

An Extremely Rare Clinical Manifestation of Acute Appendicitis in a Nonagenarian Patient: Lessons Still to Be Learned

Anargyros Bakopoulos¹, Nikolaos Koliakos¹, Ioannis Katsaros², Natasha Hasemaki², Dimitrios Tsapralis³, Diamantis I. Tsilimigras⁴, Dimitrios Moris⁵, Dimitrios Schizas²

¹ Third Department of Surgery, National and Kapodistrian University of Athens, Attikon University Hospital, Athens, Greece

² First Department of Surgery, National and Kapodistrian University of Athens, Laikon General Hospital, Athens, Greece

³ Department of Surgery, General Hospital of Ierapetra, Ierapetra, Greece

⁴ Department of Surgery, Division of Surgical Oncology, The Ohio State University, Wexner Medical Center, James Cancer Hospital, Solove Research Institute, Columbus, Ohio, United States of America

⁵ Department of Surgery, Duke University Medical Center, Durham, North Carolina, United States of America

Corresponding author: Ioannis Katsaros, First Department of Surgery, National and Kapodistrian University of Athens, Laikon General Hospital, Athens, Greece; Email: ioankats@med.uoa.gr

Received: 14 Dec 2020 ♦ **Accepted:** 19 Feb 2021 ♦ **Published:** 30 June 2022

Citation: Bakopoulos A, Koliakos N, Katsaros I, Hasemaki N, Tsapralis D, Tsilimigras DI, Moris D, Schizas D. An extremely rare clinical manifestation of acute appendicitis in a nonagenarian patient: lessons still to be learned. *Folia Med (Plovdiv)* 2022;64(3):527-531. doi: 10.3897/folmed.64.e62008.

Abstract

Acute appendicitis is associated with a relatively high mortality rate among elderly patients due to the unusual clinical presentation that often leads to misdiagnosis and, in turn, severe complications.

This report describes an extremely uncommon clinical manifestation of acute appendicitis in an elderly patient - a subcutaneous abdominal wall abscess initially treated as cellulitis. Despite the initial misdiagnosis, contrast-enhanced computed tomography revealed a circumscribed inflammatory process of the appendix that was in close proximity to the abdominal wall. The patient underwent a surgical drainage of the abscess, received broad-spectrum antibiotics, and was discharged on day 12 following an uneventful course.

Diagnosis of acute appendicitis in elderly patients is challenging due to the atypical clinical presentation and co-existing comorbidities that can be misleading. Early application of high-resolution imaging techniques is necessary to identify the cause of acute abdomen in the elderly population.

Keywords

appendicitis, case report, nonagenarian

INTRODUCTION

Acute appendicitis remains one of the most frequent causes of acute abdomen with a lifetime risk reaching up to 7%.^[1] Elderly patients account for only 5%–10% of all cases diagnosed with acute appendicitis. The atypical clinical manifestation along with various masking co-morbidities often

leads to a significant delay in diagnosis and, subsequently in the prompt management of these patients. In turn, this results in the development of severe complications, including perforation, abscess formation, and sepsis.^[2]

Complicated appendicitis is more frequently encountered in the elderly population and is associated with increased morbidity and mortality rates.^[2,3] More specific-

ly, perforated appendicitis accounts for approximately 20% of all cases of appendicitis^[1], whereas in elderly patients this percentage can reach up to 70% at the time of diagnosis^[3]. Elderly patients typically have several comorbidities, including cardiac disease, diabetes mellitus, lung disease, renal failure, etc. which all lead to longer hospital stay and increased complications.^[3]

Herein, we present a case of an elderly woman treated for acute appendicitis after presenting with a subcutaneous abscess of the abdominal wall.

CASE REPORT

This case presentation was carried out following the Declaration of Helsinki and CARE Guidelines (Consensus-based Clinical Case Reporting Guideline Development) and an informed patient's consent was obtained.^[4] A 93-year-old woman of Greek origin was admitted to our department due to a red, painful swelling located at the lower abdominal wall and concomitant pain for 2 weeks prior to admission. Her past medical history was remarkable for hypertension and depression, while her surgical history included abdominal hysterectomy and hip arthroplasty. Although first treated with oral cefuroxime for abdominal wall cellulitis, no signs of clinical improvement were noted.

