

Hydrocele with Subsequent Scrotal Abscess in a 29-Year-Old Male After Laparoscopic Appendectomy

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Background	Scrotal abscess and hydrocele constitute rare complications of laparoscopic appendectomy and appear in males under the age of 20. In this case, we report persistent scrotal hydrocele followed by scrotal abscess formation in a 29-year-old male following laparoscopic appendectomy for gangrenous appendicitis.
Summary	A 29-year-old male initially underwent laparoscopic appendectomy for gangrenous, grossly nonperforated appendicitis after he presented with abdominal pain and nausea. He was found to have leukocytosis and a dilated appendix with appendicolith on CT. Shortly after his surgery, the patient experienced left hydrocele formation, which persisted despite non-operative management and the absence of a patent processus vaginalis on ultrasound. After the formation of the scrotal hydrocele, the patient was readmitted due to the development of a right-side intra-abdominal abscess which was treated with drain placement by interventional radiology. Intra-abdominal abscess cultures grew <i>E. coli</i> . After drain placement, his scrotal hydrocele became progressively larger and more painful despite antibiotic treatment with trimethoprim-sulfamethoxazole (Bactrim). He was admitted for a third time when he experienced acute pain, increased scrotal swelling, and skin breakdown, at which point he was diagnosed with a scrotal abscess by urology. The abscess was drained, a wound vac was placed, and he was started on antibiotic therapy. He is currently being followed by urology and is recovering satisfactorily.
Conclusion	Development of scrotal abscess after appendectomy is typically observed in the context of perforated appendicitis in males less than 20 years old, about half of which have a patent processus vaginalis. At 29, this patient experienced post-appendectomy scrotal hydrocele, which subsequently developed into a scrotal abscess without an obvious patent processus vaginalis visualized on imaging or a perforated appendix. This case highlights the need to closely monitor postoperative hydrocele in adult males following laparoscopic appendectomy due to the risk of abscess formation.
Key Words	complications; appendicitis; laparoscopic; processus vaginalis

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Case Description

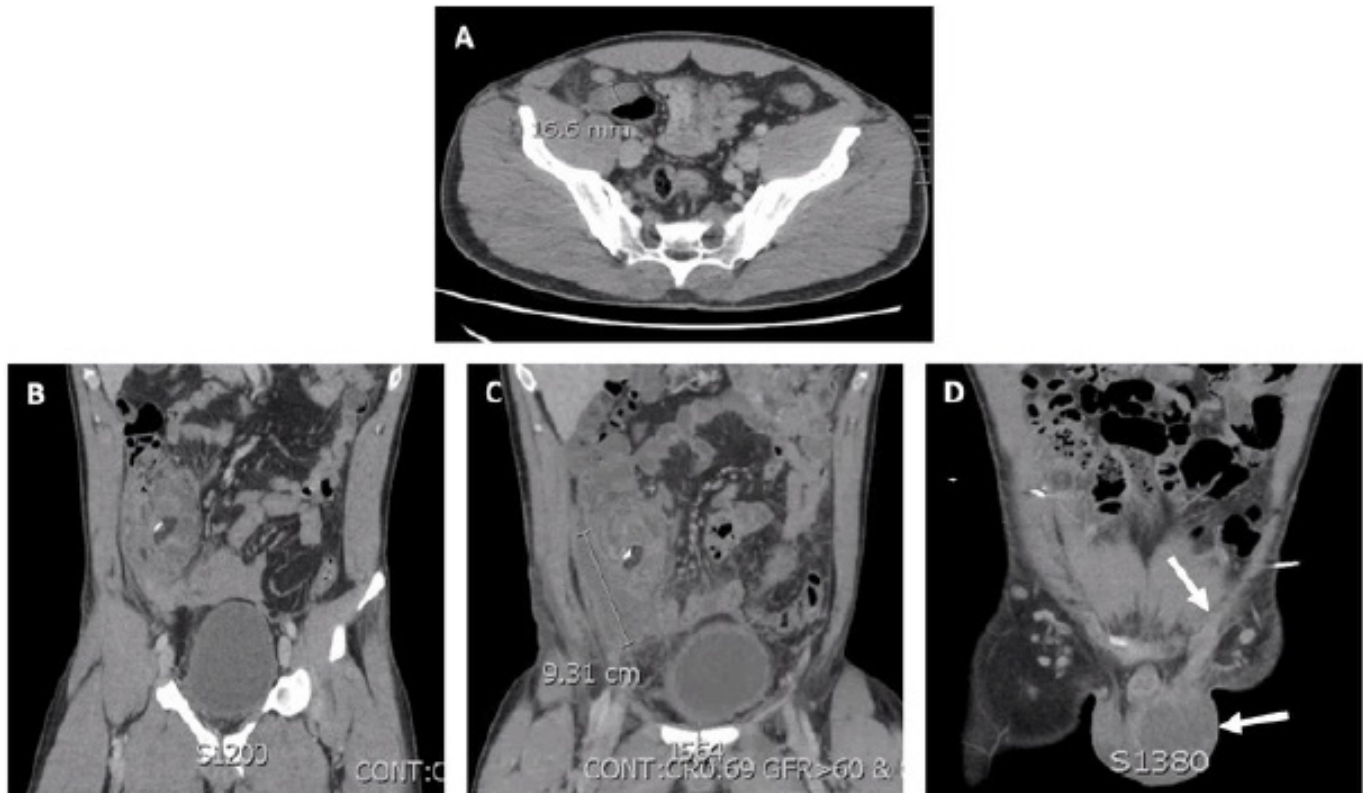
Infections constitute the most common postoperative complications following a laparoscopic appendectomy in adults, with an incidence of 3.4–4.9% for superficial wound infections and 2.7% for intraabdominal abscess formation.^{1–3} Other common complications include prolonged ileus, wound dehiscence, and urinary tract infection. Scrotal abscess after appendectomy is rare, with fewer than 30 cases reported in the literature over the past 30 years, and most commonly associated with perforated appendicitis,^{4–7} while hydrocele formation after appendectomy is even rarer, with only one case reported in the literature over the past 23 years.^{4–8} Development of hydrocele or scrotal abscess has been thus far documented only in patients younger than 20 years old.^{4–8} In this report, we present a case of hydrocele with a subsequent scrotal abscess in a 29-year-old male following a laparoscopic appendectomy for gangrenous appendicitis.

