

# Laparoscopic Treatment of a Traumatic Diaphragmatic Hernia of the Gallbladder: Report of a Case

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**Abstract :** The patient was a 78-year-old female who had been suffering from a femoral bone fracture in a traffic accident for which she had received treatment 15 years earlier. She was diagnosed to have diabetes mellitus approximately 3 years previously, and had been regularly treated with oral medication and additional clinical examinations. In March 2002, a chest X-ray exam found the abnormal shadow in her right lower lung. Based on the findings of further examinations, her gall bladder came out into the thoracic cavity and thus she was diagnosed to have a diaphragmatic hernia and gallbladder incarceration. We performed laparoscopic surgery due to the possible dangers associated with cholecystitis, cholangitis and a perforation of the gall bladder. Under a laparoscopic view, we found a 3cm hernia orifice across the right diaphragm, along with a part of the liver and gall bladder suffering an incarceration.

The adhesion of the incarceration parts was not serious; we could restore the abdominal cavity easily. The orifice of the diaphragm was approximated by tying an extra corporeal knot. In addition, because of a defect consisting of an obvious hernia sac, we made a diagnosis of a traumatic hernia. The patient recovered uneventfully after the operation. She began a normal oral intake the next day, and the thoracic drain was removed on the 3rd day

**Key words :** diaphragmatic hernia, trauma, gallbladder, laparoscopic surgery

## Introduction

Congenital and traumatic diaphragmatic hernias are not common diseases. Such hernias generally comprise the omentum, stomach and colon. We herein report the case of a diaphragmatic hernia of the gallbladder with a part of the left lobe of the liver (S4).

Although she had suffered a traffic accident which caused a bone fracture 15 years earlier, the related herniation was only noticed and diagnosed 3 months. A laparo-

scopic repair was thus considered to be the treatment of choice in this case.

## Patient

The patient was a 78-year-old female who had only slight abdominal discomfort and consulted a hospital while also being treated for diabetes mellitus. A plain chest X ray film revealed an abnormal shadow in the lower field of her right lung. She had been X-rayed 3 months before but no abnormal lesion had been detected. She visited to our

hospital for further examination and treatment.

Past history: 15 years earlier, she suffered a fracture of the right femoral bone due to a traffic accident. But at that time, she did not demonstrate either abdominal or pulmonary symptoms. Chronic pancreatitis associated with pancreatic stones and diabetes mellitus was also observed.

Laboratory data: She was 145.5cm in height and 52 kg in weight. No mass or abnormal findings of the abdomen were detected by physical examination. Serum chemical analysis showed only slight decrease of hemoglobin 11.0g/dL, but no liver dysfunction nor elevation of amylase. No pulmonary dysfunction was detected on a spirogram (VC 1.88 L, %VC 91%, FEV<sub>1.0</sub>% 87). A chest X-ray film revealed a round tumor measuring about 5 cm in diameter in the lower field of the right lung (Fig. 1). Abdominal computed tomography (CT) showed a tumor with low density and bumps on a part of the liver in the chest. The gallbladder was

not detectable in the abdomen (Fig. 2).

Magnetic resonance cholangio-pancreaticography (MRCP): The gallbladder (G) was elongated and pinched at the body (arrow heads), and the dome of the gallbladder was located in the pulmonary space. Pleural effusion (PE) was also seen around the gallbladder (Fig. 3). Stony shadow of the main pancreatic duct was obvious.

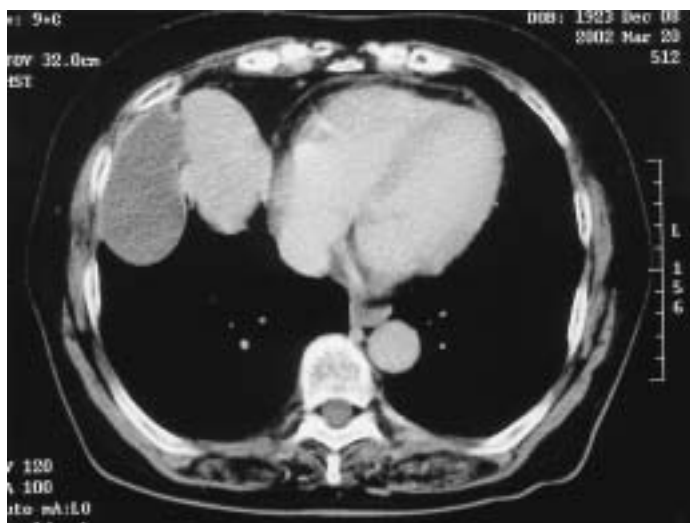
Based on these findings, we diagnosed the diaphragmatic hernia of the gallbladder into the thoracic cavity, which had perhaps been caused by old trauma.

