

Two Cases of Abdominal Abscess Caused by Retained Faecal Stone After Laparoscopic Appendectomy

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Abstract

This paper presents two cases of abdominal abscess resulting from a retained faecal stone following laparoscopic appendectomy and emphasizes the significance of avoiding faecal stone omission during the intraoperative period. The research indicates that the implementation of various strategies, including preoperative assessment, utilization of a specimen bag, thorough intraoperative examination, and postoperative review, can effectively decrease the occurrence of postoperative complications. This approach has the potential to increase the success rate of the operation, enhance the treatment experience and prognosis of patients, and is significantly important in improving the safety and efficiency of laparoscopic surgery.

Keywords

Acute Appendicitis, Laparoscopic Appendectomy, Faecal Stone Appendicitis

Acute appendicitis is a common acute abdominal disease in surgery. Laparoscopic appendectomy (LA) is nowadays the gold standard for surgical treatment of acute appendicitis. It has the advantages of less trauma, less postoperative pain, quick recovery, low infection rate, less abdominal interference, quick recovery of gastrointestinal function, less postoperative intestinal adhesion, and good cosmetic effect, as well as easy exploration of the situation of organs outside the appendix, easy identification of the patients with unclear diagnosis of appendicitis and the treatment completion under laparoscopy [1-3]. Under certain conditions, it can basically replace the traditional open appendectomy. However, the possibility of complications still exists in LA, with bleeding, incision infection, adhesive intestinal obstruction, appendix stump inflammation, and abdominal abscess as its main complications [4].

During the LA surgery in our hospital, two cases of abdominal abscesses caused by retained faecal stone after laparoscopic appendectomy were found in our hospital. The patients were recovered well after active treatments like re-surgery. They are reported as follows:

1. Introduction of Cases

1.1 Clinical Case 1

The patient, a male, aged 29 years old, was admitted to our hospital on October 10, 2021, because of metastatic pain in the lower right abdomen for 2 consecutive days. The physical examination in the hospital showed that the abdomen was flat, the abdominal muscles were soft, the tenderness and rebound pain at Macmillan's point in the right lower abdomen were significant, no mass was palpated in the whole abdomen, the liver and spleen were not palpated under the ribs, Murphy sign was negative, there was no percussion pain in both kidneys, and the bowel sounds were

4 times per minute. In the auxiliary examination on October 10, 2021, the color Doppler Imaging results of the outpatient department showed a finger-like hypoecho in the appendix area, which was connected with the cecum. Its root was swollen significantly, with a diameter of approximately 17 mm, the internal sound transmission was poor, and a strong echo mass with a diameter of approximately 14 mm could be found. Combined with clinical manifestations, the possibility of appendicitis was advised. The routine blood examination results showed a white blood cell count of $11.01 \times 10^9/L$ and a neutrophil percentage of 81.50 %.

To sum up, the patient was diagnosed as an acute appendicitis. After admission, the preoperative examination of the patient was further improved in order to prepare for the surgical treatment. On the same day, the patient underwent a laparoscopic appendectomy in emergency care under general anesthesia. The intraoperative exploration findings show that the appendix was significantly congested and edematous, with a large amount of pus covered on its surface. The appendix was taken out in a specimen bag after being resected. After the operation, the patient received symptomatic support treatment such as anti-infection and nutritional rehydration.

The patient developed pain in the lower left abdomen the next day after the surgery, accompanied by fever and diarrhea. The highest body temperature reached 38 °C, and he defecated 7-8 times a day, which was yellow and watery. Physical examination results showed that the patient had fixed tenderness in the left lower abdomen, accompanied by mild rebound pain. The routine blood re-examination results on October 12, 2021, showed a white blood cell count of $15.86 \times 10^9/L$ and a neutrophils percentage of 85.1 %. Moreover, color Doppler Imaging results found hydrops in the lower right abdomen and omentum aggregation in the middle lower left abdomen. On the third day after the surgery, the patient's umbilical incision showed redness and swelling, accompanied by purulent fluid overflow.

