

## Acute Appendiceal Diverticulitis Imitating Acute Appendicitis: Case Report

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### Abstract

**Background:** Appendiceal diverticulitis is an unusual finding in young population. Many theories have been proposed regarding the pathogenesis of appendiceal diverticulitis, and it was classified into acquired or congenital.

**Case Presentation:** We report a rare case of appendiceal diverticulitis in a 21-year-old male patient. Patient was treated by ileo-caecal resection through laparoscopy converted to open surgery for prevention of perforation and dissemination of appendiceal mass suspicious of mucocele. Histopathology found appendiceal diverticulitis without any evidence of malignancy.

**Conclusion:** Clinicians should be aware of this entity even though its rate of occurrence is rare.

**Keywords:** Appendiceal Diverticulitis; Appendicitis; Ileo-Caecal Resection

### Abbreviations

IV: Intravenous; PO: Per os

### Introduction

Since 1893, many theories have been proposed regarding the pathogenesis of appendiceal diverticula. Similar to all intestinal diverticula, those found in the appendix are classified into congenital or acquired in origin.

Congenital appendiceal diverticula are extremely rare. According to Collins [1] rate of occurrence is estimated to be 0.0014% in a series of 50,000 appendectomies for acute appendicitis. The acquired form is the more common and its incidence ranges between 0.004 and 2.1%. It is caused by a weakness in the appendiceal wall due to the lack of muscular layer which can explain the higher risk of perforation [2].

### Case Presentation

A 21-year-old male patient with no past medical or surgical history presented to the emergency department with one-day history of sudden onset colicky abdominal pain that started peri-umbilically and then shifted three hours later to the right lower quadrant, 8/10 in the visual analogue scale, associated with nausea and decreased appetite.

On physical exam the patient was afebrile with abdominal tenderness in the right lower quadrant, with positive McBurney and Rovsing signs. Blood work showed left shift leukocytosis; where WBC was 15,800, neutrophils 77.1%, CRP 15 mg/l, and urine analysis was normal.

A contrast enhanced (IV and PO) CT-Scan of the abdomen and pelvis showed an enlarged appendix (13 mm axial diameter) with thickened and enhanced wall, surrounded by fat stranding and multiple enlarged regional lymph nodes.

The radiologist suggested the presence of an appendiceal intussusception into the cecum caused by a mucocele of the appendix.

Laparoscopic appendectomy was scheduled for acute appendicitis based on the work-up. Initial exploration of the abdominal cavity found a mass of 1.5 - 2 cm in size at the base of the appendix surrounded by mesenteric inflammation (Figure 1) making suspicious the presence of appendiceal mucocele. Intraoperatively, decision was taken for conversion to infraumbilical midline laparotomy due to the risk of perforation and dissemination of the suspected mucocele. An ileo-caecal resection was performed with primary ileo-colic manual isoperistaltic anastomosis.

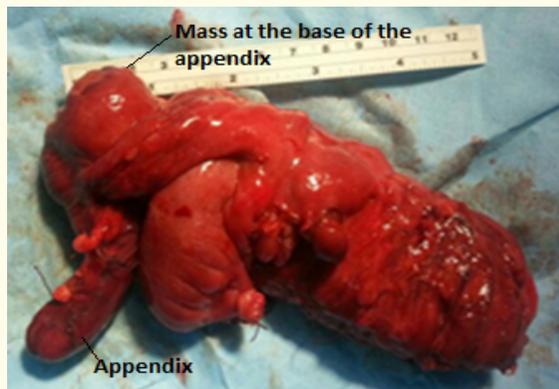


Figure 1: Mass at the base of the appendix.

The appendix measured 5.5 cm in length and 1.5 cm in diameter. On histological examination, the appendiceal surface was covered by a smooth serosa with focal ulcerations, it was noted the presence of numerous diverticula, some of them reaching the mesoappendix. They were lined by an abnormal colonic type mucosa, with severe purulent necrosis. Thirty-three lymph nodes were found in the mesocolon and the mesoappendix, all of them without malignant invasion. Based on the pathology results, the diagnosis of appendiceal purulent diverticulitis was made.

Postoperative period was uneventful; patient was discharged on day 4.

