CASE REPORT

Diverticulosis of vermiform appendix: Incidence and report of 6 cases

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ABSTRACT

Appendiceal diverticulosis (AD) is a rare condition. The author reviewed 675 archival pathologic consecutive appendectomies in his institution in the last 12 years. As the results, 6 cases of AD were found. Thus, the incidence of AD was 0.8% of all appendectomies. The AD was seen characteristically in middle aged parsons; in this series, 37-year-old (y) female (F), 42y male (M), 44y F, 56y M, 57y F, and 59y M, with the median of age of 50y, range of 37-59y, and M:F ratio of 3:3. The clinical presentation of the six cases are the same as other appendectomies. The histological features were described.

Key Words: Vermiform appendix, Diverticulosis, Appendicitis, Pathology, Gastroenterology

1. INTRODUCTION

Diverticulosis of vermiform appendix is a very rare condition. Most patients with this disease are asymptomatic, but may present acute or chronic appendicitis-like symptoms.[1] The author reports herein the incidence, pathological features and clinical features of appendicelar diverticulosis (AD) in appendectomy samples, because they have been rarely investigated.

2. CASE SERIES

The author herein reviewed 675 archival pathologic appendectomies in his institution in the last 12 years. As the results, 6 cases of AD were found. Thus, the incidence of AD was 0.8% of all appendectomies. The AD was seen characteristically in middle aged parsons; in this series, 37-year-old (y) female (F), 42y male (M), 44y F, 56y M, 57y F, and 59y M, with the median of age of 50y, range of 37-59y, and M:F ratio of 3:3.

All patients presented with acute appendicitis-like signs and symptom. Physical examination showed occasionally signs of Blunberg and fever. Leukocytosis and increased C-reactive protein were often seen. Radiologic examination (US and CT) occasionally showed more or less appendiceal swelling (see Figure 1). All cases had been clinically diagnosed as acute appendicitis, and appendectomies had been carried out in all cases.

The appendectomy specimens were immediately cut and fixed in 10% neutral formalin. The vermiform appendix was inspected grossly and two to four sections were cut along the longitudinal axis. After processing, the sections were stained with hematoxylin and eosin (HE), and observed under the light-microscopy.

Macroscopically, all 6 cases showed appendiceal swelling, and macroscopic recognition of AD was possible in 4 cases (see Figure 2). The remaining 2 cases showed AD only under microscopy (microscopic AD). Of the grossly-visible 4

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cases, diverticulosis was multiple in all, and was located in the meso-appendix in 3 cases and it was not determined in the remaining 1 case. The location of AD was uncertain in the remaining 2 cases of the microscopic AD. Microscopically, all the 6 cases of AD showed various degree of acute appendicitis and diverticulitis (see Figure 3). No diverticular hemorrhage was seen. The degree of diverticulitis varied from mild to severe. In all the 6 cases, it appeared that the diverticulitis extend into non-diverticular appendix, causing acute appendicitis in addition to diverticulitis. In 2 cases, perforation of the appendix and resultant acute peritonitis were seen. In such cases, the diverticulosis is the cause of perforation.