At the time of admission, her vital signs were normal, whereas physical examination revealed a painful redness of the skin covering the right iliac region and the hypogastrium (Fig. 1). Her abdomen was soft without tenderness or guarding. Laboratory tests showed serum Hb: 9.5 g/dL, WBC: 18,750/ μ L, PLT: 295,000/ μ L, Cr: 0.8 mg/dl, AST/ALT: 25/22 IU/L, TBIL/DBIL: 0.40/0.18 mg/dl, and CRP 319 mg/L. Double contrast-enhanced abdominal computed tomography revealed a huge abscess (10 \times 5 \times 2 cm) of the subcutaneous tissue and the dilated tip of the appendix in close proximity to the joint point of semilunar line of Spiegel and semicircular line of Douglas (Figs 2a, 2b).



Figure 1. The abdominal wall of the patient during the drainage operation. A red swelling extends from right anterior superior iliac to the pubic symphysis.

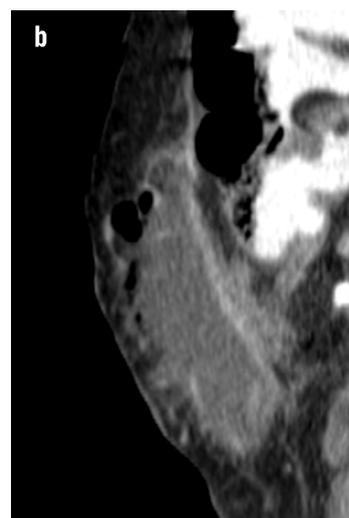


Figure 2. CT-scan demonstrates an abscess in the subcutaneous tissue of the hypogastrium. The inflamed appendix (black arrow) is in close proximity to the abscess. Sagittal reconstruction shows inflamed appendix as the cause of the subcutaneous abscess.

*Empirical antibiotic therapy with vancomycin (1 g b.i.d.) and piperacillin/tazobactam (4+0.5 g t.i.d.) was initiated combined with parenteral nutrition. The patient underwent a surgical exploration of the abscess cavity. Drainage of the abscess was performed and necrotic subcutaneous tissue was excised. A 10-cm incision was conducted both at the right and left lower abdomen, as the combined image of a subcutaneous abscess along with the surrounding abdominal wall fasciitis warranted surgical drainage and an extensive debridement as well. Surgical procedure was not extended in the abdominal cavity and no appendectomy was performed due to the extensive inflammation of the area. The wound was left open and dressings were changed on daily basis. The culture of the abscess was positive for *Staphylococcus warneri* and *Escherichia coli*, therefore adjusting the antibiotic therapy accordingly for the remaining hospitalization period. A vacuum assisted closure (VAC) device was applied to the wound four days later.*

A computed tomography was repeated five days after initial admission that showed a remarkable remission of the

abdominal wall inflammation (Figs 3a, 3b). The patient was started on oral diet progressively and was finally discharged twelve days after admission. She remained well during the follow-up and her wounds were completely healed with the assistance of VAC device (Fig. 4).

