

A Report of Two Cases of Stump Appendicitis

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Abstract: Stump appendicitis is an inflammation of appendiceal remnant after incomplete appendectomy. However, the inclusion of appendectomy in a patient's medical history often obfuscates a diagnosis of appendicitis, causing a delay in diagnosis and potentially leading to increased morbidity. Awareness of stump appendicitis can help radiologists distinguish this rare condition from more common entities. We report two cases of stump appendicitis that were correctly identified at the patients' time of presentation to the emergency department. In one case, the patient presented with recurrent stump appendicitis. In this case series, we discuss the radiographic features, clinical considerations, and treatment of stump appendicitis.

Keywords: *stump appendicitis, appendicitis, laparoscopic appendectomy, computed tomography*

Introduction

The estimated lifetime risk of developing acute appendicitis is approximately 10%.¹ Given this high lifetime risk, surgical appendectomy is one of the most commonly performed operations throughout the world.¹ Inflammation of a postoperative appendiceal remnant results in what is known as stump appendicitis. Patients who develop right lower quadrant pain following appendectomy either in the near or distant past can be a clinical challenge. Stump appendicitis is likely underrecognized due to its rarity and to clinicians' and radiologists' lack of familiarity with this entity.² Here, we share two cases of stump appendicitis and provide associated imaging and clinical observations that can aid radiologists in the timely identification and diagnosis of this condition. This case series was prepared following the CARE guidelines.³

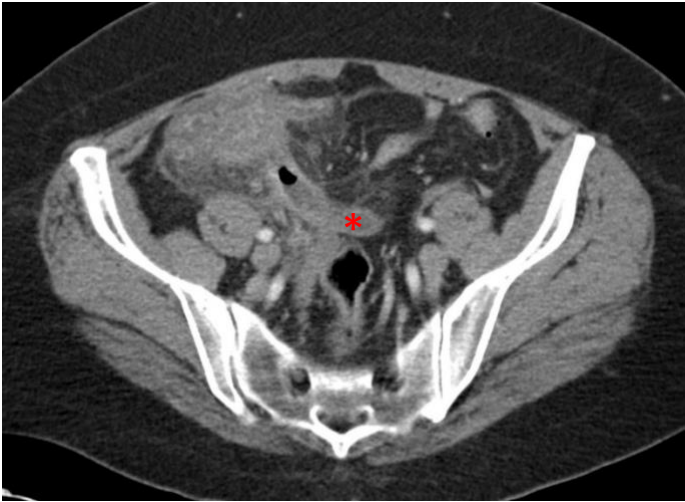
Key Points

- Stump appendicitis can be slow to diagnose, as clinicians tend to consider more common pathologies in patients with a history of appendectomy.
- Because appendectomy is a commonly performed operation and because the symptoms of stump appendicitis are nonspecific, stump appendicitis may be more common than is reported in the literature.
- Stump appendicitis is most likely to be diagnosed through computed tomography and demonstrates imaging features similar to those seen in acute appendicitis.

Case 1 Presentation

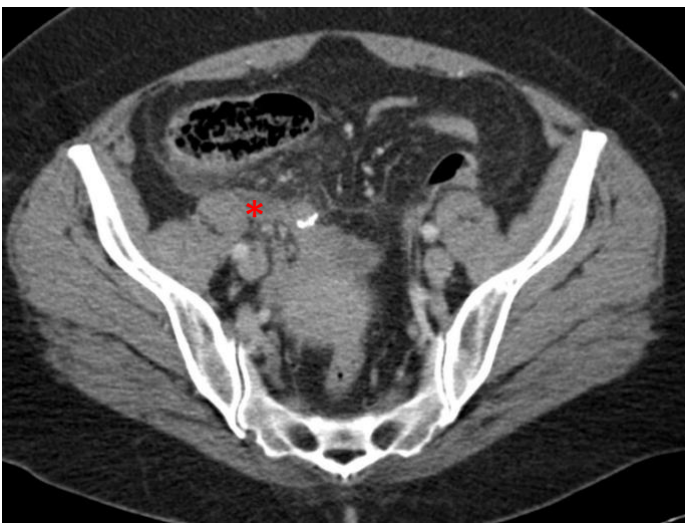
A 61-year-old woman presented to the emergency department (ED) for acute pain in the right lower quadrant of her abdomen. Computed tomography (CT) of the abdomen and pelvis showed a dilated appendix with thickening of the wall and adjacent inflammation, all of which was compatible

