



Appendiceal Diverticulitis Presenting with Clinical Features of Acute Appendicitis: Case Report and Literature Review

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Abstract

Introduction: Appendiceal diverticulitis is a rare entity that can mimic acute appendicitis. Differentiation between the two pathologies is necessary due to the high risk of perforation in the case of diverticulitis.

Case Report: A case of appendiceal diverticulitis presenting with clinical features of acute appendicitis. Laboratory results showed elevated inflammatory markers, and Computed Tomography (CT) scan showed uncomplicated acute appendicitis. Laparoscopic appendectomy was done, however macroscopic examination showed inflamed diverticulum. Pathohistological analysis displayed an early appendicular diverticulitis.

Discussion: We evidenced type 1 appendiceal diverticular disease according to Phillips et al. classification. Diagnosis is based on clinical evaluation, and imaging suggestive of diverticulitis. Appendectomy is the treatment of choice. It can be performed with laparoscopy or laparotomy without any delay. Meticulous examination of abdominal cavity and thorough histological examination of the entire removed appendix are essential due to the higher association with malignancy.

Conclusion: Acute appendiceal diverticulitis is a rare disease. Its incidence, risk of perforation and bleeding are not well known comparing to the diverticular disease of the colon. Appendectomy is done even in the case of incidental finding of appendiceal diverticula in asymptomatic patients to avoid the high risk of perforation.

Introduction

Diverticulosis of the appendix was first described by Keylinag in 1893 [1]. It is a rare anatomical variant found in 0.004% to 2.1% of appendectomies and classified into two types: congenital and acquired with an incidence respectively of 0.014% and 1.9%. This rare entity remains poorly studied and understood [2,3]. Appendiceal diverticulosis is usually an incidental finding and asymptomatic. However, if symptomatic, the diverticulum has probably become inflamed (acute or chronic diverticulitis) [4]. Appendiceal diverticulitis may mimic acute appendicitis; however it occurs in relatively older age (43 years vs. 29 years) [5]. While appendectomy is curative for both, it is important to distinguish diverticular appendix from appendicitis as it is four times more likely to perforate and may be a sign of an underlying neoplasm especially carcinoid tumors and mucinous adenomas [6,7]. Some radiological findings on Abdominal-pelvic Computed Tomography (CT) scan might help in distinguishing between acute appendicitis and appendiceal diverticulitis [8]; however it highly remains radiologist dependent. We present a case of appendiceal diverticulitis presenting with clinical features of acute appendicitis.

Case Presentation

This is the case of 44 years old male patient presenting to the department of general surgery for periumbilical pain. History goes back to 2 days prior to presentation when patient started experiencing periumbilical pain that is intermittent, crampy in nature without radiation. He denies nausea, vomiting, diarrhea, melena, hematochezia, fever, or chills. He reports slight decrease in

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Received Date: 25 Apr 2019

Accepted Date: 14 Jun 2019

Published Date: 20 Jun 2019

Citation:

Hwala S, Aoun C, El Hajj I, Malek A, Saber T, Farhat S, et al. Appendiceal Diverticulitis Presenting with Clinical Features of Acute Appendicitis: Case Report and Literature Review. *World J Surg Surgical Res.* 2019; 2: 1137.

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Figure 1: CT scan abdominal-pelvis showing a non-complicated acute appendicitis (Red Arrow).



Figure 2: Dissection of appendix and opened along its long axis showing an inflamed diverticulum.

perioral intake. On physical examination, McBurney's sign was positive. His past medical history is insignificant. As for his past surgical history, he had varicocelelectomy done bilaterally.

Abnormal laboratory values included leukocytosis of 11,400/mm³, neutrophils of 85.2% and lymphocytes of 9%. CT scan images of the abdomen and pelvis are obtained from the xiphoid through the symphysis after intravenous administration of contrast, revealing a non-complicated acute appendicitis, trace amount of pelvic free fluid, small fat-containing right inguinal hernia and mild urinary bladder wall thickening, nonspecific.

The patient undergone laparoscopic appendectomy with entry into the abdomen using under vision trocar, pneumoperitoneum was established and insertion of 1 trocar 5 mm and 1 trocar 10 mm. Identification of an inflamed appendix and a saccular outpouching structure near to its base with purulent fluid in the Cul-de-Sac. This finding was suggestive of either a nodular solid lesion or a diverticulae. Culture was taken and followed by lavage. Dissection over the mesoappendix using Ligasure 5mm reaching the appendiceal base. Application of 3 Endoloops and removal of the appendix. Application of 1 Blake drain large and closure. In the operating room, the appendix was dissected and opened along its long axis showing an inflamed diverticulum (Figure 2). It was sent to the pathohistological analysis.