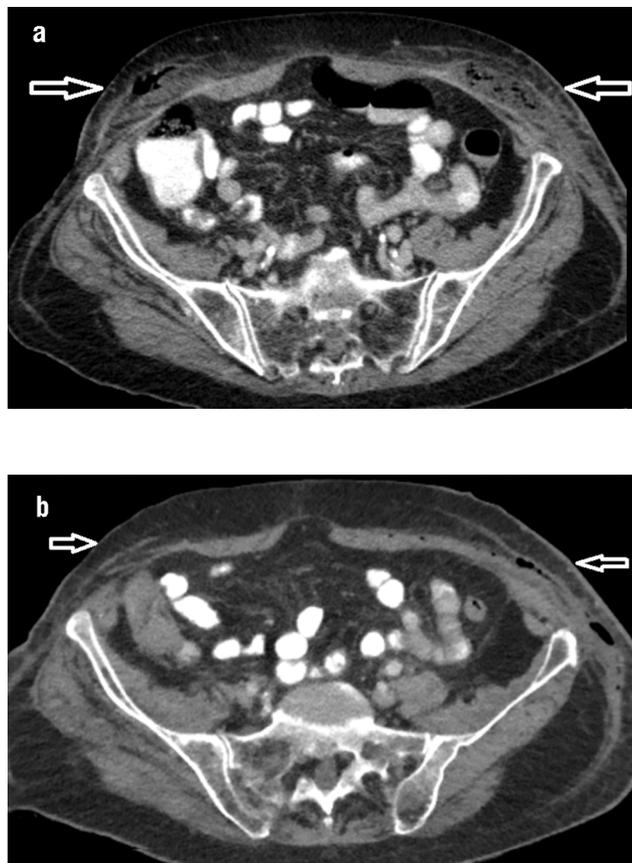


Figure 3. CT-scan at the level of the anterior superior iliac spine demonstrates the subcutaneous abscess with gas bubbles (white arrow) before the drainage and five days following the drainage.



Figure 4. The abdominal wall of the patient 20 days after the drainage. The abdominal wall is fully recovered.

DISCUSSION

Acute appendicitis is one of the most frequent surgical emergencies, with an overall lifetime risk of 7%–8% in general population, while the same percentage falls to 3%–4% in elderly patients.^[5] Among the geriatric population, acute appendicitis constitutes the third most common indication for abdominal surgery, after biliary disease and bowel obstruction.^[6] Elderly patients experience an increased rate of perioperative complications when treated for appendicitis, with the reported morbidity rates reaching up to 48%.^[7] Atypical clinical manifestation can lead to delayed diagnosis and treatment of elderly patients and severely compromise their management.^[2] The current report describes a case of acute appendicitis in a nonagenarian patient, who presented initially with a subcutaneous abscess of the lower abdominal wall without displaying the common signs of acute appendicitis; right lower quadrant pain, fever, and anorexia. Despite the significant delay in the diagnosis, double contrast-enhanced abdominal computed tomography revealed the presence of an extended, subcutaneous abscess in the hypogastrium that was successfully treated. To our knowledge, there is only one confirmed case throughout the literature concerning appendicular abscess rupture through the anterior abdominal wall in a nonagenarian patient.

Literature search yielded three cases of appendicular abscess of the abdominal wall, one extending to the superior lumbar triangle^[8] and two concerning the right flank of the abdomen^[9,10]. Ishigami et al. attributed the abdominal abscess formation to the atrophic muscles and susceptibility of the patient to infections, since she suffered from multiple sclerosis and diabetes mellitus.^[8] The patient presented by Lin et al. also had diabetes mellitus and this resulted in a vague clinical presentation.^[9] Souza et al. presented a case of an elderly patient, who, similar to our case, suffered from a painful swelling of the abdominal wall that was present over a week before hospital admission.^[10] All cases were treated by surgical drainage of the subcutaneous abscess and debridement of the infected area. Both Lin and Souza performed an appendectomy, whereas Ishigami et al. did not similar to our case. Furthermore, a case of an Amyand hernia, where the appendix ruptured in the inguinal hernia sac, was also reported in another case and was initially diagnosed as an abdominal wall abscess.^[11]

Due to the usually atypical presentation in elderly patients, the diagnosis of acute appendicitis is particularly challenging in this age group. A variety of physiological changes in the elderly such as lower baseline body temperature, attenuated response to pyrogens, and compromised T-cell response may alter patient inflammatory response in the setting of acute appendicitis. The existing co-morbidities and the absence of the hallmark signs of acute appendicitis in these patients may also complicate the diagnostic process. Indeed, elderly patients are more likely to present with delayed signs and symptoms, which usually leads to the development of severe complications such as perforation, abscess formation, and sepsis.^[12]

Current evidence suggests that 50% to 70% of elderly patients with appendicitis are correctly diagnosed on admission and approximately 5% of elderly patients are diagnosed intra-operatively.^[13] Thus, the prompt utilization of diagnostic modalities, such as contrast-enhanced computed tomography, is of utmost importance for the management of this age group.^[14] Pooler et al. reported that computed tomography can accurately diagnose acute appendicitis in elderly population with a sensitivity and specificity of 100% and 99.1%, respectively.^[15]

