CASE REPORT

Minimally invasive video-assisted trans-diaphragmatic drainage of a subphrenic complicated abscess

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ABSTRACT

Intra-abdominal abscesses usually originate from the gastrointestinal tract, with 70% occurring in the postoperative period. The mortality rate can reach 50%. These abscesses most commonly develop in the subphrenic and subhepatic spaces. Treatments include percutaneous drainage or surgical drainage. In this report, we present a minimally invasive video-assisted trans-diaphragmatic drainage (MIVTD) method through a simple incision using a right intercostal approach. This method was successfully performed on a patient who underwent Graham patch repair with laparotomy due to a diagnosis of peptic ulcer perforation and subsequently developed a right subphrenic multiloculated collection after unsuccessful percutaneous drainage.

Keywords: Minimally invasive; subphrenic abscess; transdiaphragmatic drainage.

INTRODUCTION

Intra-abdominal abscesses (IAA) are polymicrobial infections originating from the gastrointestinal tract and can range from simple to complex.[1] The most frequent IAAs are subphrenic abscesses, arising from various causes such as anastomosis leaks and peptic ulcer perforations.[1,2] Although good results can be obtained with percutaneous catheter drainage (PCD) in the treatment of simple abscesses, the success rate of PCD is low in treating complicated abscesses.[2,3] In these cases, surgical drainage is performed.[4]

In this case report, we present a minimally invasive video-assisted trans-diaphragmatic (MIVTD) drainage treatment of a right subphrenic perihepatic multiloculated complicated collection, which could not be treated with PCD application, using the right intercostal approach with video-endoscopic debridement through a single incision in a patient who underwent emergency laparotomy and Graham patch repair due to peptic ulcer perforation.

CASE REPORT

A 22-year-old male patient underwent laparotomy and Graham patch repair, intra-abdominal irrigation, and drainage following a diagnosis of peptic ulcer perforation (Fig. 1). Empirical intravenous (IV) ceftriaxone was initiated. No growth was detected in the intraoperative intra-abdominal fluid culture. On the 5th day of follow-up, the patient's leukocyte level decreased to 11,850 µL, and right and left-sided drainage fluids became serous and decreased to 100 mL daily.

On the seventh day, thoracic and abdominal computed tomography (CT) was performed on the patient with fever, dyspnea, right flank pain, C-reactive protein (CRP) of 121 mg/L, and leukocyte level of 15,940 uL. CT revealed a 4 cm thick pleural effusion in the right hemithorax, a 5x2.5 cm mass in the back of the liver, and a 16x7 cm in diameter fluid area with an air-fluid level in front (Fig. 2A). Piperacillin-tazobactam was initiated. A 10 F PCD was placed in the dense liquid

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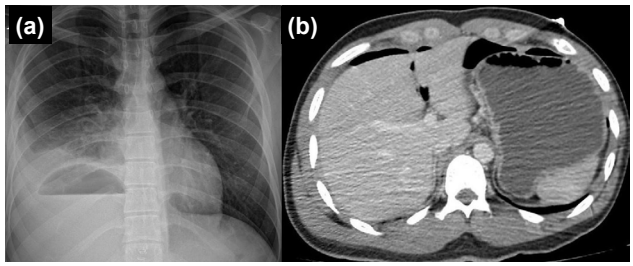

Figure 1. Peptic ulcer perforation. **(a)** Chest X-ray. **(a)** Computed tomography.

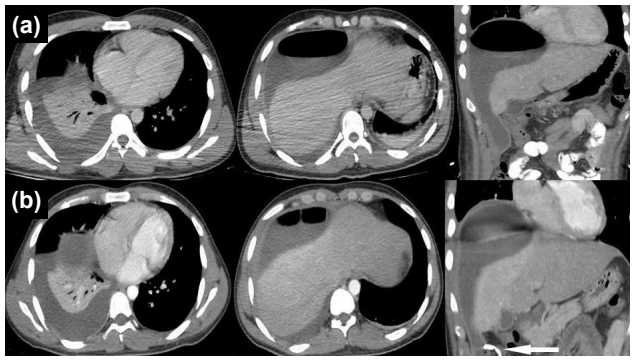

Figure 2. Right pleural effusion and dense multiloculated perihepatic complicated collection with air-fluid leveling on computed tomography. **(a)** Before the drainage catheter; **(b)** After the drainage catheter (arrow: drainage catheter).

area using ultrasonography. No reproduction was noted in the drainage culture.