The macroscopic description of the pathologist noted a vermiform appendix measuring 5 cm in length and 1 cm in diameter with mesoappendix attached to its proximal 4 cm. Serosa is missing over 2.5 cm of appendix distal to resection margin. The serosal aspect

Table 1: Appendiceal diverticular disease classification according to Phillips et al.

Microscopic typologies of appendiceal diverticular disease	
Type 1	Primary acute diverticulitis, with or without acute peridiverticulitis
Type 2	Acute peridiverticulitis secondary to acute appendicitis
Type 3	Diverticulum without inflammation
Type 4	Diverticulum with acute appendicitis
Type 5	Chronic peridiverticulitis with acute appendicitis

is shiny and smooth. A cystic nodule 0.5 cm diameter is noted 0.6 cm from resection margin. The lumen is patent. The wall is edematous and thickened up to 0.5 cm. As a final diagnosis; an early appendicular diverticulitis.

Discussion

Appendiceal diverticulum is a rare condition. General incidence is very variable in literature with Abdullgaffar et al. [2] reporting 0.014% [2], Sohn et al. [9], 3.7% [8] and Collins 1.4% (evaluating 50,000 autopsies and surgical specimen studies) [9]. They are either congenital or acquired [10]. Congenital diverticula are outpouchings of the entire appendiceal wall while the acquired, or pseudodiverticula, arise from the herniation of the appendiceal mucosa and submucosa through defects in the muscularis near penetrating arteries [11]. They are believed to arise from sustained contraction of the Appendix behind an obstruction leading to luminal distension, inflammation, and perforation [6,11,12]. Sources of obstruction may include, but are not limited to inflammation, fecaliths, calculi, and neoplasms [12,13]. They are most commonly found along the mesenteric edge in the distal third of the appendix and are associated with other diseases such as Patau syndrome (trisomy 13) [6,14].

An average age of a patient presenting (and later correctly diagnosed) with appendiceal diverticulitis is 38 years [6,15]. It is an individual pathologic entity and differs from acute appendicitis in several clinical and pathological aspects [4]. Acute appendicitis occurs when the appendix lumen is obstructed. The appendix subsequently becomes filled with mucus and swells, increasing pressure within the lumen and causing dull central or periumbilical abdominal pain [16]. Finally, the appendix becomes ischemic and necrotic, resulting in perforation. Well-localized pain occurs later when inflammation spreads to the adjacent parietal peritoneum. On the other hand, appendiceal diverticulitis usually occurs in acquired diverticula [14], which contain only the mucosal and submucosal layers without a muscular layer. Because of these anatomical characteristics, diverticula can be easily perforated.

Since only slight inflammation may be noted initially, symptoms such as dull central or periumbilical abdominal pain may be very slight. The development of localized abscess without well-localized pain occurs after several days, prolonging the duration of preoperative symptoms and increasing the rates of perforation and of intraperitoneal abscess in patients with appendiceal diverticulitis. The WBC level was decreased and the CRP level was increased in patients with appendiceal diverticulitis compared to those with acute appendicitis, suggesting that patients with appendiceal diverticulitis had a longer duration of inflammation at admission [12].

Therefore, when we have a patient with chronic abdominal pain appendiceal diverticulitis should be considered in the differential diagnosis. The abdominal pain can be present up to 14 days prior to the hospitalization. According to Phillips et al. [18] appendiceal

diverticular disease classification (Table 1), we evidenced a type 1 appendiceal diverticular disease [17].

It is important to make an accurate diagnosis of appendiceal diverticulitis in order to consider the higher rate of complications such as perforation (33% vs. 9.8%) [5], and for the higher risk of associated appendiceal neoplasms, especially carcinoid tumors and mucinous adenomas [3,18,19]. Diagnosis is based on clinical evaluation, but ultrasonography can be useful if performed by skilled sonographers. Diverticula appear as round cysts with enhanced walls attached to an enlarged appendix. In case of doubt, CT scan can be performed [14]. CT findings suggestive of appendiceal diverticulitis included the absence of fluid collection in the appendix, absence of appendicolith, and formation of abscess [12].

Appendectomy is the appropriate treatment. It can be performed with laparoscopy or laparotomy without any delay. Meticulous examination of abdominal cavity and thorough histological examination of the entire removed appendix are essential because as mentioned above appendiceal diverticulitis have higher malignant association [14,20,21].

Conclusion

Acute appendiceal diverticulitis is a rare disease. Its incidence, risk of perforation and bleeding are not well known comparing to the diverticular disease of the colon. It should be considered when a patient presents with right lower quadrant pain of several days' duration with elevated inflammatory markers and specific findings in imaging.

Appendectomy is the treatment of choice, even in the case of incidental finding of appendiceal diverticula in asymptomatic patients to avoid the high risk of perforation.

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