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Hepatic Abscess as a Rare Late Complication of Perforated Appendicitis. A Case Presentation

Martino Gerosa[1]*, Francesca Roufael[2], Chiara Lasagna[2], Fabiana Di Monte[3], Richard Sassun[2], Annaclara Sileo[2], Mauro Santonocito[1], Barbara Vignati[1], Nicola Zarpellon[4], Roberto Cirocchi[5], Dario Maggioni[1], Giulio Maria Mari[1], on behalf of Advanced International Mini-invasive Surgery Academy Clinical Research Network[6]

[1]Department of Laparoscopic and Oncological General Surgery, Desio Hospital, ASST Brianza, Italy
[2]General Surgery Residency, University of Milan, Italy
[3]General Surgery Residency, University of Verona, Italy
[4]Department of Radiology, Fondazione IRCCS San Gerardo dei Tintori, Monza, Italy
[5]Department of Medical and Surgical Sciences, University of Bologna, Bologna, Italy
[6]AIMS Academy Clinical Research Network, Niguarda Ca Granda Hospital, Milan, Italy

***Corresponding author:**
Martino Gerosa, MD
Department of Laparoscopic and Oncological General Surgery
Desio Hospital, ASST Brianza, Italy
E-mail: martinogerosa81@gmail.com

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Rezumat

Abcesul hepatic ca o complicație tardivă rară a apendicitei perforate. Prezentare de caz

Context: Apendicita acută este o urgență chirurgicală frecventă, care afectează predominant bărbații tineri. Deşi apendicectomia laparoscopică reduce rezultatele adverse, sunt cunoscute potențialele complicații legate de această afecțiune. Printre acestea, abcesul hepatic este o complicație rară şi severă, cu cazuri limitate raportate în literatura de specialitate.
Prezentare caz: Prezentăm cazul unui bărbat în vârstă de 18 ani cu peritonită purulentă difuză datorată apendicitei perforate, care a dezvoltat un abces hepatic la o lună după operație. În ciuda tratamentului inițial, care a inclus intervenție chirurgicală şi terapie cu antibiotice, după o lună pacientul s-a prezentat cu temperatură ridicată şi durere în cadranul superior drept, ceea ce a dus la descoperirea şi drenajul percutan ulterior al unui abces hepatic şi terapie intravenoasă cu antibiotice. Cultura abcesului a identificat Bacteroides Fragilis, ghidând terapia antibiotică țintită şi rezultând o recuperare completă.
Discuții: Acest caz evidențiază potențialul formării unui abces hepatic în urma apendicitei acute, suspectată a fi cauzată de răspândirea bacteriană hematogenă. Având în vedere natura neobişnuită a acestei complicații, este necesar un indice ridicat de suspiciune la pacienții care prezintă simptome neobişnuite post-apendicectomie. Drenajul percutan imediat, alături de terapia antibiotică cu spectru larg, urmat de tratament țintit la identificarea agentului patogen, este crucial pentru gestionarea acestei afecțiuni care pune viața în pericol.
Concluzie: Deşi rar, abcesul hepatic poate apărea ca o complicație a apendicitei acute, subliniind importanța conştientizării şi a intervenției prompte pentru a preveni consecințele severe. Drenajul percutan al abcesului asociat cu o terapie antibiotică țintită reprezintă tratamentul de elecție.

Cuvinte cheie: abces hepatic, apendicită acută perforată, apendicectomie laparoscopică, drenaj percutan, terapie antibiotică, raport de caz

Abstract

Background: Acute appendicitis is a common surgical emergency, predominantly affecting young males. Although laparoscopic appendectomy reduces adverse outcomes, potential complications related to this condition are known. Among these, hepatic abscess is a rare and severe complication, with limited cases reported in the literature.
Case Report: We report a case of an 18-years-old male with diffuse purulent peritonitis due to perforated appendicitis who developed a hepatic abscess one month post-surgery. Despite the initial management including surgical intervention and antibiotic therapy, after one month the patient presented with high temperature and right upper quadrant pain, leading to the discovery and subsequent percutaneous drainage of a hepatic abscess and intravenous antibiotic therapy. The abscess culture identified Bacteroides Fragilis, guiding targeted antibiotic therapy and resulting in a full recovery.
Discussion: This case highlights the potential for hepatic abscess formation following acute appendicitis, suspected to arise from hematogenous bacterial spread. Given the uncommon nature of this complication, a high index of suspicion in patients presenting with unusual symptoms post-appendectomy is required. Immediate percutaneous drainage alongside broad-spectrum antibiotic therapy, followed by targeted treatment upon pathogen identification, is crucial for managing this life-threatening condition.
Conclusion: Although rare, hepatic abscess can occur as a complication of acute appendicitis, underscoring the importance of awareness and prompt intervention to prevent severe outcomes. Percutaneous drainage of the abscess associated to a targeted antibiotic therapy represents the treatment of choice.

