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Negative Pressure Wound Therapy applied to a cholecystoparietal fistula: How to treat a rare complication of a common condition – a case report

Francesco Calabrese, Francesco Palmieri, Giorgio Querini, Sandro Zonta

CASE REPORT

Abstract— A cholecystoparietal fistula is an uncommon complication of gallstone disease as a result of neglected gallbladder disease). The subcutaneous abdominal wall abscess, derived from this condition, might be wide and hard to treat, especially in elderly and debilitated patients. The best management of cholecystoparietal fistula depends on its etiology and may require medical, surgical, or endoscopic treatment.

Negative Pressure Wound Therapy (NPWT) is a valuable support therapy that can improve the prognosis of the disease and the patient's outcome.

We report the case of an 89-year-old female patient affected by a spontaneous cholecystoparietal fistula with a wide abdominal wall abscess treated by a one-stage surgical approach combined with NPWT over the resulting skin loss.

Keywords—cholecystoparietal fistula, cholecystitis, gallstones, negative pressure wound therapy, parietal wall abscess

INTRODUCTION

BILIARY fistulas are usually classified into two categories: the internal ones, more common, and external ones.^{1, 2} Nowadays, cholecystocutaneous and cholecystoparietal fistulas are rare. There are less than 100 cases of cholecystocutaneous fistulas reported in the modern medical literature. Their etiology can be spontaneous, therapeutic, traumatic, and iatrogenic.¹ The spontaneous fistulas are often due to gallbladder carcinoma, or to cholangiocarcinoma, or chronic cholecystitis.³ The iatrogenic fistulas are due to a complication of hepatic surgery or the placement of cholecystostomy drainage.

Cholecystocutaneous fistula was first described in 1670 by Thilesus.⁴ Then, in 1890, Courvoisier reported 169 cholecystocutaneous fistula cases out of 499 gallbladder perforation incidents.⁵ In modern times, the external biliary fistula became an extremely uncommon event. This is due to better imaging methods, like ultrasonography (US) and computer tomography (CT), together with higher availability of antibiotics and the progress in the surgical and endoscopic management of gallstone disease.³ Currently, a cholecystocutaneous fistula is generally caused by an acute or chronic calculous

cholecystitis or by a chronic cholecystoenteric fistulation.⁶ Compared to the past, today there are several devices and instruments, like endoscopic or laparoscopic procedures, interventional radiological procedures, or application of the Negative Pressure Wound Therapy (NPWT), that can be very useful to improve the treatment of this rare poor prognosis complication.

CASE REPORT

An 89-year-old female patient was admitted to ER Department due to right upper abdominal pain and fever. Her medical history included hypertension, acute coronary syndrome, peripheral artery disease, and cholecystocholecholelithiasis which was treated with endoscopic sphincterotomy and stones extraction 18 months ago. After the ERCP procedure, the patient refused to undergo a laparoscopic cholecystectomy. The physical examination reported a painful erythematous swelling of the abdominal wall, extending from the right hypochondriac region to the right anterior superior iliac spine (Fig. 1), without any other signs or symptoms.

CT scan revealed an extensive subcutaneous fluid collection with air bubbles and inflammatory changes in the perihepatic and pericholecystic tissue (Fig. 2).

The patient underwent an urgent surgical procedure. Exploratory laparotomy and abdominal wall abscess incision were performed. After the skin incision and pus drainage (culture tests identified *Escherichia coli* and *Klebsiella pneumoniae*), we identified a large abscess cavity, that extended from the right costal arch to the pubis, and necrotizing fasciitis of the subcutaneous and muscular layer. Furthermore, several gallstones were found inside the abscess cavity (Fig. 3). As the abdominal cavity exploration revealed chronic cholecystitis and a fistula between the gallbladder fundus and the abdominal wall, we performed a cholecystectomy with the fistulous tract excision and an adequate abscess cavity drainage, through a double skin incision near the erythematous swelling in the right abdominal wall (Fig. 4). We postponed the application of NPWT as a result of massive contamination at the surgical site. The consequence of surgical treatment was a large skin loss of the abdominal wall due to the infection and necrosis of the soft tissue.

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Figure 1. Erythematous swelling of the abdominal wall

Therefore, on the first post-operative day, the NPWT system was applied to the abscess cavity. The NPWT dressing was replaced every 72 hours with surgical debridement of the wound. The NPWT parameters were set on intermittent pressure therapy: 10 minutes on – 80 mmHg followed by 2 minutes on 0 mmHg. For the medication, we used a 0.9% sodium chloride solution to irrigate the wound and a large polyurethane sponge to apply the NPWT. A total of 12 NPWT medications have been changed in 32 days. The patient was treated with intravenous administration of Piperacillin / Tazobactam 4,5 g every 8 hours for 14 days. As a result, the development of a good quality granulation tissue allowed us to suture the wound edges (Fig. 5). The recovery was uneventful, and the patient was discharged on the 33rd postoperative day. Gallbladder's histopathological examination reported chronic cholecystitis with no evidence of malignancy.