Figure 1. CT of the Abdomen and Pelvis of a 61-Year-Old Woman with Acute Appendicitis.



CT of the abdomen and pelvis obtained at the time of the patient's first presentation to the emergency department shows a dilated, thick-walled appendix (red asterisk) with adjacent inflammation.

Figure 2. CT of the Abdomen and Pelvis of a 61-Year-Old Woman with Pain in the Right Lower Quadrant One Month After Laparoscopic Appendectomy.



CT of the abdomen and pelvis obtained at the time of the patient's second presentation to the emergency department shows surgical clips, a remnant appendix with adjacent inflammation, and a small fluid collection (red asterisk).

with a diagnosis of acute appendicitis (Figure 1).

The same day, the patient was treated with a laparoscopic appendectomy. She had an

Figure 3. CT of the Abdomen and Pelvis of a 61-Year-Old Woman with Recurrent Stump Appendicitis Four Months After Laparoscopic Appendectomy.



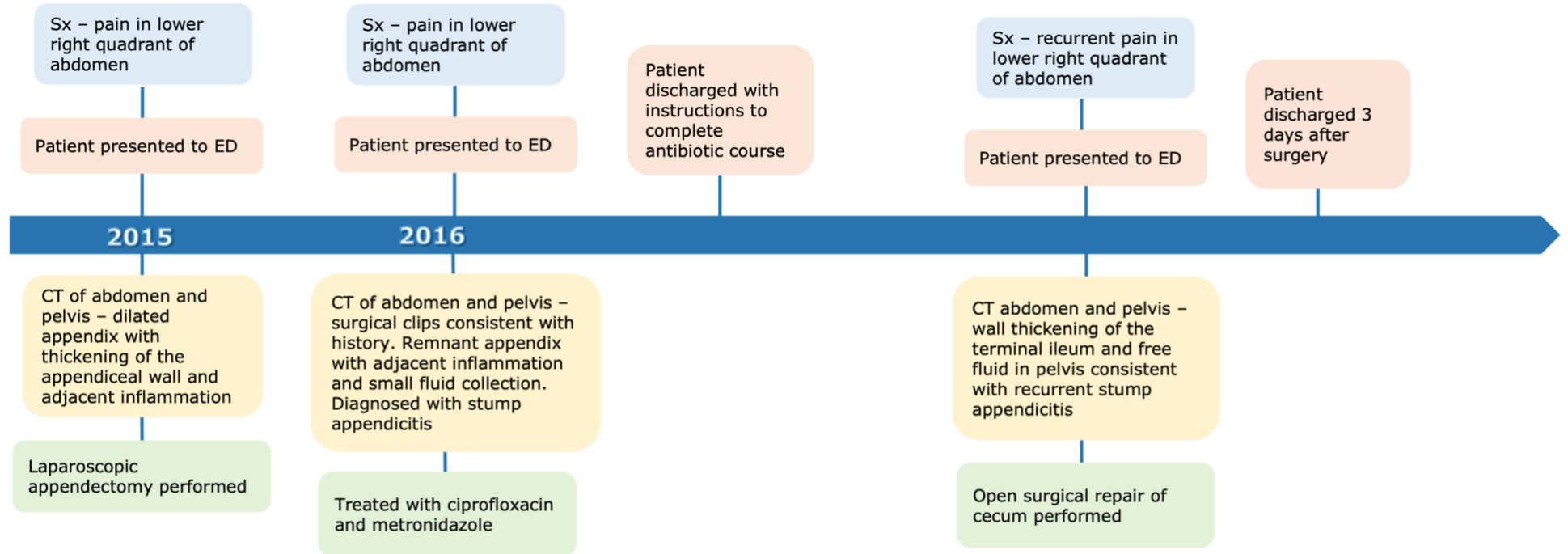
A CT image of the abdomen and pelvis obtained four months after laparoscopic appendectomy and three months after the patient's first episode of stump appendicitis shows inflammation around the remnant appendix (red asterisk) and thickening of the adjacent bowel.