Keywords: hepatic abscess, acute perforated appendicitis, laparoscopic appendectomy, percutaneous drainage, antibiotic therapy, case report

Introduction

Appendicitis is one of the most common surgical emergencies globally, mostly occurring in young male individuals (1).

Although non-operative management with antibiotics is a safe alternative to surgery in selected case, surgical appendectomy combined with abdominal cavity washing is the gold standard, except in the presence of specific contraindications (2,3). The mini-invasive approach is associated with lower overall complication rate compared to open appendectomy (8.7% vs 11.1%) along with a reduction in hospital length of stay (5). The mini-invasive approach also facilitates washing the entire abdominal cavity across all quadrants which is essential in cases of diffuse purulent peritonitis (6).

This scenario is associated with a high incidence of complications, which can arise even time after surgery, as in the case of an intraperitoneal abscess (7,8).

In fact, the intraperitoneal bacterial dissemination may not be completely eradicated by peritoneal washing, leaving unseen purulent foci. In these cases, a re-surgery is generally required for a second peritoneal lavage (9).

Conversely, the formation of abscesses within the parenchyma of distant organs is a rare complication after peritonitis from appendicitis and can be theoretically supported by the hematogenous spread of bacteria (10).

Hepatic abscess is a rare (<0.03%) but severe condition, and in less than 10% of cases, it can arise following acute appendicitis. In this scenario, it is classified as a pyogenic abscess, differentiating it from the other possible entity, which is the amoebic abscess (11).

This uncommon complication has rarely been described in the literature and the pathophysiology is still not clear (9,10,12).

We report the case of an 18-years-old man who underwent surgery for diffuse peritonitis resulting from perforated appendicitis, and subsequently developed a hepatic abscess one month after the procedure.

Case Report

A 18-years-old man presented to the emergency department with 2-day history of right lower-quadrant abdominal pain associated to fever,

vomiting, and diarrhea. His past medical history was silent.

On physical examination, the patient exhibited abdominal distention and marked tenderness in the right iliac fossa with a positive McBurney sign. Blood test revealed an increased WBC count of 19,900 cells/mm^3 (normal range 4000 – 11,000 cells^7/mm^3) and an elevated C-reactive protein (CRP) level of 257 mg/dL (normal range 0 – 5 mg/dL).

Abdominal ultrasound identified an 11 mm of diameter appendix with hyperechoic and thickened walls associated with mild right inferior paracolic, subhepatic and perisplenic fluid suggestive of an acute appendicitis.

The patient underwent explorative laparoscopy: the intraoperative scenario revealed a severe acute necrotizing appendicitis with diffuse purulent peritonitis affecting all abdominal quadrants (*Fig. 1*). No fecalith was documented. Laparoscopic appendectomy and peritoneal lavage were completed (*Fig. 2*) leaving 2 drainages in the abdominal cavity respectively in the pelvic space and in the right paracolic gutter. The microbial culture of the pus drained intraoperatively showed a multisensitive Escherichia Coli. Empirical therapy with 2 gr of intravenous ceftriaxone once a day was started accordingly.

After completing a seven-day course of intravenous antibiotic therapy, the patient was discharged home in good general health conditions.

One month later the patient was re-admitted to our emergency department with high fever and right upper abdominal pain persisting for the past 5 days. On physical examination, he exhibited tenderness in the right upper quadrant of the abdomen. His pulse rate was 90 beats per minute and his arterial blood pressure was 140/90 mmHg. Laboratory findings revealed elevated inflammatory parameters such as a CRP of 117 mg/dL.

Abdominal ultrasound showed a hypoechoic area of 50 mm x 35 mm of the VI hepatic segment suggestive for a liver pyogenic abscess.

Subsequently, a computer tomography (CT) abdominal scan with intravenous contrast was performed which depicted a hypodense abscess zone measuring 48 mm x 41 mm in diameter in the posterior subcapsular region of the VI hepatic segment (*Fig. 3*).

Blood cultures were obtained during the patient's high fever episode, yielding negative results. Empirical antibiotic therapy with Piperacillin /Tazobactam 4.5 gr three times a day was started prior to abscess drainage.

Ultrasound guided percutaneous drainage was performed 24 hours after the hospital admission using an 8 French pigtail catheter.

Bacteroides Fragilis was isolated in the cultures of the drained pus, and it was found to be sensitive to the previous prescribed antibiotic therapy. The patient's clinical condition rapidly improved, reflecting the concurrent improvement of the inflammatory markers on laboratory tests.

