ABDOMINAL IMAGING

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Atypical Radiographic Manifestations of Duodenal Diverticula: A Pictorial Essay

Duodenal diverticula are frequently encountered in daily practice of radiology centers. Dissimilar figures with different dimensions and unlikely positions of duodenal diverticula sometimes unusual—may be found. In this pictorial essay, we present various atypical shapes, dimensions and locations of duodenal diverticula which are found during many years of experience in the field of gastrointestinal fluoroscopic contrast assessments.

Keywords: duodenal diverticulum, mesenteric, antimesenteric

Introduction

Duodenal diverticula are found in 1%–5% of barium studies and are acquired lesions consisting of a sac of mucosal and submucosal layers herniated through a muscular defect.

The duodenum is the second most common location of diverticula after the colon. Duodenal diverticula are commonly found along the medial border of the descending duodenum in the periampullary region but can occur in the lateral border of the descending duodenum as well. Post-bulbar and outer duodenal aspect are their rare sites.¹⁻³

Most diverticula are between 0.3 and 3 cm in diameter. The larger ones are mostly found at duodeno-jejunal flexure. In almost 10% of conditions, they are multiple. Bizarre multilobulated or giant diverticula are occasionally seen. Contrast media may remain for a longer time in the diverticulum than the duodenum itself.^{1,4}

Although most duodenal diverticula are asymptomatic, serious complications such as duodenal diverticulitis, upper gastrointestinal bleeding, gastric outlet obstruction, and pancreatobiliary disease can sometimes develop.^{1,2,5,6} Because duodenal diverticula are retroperitoneal structures, their perforation results in neither signs of eritonitis nor free intraperitoneal gas. A large diverticulum occasionally causes symptoms of partial upper gastrointestinal obstruction. A gasfilled giant duodenal diverticulum may be misinterpreted as an abscess, dilated cecum, colonic diverticulum or pseudocyst of the pancreas.^{1,7}

Anomalous insertion of the common bile duct and pancreatic duct into a duodenal diverticulum can be demonstrated in about 3% of carefully-performed Ttube cholangiograms. This anatomic arrangement appears to interfere with the normal emptying mechanism of the ductal system and predispose to obstructive biliary and pancreatic disease. The absence of ampullary sphincter mechanism permits spontaneous reflux of barium from the diverticulum into the common bile duct which can result in an ascending infection.^{1,3,6}

Caronia, et al, reported a patient with a 6-cm duodenal diverticulum.⁸ In our practice, we encountered 19 duodenal diverticula measuring six cm in diameter

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Received December 6, 2006; Accepted after revision February 7, 2007.

Iran. J. Radiol. Spring 2007;4(3):141-150



Fig. 1. A and B, Barium meal in a 42-year-old man shows a simple antimesenteric duodenal diverticulum with filling defect in the neck.

or larger—one of whom had an 8-cm diverticulum. On the other hand, because diverticula on the medial duodenal wall are usually limited in size by the surrounding pancreatic tissue, giant diverticula are more likely to arise laterally.¹ Nevertheless, we had a patient with a 96-mm duodenal diverticulum along the medial border of the 2nd portion of the duodenum.

Simultaneous presence of five duodenal diverticula has been reported as an extremely rare condition.⁹ However, we encountered a 50-year-old woman who had at least five diverticula (four with mesenteric and another with antimesenteric type) and four patients each of whom had four duodenal diverticula some of which were giant. We could not find any reports on simultaneous occurrence of mesenteric and antimesenteric diverticula. Herein, we present two out of three such patients in our patients group. Our pa-



Fig. 2. Barium study in a 55-year-old woman shows an spade shaped antimesenteric diverticulum in the 4th portion of duodenum and a filling defect within its sac.

tients finding are classified as follow:

Part one: Atypical radiologic manifestations of duodenal diverticula depending on their location are shown in Figures 1-4.

Part two: Atypical radiologic manifestations of duodenal diverticula depending on their number are illustrated in Figures 5-8.

Part three: Atypical radiologic manifestations of duodenal diverticula depending on their size are demonstrated in Figure. 9-10.

