesses involved a gastric leak in 1 case that was managed by endoscopic stenting, and a partial splenic tear is the other complication that required blood transfusion and diagnostic laparoscopy on postoperative day 1 with no further intervention. In the case of failure of treatment by percutaneous drainage and antibiotics, the abscess was managed by open or laparoscopic splenectomy (**Table 1**). In 2012, Alfalah et al.<sup>6</sup> published a case of liver abscess in a 32-year-old woman 44 days after LSG. No gastric leak was observed, and her treatment included percutaneous drainage with antibiotic therapy. We found only 5 cases of splenic abscess at 16 to 77 days after LSG reported in the age group 19–44 years.<sup>7–9</sup> No concomitant gastric leak was



**Table 1.**  
Published Cases of Splenic and Liver Abscesses

Case Report	Time After Surgery (weeks)	Abscess	Management
Alfalah H et al <sup>5</sup>	6	Liver	Antibiotic and percutaneous drainage
Schiavo L et al <sup>6</sup>	11	Spleen (multiple)	Antibiotic
Singh Y et al <sup>7</sup>	10	Spleen	Splenectomy
Sakran N et al <sup>8</sup>			
Case 1	8	Spleen (multiple)	Splenectomy
Case 2	10	Spleen	Laparoscopic drainage
Avulov V et al <sup>9</sup>	2	Spleen (multiple)	Splenectomy
Abdelhadi MH et al <sup>4</sup>			
Case 1	24	Liver (multiple)	Antibiotic and percutaneous drainage
Case 2	24	Liver, 6th section 5.3 cm	Antibiotic and laparoscopic drainage
Case 3	10	Spleen 9 cm	Splenectomy
Case 4	3	Spleen (multiple)	Splenectomy

observed in these 5 cases, and they were treated with antibiotic therapy, percutaneous drainage, laparoscopic drainage, and splenectomy. Our case is report a rare concomitant splenic and liver abscesses with splenic and segmental portal thrombosis diagnosed 67 days after primary LSG in a patient without predisposing conditions. The first step was sepsis and septic splenic-segmental portal vein thrombosis. The splenic abscess that was nonresponsive to antibiotic treatment was successfully managed by laparoscopic drainage, therefore avoiding splenectomy. In our opinion, in this case, the pathogenesis of the liver abscess was secondary to the infarction and infection of the spleen and of the sequential splenic vein and the segmental portal thrombosis. Bacterial seeding from the spleen to the liver guided by the portal system was also observed.

## CONCLUSION

In high-volume surgical centers, late unusual complications after LSG have been observed. The conservative treatment of splenic and hepatic abscesses is an effective option and should be the first step of clinical management. A CT scan is mandatory to rule out any concomitant leak/abdominal collection and to localize any intrahepatic abscess. The splenic abscess after LSG is usually localized in the upper pole (ischemic area after dissection of the short vessels) and is generally self-limited to the ischemic area. The laparoscopic spleen-preserving approach has been shown to be effective in selected cases.

## References:

1. Shoar S, Saber AA. Long-term and midterm outcomes of laparoscopic sleeve gastrectomy versus Roux-en-Y gastric bypass: a systematic review and meta-analysis of comparative studies. *Surg Obes Relat Dis.* 2017;13:170–180.
2. Angrisani L, Santonicola A, Iovino P, Formisano G, Buchwald H, Scopinaro N. Bariatric surgery worldwide 2013. *Obes Surg.* 2015;25:1822–1832.
3. Iossa A, Abdelgawad M, Watkins BM, Silecchia G. Leaks after laparoscopic sleeve gastrectomy: overview of pathogenesis and risk factors. *Langenbecks Arch Surg.* 2016;401:757–766.
4. Abdelhadi MH, Salama AF, Karam M, Bashah M. Solid organ infections: rare complications after laparoscopic sleeve gastrectomy: a report of four cases. *Obes Surg.* 2017;27:1374–1380.
5. Alfalah H, D'Souza J, Abbass G. Liver abscess, a rare complication post sleeve gastrectomy. Presented at the XVI Annual Meeting of the European Society of Surgery; Istanbul, Turkey, November 22–24, 2012.
6. Schiavo L, Scalera G, De Sena G, et al. Nonsurgical management of multiple splenic abscesses in an obese patient that underwent laparoscopic sleeve gastrectomy: case report and review of literature. *Clin Case Rep.* 2015;3:870–874.
7. Singh Y, Cawich S, Aziz I, et al. Delayed splenic abscess after laparoscopic sleeve gastrectomy. *BMJ Case Rep.* Published online February 17, 2015.
8. Sakran N, Ilivitzki A, Zeina A, et al. Splenic abscess after sleeve gastrectomy: a report of two cases. *Obes Facts.* 2012;5:635–639.
9. Avulov V, McQuillen DP, Mizusawa M, et al. Splenic abscess after sleeve gastrectomy. *SAGES Metab Obes Arch.* 2014;7:71.