uneventful postoperative course. One month after her surgery, she again presented to the emergency room with acute pain in the right lower quadrant of her abdomen. CT of the abdomen and pelvis showed surgical clips in the right lower quadrant of the abdomen, consistent with the patient's history of laparoscopic appendectomy. A remnant appendix, with adjacent inflammation and a small fluid collection, was also observed. (Figure 2).

The patient was diagnosed with stump appendicitis and admitted to the hospital. She was treated with ciprofloxacin and metronidazole. Her symptoms improved, and the patient was discharged with instructions to finish her antibiotic course.

Three months after this hospitalization, the patient had recurrent severe pain in the right lower quadrant and returned to the emergency department. CT of the abdomen and pelvis showed the remnant appendix with wall thickening of the terminal ileum and small free fluid in the pelvis (Figure 3), findings consistent with recurrent stump

Timeline of a case a 61-Year-Old Woman with Recurrent Stump Appendicitis (Case 1)



Color-shading:

- patient visits
- signs & symptoms
- laboratory & imaging tests
- treatment

Abbreviations: CT, computed tomography; ED, emergency department; Sx, symptoms

appendicitis. General surgery was consulted, and, given the recurrence of her stump appendicitis, the surgeons elected to perform an open surgical repair of the cecum. The patient's postoperative course was uncomplicated, and she was discharged 3 days after admission and surgery.

Case 2 Presentation

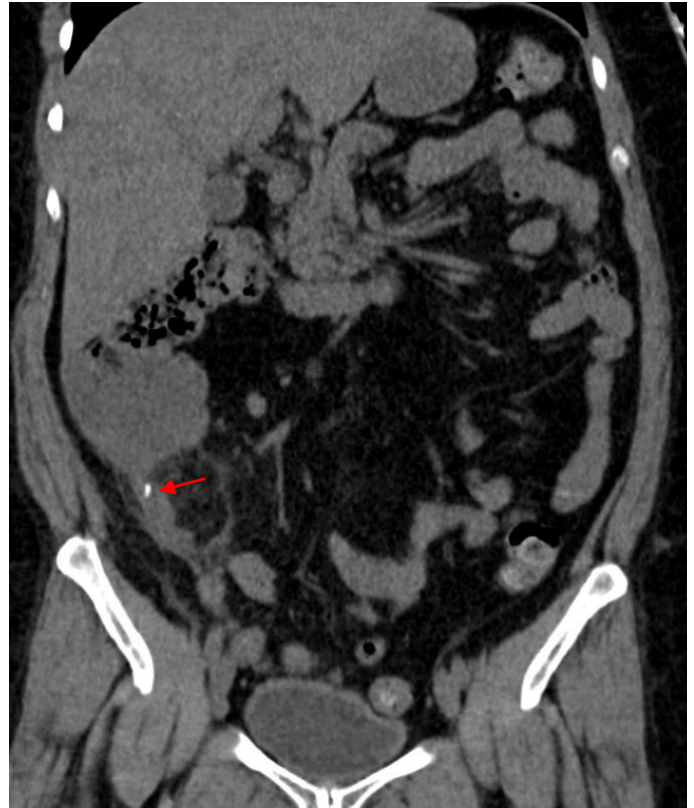
A 60-year-old woman presented to the ED for acute pain in the right upper quadrant of her abdomen. She provided history of laparoscopic appendectomy and total abdominal hysterectomy that had occurred 6 months prior. CT of the abdomen and pelvis showed surgical clips in the right lower quadrant consistent with the history of appendectomy (Figure 4). A remnant appendix with moderate adjacent inflammation, compatible with stump appendicitis, was also observed. The patient was treated with laparoscopic-assisted ileocecectomy. While the postoperative course was complicated by the patient's development of atrial fibrillation, the patient was discharged from the hospital five days after surgery.

