Perforated Duodenal Diverticulum: A Case Report and Review of Literature

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Abstract

Duodenal diverticulum (DD) is not an infrequent adverse health issue, as more cases are now being diagnosed and reported after the advancement of gastrointestinal radiology and advent of endoscopy and gastrointestinal radiology, but majority of these are asymptomatic. The symptoms usually occur after the development of complications. Here, we present the case of an 85-years old male Saudi on regular ibuprofen for his joint problems, presented with upper abdominal pain for 5 days. A computerized tomography (CT scan) revealed free retroperitoneal air and Laporatomy confirmed perforated duodenal diverticulum (PDD). PDD poses both a diagnostic and therapeutic dilemma. Association with chronic use of ibuprofen in this case may highlight the impact of chronic use of NSAIDs upon the asymptomatic diverticulum.

Keywords

Diverticulectomy, Extraluminal Diverticulum, Feeding Jujenostomy, Intraluminal Diverticulum

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Introduction

The second common site in the alimentary canal where diverticula can occur is duodenum (Simões et al. 2014). Up to 90% of diverticula arise from second part of duodenum (Simões et al. 2014; Glener et al. 2016). DD is divided into intraluminal duodenal diverticulum (IDD) and extraluminal duodenal diverticulum (EDD), the latter is the most common type (Song, 2015). The site of occurrence of approximately 75% of EDD is ampulla of Vater within 2 cm (Simões et al. 2014). Other classification that is used to classify this disease is primary and secondary DD. The primary diverticula are termed as true diverticula whereas most of the secondary diverticula are considered as false diverticula because these are usually formed secondary to the chronic duodenal ulceration (Glener et al. 2016).

Another point of consideration about duodenal diverticulum is that peak incidence of this disease occurs in later decades of life usually between 50-60 years and the incidence chances are increased with an increase in age (Simões et al. 2014; Glener et al. 2016). The clinical presentation of this disease usually occurs due to complications associated with this disease (Oukachbi and Brouzes 2013). Jaundice as well as pancreatitis (both acute and chronic obstruction of duodenum) may occur due to the mechanical compression and the inflammation may cause the perforation and diverticulitis. Some complications such as perforation and hemorrhage are threatening to life and to overcome such complications, there is a crucial need to use surgical intervention to avoid such complications (Gulmez et al. 2016). However, most of the signs and symptoms associated with perforated duodenal diverticulum are often not specific, and

elusive nature of the radiologic findings make it essential to use the correct preoperative diagnosis that has significant capacity to decrease mortality (Valencia et al. 2014).

As described above, the diagnostic problem may occur regarding diagnosis of this disease because of the fact that most of the patients show rare symptoms. Endoscopy method is used for diagnosis of diverticula and in this regard, upper GI barium and side viewing endoscopy are commonly used. Surgical management is not required in the case of asymptomatic diverticula as it is difficult to perform surgical procedures and an increased incidence of post-operative complications that may be life threatening, thus increasing the burden of mortality. In order to make the treatment approach successful, it is imperative to develop early recognition (Oukachbi and Brouzes 2013; Valencia et al. 2014). The detection of perforation of duodenal diverticulum makes it imperative to have high index suspicion.

Case Presentation

An 85-year-old male Saudi, known diabetic, hypertensive with bilateral non-obstructing renal pelvis stones and osteoarthritis, on regular ibuprofen was presented to the unit for his joints problems. He had a history of epigastric pain from 5 and right upper quadrant that radiated to the back; he vomited once at the day of presentation. On physical examination he was a febrile, pulse 80/m, BP 135/75, temperature 37^{o}C, had a localized tenderness at right iliac fosse; while the rest of physical examination was unremarkable. Investigation revealed leukocyte count to be 6.0 x 10^{9}/L, Hb 11g/dl, renal function panel and liver function to be normal, and serum amylase and serum lipase levels to be within normal range. An erect chest x-ray was carried out that showed no evidence for free air under diaphragm.

