CASE REPORT

Appendiceal Diverticulosis in a Chinese Patient

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ABSTRACT

Appendiceal diverticulosis is a rare entity. An inflamed appendix has a higher perforation rate if associated with diverticulitis. Barium enema and computed tomography are useful in demonstrating this lesion and its associated complications. This article describes the radiographic findings in a Chinese patient with appendiceal diverticulosis, together with a brief literature review.

Key Words: Appendix, Barium, enema, Chinese, Computed tomography, Diverticulosis

INTRODUCTION

Diverticula in the vermiform appendix are rare. The incidence in Caucasians is estimated at approximately 1% (ranging from 0.65 to 2%).¹ ² A study conducted in Malaysia over an 8-year period reported an incidence of approximately 0.4% in the Asian population studied.³ Appendiceal diverticulosis is a clinically important entity because the presence of a diverticulum in an inflamed appendix is associated with a higher perforation rate, earlier rupture, and possibly, a predisposition to pseudomyxoma peritonei.¹ ² ³ A case of massive gastrointestinal bleeding associated with a diverticulum in a non-inflamed appendix has also been reported.⁴

CASE REPORT

A 63-year-old man was admitted with symptoms of chronic vague abdominal pain and constipation. There was no vomiting or gastrointestinal bleeding. The patient had a history of gastrectomy for a perforated peptic ulcer 10 years previously, and alcohol dependent syndrome. Physical examination was unremarkable. No abdominal guarding or rebound tenderness was present to suggest perforation or peritonitis.

A barium enema examination was completed and revealed several small, barium-filled diverticula arising from the appendix (Figure 1). No features of diverticulitis, such as double tracking, or spasm of the bowel loops, were noted. There were no diverticula located at the tip of the appendix, and no diverticula were seen in the colon. Computed tomography (CT) identified appendiceal diverticula (Figure 2), with both the mesenteric and anti-mesenteric borders involved. There was no evidence of acute appendicitis or diverticulitis — the appendix was not dilated, and there was no peri-appendiceal or peri-diverticular inflammatory infiltrate. No obstructing mass was seen in the proximal appendix.

Figure 1. Barium enema shows several small barium filled diverticula arising from the appendix.
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or caecum, and there were no dilated transmural appendiceal vessels associated with the diverticula.

Elective appendicectomy was not undertaken, as the patient had an underlying cirrhosis, and the prophylactic value of appendicectomy remains controversial in this clinical context.

DISCUSSION

As in other parts of the gastrointestinal system, diverticula of the appendix are considered to be either true or false diverticulum. The so-called “true” diverticulum of congenital origin, has a complete wall, which includes a well-developed muscularis propria. “False” or acquired diverticula have a wall consisting of mucosa and submucosa only, with the muscularis propria absent. Acquired diverticula are far more common — the ratio reported is 10 acquired diverticula to one congenital diverticulum.1 Microscopic examinations of an acquired appendiceal diverticulum reveal herniation of the mucosa and submucosa of the appendix into the mesoappendiceal fat, through a defect in the muscular wall. The pathogenesis of appendiceal diverticulum is currently poorly understood.

Diverticular disease of the appendix can be classified clinically into four categories:

1. Acute diverticulitis.
2. Acute diverticulitis with acute appendicitis.
3. Acute appendicitis with a diverticulum.
4. Appendix with diverticulum.1

The main clinical significance of appendiceal diverticula is its influence on appendiceal perforation when the appendix is inflamed. A study by Wetzig1 over a 10-year period, reported a 27% perforation rate in inflamed appendices associated with diverticula versus a 6.6% perforation rate in patients with appendicitis without diverticulum. Chong1 reported a 33% perforation rate when the appendix was inflamed in patients with an appendiceal diverticulum or diverticula, and an 83.3% perforation rate in this patient group when diverticulitis was present. Similarly, Lipton et al2 identified a 4-fold increase in the incidence of perforation in patients with acute diverticulitis of the appendix when compared with patients with acute appendicitis alone.

Norman et al3 described a very rare but significant complication of appendiceal diverticula — that of massive gastrointestinal bleeding from an acquired diverticulum in a non-inflamed appendix. A superior mesenteric arteriogram demonstrated contrast extravasation into the appendix in this case. Pathological study of the resected appendix revealed an abnormal arterial wall and rupture of the appendiceal artery passing near the diverticulum. Of interest in this regard, Wetzig et al1 noted in their study that transmural appendiceal blood vessels adjacent to the diverticular orifice were present in 50% of appendices with diverticula.

Acquired appendiceal diverticula have a male preponderance.1,4 Although these lesions occur in adults of all ages, they are most frequently seen in patients less than 40 years of age.4 The average age of patients with acquired appendiceal diverticula is older than that of patients with acute appendicitis but no diverticulum (37.8 years vs 19.2 years).1 Multiple diverticula and solitary diverticulum occur in an approximately equal proportion of patients.1,4 The greatest number of appendiceal diverticula seen in one individual was found to be five in the Chong study,4 however, a greater number of diverticula were noted in the current patient. Some studies have found appendiceal diverticula occurring exclusively in the mesenteric border, whilst other studies have shown similar involvement of the mesenteric and anti-mesenteric borders, as seen in this case. Cases with isolated involvement of only the tip of the appendix have also been reported.1

Appendiceal diverticula are associated with a small appendiceal lumen. Diverticula have also been reported

Figure 2. Appendiceal diverticula as seen on computed tomography scanning of the abdomen. No adjacent soft tissue stranding is evident.
in association with an obstructing tumour (carcinoma or carcinoid tumour), though infrequently. There is no correlation between the presence of appendiceal diverticulosis and colonic diverticulosis.

Appendiceal diverticula or diverticulitis, if symptomatic, presents as right lower quadrant pain, mimicking appendicitis. Distinguishing features in the differential diagnosis include older age at presentation, intermittent pain and longer duration of pain, fewer or absent gastrointestinal tract symptoms, absence of typical abdominal pain progression, and lastly, a remarkably high incidence of perforation if surgical treatment is delayed.

Appendiceal diverticula can also present as an incidental finding on barium enema examination, as seen in the current case, with multiple barium-filled outpouchings arising from the appendix evident. CT in such patients may allow better illustration of the appendix and associated features of acute appendicitis, acute diverticulitis of the appendix, as well as any proximal obstructing mass lesion. A diagnostic difficulty is in cases of frank appendiceal diverticulitis with phlegmon formation, where the presence of inflammatory mass may be indistinguishable from that of caecal diverticulitis or appendicitis.

Since the presence of diverticula in an inflamed appendix is associated with a high perforation rate, appendicectomy has been suggested if a diverticulum in the appendix is found incidentally during laparotomy. Elective removal of an appendix with diverticula noted on barium enema or CT as an incidental finding is, however, more controversial.

**CONCLUSION**

Appendiceal diverticulum is a rare condition. It is associated with a higher rate and earlier perforation of an inflamed appendix. In the non-inflamed appendix, the diverticulum can cause symptoms mimicking acute appendicitis. It has been reported as a cause of massive gastrointestinal bleeding on one occasion. Diagnosis of appendiceal diverticulum can readily be made on barium enema or CT. CT may have the advantage of also assisting exclusion of an associated appendicitis or diverticulitis, and in identifying any associated proximal obstructing mass, which occurs infrequently.

**REFERENCES**