The pigtail catheter was removed after two days, subsequently to an abdominal ultrasound showing a complete resolution of the abscess (*Fig. 4*). The patient was discharged after completing seven days of intravenous antibiotic therapy.

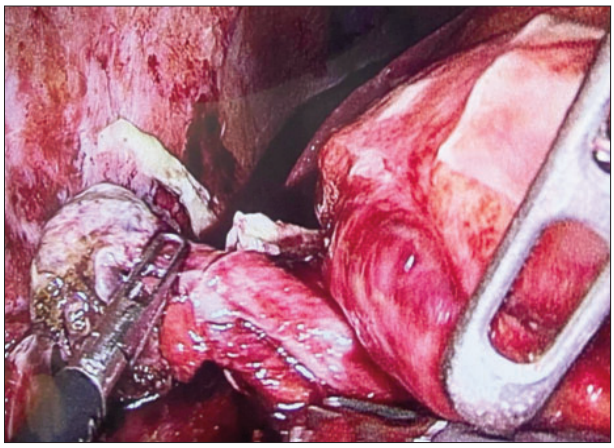

Figure 1. Intraoperative image: acute necrotizing appendicitis with diffuse purulent peritonitis

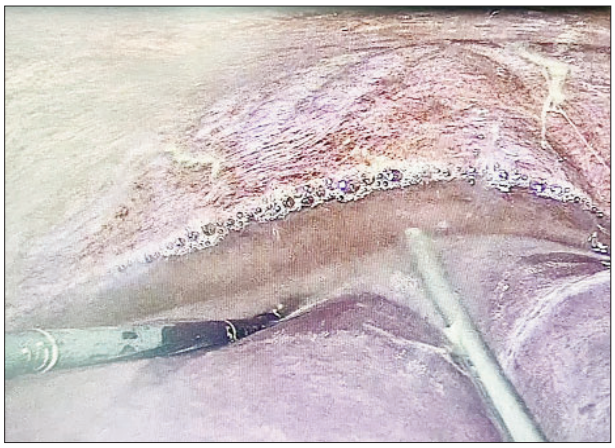

Figure 2. Peritoneal cavity after laparoscopic lavage in the right hypocondrium

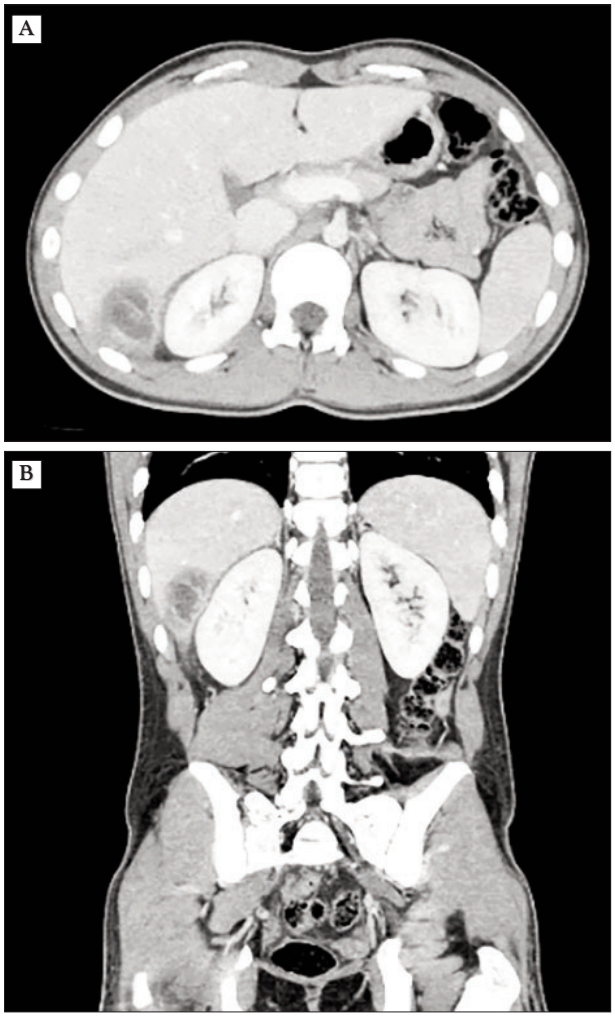

Figure 3. Hypodense abscess zone measuring 48 mm x 41 mm in diameter in the posterior subcapsular region of the VI hepatic segment. (A) Axial section; (B) Coronal section.

Figure 4. Ultrasound image showing resolution of the hepatic abscess after percutaneous drainage

Discussion

The occurrence of an intrahepatic abscess following acute appendicitis in a non-pediatric patient is a rare but potentially life-threatening event (13). The origin of this bacterial dissemination is suspected to be hematogenous. It is in fact hard to believe that the presence of purulent material close to the Glisson's capsule of the liver can lead to an intra-hepatic abscess by penetrating the liver capsule (14).