On the 12th postoperative day, the patient's CRP was 115 mg/L and the leukocyte level was 17,990 µL. The total volume of fluid in abdominal drains and drainage catheters was less than 40 mL. The patient experienced a subfebrile fever. A whole abdomen control CT was taken, showing right pleural effusion and diffuse atelectasis. In front of the right hepatic lobe, there was a peripheral complicated fluid area of 220 x 140x77 mm showing an air-fluid level. According to previous imaging, fluid sizes were unchanged and the percutaneous drainage catheter was not in the fluid area (Fig. 2B).

On the 13th postoperative day, a decision was made for surgical drainage to address the multiloculated subphrenic intra-abdominal fluid that could not be drained with PCD. Videoendoscopic debridement was planned through a mini-incision to minimize trauma severity. Based on the radiological findings, the intersection of the anterior axillary line and the seventh intercostal space was chosen for the procedure. After a puncture was performed and its suitability confirmed, a 1.5 cm skin incision was made. Careful dissection through the intercostal muscle, lower-end muscle fibers of the diaphragm, and peritoneum was performed using dissecting scissors to reach the fluid area. Here, a 5.5 mm thoracic port was inserted, and the abscess was explored using 5 mm 30° optics. Infected necrotic tissues, dense fluid, and air were found in the abscess area in the subphrenic region. An aspirator was positioned next to the optical camera to aspirate the abscess and tissue pieces (Fig. 3). A 32 French silicone drain was placed in the abscess cavity, completing the minimally invasive video-assisted thoracic (MIVAT) drainage. Other drains were removed, and a 24 French thoracic drainage was placed for the right pleural effusion.

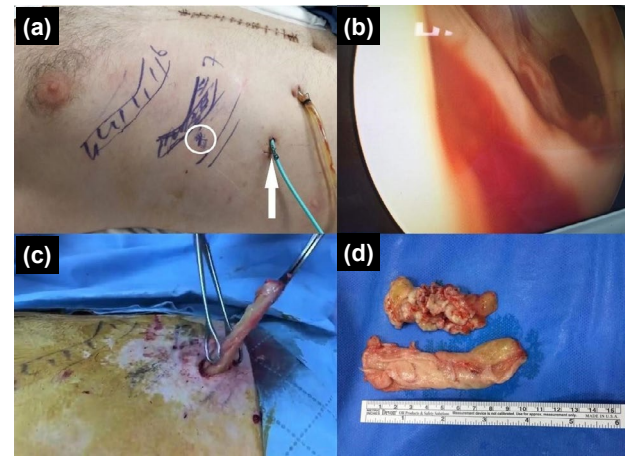

Figure 3. Minimally invasive video-assisted transdiaphragmatic drainage procedure. **(a)** Incision site (circle) and drainage catheter (white arrow); **(b)** Videoscopic view of the site; **(c)** Debridement and drainage of the debris; **(d)** View of the debris.

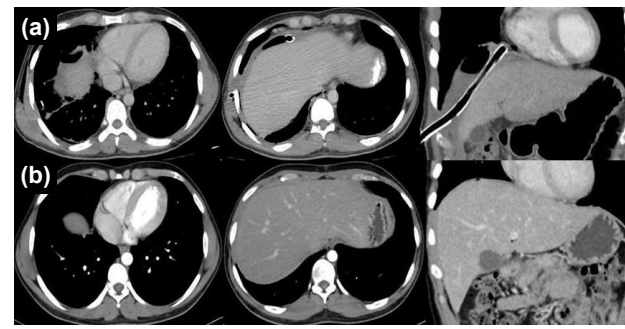

Figure 4. Regression periods of the right pleural effusion and perihepatic complicated collection after video-endoscopic drainage. **(a)** Fifth day; **(b)** 45th day.

