SAS Journal of Medicine
Abbreviated Key Title: SAS J Med
ISSN 2454-5112
Journal homepage: https://saspublishers.com

OPEN ACCESS

Duodenal Diverticulum: An Unusual Cause of Pancreatitis

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DOI: 10.36347/sasjm.2021.v07i06.008 | **Received:** 18.04.2021 | **Accepted:** 31.05.2021 | **Published:** 11.06.2021

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Abstract **Case Report**

Duodenal diverticula are anatomical entities which, although quite frequent, remain most often asymptomatic and of incidental discovery following a radiological examination. Their clinical expression during diverticulitis, pancreatitis and cholangitis poses a diagnostic problem and must therefore be evoked and recognized in imaging. The objective of this work is to highlight and discuss the different clinical presentations, the radiological aspects and their complications as well as the various differential diagnoses.

Key words: Duodenal diverticulum, imaging, complications.

INTRODUCTION

The duodenum represents the second diverticular location after the colon followed by the jejunum and the stomach. The second portion of the duodenum represents the elective site of these diverticula [1, 2].

Duodenal diverticula are most often asymptomatic and are therefore discovered incidentally. However, rare but serious complications may occur, such as perforation, hemorrhage, biliary, duodenal or pancreatic obstruction, or diverticulitis [3]. We report the case of a patient with abdominal pain revealing duodenal diverticulum.

OBSERVATION

The patient was a 36-year-old male with no previous pathological history who presented with excruciating, recurrent right hypochondrial and flank pain associated with vomiting. The patient was not a known smoker or alcoholic. The examination on admission found a conscious patient with a fever of 38.2, hemodynamically and respiratorily stable, with objective palpation of a slight abdominal tenderness. There was no notion of hematemesis, no melena, no palpable mass, no transit disorder, no known lithiasis.

An inflammatory workup was performed showing a VS at 62mm/h, a CRP at 180mg/l and white blood cells at 14 000 elements/mm3, with a lipasemia at 232UI/L.

An initial ultrasound was performed, revealing no detectable abnormality, but the significant abdominal meteorism made it necessary to perform an abdominal CT scan with PDC injection. The latter showed the presence of a duodenal diverticulum with contents similar to the duodenum, without parietal thickening or infiltration of the surrounding fat and arriving in intimate contact with the head of the pancreas without any notable peri or pancreatic lesion (figure 1), concluding that the diverticulum was probably due to compression of the pancreatic duct by the diverticulum.

In view of these elements, an additional ingestion of gastrograffin was performed to look for a fistula or a possible perforation (figure 2) but without any scannographic translation in our patient.

An MRI performed afterwards revealed the presence of a saccular formation continuing with the duodenal wall with aerial content and duodenal stasis upstream (figure 3), concluding to an uncomplicated duodenal diverticulum without biliary or pancreatic anomaly.

The therapeutic attitude implemented in the absence of signs of complications, notably the absence of hemorrhage, advanced pancreatitis or cholangitis.

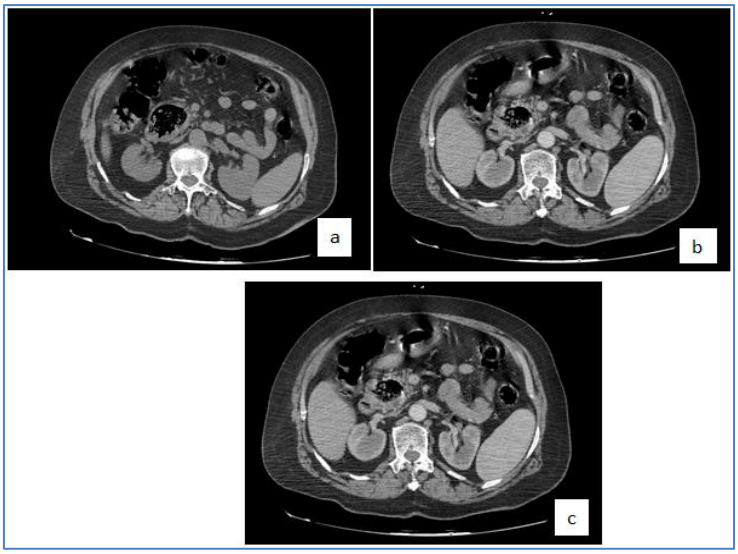

Fig-1: Abdominal CT scan in axial section showing before (a) and after (b) injection of PDC showing the duodenal diverticulum at the inner wall of D2 without any notable thickening or infiltration. Note the normal appearance of the pancreas and its ducts as well as the bile ducts (c)

Fig-2: CT scan in axial (a) and coronal (b) section after gastrograffin ingestion showing the duodenal diverticulum in communication with the inner wall of D2