After anti-infection treatment, dressing change of incision, and symptomatic treatment, the patient's fever symptoms had alleviated, but the pain in the lower left abdomen still existed and the umbilical incision was not healed well. During the process of treatment, it was not ideal for the patient to make cooperation in examination and treatment. On November 2, 2021, the follow-up CT scan results of the lower abdomen (see Fig. 1) showed an increase in umbilical density and subcutaneous fat gap density, and the blurred boundaries. The abdominal muscle on the left side of the navel was significantly swollen, with unclear boundaries, and a high-density shadow with a size of approximately 11 mm x 9 mm could be found, with a CT value of 528Hu, and clear boundaries. Local abdominal cavity density increased. Combined with clinical diagnosis, it was diagnosed as umbilical infection, left abdominal wall infection, and hypogastric infection, and high-density shadow was unknown. Moreover, the results of color Doppler Imaging results showed that there was no echo area in the subcutaneous soft tissue of umbilical region. Hydrops were suggested, with a small amount of hydrops in the intestines.

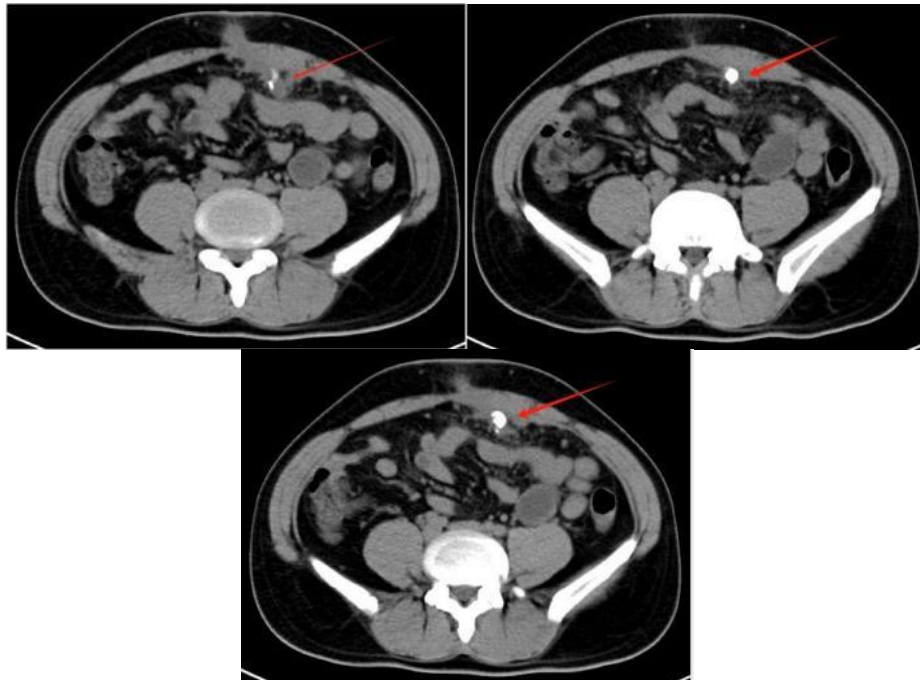


Figure 1. CT showed a high-density shadow near the abdominal wall at the lower left of the navel (the position pointed by the arrow).

After detailed analysis, the color Doppler Imaging results of the patient before the appendectomy showed a high-density shadow in the appendix. After the appendectomy, the patient developed symptoms of peritonitis. The possibility of intra-abdominal infection was suggested, especially the formation of abdominal abscesses. The follow-up CT reexamination further confirmed the existence of a high-density shadow in the abscess cavity, which suggested that the intra-abdominal infection might be an abdominal abscess caused by retained faecal stone after laparoscopic appendectomy. In view of the poor effect of conservative treatment, the patient's condition showed a sign of re-operation. After sufficient communication and consent with the patient and his family, we performed laparoscopic exploration and abdominal abscess drainage under general anesthesia on November 5, 2021. During the operation, we observed that the omentum under the original umbilical incision was attached to the abdominal wall to form a certain package. By bluntly separating the adhered greater omentum, pus was found to flow out and the omentum was wrapped to form a pus cavity, which was approximately 2 cm x 2 cm in size. A faecal stone was found in the pus cavity, which was approximately 10 mm x 9 mm in size. The pus and faecal stone were removed thoroughly from the pus cavity, and the faecal stone in the specimen bag was taken out.

This surgery confirmed that abdominal abscess was caused by retained faecal stone after laparoscopic appendectomy. After the surgery, the patient continued to receive anti-infection treatment and dressing change of incision, and his condition recovered well, and eventually he was discharged successfully.

