A case of spontaneous hemothorax causing massive pleural effusion following laparoscopic sleeve gastrectomy

Nawaf Essam Bakri1*, Abdullah Abrabu Ali1, Hatim Adnan Almaghrabi2, Ali Yahya Alhalbub3, Mohammed Ageel Ahmed4

ABSTRACT

Background: Pleural effusion is a rare complication of sleeve gastrectomy. It has many possible etiologies, including gastric leakage, gastropleural fistula formation, splenic abscess, and complications related to administered medications, such as spontaneous hemothorax secondary to anticoagulants.

Case Presentation: An unusual case of a 46-year-old woman was reported, who was presented to the emergency room (ER) 10 days after laparoscopic sleeve gastrectomy complaining of dyspnea, chest pain, and dry cough for 4 days. Imaging confirmed massive pleural effusion on the left side. The patient showed improvement after intensive care unit (ICU) admission and drainage via the chest tube.

Conclusion: Sleeve gastrectomies are associated with several complications. Low-molecular-weight heparin (LMWH) as prophylaxis for portal vein thrombosis leads to a spontaneous hemothorax. Unfortunately, computed tomography with contrast could not be performed because of vital instability. However, it was concluded that a massive spontaneous hemothorax occurred due to LMWH. The patient was admitted to ICU and underwent slow drainage of pleural effusion until complete recovery.

Keywords: Spontaneous hemothorax, massive pleural effusion, post upper abdominal surgery, post laparoscopic sleeve gastrectomy, critical care.

Introduction

Obesity is a popular medical condition that is a health concern for governments worldwide [1,2]. The World Health Organization defines obesity as a body mass index (BMI) of more than 30 kg/m². It is associated with hypertension, diabetes, and atherosclerotic disease and negatively affects the overall quality of life [1]. In 2022, the prevalence of obesity was estimated to increase to 41% in men and 78% in women [3].

Laparoscopic sleeve gastrectomy (LSG) is the most common treatment option for obesity which is performed by excising up to 85% stomach of the patients [4]. The procedure not only accomplishes weight loss and eradication of comorbidities such as diabetes mellitus type II, sleep apnea, and arterial hypertension but also ensures a better quality of life for the patient [5]. However, although LSG is a safe weight loss treatment, various problems have been observed, including leakage, infection, bleeding, splenic injury, and strictures [6].

Case Presentation

A 46-year-old woman with a BMI of 47 kg/m² was diagnosed with morbid obesity, for which she underwent LSG along with laparoscopic cholecystectomy. The patient stayed in the surgical ward for 4 days with no complications or concerning signs; hence, she was discharged. However, she presented to the ER 10 days after discharge with complaints of dyspnea, chest pain, and dry cough for 4 days.

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Upon examination, the patient was conscious, alert, and oriented, with a Glasgow coma scale score of 15/15. She had severe respiratory distress indicated by accessory muscle usage with a respiratory rate of >30 breaths/minute. Additionally, no air entry was observed on the left side. The heart rate was 140 beats/minute and blood pressure was 130/50 mmHg (Table 1).

Chest X-ray showed massive pleural effusion on the left side causing a complete collapse of the left lung and compression with the collapse of the right side with midline shift to the other side.

Computed tomography (CT) of the chest was performed on the day of admission. There was evidence of massive left-sided free pleural effusion, causing complete compression collapse of the underlying left lung. On the following day, a left-sided chest tube revealed mild to moderate resolution of the massive left-sided free pleural effusion, with mild to moderate reinflation of the previously described completely collapsed left lung. This was associated with scattered patchy alveolar pneumonia consolidation within the reinflated left lung segments with air bronchogram inside (multiple air locules within the remaining left pleural effusion giving rise to left hydropneumothorax), causing mild shifting of the cardiac shadow and mediastinum to the contralateral right side.

CT of the abdomen and pelvis showed hepatic steatosis (fatty metamorphosis cholecystectomy), and evidence of gastric sleeve operation with a small hiatus hernia (herniation of part of stomach fundus through hiatus opening into the thoracic cavity) (Figure 1).

Chest tube inserted on the left side with drained 2,600 ml of hemorrhagic exudate fluid. The patient was admitted to the intensive care unit (ICU) and underwent slow drainage of the pleural effusion. She showed good recovery and resolution of the effusion. The patient was admitted to the ICU for 3 days and then shifted to the surgical ward for 4 days before being discharged.

### Discussion

Pleural effusion is the accumulation of pleural fluid in the pleural space [7]. The incidence of developing pleural effusion after abdominal surgery is estimated to be 8%, with upper abdominal surgeries reporting a higher incidence as the surgical area is close to the chest [8]. Pleural effusion following surgery might result from thoracic or abdominal complications. Thoracic complications that cause pleural effusion include esophageal perforation and peritoneal fluid collection from gastric or anastomotic leaks [8]. Abdominal causes of pleural effusion include subdiaphragmatic abscesses, pancreatitis, biliary tract infections, and bowel anastomotic leaks [8].