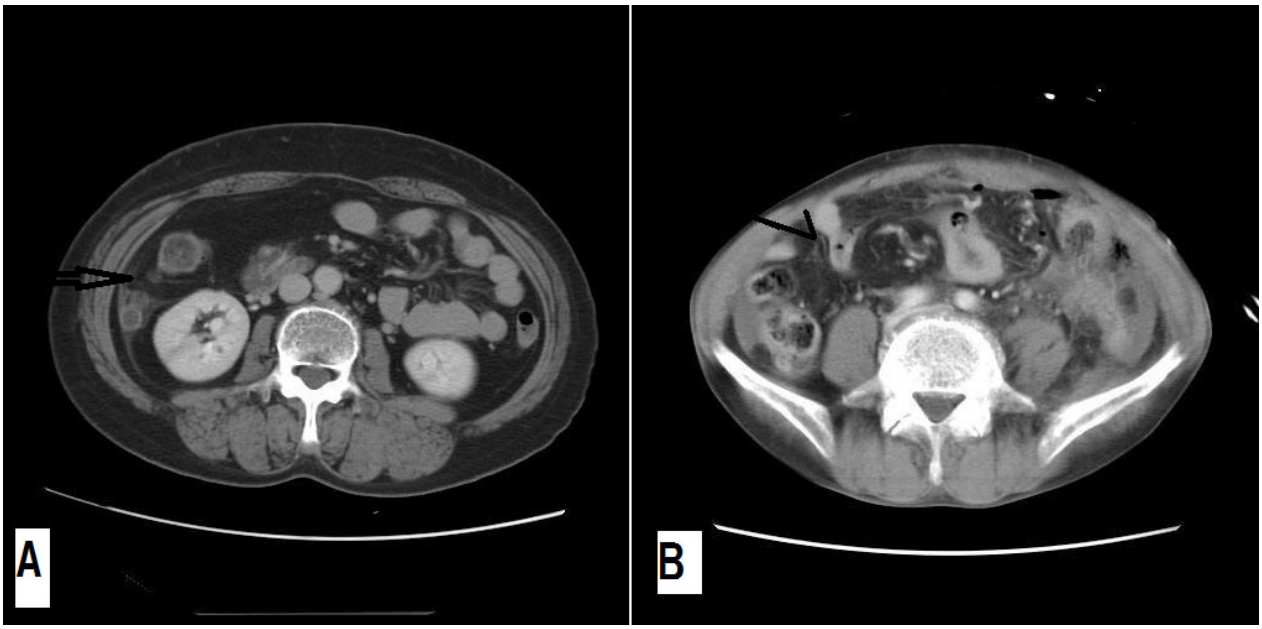

Figure 1. Examples of appendiceal diverticulosis with diverticulitis. The vermiform appendix was enlarged and mildly (A) and severely (B), both of which can be visible in computed tomography. A: 37-year-old female. B: 56-year-old male.

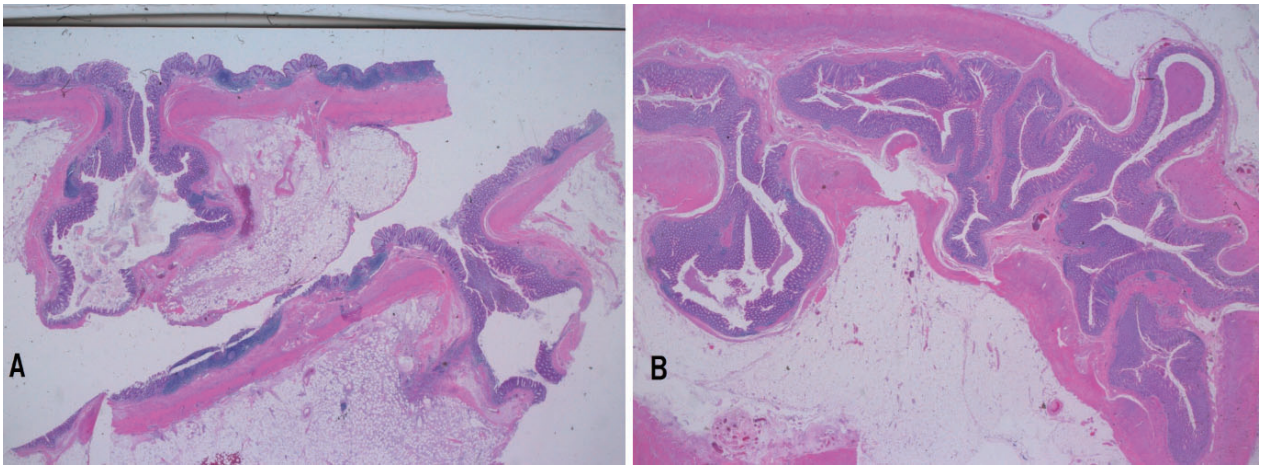

Figure 2. Gross features of appendiceal diverticulosis. Since no gross pictures are available or not representative, loupe features are show. Multiple appendiceal diverticulosis is apparent. A, B: $\times 10$.

3. Discussion

Although colonic diverticulosis has been well studied in autopsy materials, studies of AD have not comprehensively performed in autopsy series which will show the most real features of AD. In appendectomy studies, there has been a few studies.[2–4] The incidence of AD in appendectomies is about 1%;[2,3] that of the present series was 6/675 (0.8%). The status of multiplicity and locations in AD is not known.

The reason may be due to the fact that vermiform appendix is a small organ for researcher to study. The present 6 cases showed that all had multiple AD. The locations of colonic diverticulosis are predominant in the meso-colon attachments where vasculatures penetrate the muscular layer, causing muscular weakness. In the present series also, 3/6 cases (50%) showed predominant occurrence in meso-appendix where vasculatures penetrate the walls. In 3/6 cases (50%) of the present series, the locations of diverticulosis were not determined because of the small-size of vermiform appendix.