1.2 Clinical Case 1

The patient, female, aged 28 years old, was admitted into our hospital on September 3, 2023, because of metastatic pain in the lower right abdomen for 1 consecutive day. The results of a special physical examination showed that the abdomen was flat, no gastrointestinal and peristalsis waves were found, the abdominal muscles were soft, the tenderness and rebound pain at Macmillan's point in the right lower abdomen were found, no mass was palpated in the whole abdomen, the liver and spleen were not palpated under the ribs, there was no percussion pain in both kidneys, and the bowel sounds were 4 times per minute.

In the auxiliary examination on September 3, 2023, the routine bleeding examination results showed a white blood cell count of $10.59 \times 10^9/L$ and a neutrophil percentage of 81.50 % and the color Doppler Imaging results showed "a faecal stone entrapment in the ileocecal region, a thickened neck of the appendix and richer blood flow signals, and the appendix was wrapped by omentum. Combined with the clinical manifestations, local inflammatory changes of the appendix were suggested". After admission, the relevant examinations were further performed. On November 3, 2023, the plain CT scan results of the lower abdomen and pelvis showed (see Fig. 2): "1. The possibility of appendiceal faecal stone, appendicitis, and the formation of surrounding abscesses are suggested. 2. a small amount of hydrops in the pelvic cavity is suggested", and no abnormalities were found in the remaining examinations.

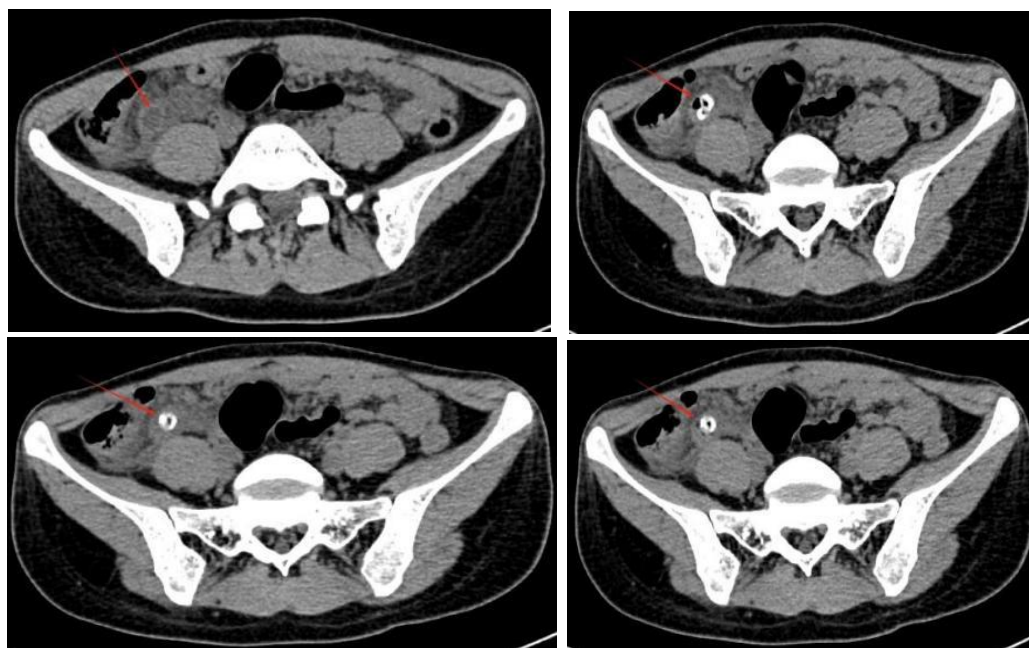


Figure 2. CT examination showed a significant thickening of the appendix lumen and a high-density shadow of faecal stones in it (the position pointed by the arrow).

Preoperative diagnosis: acute appendicitis. On the day of admission, the patient underwent a laparoscopic appendectomy in emergency care under general anesthesia. During the operation, it was found that the appendix was significantly swollen and purulent, with a small amount of pus in the pelvic cavity and faecal stones at the root of the appendix. The appendix was taken out in a specimen bag after being resected. The operation process was successful. After the operation, the patient received symptomatic support treatment such as anti-infection and nutritional rehydration. On the fifth day after the surgery, the patient's condition was stable, and she was recovered well and discharged on September 8, 2023. At the time of discharge, the patient had no discomfort like abdominal pain, and the results of the physical examination of the abdomen showed that the abdominal muscle was soft and free from any tenderness, rebound pain, etc.

