



Stump Appendicitis - Rare Radiological Challenges

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Abstract

Acute Appendicitis is the most common causes of abdominal pain, and it is one of the common surgical emergencies treated by surgeons. Stump appendicitis, is an uncommon complication, also known as remnant appendicitis. It is the result of unintentional incomplete appendectomy with subsequent inflammatory changes in the appendiceal remnant's scan of the abdomen is more specific than ultrasound for the accurate diagnosis of stump appendicitis because it excludes other causes of the acute abdomen. CT findings may be similar with acute appendicitis. Therefore, it has been proposed that diagnosis of stump appendicitis should be borne in mind in the differential diagnosis presented with right lower abdominal pain with history of appendectomy. The diagnosis of stump appendicitis should be borne in mind in the differential diagnosis of patients presented with right lower abdominal pain with history of appendectomy's is more specific than ultrasonography for an accurate diagnosis of stump appendicitis.

Keywords: Stump appendicitis; Ultrasonography; Computed tomography; Recurrent appendicitis; Appendectomy

Introduction

Acute Appendicitis is one of the most common causes of abdominal pain, and its common surgical emergencies treated by surgeons. Most surgeons are familiar with the common complications including stump appendicitis. Stump appendicitis is an acute inflammation of the residual appendiceal stump. It is one of the rare delayed complications of post appendectomy with a reported incidence of 1 in 50,000 cases [1] & prevalence is 0.15%. Stump appendicitis can present as a diagnostic dilemma if the treating surgeon is unfamiliar with this rare complication. The postoperative development of stump appendicitis is an exceedingly rare with only 40 reported cases in the English language literature [2].

The first appendectomy was performed in 1735 by Claudius Amyand, and in 1886, Reginald Fitz described the clinicopathological features, while Rose described stump appendicitis for the first time in 1945 [3].

The time interval for the onset of stump appendicitis varies from two weeks to 23 years after surgery [4].

Case Presentation

A 42-year-old male with a history of laparoscopic appendectomy 5 months ago (February 2021) was presented in the emergency department of tertiary level hospital with acute on set of pain abdomen in per-umbilical region & shifted to Right Lower Quadrant (RIF). Pain radiates to groin, continue in nature with anorexia. He had few episodes of vomiting & loose motion. On clinical examination showed localized features of peritonism at RIF with features of peritonitis. Inflammatory markers were normal. No renal angle tenderness. He had Temperature 99F, White Cell Count 11,600/cm³ with raised neutrophils 82%. Hemoglobin was 13.8 gm/L. Biochemistry was normal. Urine analysis was unremarkable. He had no co-morbidities. SARS-CoV-2 real time PCR was negative. Chest X-ray was unremarkable & no free gas under diaphragm. Ultrasonography of abdomen was performed & revealed ill (Figure 1) defined small inflamed tubular structure with minimal fluid collection, fat stranding in right lower abdomen around cecal region & was diagnosed stump appendicitis.

Contrast Enhanced Computerized Tomography (CECT) of abdomen& pelvis was performed & showed gas lobules around the cecal pole with a minimal amount of free fluids and fat stranding as

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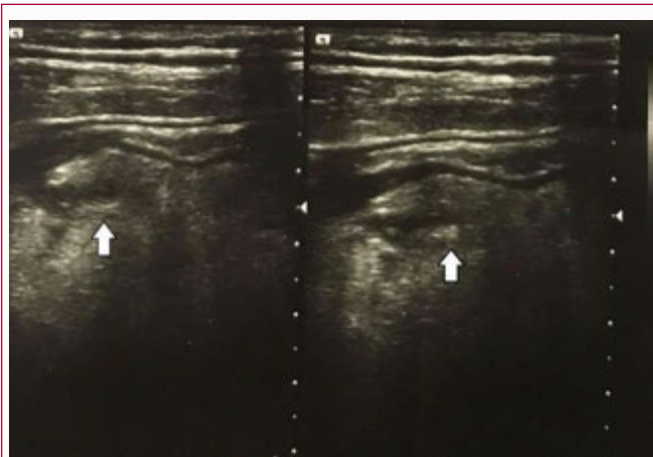


Figure 1: Ultrasound - Hypoechoic tubular structure with collection at RIF and Appendicolith (arrowheads).

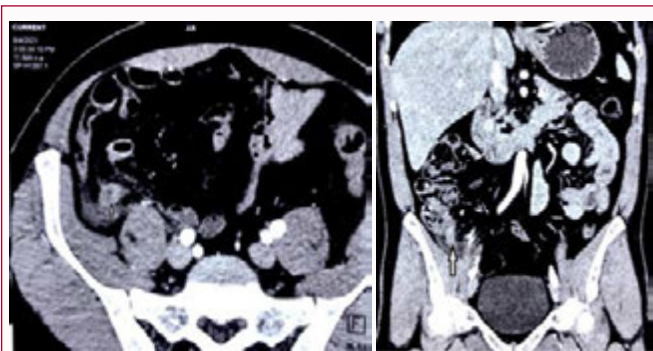


Figure 2: Contrast-enhanced axial and coronal CT of abdomen shows wall enhancing enlarged Appendiceal stump (arrow) with fat stranding.

well as enhancing wall 8 mm in diameter & 9 mm long stump (Figure 2) tubular structure with history of laparoscopic appendectomy 5 months ago was diagnosed stump appendicitis with perforation. The patient underwent surgery and post-surgery found perforated appendiceal stump with appendicolith. The stump was approximately 9 mm long (Figure 3). Histopathological examination of the operated stump confirmed the presence of a stump appendix with inflammation of appendix & surrounding adjacent tissue (Figure 4). Some reports have suggested that laparoscopic appendectomy is associated with an increased incidence of stump appendicitis when compared with open appendectomy [5].