A 29-year-old healthy male presented to the emergency room with acute onset of right lower quadrant abdominal pain and nausea but no emesis. He reported that he experienced these symptoms for one day. His presentation did not include fever, chills, diarrhea, chest pain, or shortness of breath. He was afebrile with stable vitals, and his admission labs were notable for leukocytosis to 12.1. A subsequent abdominal CT scan demonstrated a dilated edematous appendix with an appendicolith at the appendiceal base (Figure 1A). The patient underwent an uncomplicated laparoscopic appendectomy, with findings of dilated, gangrenous, grossly nonperforated appendicitis. Some turbid fluid was present in the abdomen, but no free purulent fluid. The appendix was transected at the base with an Endo GIA stapler, and a small amount of blood in the right lower quadrant was suctioned out. Perioperatively, the patient was placed on piperacillin-tazobactam (Zosyn). The patient had an uneventful postoperative course, he was advanced to a regular diet, and his bowel function returned. During his hospitalization, the patient developed mild swelling of his left scrotum with mild discomfort but no overlying skin changes, which was characterized as a reactive hydrocele, and the patient received nonoperative management with scrotal support. He was then discharged home.

On postoperative day (POD) 5, the patient was readmitted for recurrent right lower quadrant abdominal pain. A CT scan revealed a developing phlegmon in the right lower quadrant with retroperitoneal hematoma and a small hemoperitoneum (Figure 1B). A repeat CT scan performed on POD 9 revealed an abscess in the right lower quadrant (Figure 1C). Two drains were placed in his right lower quadrant by interventional radiology (IR). During his hospitalization, the patient developed increased swelling of the left scrotum. A left scrotal ultrasound that was performed showed a complex hydrocele. Urology was consulted and recommended supportive care for this reactive hydrocele. During his hospitalization, he was treated with piperacillin-tazobactam (Zosyn) and discharged on a seven-day course of trimethoprim-sulfamethoxazole (Bactrim) after abscess cultures grew trimethoprim-sulfamethoxazole (Bactrim) sensitive *E. coli* but were negative for anaerobes.

At the two-week postoperative clinic follow-up after the appendectomy, the patient's appendectomy was healing satisfactorily, with clean and dry incisions and minimal serosanguinous drain output from the IR drain. Appendiceal pathology was benign; however, the hydrocele persisted. The patient received a prescription for an extended two-week course of trimethoprim-sulfamethoxazole (Bactrim), pain medications, and a referral for a follow-up with urology.

On POD 18, the patient presented again to the ED with increased left scrotal swelling and tenderness, but now, with fever, chills, and scrotal skin breakdown. CT scan showed the presence of a scrotal abscess and enhancement of the left spermatic cord (Figure 1D). The patient underwent scrotal incision, drainage, and wound vac placement by the urology service. He received treatment with piperacillin-tazobactam (Zosyn) until abscess cultures grew Bactrim-resistant *E. coli* primarily with light anaerobe growth (*Bacteroides fragilis*). He was discharged on a ten-day course of cephalexin and metronidazole. The patient underwent subsequent wound vac changes with urology until his wound was sufficiently healed. His IR drains were removed sequentially without issues. At the most recent follow-up, the patient had completed his antibiotics, had the wound vac and drains removed, and recovered normally without any further complications.