A retrospective study of 390 patients who underwent different bariatric surgeries found that 26 of 390 patients

### Table 1. Laboratory summary of the patient.

<table>
<thead>
<tr>
<th>Laboratory investigations</th>
<th>Units</th>
<th>First day</th>
<th>Second day</th>
<th>Third day</th>
<th>Fourth day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete blood count</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WBCs K/μl</td>
<td></td>
<td>13.59</td>
<td>8.72</td>
<td>6.05</td>
<td>4.43</td>
</tr>
<tr>
<td>HGB g/dl</td>
<td></td>
<td>10.1</td>
<td>9.1</td>
<td>8.7</td>
<td>8.1</td>
</tr>
<tr>
<td>HCT %</td>
<td></td>
<td>31.7</td>
<td>29.3</td>
<td>28.4</td>
<td>26.8</td>
</tr>
<tr>
<td>Platelets K/μl</td>
<td></td>
<td>586</td>
<td>348</td>
<td>418</td>
<td>390</td>
</tr>
<tr>
<td>Coagulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INR Seconds</td>
<td></td>
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<td>-</td>
<td>1.51</td>
<td>1.45</td>
</tr>
<tr>
<td>PTSeconds</td>
<td></td>
<td>15.8</td>
<td>-</td>
<td>17.5</td>
<td>16.8</td>
</tr>
<tr>
<td>PTTSeconds</td>
<td></td>
<td>35.4</td>
<td>-</td>
<td>30</td>
<td>30.9</td>
</tr>
</tbody>
</table>

### Figure 1. CT findings of the abdomen and pelvis.
had thoracic complications, 18 of which were pleural effusions following LSG [9]. CT is the gold standard for diagnosing post-sleeve gastrectomy complications [8].

At the time of admission, the patient was vitally unstable; a CT scan without contrast was performed instead of the generally preferred CT scan with contrast, which made it challenging to confirm the cause of the patients’ presentation.

The gastric leak is a complication of sleeve gastrectomy that most commonly occurs at the proximal gastric pouch, specifically at the angle of his [10]. In addition, gastric leaks might predispose the thoracic cavity to infection and cause pleural effusion [11]. Pleural effusion is reported to affect 52.5% of gastric leak patients post-sleeve gastrectomy [12].

Diagnosis of gastrointestinal leaks after bariatric surgery is challenging. In a retrospective review of patients who underwent LSG covering 80 patients, less than 30% of patients were diagnosed correctly with a leak from the first visit to the ER, and pleural effusion was observed in nearly half of the patient population [13].

Patients are routinely administered anticoagulant medications such as low-molecular-weight heparin (LMWH) as prophylaxis for portal vein thrombosis (PVT) after sleeve gastrectomy [14]. However, this might enhance the bleeding risk in the patient, resulting in spontaneous hemotherax, which is the accumulation of blood within the pleural space without trauma or other causes [15].

Other predisposing factors for spontaneous hemotherax include inflammatory process-related blood-vessel erosion, malignancies, and hematological abnormalities. Spontaneous hemotherax due to anticoagulant use is a rare complication that is difficult for clinicians to diagnose and differentiate from other causes [15].

Conclusion

Sleeve gastrectomies are associated with several complications. LMWH as prophylaxis for PVT leads to a spontaneous hemotherax. Unfortunately, CT with contrast could not be performed because of vital instability. However, it was concluded that a massive spontaneous hemotherax occurred due to LMWH. The patient was admitted to ICU and underwent slow drainage of pleural effusion until complete recovery.

Acknowledgment

The authors would like to thank the patient who approved this case for publication in medical evolution.

<table>
<thead>
<tr>
<th>Abbreviations</th>
<th>Description</th>
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<tbody>
<tr>
<td>BMI</td>
<td>Body mass index</td>
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<tr>
<td>CT</td>
<td>Computed tomography</td>
</tr>
<tr>
<td>HCT</td>
<td>Hematocrit</td>
</tr>
<tr>
<td>HGB</td>
<td>Hemoglobin</td>
</tr>
<tr>
<td>ICU</td>
<td>Intensive care unit</td>
</tr>
<tr>
<td>INR</td>
<td>International normalized ratio</td>
</tr>
<tr>
<td>LMWH</td>
<td>Low-molecular-weight heparin</td>
</tr>
<tr>
<td>LSG</td>
<td>Laparoscopic sleeve gastrectomy</td>
</tr>
<tr>
<td>PT</td>
<td>Prothrombin time</td>
</tr>
<tr>
<td>PTT</td>
<td>Partial thromboplastin time</td>
</tr>
<tr>
<td>PVT</td>
<td>Portal vein thrombosis</td>
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<tr>
<td>WBC</td>
<td>White blood cell</td>
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</table>

Conflict of interest

The author declared that there is no conflict of interest regarding the publication of this case report.

Funding

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Consent for publication

Informed consent was obtained from the participant.

Ethical approval

Ethical approval is not required at our institution for this case report.

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References


Pleural effusion following gastrectomy