### Operative Findings and Procedures

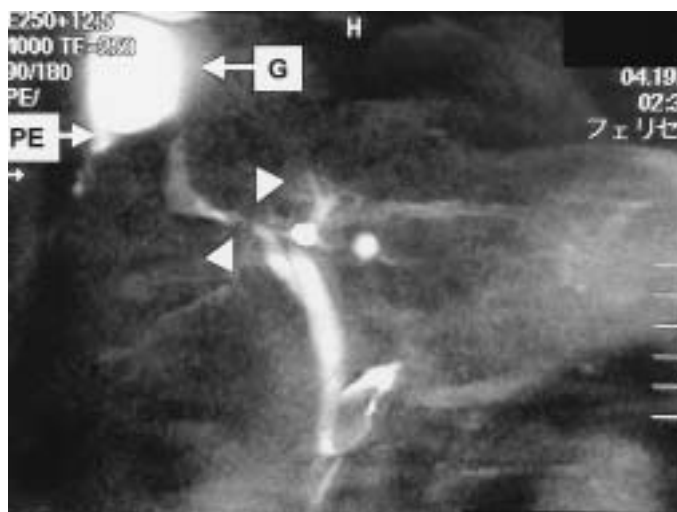
Under general anesthesia, a Hasson trocar was placed in the supraumbilical region, an additional two 5 mm trocars were introduced and the peritoneal cavity was observed by a 5 mm 30-degree laparoscope under 6 mmHg CO<sub>2</sub> pneumoperitoneum. Gallbladder and a part of liver (S4) were extruded into the pulmonary space via a laceration of the right



**Fig. 1.** Chest X-ray examination: A round tumor measuring about 5 cm in diameter in the lower field of the right lung.



**Fig. 2.** Abdominal CT : A tumor with a low density and bumps appearing on a part of the liver in the chest.

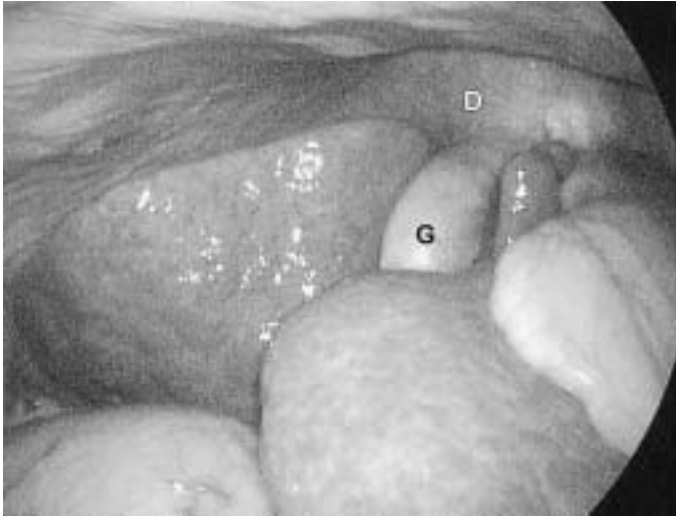


**Fig. 3.** MRCP : Gallbladder (G) was elongated and pinched at the body (arrowheads), and the dome of the gallbladder was located in the pulmonary space. Pleural effusion (PE) was also seen around the gallbladder.

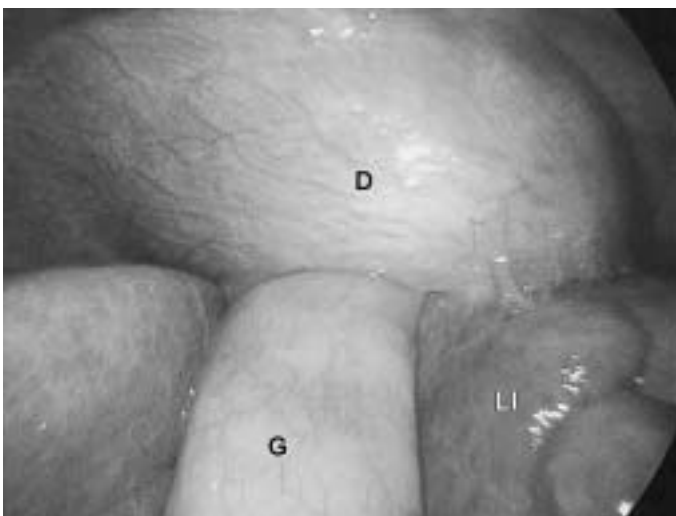
diaphragm (Fig. 4 and 5). At first, the body of the gallbladder was pulled by a clamp toward the abdominal space. After some fibrous adhesions between the gallbladder wall and edge of the diaphragmatic hernia port were incised with electrocautery, the dome of gallbladder was readily repositioned. We

therefore did not resect the gallbladder, because neither serosal injury nor a laceration of the gallbladder wall was noticed.

By dissecting the adhesion between liver and hernia ring, no hernia sac was found and the pericardia and the right lobe of lung via the hernia port were visible (Fig. 6). The



**Fig. 4.** Laparoscopic findings: Gallbladder (G) was extruded into the pulmonary space via a laceration of the right diaphragm (D).