Figure 1. Abdominal CT Scans. Published with Permission

A) CT on initial admission for appendicitis showing dilated appendix to 16.6 mm with surrounding fat stranding and associated 1.1 cm appendicolith at appendiceal base; B) CT on POD5 demonstrating phlegmonous changes in right lower quadrant; (C) CT on POD 9 showing 4.9 × 3.0 × 9.3 cm rim-enhancing right lower abdominal quadrant abscess; and D) CT on POD 18 showing left scrotal abscess (bottom arrow) and enhancement of left spermatic cord (top arrow).

Discussion

Hydrocele formation after laparoscopic appendectomy is an extremely rare complication, with only a single case reported in a 20-year-old male in the last 23 years. The only reported cases of acute postoperative scrotal swelling that have led to hydrocele formation followed laparoscopic cholecystectomy rather than appendectomy.^{8–10} Scrotal abscess also constitutes a rare complication of laparoscopic appendectomy and is typically documented in patients with perforated appendicitis who are less than 20 years old. Fewer than 30 cases of postappendectomy scrotal abscesses have been reported in the literature in the last 30 years, with a median age of occurrence at seven years (range four days to 20 years).^{4–7}

In this case, hydrocele and the subsequent abscess were observed as postoperative laparoscopic appendectomy complications for gangrenous appendicitis in a 29-year-old male significantly older than the age range of patients with similar complications previously reported in the liter-

ature. Also, this case did not involve appendix perforation compared to all previous cases of scrotal abscess formation, which involved perforated appendicitis regardless of whether the appendix was gangrenous.^{6,7,11}

Translocation of intestinal flora along the spermatic cord through a patent processus vaginalis stented open by pneumoperitoneum generated by laparoscopy or inguinal hernia (congenital or acquired) constitutes a possible mechanism by which a scrotal abscess can develop after appendicitis. The obliteration of the processus vaginalis—the canal by which testes descend into the scrotum during male development—occurs in 63–85% of males by two years of age.¹² However, for the remaining 15–37% of males with a persistently patent processus vaginalis, approximately half will develop a hydrocele or inguinal hernia due to abdominal contents (such as peritoneal fluid or bowel) entering the scrotum.⁹ Interestingly, in published case reports, only half of the patients who developed a postappendectomy scrotal abscess had an identifiable patent processus vaginalis on imaging.^{6,7}

Although neither a patent processus vaginalis nor an inguinal hernia was visualized on imaging in this patient, scrotal ultrasound and abdominal CT showed enhancement of the left spermatic cord. A physical exam revealed a left scrotal abscess and tenderness to palpation of the left spermatic cord—an indication of infection in the spermatic cord in addition to the infection in the scrotum. These infections suggest the translocation of infected material from the region of the appendix/abdominal abscess into the scrotum along the trajectory of the spermatic cord, which contains the processus vaginalis. *E. coli* growth in cultures from both the abdominal abscess and scrotal abscess further supports an abdominal source as the etiology of the hydrocele and the subsequent scrotal abscess. Therefore, based on imaging, physical examination findings, and culture results, a possible mechanism for the development of a scrotal abscess in this patient is the translocation of infected intraabdominal material from either the intraabdominal abscess or a microperforated gangrenous appendix via a patent processus vaginalis that was not detectable on ultrasound.

Conclusion

We report an instance of postappendectomy hydrocele complicated by a scrotal abscess in an adult male markedly older than 20 years old that required surgical intervention. Given the rarity of this complication, early diagnosis is less likely to occur, as seen in this case. Therefore, in acute scrotal swelling following a laparoscopic appendectomy in adult males, a differential diagnosis should include scrotal hydrocele with potential abscess formation due to the seeding of infectious material from the abdomen. Patients with inguinal hernia or patients with patent processus vaginalis, that may or may not be readily visible on imaging, who exhibit spermatic cord tenderness to palpation, may be at particular risk of such a complication due to a direct pathway for infectious material translocation into the scrotum and should be closely monitored for the development of acute postoperative scrotal swelling. Early evaluation of acute postoperative scrotal swelling with ultrasound combined with close postoperative follow-up, possibly through serial ultrasound imaging and physical exams, may aid in the earlier diagnosis of an infection tracking into the scrotum, earlier initiation of appropriate treatment, and prevention of scrotal abscess formation. Although asymptomatic hydrocele can be treated supportively, intraabdominal infection and abscess formation may warrant early hydrocele incision and drainage and the initiation of antibiotics with anaerobic coverage to limit infection and subsequent scrotal abscess formation.

Lessons Learned

While previously reported in children and adolescents, acute scrotal swelling after appendectomy in adult males may indicate reactive hydrocele and abscess formation and should be closely monitored.

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