DISCUSSION

Currently, a cholecystocutaneous fistula is generally caused by an acute or chronic calculous cholecystitis or by a chronic perforation of the gallbladder.⁶ The gallbladder's wall necrosis, and its following perforation, leads to bile drainage into the abdominal wall and then through subcutaneous tissues and skin with cholecystocutaneous fistula formation. The increased gallbladder intraluminal pressure, secondary to cystic duct obstruction, caused by stones, may be related to the fistula formation.⁷ Hence, because of the chronic bile outflow obstruction, and the following increased intraluminal pressure, the gallbladder's wall perfusion decreases leading to necrosis and perforation of the organ.⁸ After the gallbladder's wall rupture, the bile may drain into the peritoneal cavity, into the adjacent viscera, or towards the outside, through the abdominal wall. This leads to the creation of an external fistula that generally involves the right upper abdominal quadrant, but rarely it could affect the umbilicus, anterior chest wall,

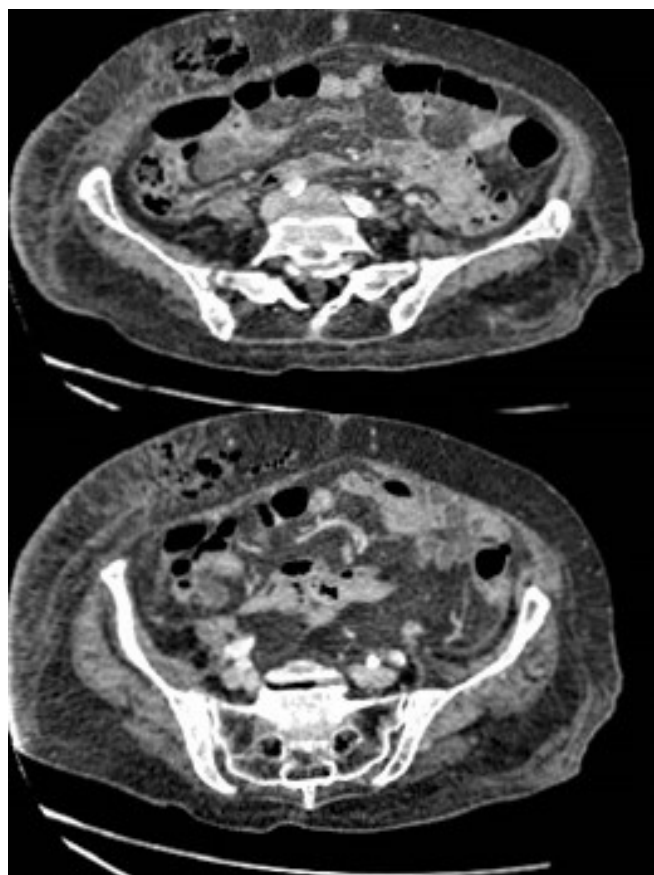


Figure 2. CT-Scan shows irregular area in the right abdominal wall with air bubbles in a fluid collection

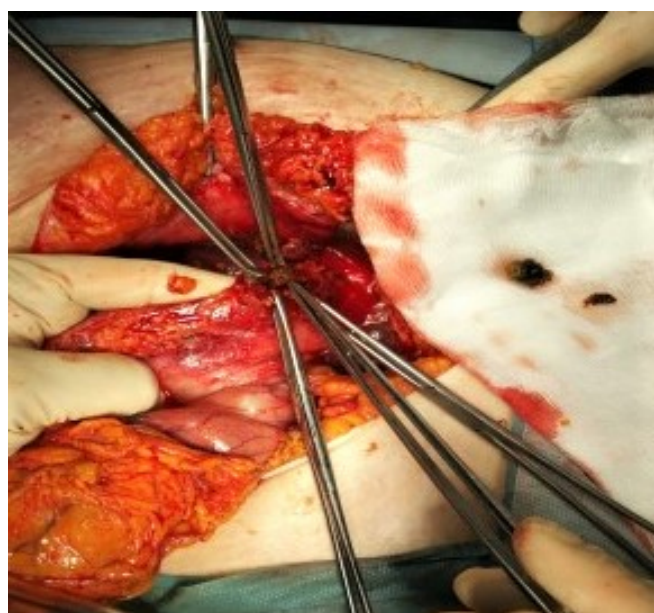


Figure 3. Gallstones found in the abscess



Figure 4. Incisions in the right abdominal to allow an adequate drainage of the cavity



Figure 5. The wound in 33rd postoperative day.