In a recent cohort study, Segev et al.^[1] stated that the interval from the onset of symptoms to admission for the elderly patients with acute appendicitis was almost double compared to younger patients (50 hours vs. 30 hours, respectively). Consequently, longer delay in seeking medical help was associated with higher rate of postoperative complications (63.6% vs. 22.5%) in the elderly group. Based on the same study, the length of postoperative hospital stay was significantly longer for elderly patients compared to younger individuals (5.7 vs. 3.2 days). Of note, male sex, longer duration of pain prior to admission, fever (>38°C), and anorexia have been associated with an increased risk for rupture of the appendix.^[2]

No consensus has been reached regarding the preferred treatment approach for elderly patients diagnosed with acute appendicitis.^[3] Both open and laparoscopic appendectomy have been implemented and the current approach is largely dependent on the preference of the surgeon.^[3] Emergency laparoscopic appendectomy is less invasive and has been associated with lower morbidity rates, faster recovery, and earlier bowel function compared to open appendectomy. Masoomi et al. suggested that laparoscopic appendectomy should be the procedure of choice for both complicated and non-complicated appendicitis in elderly patients, due to the lower associated complication and mortality rates, shorter length of stay, as well as a lower total cost when compared with open appendectomy.^[16] Performing surgery among elderly patients is mainly limited by pre-existing comorbidities with cardiac disease being the most prominent.^[3] Speicher et al., however, advocated for a laparoscopic approach even among patients with congestive heart failure.^[17]

In conclusion, the current case represents an uncommon clinical manifestation of acute appendicitis - subcutaneous abscess of the lower abdominal wall. The atypical presentation of acute appendicitis in this age group may delay diagnosis and compromise patient outcomes. The high rates of misdiagnosis highlight the importance of a high index of suspicion and the use of contrast-enhanced computed tomography early in the diagnostic process to prevent severe complications in this challenging group of patients.

Acknowledgements

The authors have no support to report.

Funding

The authors have no funding to report.

Competing Interests

The authors have declared that no competing interests exist.

REFERENCES

1. Segev L, Keidar A, Schrier I, et al. Acute appendicitis in the elderly in the twenty-first century. *J Gastrointest Surg* 2015; 19(4):730–5.
2. Sirikurnpiboon S, Amornpornchareon S. Factors associated with perforated appendicitis in elderly patients in a tertiary care hospital. *Surg Res Pract* 2015; 2015:847681.
3. Cohen-Arazi O, Dabour K, Bala M, et al. Management, treatment and outcomes of acute appendicitis in an elderly population: a single-center experience. *Eur J Trauma Emerg Surg* 2017; 43(5):723–7.
4. Gagnier JJ, Kienle G, Altman DG, et al. The CARE guidelines: consensus-based clinical case reporting guideline development. *BMJ case reports* 2013; 2013.
5. Bhangu A, Soreide K, Di Saverio S, et al. Acute appendicitis: modern understanding of pathogenesis, diagnosis, and management. *The Lancet* 2015; 386(10000):1278–87.
6. Spangler R, Van Pham T, Khoujah D, et al. Abdominal emergencies in the geriatric patient. *Int J Emerg Med* 2014; 7(1):43.
7. Franz MG, Norman J, Fabri PJ. Increased morbidity of appendicitis with advancing age. *Am Surg* 1995; 61(1):40–4.
8. Ishigami K, Khanna G, Samuel I, et al. Gas-forming abdominal wall abscess: unusual manifestation of perforated retroperitoneal appendicitis extending through the superior lumbar triangle. *Emerg Radiol* 2004; 10(4):207–9.
9. Lin Y-Y, Tsai S-H, Chu S-J. Abdominal wall abscess in a diabetic patient with ruptured appendicitis. *J Trauma* 2008; 65(2):492.
10. Souza I, Nunes DAA, Massuqueto CMG, et al. Complicated acute appendicitis presenting as an abscess in the abdominal wall in an elderly patient: A case report. *Int J Surg Case Rep* 2017; 41:5–8.
11. Ahmed K, Hakim S, Suliman AM, et al. Acute appendicitis presenting as an abdominal wall abscess: A case report. *Int J Surg Case Rep* 2017; 35:37–40.
12. Omari AH, Khammash MR, Qasaimeh GR, et al. Acute appendicitis in the elderly: risk factors for perforation. *World J Emerg Surg* 2014; 9(1):1–6.
13. Lunca S, Bouras G, Romedea NS. Acute appendicitis in the elderly patient: diagnostic problems, prognostic factors and outcomes. *Rom J Gastroenterol* 2004; 13(4):299–303.
14. Magidson PD, Martinez JP. Abdominal pain in the geriatric patient. *Emerg Med Clin North Am* 2016; 34(3):559–74.
15. Pooler BD, Lawrence EM, Pickhardt PJ. MDCT for suspected appendicitis in the elderly: diagnostic performance and patient outcome. *Emerg Radiol* 2012; 19(1):27–33.
16. Masoomi H, Mills S, Dolich MO, et al. Does laparoscopic appendectomy impart an advantage over open appendectomy in elderly patients? *World J Surg* 2012; 36(7):1534–9.
17. Speicher PJ, Ganapathi AM, Englum BR, et al. Laparoscopy is safe among patients with congestive heart failure undergoing general surgery procedures. *Surgery* 2014; 156(2):371–8.