### Discussion

Average age of patients with appendiceal diverticulitis is higher as compared to patients with acute appendicitis (37 vs 19 years, respectively) [14]. The acquired type is the more common, and both are more prevalent in men [1,4]. They are located usually in the distal third of the appendix [1].

Many diverticula take place along the mesenteric side which is structurally weaker due to the presence of vascular hiatuses making them prone to perforation if existing acute inflammation [5], similarly as it happens to sigmoid diverticula.

Favara, *et al.* [7] suggested a chromosomal etiology after finding trisomy 13 and 15 in 7 out of 8 patients with multiple congenital appendiceal diverticula. Alongside with these findings, autopsy data of patients diagnosed with cystic fibrosis showed 14% incidence of appendiceal diverticula, with average age of 13 years [6]. Other possible etiologies for congenital diverticula are appendiceal duplication, local sacculations formed during appendiceal recanalization, epithelial inclusion in the appendiceal wall, and traction [7]. Unlike the acquired form, congenital appendiceal diverticula have all layer components of the bowel wall.

Regarding acquired diverticula, Stout [8] reported a non-inflammatory theory; he suggested that luminal obstruction of the appendix with 1- to 2-ml daily intraluminal secretions was associated with active smooth muscle contraction of the appendix in order to void these secretions. This would result in high intraluminal pressure leading to diverticular formation. In most cases, multiple factors can lead to the development of acquired appendiceal diverticulosis.

A swelling of the mucosa, inflammation, fecaliths, fibrous strictures or torsion may cause partial or complete obstruction of the lumen, favoring the progression from diverticulosis to diverticulitis. Most of these patients were considered as having chronic appendicitis in the pre-antibiotic era [9,10].

A study done by Sohn TJ., *et al.* on 1029 series of patients who underwent appendectomies from January 2009 to May 2011, showed that the clinical characteristics of acute appendiceal diverticulitis (location of pain, signs of localized peritonitis, associated gastrointestinal symptoms and fever) and elevated white blood count were not significantly different compared with acute appendicitis. However, higher perforation rate was seen in the first group as compared to the second group (65.8% vs 10.2%, respectively) ( $p < 0.005$ ) [11]. Patients with appendiceal diverticulitis are four times more susceptible to perforate than those with simple acute appendicitis. This results in longer recovery and 30-fold increase in mortality [2,4,12,13].

One of the reasons why it is uncommon for an appendiceal diverticulitis to cause generalized peritonitis is that most of the acquired diverticula occur at the mesoappendix side. In this case, the mesentery contains the inflammatory process after perforation preventing from spreading the infection into the peritoneal cavity. However, in acute appendicitis, perforation usually occurs in the visceral surface of appendix leading to diffuse peritonitis [13].

Due to the higher risk of complications at the time of presentation, radiographic assessment of appendiceal diverticulitis is cumbersome [15]. The pathognomonic sign of the latter on CT scan in the visualization of the inflamed diverticula however it is usually masked by the presence of complications [3,16].

The treatment of appendiceal diverticulitis depends on intraoperative findings. In case of incidental finding of a non-inflamed appendicular diverticulum, appendectomy is recommended [17]. It may be difficult to differentiate an inflammatory diverticular mass from a tumor if the induration extends to the caecum. In our case, the presence of the mass at the base of the appendix, made us suspect a mucocele. Due to the young age of the patient and the intraoperative suspicion, we preferred to convert to open surgery. It could have been suggested to pursue laparoscopy but mucocele perforation carries worst prognosis and dissemination of malignancy to the port sites can also occur.

### Conclusion

Despite the rarity of disease, clinicians should include appendiceal diverticulitis in the differential diagnosis process. There is a four-fold increase in early perforation rates in cases of appendiceal diverticulitis as compared to acute appendicitis. Best option for diagnosis is not a CT scan due to low specificity; on the other hand laparoscopy allows the inspection of the appendix to rule out appendiceal diverticulitis. Its treatment includes simple appendectomy or caecectomy, ileo-caecal resection or even right hemicolectomy based on intraoperative findings.

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All the authors have contributed in this article.

### Conflict of Interest

No conflict of interest.

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