Discussion

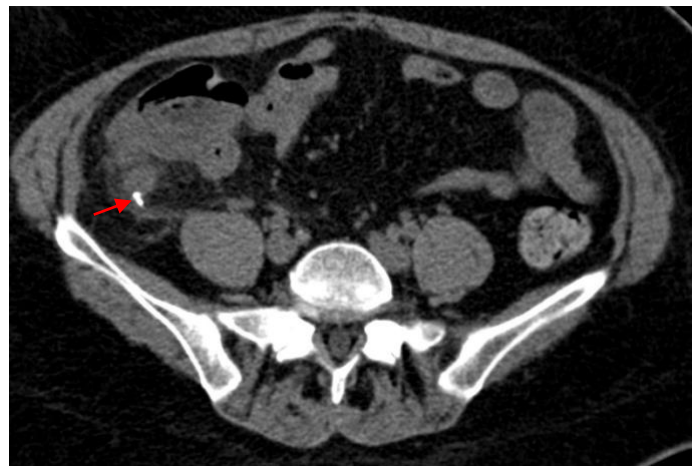
The findings of stump appendicitis may be similar to those of acute appendicitis.^{1,2} In particular, if the appendiceal remnant is of sufficient length, the findings may include a thick-walled tubular structure with wall enhancement with or without adjacent inflammation and fluid.^{1,2} If the appendiceal remnant is small, the findings may not be entirely specific and include wall thickening of the cecum, right lower quadrant fluid or fat stranding.^{1,2} Stump appendicitis is most likely to be diagnosed with CT imaging.¹

Figure 4. CT of the Abdomen and Pelvis of a 60-Year-Old Woman with History of Laparoscopic Appendectomy.