The patient came to the outpatient department for seeking medical advice on September 11, 2023, because of pain in the lower right abdomen. The physical examination result showed the tenderness and slight rebound pain in the lower right abdomen, while no abnormalities were found in the routine blood examination. The color Doppler Imaging results of the appendiceal region showed a flaky liquid dark area in the lower right abdomen, which was approximately 34 mm x 16 mm in size. There were poor sound transmission effects in the dark area and dense weak echo light spots and strong echo masses. A flaky high-echo package could be observed around the dark area. The conclusion of ultrasonic examination showed hydrops in the lower right abdomen and wrapping by omentum. Post-operative peritonitis for appendicitis was suggested. From September 11 to September 16, the patient was treated with intravenous antibiotics in the outpatient department, and the symptoms of abdominal pain were relieved.

The patient came to our hospital again on September 20, 2023, because of pain in the lower right abdomen. Physical examination results showed that the abdomen was flat and soft, with tenderness in lower right abdomen and no significant rebound pain, and mass could be palpated in the lower right abdomen, approximately 6 cm x 4 cm in size, with a slightly hard texture and relatively clear boundaries. The color Doppler Imaging results on the same day showed a mixed echo mass in the lower right abdomen, approximately 45 mm x 26 mm in size, with unclear boundaries. In the enclosed mass, multiple strong punctate echoes and a strong echo mass with a size of approximately 13 mm x 8 mm could be observed, and it was followed by sound shadow. The enclosed mass was adhered to the surrounding tissues. The ultrasonic examination showed a mixed echogenic mass in the lower right abdomen, and encapsulated effusion was suggested. The patient was admitted by the outpatient department to the hospital for diagnosis and treatment. The results of the CT examination of the lower abdomen and pelvic cavity performed on September 20, 2023 (Fig.3) were described as follows: compared with the CT film on September 3, 2023, the present CT film shows that the enlarged appendix shadow found in the original lower right abdomen has disappeared, and the flaky high-density shadow can still be observed on the right side of the pelvic cavity, and no significant pneumatosis or effusion is found in the abdominal cavity. A small amount of liquid density shadow is found in the pelvic cavity, which is similar to the previous observation result.

Diagnosis tips: 1. Situation of appendicitis was changed after appendectomy. 2. A small amount of effusion still existed in the pelvic cavity. No significant abnormality was found in the remaining examinations.

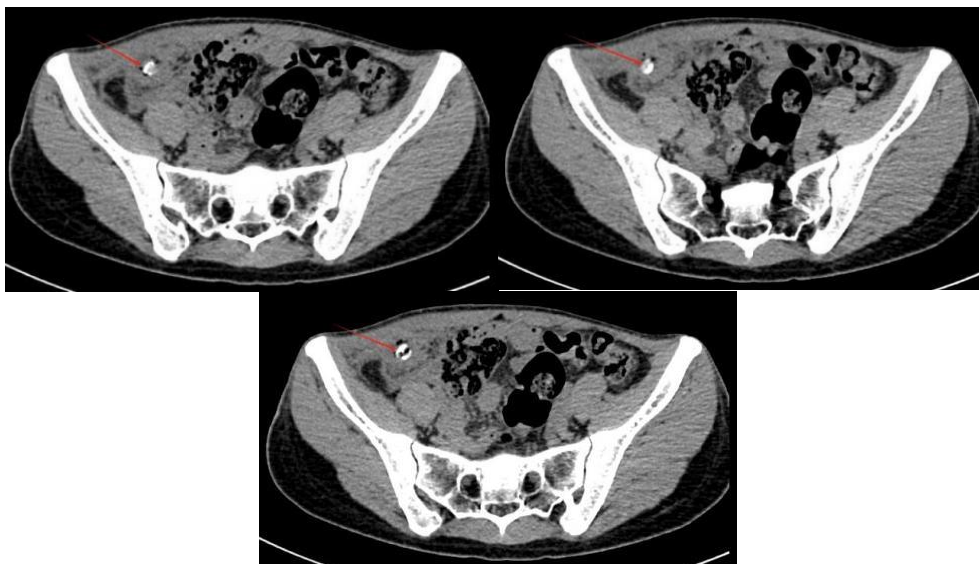


Figure 3. CT Examination after LA showed that the enlarged appendix shadow found in the original lower right abdomen has disappeared, and the flaky high-density shadow can still be observed on the right side of the pelvic cavity (the position pointed by the arrow).

Consideration for admission diagnosis: causes for abdominal pain: mixed echogenic enclosed mass in the lower right abdomen; retained faecal stones, and abdominal abscess.