right groin, and gluteal region.⁹ In the beginning, the fistula formation process causes only the presence of a cutaneous tender inflammatory area or an abdominal wall abscess which later, spontaneously, flows out through the skin. Radiological findings (US and CT) are usually non-specific, ambiguous, and misleading at the initial presentation.⁹ The management of this rare gallstone disease complication includes abscess drainage, sepsis control, through a broad-spectrum antibiotic therapy, cholecystectomy, and fistulous tract excision. The abscess drainage and the open or laparoscopic cholecystectomy with the fistulous tract excision can be performed as a single or two-stage procedure.⁹

The Negative Pressure Wound Therapy (NPWT) is a technique that using a suction pump tubing, set at subatmospheric pressure, and a sealed dressing allows to remove the excessive exudate and promote the healing of an acute or chronic wound and the granulation tissue formation in wide skin loss condition.¹⁰

In our case, a one-stage procedure was chosen. We performed both abscess drainage and open cholecystectomy with fistula tract excision during the same surgical operation with the application of the negative pressure wound therapy over the resulting skin loss 24 hours after the surgical procedure. Application of the NPWT to patients with cholecystocutaneous and cholecystopatiatal fistula decreases the rate of surgical site infection by promoting the wound complete healing. This involves a decrease in the number of days in the hospital and a better prognosis, especially for elderly patients. Moreover, in an elderly patient, NPWT could be a good device in order to treat in an emergency setting the abdominal wall abscess after drainage, delaying the surgical procedure of cholecystectomy in elective conditions (two-stage approach).

CONCLUSIONS

Cholecystocutaneous fistula is an extremely uncommon condition and it generally represents a complication of a long-time chronic calculous cholecystitis.⁶ Despite its rarity, it should be included in the differential diagnosis of abdominal wall abscess of the right regions, especially in elderly patients with a history of gallstone disease. The best surgical treatment depends on the fistula etiology and patient's conditions.⁹ Firstly, it is preferred the one-stage approach in the elderly patients to avoid a second general anesthesia. Secondly, an open procedure guarantees an adequate fistulous tract excision which could be very difficult to perform laparoscopically. Lastly, the application of NPWT in our case has ensured a complete wound healing, even with a wide skin loss, as well as a faster recovery without any other complications.

Modification of iNPWT as presented in the study seems to be a crucial element for good outcomes.

REFERENCES

- [1] S. Safaie-Shirazi, "Spontaneous enterobiliary fistulas," *Surg Gynecol Obstet.*, vol. 137, pp. 769–772, 1973.
- [2] M. Crespi, G. Montecamozzo, and D. Foschi, "Diagnosis and treatment of biliary fistulas in the laparoscopic era," *Gastroenterology research and practice*, vol. 2016, 2016.
- [3] H. Flora and S. Bhattacharya, "Spontaneous cholecystocutaneous fistula," *Hpb*, vol. 3, no. 4, pp. 279–280, 2001.
- [4] C. Horhammer, "Ueber estraperitoneale perforatio der gallenblase," *Munch Med Wochenschr*, vol. 10, pp. 1451–1452, 1916.
- [5] L. G. Courvoisier, *Casuistisch-statistische Beiträge zur Pathologie und Chirurgie der Gallenwege*. Vogel, 1890.
- [6] M. Andley, R. S. BISWAS, S. Ashok, G. Somshekar, and S. M. GULATI, "Spontaneous cholecystocutaneous fistula secondary to calculous cholecystitis," *The American journal of gastroenterology*, vol. 91, no. 8, pp. 1656–1657, 1996.
- [7] C. d. A. Urban, L. A. B. D. Urban, R. S. d. Lima, and L. F. Bleggi-Torres, "Spontaneous combined internal and external biliary fistule in association with gallstones and gliomatosis of the gallbladder," *Rev. bras. cancerol*, pp. 273–276, 2001.

- [8] F. Guardado-Bermúdez, A. Aguilar-Jaimes, F. J. Ardisson-Zamora, L. A. Guerrero-Silva, E. Villanueva-Rodríguez, and N. A. Gómez-de Leija, "Spontaneous cholecystocutaneous fistula," *Cirugía y Cirujanos (English Edition)*, vol. 83, no. 1, pp. 61–64, 2015.
- [9] V. Gupta, S. Benerjee, H. Garg, and S. Vyas, "Spontaneous cholecysto-antral-cutaneous fistula: a consequence of neglected calculus cholecystitis," *Singapore Med J*, vol. 53, no. 10, pp. e201–3, 2012.
- [10] J. Cipolla, D. Baillie, S. Steinberg, N. Martin, N. Jaik, J. Lukaszczyk, and S. Stawicki, "Negative pressure wound therapy: Unusual and innovative applications," *OPUS*, vol. 12, pp. 15–29, 2008.