Following diffuse purulent peritonitis, the formation of intra-peritoneal abscess pockets can occur. This situation may result from non-optimal peritoneal washing during appendectomy. A systematic review and meta-analysis concluded that there was no significant difference in intra-abdominal abscess rates comparing laparoscopic versus open appendectomy in adults with complicated appendicitis (6). Boularab J. (15) reported a liver abscess containing a fecalith 8 months after uneventful laparoscopic appendectomy. He suggest that prevalence of these abscesses caused by residual stercolith is likely to increase as the number of laparoscopic appendectomies rises. He suggest the stercolith is expelled towards the subhepatic space during the "abundant" lavage, expecially when the patient is placed in the Trendelenburg position. The prolonged irritation of the liver surface by the direct contact with the stercolith is probably the mechanism of the abscess formation. The difficulty in exploring the declivity regions of the abdomen laparoscopically, particularly the subphrenic and subhepatic regions, explains the challenges in making an intraoperative diagnosis of loss of stercolith.

Anyway literature lack of comparison of occurrence of liver abscesses after open versus laparoscopic surgical interventions due to the rarity of this complication.

Conversely, an intrahepatic abscess might develop for the presence of bacteria capable of translocating into the bloodstream during the active phase of appendicular inflammation (10).

Percutaneous drainage of the abscess represents is the preferred treatment also allowing the collection of material for culture testing, facilitating the identification of the targeted antibiotic therapy (10,16).

Immunodeficiency can certainly be one of the predisposing factors for the formation of

distant hematogenous abscesses after appendicitis. However, the case we present concerns a young man in perfect health conditions, underscoring the potential for an appendicitis to generate a transient abscess-forming septic state.

The onset of liver abscess can have different timing. Early and late occurrence are reported.

Maatouk M. reported a case of retained appendicolith with perihepatic abscess even 1 year after laparoscopic appendectomy (17). Boularab J. (15) and Rathi H. (18) reported a case of hepatic abscess developed respectively 8 and 9 months after appendectomy.

Ward TE reported the case of a 29-year-old female diagnosed with acute appendicitis who underwent an uneventful laparoscopic appendectomy; three weeks later, the patient developed a hepatic abscess that was radiologically drained (19). Assenza M. described a case of a three weeks post-appendicectomy hepatic abscess formation due to a lost fecalith, which was then removed from the liver parenchyma using a Dormia basket recovery system (20).

The presence of a liver abscess can coincide with acute appendicitis: Kania BE (21) and Kokayi A. Jr (14) described two different cases of a simultaneous presentation of acute appendicitis and hepatic abscess. Similarly, Akyüz B. (12) and Armstrong T. (13) reported two cases of an inflamed appendix adherent to the liver capsule and communicated to the liver via a fistula resulting in a subcapsular abscess in the right hepatic lobe.

Wichmann D. conducted an 8 years retrospective analysis of nearly 2,000 cases of acute appendicitis, reporting five cases of post-operative liver abscesses (0.25%) concluding that pyogenic liver abscesses should be considered in patients exhibiting unusual high infectious parameters, septic symptoms, and detection of unknown liver lesions (10). The treatment of choice in all cases was a radio-guided percutaneous drainage. In addition, to be able to solve the infectious problem, the pathogen could be isolated throughout the drained material. The common causative agents that have been associated with a pyogenic hepatic abscess include E. coli, Staphylococcus aureus, Streptococcus species, Klebsiella pneumoniae, Pseudomonas aeruginosa, Entamoeba histolytica, and Bacteroides fragilis (10).

In all reported cases, immediate broad spectrum systemic antibiotic therapy is recommended. If the initial therapy is not fully effective, a second therapy targeted at the isolated pathogen should be administered.

Conclusion

The possibility of developing an intrahepatic abscess after acute appendicitis in a non-pediatric patient is a rare but potentially life-threatening event. Although this occurrence is rare, it is essential to recognize a hepatic abscess as a potential complication of appendicitis. Percutaneous drainage of the abscess associated to a targeted antibiotic therapy represents the treatment of choice.

Authors' Contributions

MG and GMM collected information of patient, revised the literature and drafted the manuscript. FR collected information of patient and drafted case report. CL, FDM, RS, AS, MS, BV, RC, DM. revised the manuscript. GM and FR performed the surgery. NZ performed percutaneous drainage.

Conflict of Interest

The authors declare no conflict of interest.

Ethical Statement

Written informed consent was obtained from the individual for the publication of any potentially identifiable images or data included in this article.

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