Part four: Atypical radiologic manifestations of duodenal diverticula depending on the shape and contents or associations of duodenal diverticula are illustrated Figures 11-13.

Part five: Some special cases are displayed in Figures 14-20.



Fig. 3. Multilobulated antimesenteric diverticulum.

A, Barium study in a 52-year-old woman reveals a diverticulum in the 3rd portion of the duodenum.

B, Barium meal in a 44-year-old man-there is a tri-lobe antimesenteric diverticulum of the 3rd portion of the duodenum.



Fig. 4. Antimesenteric diverticulum in the 3rd portion of the duodenum. **A**, A simple diverticulum in a 58-year-old man.

B, A 61-year-old woman with a huge multi-lobulated antimesenteric duodenal diverticulum in the 3rd portion of the duodenum.



Fig. 5. At least four mesenteric duodenal diverticula.

A and **B**, A 61-year-old man with multiple diverticula, two of which in the 2nd portion and two in the 3rd portion of the duodenum.

C, A 60-year-old man with multiple mesenteric diverticula; two of which in the 2nd portion, one in the 3rd and another in the 4th portion of the duodenum.



- Fig. 6. Multiple mesenteric diverticula.
- A, A 50-year-old woman with at least five diverticula—one antimesenteric and four mesenteric type.
- B, A 68-year-old woman with multiple huge diverticula at the mesenteric side of the 2nd and 3rd portions of the duodenum.



Fig. 7. Multiple mesenteric diverticula.

- **A**, A 53-year-old woman with four mesenteric diverticula in the 2nd and 3rd portions of the duodenum.
- B, A 48-year-old man with four smaller mesenteric diverticula in the 2nd and 3rd portions of the duodenum.



Fig. 8. Multiple duodenal diverticula.

A, All mesenteric types in the 3rd and 4th portions of the duodenum in a 55-year-old man, and in a 64-year-old man (**B**).



Fig. 9. A and B, A 95-mm diverticulum in mesenteric side of the 2nd portion of the duodenum in a 60-year-old man.



Fig. 10. Giant diverticulum in two patients.

- A, A flower-like multilobulated giant diverticulum in the inferior genu of descending duodenum in a 75-year-old man.
- B, A 44-year-old man with a large peri-ampullary duodenal diverticulum.



Fig. 11. Fluid levels in diverticula.

A, Two diverticula of the superior genu of the 2nd portion of the duodenum in a 50-year-old woman.

B and C, A 72-year-old man with a huge multilobulated duodenal diverticulum with air fluid level on the superior genu of the 2nd portion of the duodenum.



Fig. 12. A 48-year-old male with an antimesenteric diverticulum of the bulb associated with a jejunal diverticulum.



Fig. 13. A 65-year-old man with hiatal hernia and antimesenteric diverticulum in the 2nd portion of the duodenum.



Fig. 14. A and B, A 65-year-old man with a periampullary duodenal diverticulum. Free reflux of the contrast material into the common bile duct and intra-hepatic bile ducts with their dilatation are apparent.



Fig. 15. A 25-year-old woman with upper GI obstructive symptoms. Barium meal reveals an intraluminal diverticulum as the cause.



Fig. 16. A 53-year-old man with a huge mesenteric duodenal diverticulum on the 3rd portion of the duodenum that measures almost 8 centimeters in diameter and that contains an *Ascaris lumbricoides* within the sac.



Fig. 17. A, The plain abdominal film of a 72-year-old woman which was interpreted as a calcification of unknown origin in the right upper quadrant. **B**, After ingestion of the contrast material, the source became clear. It was a duodenal diverticulum on the mesenteric border of the 2nd portion of the duodenum which had been opacified during the previous contrast studies.

Fig. 18. A and B, A 65-year-old man with a lobulated periampullary duodenal diverticulum containing filling defects associated with a gastric ulcer.



Fig. 19. A 67-year-old man with a giant duodenal diverticulum with obstructive signs in his upper GI barium meal study.

Fig. 20. A and B, A 33-year-old woman presented with concurrent occurrence of mesenteric and antimesenteric diverticula. Two mesenteric diverticula are in peri-ampullary position and one antimesenteric diverticulum is in the 3rd portion of the duodenum.

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