Чрезвычайно редкое клиническое проявление острого аппендицита у пациента старше 90 лет: уроки, которые еще предстоит усвоить

Анаргирос Бакопулос¹, Николаос Колиакос¹, Йоанис Кацарос², Наташа Хасемаки², Димитриос Цапралис³, Диамантис И. Цилимиграс⁴, Димитриос Морис⁵, Димитриос Скизас²

¹ Третья кафедра хирургии, Афинский национальный университет имени Каподистрии, Университетская больница „Атикон“, Афины, Греция

² Первая кафедра хирургии, Афинский национальный университет имени Каподистрии, Университетская больница „Лаикон“, Афины, Греция

³ Отделение хирургии, Больница Иерапетры, Иерапетра, Греция

⁴ Кафедра хирургии, Секция хирургической онкологии, Государственный университет Огайо, Медицинский центр „Уекснер“, Онкологическая больница „Джеймс“, Исследовательский институт „Солове“, Колумбия, Огайо, Соединённые Штаты Америки

⁵ Кафедра хирургии, Медицинский центр Университета „Дюк“, Дарем, Северная Каролина, Соединённые Штаты Америки

Адрес для корреспонденции: Йоанис Кацарос, Первая кафедра хирургии, Афинский национальный университет имени Каподистрии, Университетская больница „Лаикон“, Афины, Греция; Email: ioankats@med.uoa.gr

Дата получения: 14 декабря 2020 ♦ **Дата приемки:** 19 февраля 2021 ♦ **Дата публикации:** 30 июня 2022

Образец цитирования: Bakopoulos A, Koliakos N, Katsaros I, Hasemaki N, Tsapralis D, Tsilimigras DI, Moris D, Schizas D. An extremely rare clinical manifestation of acute appendicitis in a nonagenarian patient: lessons still to be learned. Folia Med (Plovdiv) 2022;64(3):527-531. doi: 10.3897/folmed.64.e62008.

Резюме

Острый аппендицит связан с относительно высокой смертностью среди пациентов пожилого возраста из-за необычной клинической картины, часто приводящей к ошибочной диагностике и, в свою очередь, к тяжёлым осложнениям.

В этом сообщении описывается чрезвычайно редкое клиническое проявление острого аппендицита у пожилого пациента – подкожный абсцесс брюшной стенки, первоначально леченный как флегмона. Несмотря на первоначальный ошибочный диагноз, компьютерная томография с контрастированием выявила ограниченный воспалительный процесс червеобразного отростка, который находился в непосредственной близости от брюшной стенки. Больному было выполнено хирургическое дренирование абсцесса, назначена антибиотикотерапия широкого спектра действия, выписан на 12-е сутки без осложнений.

Диагностика острого аппендицита у пожилых пациентов затруднена из-за атипичной клинической картины и сопутствующих заболеваний, которые могут ввести в заблуждение. Раннее применение методов визуализации с высоким разрешением необходимо для выявления причины острого живота у пожилых людей.

Ключевые слова

аппендицит, клинический случай, возраст от 90 до 100 лет