A Coronal view

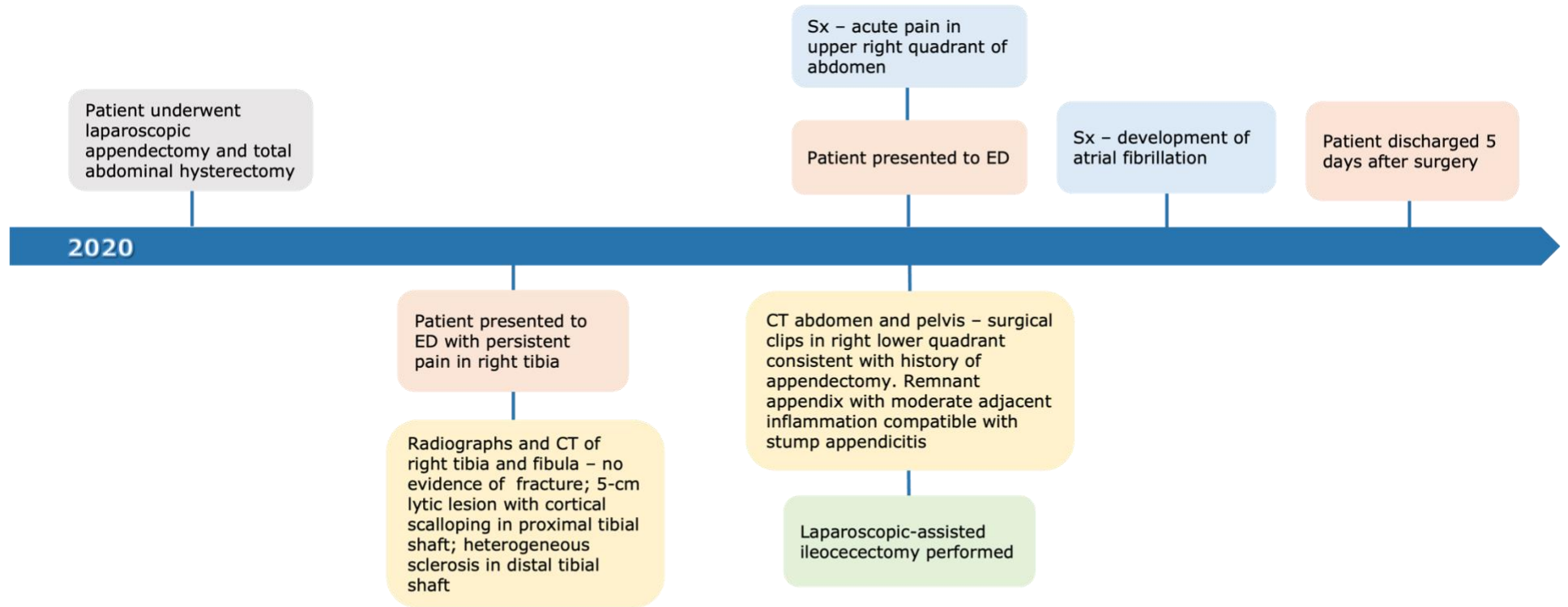


B Axial view



CT of the abdomen and pelvis obtained at the time of the patient's presentation to the emergency department shows surgical clips from the appendectomy she underwent 6 months prior as well as a remnant appendix (A, B red arrows) with moderate adjacent inflammation.

Timeline a 60-Year-Old Woman with History of Laparoscopic Appendectomy and a Diagnosis of Stump Appendicitis (Case 2)



Color-shading:

- patient visits
- signs & symptoms
- laboratory & imaging tests
- treatment
- medical history

Abbreviations: CT, computed tomography; ED, emergency department; Sx, symptoms

Although the true incidence of stump appendicitis is not known, it is presumed to be quite low and is estimated to be between 0.002% and 0.15%.^{2,4} However, given that appendectomy is one of the most commonly performed surgeries throughout the world, it is likely that stump appendicitis is much more common than reported in the literature.^{2,4} It is also likely underrecognized by both emergency room physicians and surgeons because a history of appendectomy may lead clinicians to omit appendicitis from consideration among potential diagnoses.⁵⁻⁷ Radiologists can effectively guide management of patients by being aware of stump appendicitis and considering it as a potential diagnosis, especially with the presence of laparoscopic appendectomy in a patient's medical history. This awareness can help radiologists distinguish stump appendicitis from more common entities, such as epiploic appendagitis, terminal ileitis, diverticulitis, and right-sided colitis.⁸⁻¹⁰ Removal of the remnant appendix is usually recommended for the treatment of stump appendicitis, but more conservative treatment options can be appropriate.¹¹ For instance, the patient in the first case report was initially treated conservatively with antibiotics, but upon the recurrence of her stump appendicitis, she was treated with open surgery.

Conclusion

In conclusion, stump appendicitis can be a difficult diagnosis to make given its overall rarity, the often nonspecific presentation of symptoms, and the potentially misleading history of prior appendectomy. Radiologists can be an invaluable part of the diagnostic process in these cases by recognizing the findings on CT images and considering the diagnosis in light of the patient's history of

prior appendectomy. With the increasing role of imaging in the emergency department, particularly CT imaging for adults, radiologists' familiarity with this entity is paramount for timely diagnosis and the prevention of significant morbidity.

Author Contributions

Conceptualization, S.H., R.H.; Acquisition, analysis, and interpretation of data, S.H., R.H.; Writing – original draft preparation, S.H., R.H.; Review and editing, S.H., R.H. All listed authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors had full access to all the data in the study and take responsibility for the integrity of the data and accuracy of the data analysis..

Disclosures

None to report.

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