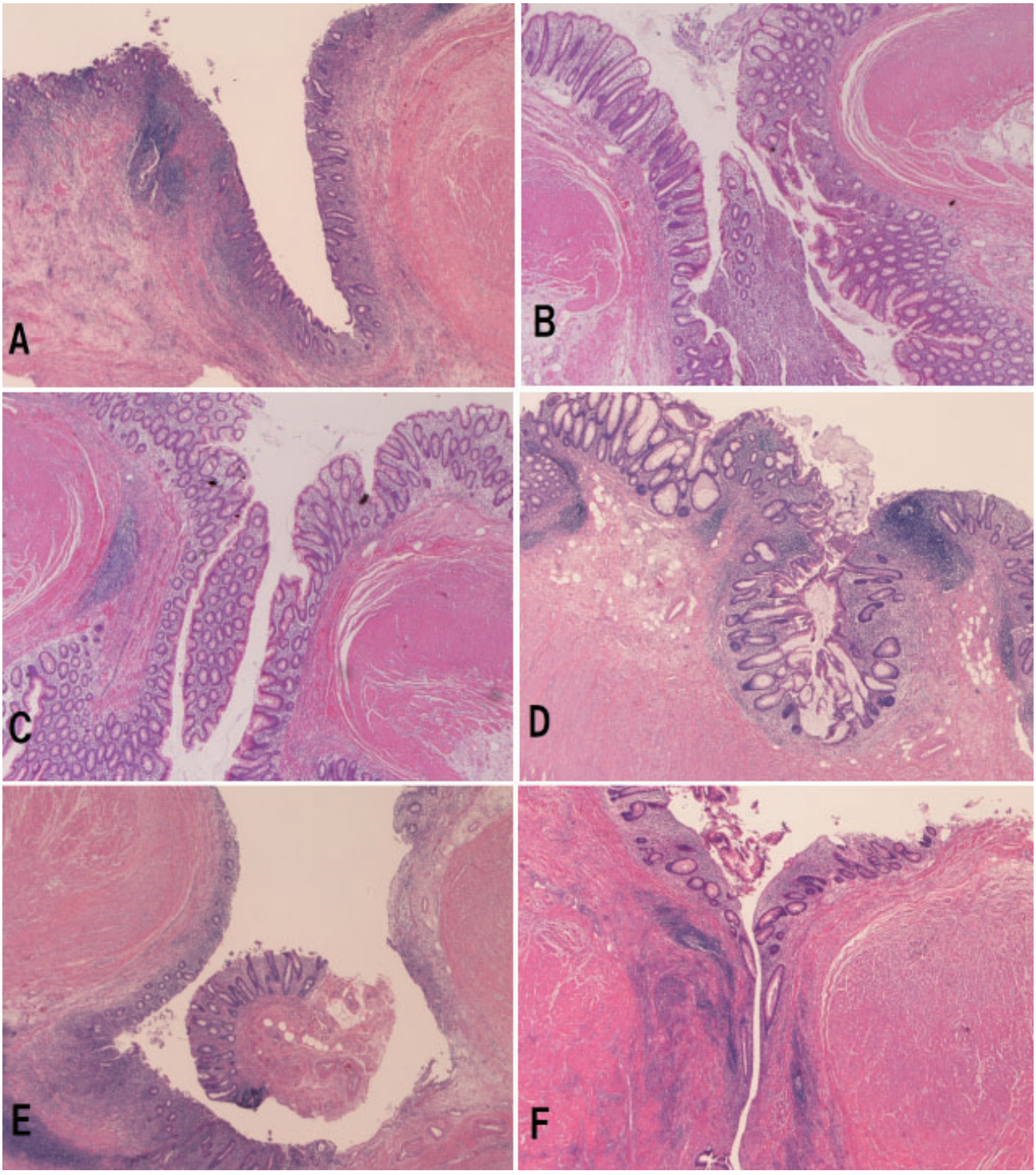

Figure 3. Appendiceal diverticulosis of each patient. A: 37-year-old (y) female (F), B: 42y male (M), C: 44y F, D: 56y M, E 57y F, F: 59y M. B, F: Penetrating diverticuli. C, E: Deep nearly penetrating diverticuli. A, D: Relatively shallow diverticuli. A-F: HE, ×40.

The histological examinations of AV were interesting. In all 6 cases (100%), diverticulitis was seen to be extending into mucosa of non-AD appendix, and 2/6 cases (33%) showed perforations of appendix. The depth of AD varied from case to case and area to area, the depth being submucosa, proper muscle, subserosa, or perforated. These suggest that AD first occurs in mucosa and extends to appendiceal subserosa. No studies exist about AD features of general population. Since the present series dealt with appendectomies (symptomatic AD), the true AD features including symptomatic AD and asymptomatic AD is unclear. The pathogenesis of AD is unknown. In general, colonic diverticulosis is classified into congenital and acquired. The former lacks a muscular layer in diverticular walls. In contrast, the latter shows a muscular layer in diverticular walls. However, this hypothesis is not concluded. In the present series, the depth of AD was variable, suggesting that the etiology cannot be determined from above-mentioned depth of AD. The author speculates that some weak sites of appendiceal muscularis herniates by luminal pressure and then forms AD.

The clinical features of AD are different between asymptomatic and symptomatic cases.[1] The present series showed that symptomatic AD shows sign and symptom indistinguishable from acute appendicitis. AD occurred middle-aged persons in this series. This is in contrast to the age distribution of acute appendicitis which shows two age peaks of childhood and adolescence and old persons. The imaging modality of AD shows appendiceal swelling parallel to the degree of inflammation.[5] It is suggested that when complications such as diverticulitis, perforation, and abscess formation develop, acute appendicitis-like symptoms and signs emerge. Early diagnosis and appendectomy seems critical because perforation of AD and resultant peritonitis eventually occur. Although hemorrhage, diverticulitis, perforation are three major complications of colonic diverticulosis, hemorrhage from AD was not seen in the present series. Finally, the author want to say that the author recently experienced a case of primary mucinous adenocarcinoma of vermiform appendix arising from AD[6] and a case of appendiceal diverticulitis clinically masquerading as an appendiceal carcinoma.[7] These cases are not included in the present series.

Conflicts of Interest Disclosure

The author declares no conflicts of interest.

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