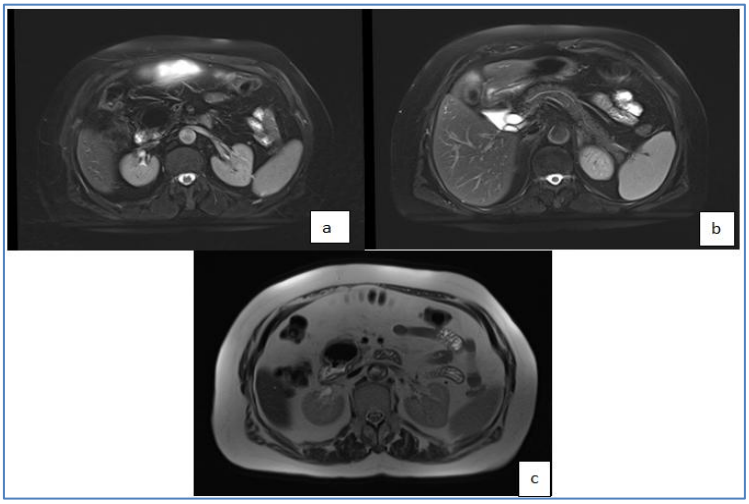

Fig-3: Axial section MRI in T2-weighted (a,b) and T2 FatSat (c) sequences showing a saccular formation connected to the inner wall of D, with no pancreatic or biliary abnormalities

DISCUSSION

The duodenal diverticulum results from a congenital anomaly. During embryonic life, the foregut closes at the 7th week and becomes canalized again, forming the duodenum [4]. During this period malformations can occur such as duplication, stenosis, atresia or duodenal diaphragm. One theory is that the appearance of the diverticulum is the result of iterative peristaltic pressure of the diaphragm rather than a congenital malformation.

Histologically, the diverticulum has only two layers, one mucous and one muscular, unlike the

duplication, which has four layers and two lumens that extend.

Clinically, the typical clinical presentation is that of acute abdominal pain in the right hypochondrium. However, the presentation can be depicted in the form of a complicated picture that can include hematemesis due to ulcerations, jaundice secondary to angiocholitis [5, 6]. The latter two complications are often due to compression of the pancreatic and bile ducts by the diverticulum.

The filling of the diverticulum with food can lead to the formation of a bezoar (sometimes even containing foreign bodies) responsible for abdominal pain relieved by vomiting but also can be the cause of a palpable mass.

The radiological workup is of primary and considerable contribution, it allows affirming the diagnosis, to detect certain complications and to make the part as for the differential diagnosis.

On CT scan, it can often look like a rounded mass with clear boundaries, with either aeric, hydric or mixed contents [3] or even food debris; if the latter are important, they can constitute a bezoar. Its contours are regular and enhanced after injection of iodinated contrast. Water tagging of the duodenum allows appreciating the continuitý between it and the diverticulum [7, 8].

The CT appearance can sometimes be confused with an intrapancreatic mass (False cyst, abscess, tumor) or a duodenal ulcer perforation [8-10].

MRI will provide semiology identical to that of CT, but CP-MRI sequences will best allow appreciating the relationship of the diverticulum with the biliary and pancreatic ductal system [8].

Only one publication evaluates the contribution of MRI to the diagnosis: the duodenal diverticulum appears on coronal slices as a fluid collection surrounded by a T2 hypodense area whose shape changes with peristalsis [11].

The sonographic appearance shows a mass that is often heterogeneous, containing hyperechoic structures corresponding to air with evidence of continuity with the digestive structures. The diagnosis is generally not evoked at this stage but the examination leads to more efficient explorations.

TOGD is performed at a distance from the bleeding episode and allows visualization of the diverticula in 80% of cases [3]. During this examination, the diverticulum appears as an additional image with smooth and regular contours, communicating with the duodenal lumen. The most important diagnostic feature is the retention of barium in the diverticular sac, which must be 6 hours or more [6].

The duodenal wind sock sign is the pathognomonic radiological sign first described by Nelson [10]. Upper GI endoscopy is a crucial paraclinical tool in the diagnosis of duodenal diverticula. It allows a positive diagnosis in more than 75% of patients [12].

Duodenal diverticula can become complicated and therefore it is crucial to know their appearance on imaging. The duodenal diverticulitis has a similar semiology on CT scan to that observed for other localizations and in particular the colon. Inflammatory changes are present, with infiltration of the adjacent retroperitoneal fat associated with parietal thickening and narrowing of the lumen [9].

Diverticular perforation is the prerogative of the CT scan, which shows direct signs of gas effusion, generally localized in the right anterior pararenal space. Or exceptionally a pneumoperitoneum [9].

An extra-duodenal leak of contrast medium may be seen. In post-traumatic perforations, a peri-duodenal hematoma may be seen.

Intra-diverticular bezoars are foreign bodies giving in CT the appearance of a mass with heterogeneous, solid and aerated contents [9].

Duodeno-colonic fistulas are demonstrated either by duodenal opacification or more often by barium enema [13].

Although rare, complications of duodenal diverticula should be known and investigated. From a therapeutic point of view and depending on the clinical picture, two attitudes can be adopted. Medical treatment with antibiotic therapy and parenteral nutrition, with regular and close monitoring in a surgical setting. In case of failure, a surgical intervention must be considered quickly or a diverticulectomy, with duodenal closure 2 plans must be conducted. Intervention on an inflammatory tissue exposes to postoperative peritonitis rupture leading to peritonitis or fistula

CONCLUSION

Duodenal diverticula are usually latent, discovered incidentally during an imaging workup for another digestive pathology. This requires knowledge of their appearance on imaging, of which CT stands out as the examination of choice. A complementary MRI can be performed to eliminate differential diagnoses. However, their discovery during a complication requires the search for pancreatic and biliary

consequences, as well as inflammatory consequences or even perforation.

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