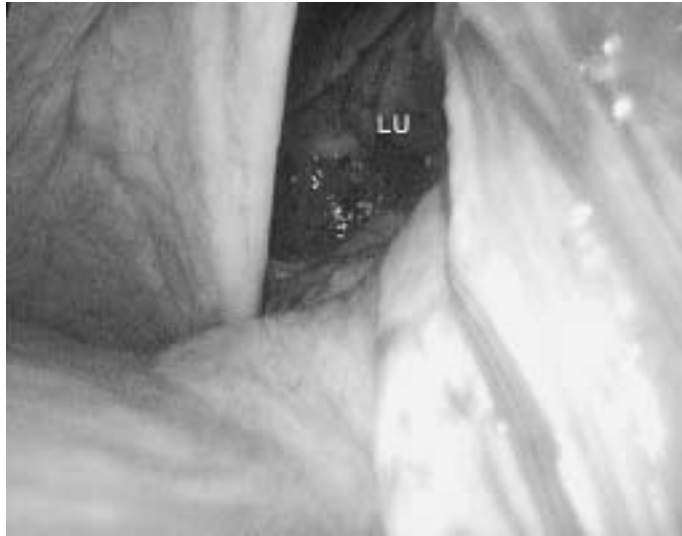
**Fig. 5.** Laparoscopic findings: A dome of gallbladder (G) and a part of liver (S4) (LI) had extruded into the pulmonary space via a laceration of the right diaphragm (D).

diaphragmatic hernia ring measuring 3–4 cm in length was closed with interrupted extra corporeal sutures (Fig. 7). The suture line was examined from an additional 5 mm thoracic trocar by the laparoscope and we confirmed that no injury existed in the lung or pericardium. A thoracic catheter drain was

placed in the pleural cavity.

### Postoperative course

The postoperative course was uneventful. Feeding started on the next day and she was discharged on the 5<sup>th</sup> day after operation.



**Fig. 6.** Laparoscopic findings: The pericardium and the right lobe of lung (LU) are visible via the hernia port.



**Fig. 7.** Laparoscopic findings: The diaphragmatic hernia ring measuring 3–4 cm in length was closed with interrupted extra corporeal sutures.

MRCP performed 3 weeks after discharge revealed the repositioning and good function of the gallbladder (Fig. 8).

### Discussion

Traumatic diaphragmatic hernia is associated with from 3–6% of abdominal and chest trauma. Many cases display hypotension, dyspnea and severe pain. Carter<sup>1)</sup> classified three phases including an acute, chronic and incarcerating phase. Most patients share the acute phase. In chronic phase, a morbid duration of asymptomatic traumatic diaphragmatic hernia has been reported to be vary from 2 to 40 years.<sup>2)3)</sup> We herein presented a chronic case discovered by chest X ray film in which the patient had suffered a traffic accident 13 years earlier.

A traumatic hernia is generally caused by blunt trauma of abdomen which elevates the abdominal pressure and eventually lacerates the diaphragm. In most cases of traumatic hernia, the hernia sac shows a defect. Because a defect of the hernia sac was confirmed by laparoscopy, we diagnosed our case to have a traumatic nature.

Moreover, according to Tsukioka's report and those of others,<sup>4)</sup> such hernias may con-

tain internal organs, such as the stomach, the large intestine, the small intestine, the omentum, and the spleen, while the gallbladder was only reported with the duodenum in a report by Ota and others.<sup>5)</sup> This case is thus considered to be a rare case, since the gallbladder and liver were found to be incarcerated. This case could be diagnosed by abdominal X-ray, Abdominal CT,<sup>6)</sup> and MRCP before an operation. Especially, MRCP was very effective in diagnosing this case, however, this modality is invasive. In this case, the dome of the gallbladder was incarcerated at the hernia orifice at the time of traffic accident, and thereafter it was drawn into the thorax over a 13-year period.

One way to treat a diaphragmatic hernia is by surgery. A transabdominal and trans-thoracic approach is used for most cases. Recently laparoscopic or thoracoscopic surgery,<sup>7)</sup> has also been performed since 1994. A laparoscopic view of a right diaphragmatic hernia is superior to open surgery, and suturing techniques are also feasible. In our case, the hernia ring was only 3 cm long and it was easy to reposition the incarcerated gallbladder and close the ring by interrupted sutures extracorporeally. Laparoscopic surgery also has advantages of less postopera-



**Fig. 8.** MRCP performed 3 weeks after discharge revealed a repositioning and good function of the gallbladder.

tive pain and the ability to return to society more quickly.

### Conclusion

We treated a rare case of a traumatic diaphragmatic hernia of gallbladder by laparoscopic procedures. The operation and post-operative course was uneventful. Laparoscopic surgery is thus considered to be preferable for the treatment of chronic traumatic diaphragmatic hernias.

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