Considering the ineffectiveness of conservative treatment, the patient underwent the laparoscopic exploration and drainage of an abdominal abscess under general anesthesia on September 20, 2023. Laparoscopic exploration during operation: The greater omentum gathered in the lower right abdomen, partially wrapped into a mass, with significant inflammatory edema, and it has adhered to the lower right abdominal wall, and local abdominal wall edema was significant. After carefully separating the adhesion between the greater omentum and the abdominal wall, an abscess around the greater omentum was found, with a size of approximately 4.0 cm x 3.0 cm, and yellow-white pus overflowed from the abscess. After fully opening the abscess cavity, a faecal stone, approximately 12 mm x 8 mm (similar to that described by color Doppler imaging before operation) was found in the abscess cavity, and it was taken out. No abnormality was found in other organs in the abdominal cavity, and no significant effusion was found in the abdominal cavity. Drainage tubes were inserted in the right iliac fossa and pelvic cavity. It was proved that the abdominal abscess was caused by retained faecal stones in the appendix after laparoscopic appendectomy. After intravenous antibiotics and other treatments, the patient's abdominal symptoms and signs disappeared, and he was discharged on September 28, 2023, after his condition improved.

2. Analysis and Discussion

Retrospective analysis of the diagnosis and treatment process of case 1 after the LA: the surgeon recalled that faecal stones were maybe not all taken out because the collection bag was broken when taking the appendix specimen during the LA, which thus resulted in the faecal stones left in the abdominal cavity, and causes abdominal infection and the formation of an abdominal abscess.

Retrospective analysis of the diagnosis and treatment process of case 2 after the LA: The preliminary review of the video of the LA found that the appendectomy was relatively complete, the faecal stone in the appendix lumen was detected during the LA, and the faecal stone was also put into the specimen bag at that time. After the LA, no significant abnormality was found in routine abdominal examination. After carefully reviewing the video for many times, the possible reasons are considered as follows: after the appendix was placed in the specimen bag, the aspirator was used to absorb the local abdominal effusion again. During this period, the specimen bag of the appendix was temporarily out of the operating visual field, and the faecal stone of the appendix might leak out of the abdominal blind area of the abdominal cavity, which thus results in the retained faecal stone.

Obstruction of the appendix lumen is the most common cause of acute appendicitis in clinical practice, and the faecal stone in the appendix is one of the important causes of obstruction of the appendiceal lumen, accounting for 35 % or so. This shows that faecal stone appendicitis is a common type in clinical practice. In the said two cases, complications of abdominal abscess were both caused by retained faecal stones after the LA. At last, a second surgery was needed to clean the abdominal abscess and remove the faecal stones before the patients were recovered, which adversely affected the patients. We should learn lessons and sum up experience in clinical work in the future, and treat clinical work with a strong sense of responsibility and a craftsman-like spirit to avoid similar postoperative complications.

The experiences for treatment of faecal appendicitis are summarized as follows: (1) fully evaluate and understand the approximate types of appendix before surgery. It is necessary to be vigilant before surgery and be more cautious during laparoscopic surgery if it is definitely a faecal stone appendix; (2) Try to use specimen bags as much as possible, avoid taking specimens directly from the sheath card, place the excised specimen promptly into the specimen bag, and tighten the strap; (3) after the specimen is put into the bag, the specimen bag can be taken out first to avoid further operation and surgical operation in the blind area of vision; (4) when the specimen bag is ruptured, it is necessary to carefully check the specimen, check the incision, and enter the abdominal cavity again for examination when necessary. If any retained faecal stones are found, they should be completely removed to avoid leaving behind; (5) After the surgery, pay attention to checking the excised appendix specimen to ensure that it is consistent with the preoperative imaging examination result; (6) Before and after the surgery, check the abdominal cavity routinely to avoid potential problems.

3. Conclusion

The importance of avoiding faecal omission during the surgery was highlighted in this study by analyzing two cases of abdominal abscesses caused by retained faecal stones after laparoscopic appendectomy. The studies show that many measures should be taken in the surgery of faecal stone appendicitis, including but not limited to a preoperative

thorough evaluation, collection of the appendix with specimen bag, meticulous intraoperative examination, and post-operation review, which can significantly reduce the occurrence of postoperative complications. To attach importance to such details can not only enhance the success rate of surgery but also significantly improve the treatment experience and prognosis of patients, which is of great significance to enhance the safety and efficiency of laparoscopic surgery [5-8].

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