On the fifth day of MIVTD drainage, the CRP level was 16.3 mg/L, leukocyte count was 6,400 µL, and the patient had no fever. There was no growth in the debrided tissue cultures. An abdominal CT was taken for control, showing a collection in front of the right lobe of the liver measuring 3x2 cm (Fig. 4A). By the eighth day of MIVTD drainage, no fluid was coming from the drains, and there was no pathology on the chest X-ray. The patient was discharged after the abdominal and thoracic drains were removed. No pathology was found on the thorax and abdominal CT scans 1.5 months after the Graham patch repair (Fig. 4B).

DISCUSSION

Postoperative IAAs are most common in the subphrenic space, pelvis, or subhepatic space.[5,6] They are primarily caused by surgical site infections, visceral perforations, and anastomosis leakages.[7]

Today, PCD is the standard approach in the treatment of IAAs, and the mortality rate is 4.2%.[5] Surgical drainage is performed when surgical debridement is necessary, including in cases of diffuse peritonitis, multiple abscesses, the presence of an enteric fistula, abscesses with dense contents and hematoma, and anatomical inaccessibility.[4,7] The mortality rate for surgical drainage ranges between 14.6% and 43%.[5,8]

In the presence of interloop collections and enteric fistulae, drainage may be considered by laparotomy.[6,7] However, laparotomy is seriously traumatic and causes complications such as contamination of uninfected areas, incisional hernia, and recurrence of intra-abdominal abscess.[7,8] Laparoscopic drainage is minimally invasive for selected patients.[4,8]

The subphrenic area is anatomically risky. PCD drainage should be performed in cases of simple abscesses and where anatomical accessibility is assured.[2,6] If possible, minimally invasive surgical drainage is performed for subphrenic multiloculated, dense abscesses, and in cases where PCD fails.[9] Clinicians have previously reported that trans-diaphragmatic laparoscopic drainage, performed by passing through the pleural space through an incision in the right 10th intercostal space, is an effective approach.[10,11]

In our case, PCD was initially performed on the right subphrenic abscess. The procedure failed because the collection was dense and multiloculated. Consequently, a decision for surgical drainage was made. Minimally invasive surgery was planned to prevent serious trauma and reduce the risk of complications. In our patient, the pleura was accessed from the right seventh intercostal space without touching the pleura, and trans-diaphragmatic laparoscopic drainage was performed.

CONCLUSION

In conclusion, as demonstrated in our case, subphrenic abscesses can be successfully treated with MIVTD by directly accessing the peritoneum through the right intercostal space without opening the diaphragm and pleura, thereby preventing the thorax against trauma and contamination.

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Conflict of Interest: None declared.

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OLGU SUNUMU - *ÖZ*

Subfrenik apsenin minimal invazif transdiyafragmatik drenajı

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Karın içi apseler genellikle gastrointestinal sistemden kaynaklanır ve %70'i ameliyat sonrası dönemde görülür. Ölüm oranı %50'ye ulaşabilir. Bu apseler en sık subfrenik ve subhepatik boşluklarda bulunur. Tedavide perkütan drenaj veya cerrahi drenaj uygulanır. Bu yazıda,ülser perforasyonu tanısıyla laparotomi ile Graham yama onarımı uygulanan ve sağ subfrenik multiloküle gelişen hastamızda, sağ interkostal yaklaşımla basit bir kesi ile başarıyla uygulanan minimal invaziv video yardımlı transdiyafragmatik drenaj yöntemini sunuyoruz.

Anahtar sözcükler: Minimal invaziv; subfrenik abse; transdiaphragmatic drainage.

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