Discussion

The appendix arises from the posteromedial wall of the caecum about 3 cm below the ileo-cecal valve however; it has variable position and length. The interval time for onset of stump appendicitis range from two weeks to 23 years after surgery [4].

A long (≥ 2 cm) stump from laparoscopic appendectomy and retained appendicolith in an adult patients have prevalence of recurrent obstruction and inflammation. Generally, an appendix stump shorter than <5 mm reduces the risk of stump appendicitis [6]. It has been suggested that appendicular stump longer than 3 mm should not be left behind during surgery [5]. Longer stump may result in chronic inflammation or a reservoir for fecalith, & prone to inflammation. Appendiceal stump lengths are reported to range from 5 mm to 5.1 cm [7,8]. Perforation of stump at presentation



Figure 3: Post surgery gross appendiceal stump.

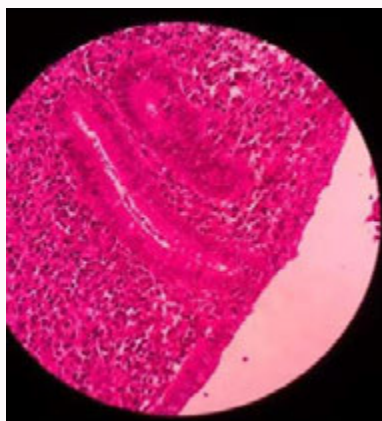


Figure 4: Microscopic appearance of stump appendix.

ranges from 16% to 30%, and increased by a delay in diagnosis or with atypical presentation & in older patients [6]. The lifetime risk of developing appendicitis is 8.6% for men and 6.7% for women [9].

CT scan of the abdomen is more specific than ultrasound for the accurate diagnosis of stump appendicitis because it excludes other causes of the acute abdomen. CT findings may be similar to those seen in acute appendicitis. These include peri-cecal inflammatory changes, abscess formation, fluid in the right para-colic gutter, cecal wall thickening and an ileocecal mass [6].

The common CT finding in acute appendicitis include appendicolith, appendicular diameter of >6 mm, enhancement of wall, peri-appendiceal fat stranding, right lower abdomen fluid collection, may be extra-luminal gas, "arrow head sign in caecum". CT finding is highly accurate not only diagnosis but also excluding appendicitis, as similar in stump appendicitis [10].

The first appendectomy was performed in 1735 by Claudius Amyand, and in 1886, Reginald Fitz described the clinicopathological features, and Rose described stump appendicitis for the first time in 1945 [7].

A CT scan of the abdomen and pelvis was performed with Intravenous (IV) contrast and showed a tubular structure at the base of the caecum, with an enhancing wall, peri-appendiceal fat stranding and minimal collection consistent with an inflamed appendiceal stump (Figure 2). A preoperative diagnosis of stump appendicitis was made from the CT study. Surgical exploration performed after completion of the CT scan and revealed a 9 mm -long inflamed

appendiceal stump, with associated retro-cecal inflammatory changes, minimal collection, appendicolith and made clinical diagnosis of stump appendicitis.

Computer Tomography (CT) for the diagnosis of appendicitis has main two methods –the standard oral & IV contrast abdomen/pelvis scan & rectal contrast study. The IV contrast scan Shows concentric, thickened appendiceal wall, appendicolith, fat stranding or other sign of inflammation. Abscess, Phlegmon, also suggestive of appendicitis. Contrast or free air within the lumen of appendix virtually excludes the diagnosis of appendicitis. The sensitivity & specificity of a contrast CT abdomen & pelvic scan are 94% and 95% respectively [11] it can provide alternative diagnosis up to 15%. Alternative method of CT scan is rectal contrast (started 1996) enhanced focusing on right lower abdomen. Contrast is inserted per rectally using Foley's catheter to visualized lumen of bowel including appendix but it has demerit that only appendix is visualized and if it is normal, other possible causes of pain abdomen or alternative causes will not help in diagnosis thus now a days it is not in regular use. Contrast CT scan of abdomen in suspected appendicitis has 98% accurate in diagnosis if read by an experienced radiologist [12].

Conclusion

The diagnosis of stump appendicitis should be borne in mind in the differential diagnosis, presented with right lower abdominal pain in history of appendectomies patients. CT is more specific than ultrasound for an accurate diagnosis of stump appendicitis because it excludes other clinical mimickers. The findings may be similar to those seen in acute appendicitis like peri-cecal inflammatory change, abscess formation, fluid in the right lower abdomen, cecal wall thickening & enhanced inflamed appendix.

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