CT scan of abdomen with contrast demonstrated free retroperitoneal air (Fig. 1) and thickened bowel wall. There was no an accurate diagnosis preoperatively, but perforated atypical peptic ulcer and perforated duodenal diverticulum were the most possible diagnosis. The duodenum was kocherized at the time of operation. Around the friable, large perforated duodenal diverticulum, some quantity of bile-stained fluid was found at the third part (Fig. 2). The diverticulum was dissected, opened and excised. Interrupted single layer closure of diverticular neck plus feeding jejunostomy carried out and around the site of perforation, a closed-suction drain was placed. Patient underwent rather smooth postoperative course. There was some leakage but it dried after two weeks, while feeding jejunostomy was removed after 3 weeks. On follow up, patient did not present any complain. Basic laboratory tests were within normal range. Ultrasound of abdomen illustrated no intraperitoneal collection.

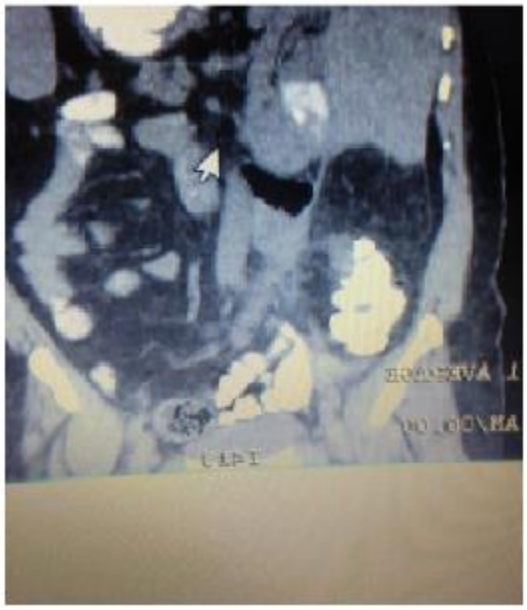

Figure 1: CT suggests perforated DD (arrowhead) with free air in the retropertonum

Figure 2: Diverticular neck and part of diverticular wall after excision of diverticulum

Discussion

It is evident from the research studies that approximately 22%-25% population has duodenal diverticula (Fan and Talbot 2016), but a vast majority is asymptomatic (Simões et al. 2014; Glener et al. 2016). These studies have also revealed that in most cases, DD shows vague clinical presentation and the condition varies. The CT scan of abdominal region is carried out for the detection of duodenal diverticulum perforation as it can present retroperitoneal and extraluminal collection of fluid or air (Oukachbi and Brouzes 2013). The guidelines for the surgical treatment of this disease are not present as it was considered as a rare disease due to lack of appropriate diagnosis. Nonspecific abdominal symptoms may present in up to 5% of the cases (Glener et al. 2016). The symptoms may vary from person to person, for instance if ostium is buried or inadequate drainage of sac occurs, inflammation might happen resulting in perforation and localized abscess formation. Perforation may also occur from foreign bodies, enteroliths and

ulceration. The onset of perforation is usually acute; however, in some cases, gradual perforation may occur. In some of the cases, ulceration can occur due to inflammation and ectopic gastric mucosa. This disease may also be associated with perforation in the mesenteric vessel, or in some cases, in aorta, leading to heavy bleeding (Glener et al. 2016; Oukachbi and Brouzes 2013). In some patients, NSAIDs intake may lead to hemorrhage and in some cases, ulceration may occur. Some clinicians have presented their views that chance of bleeding from diverticula is very common and thus in Upper gastrointestinal (UGI) hemorrhage, there is a need to increase index of suspicion. Biliary or pancreatic fistula is another complication that may occur during surgery (Gulmez et al. 2016).

Perforation is a life-threatening complication, necessitating urgent surgical intervention with mortality of up to 30%. However, without surgical intervention, mortality may approach 90% (Oukachbi and Brouzes 2013). Nevertheless, conservative management of selected cases has been reported by some authors (Rossetti et al. 2013). The intake of non-steroidal anti-inflammatory drugs (NSAIDs) has been attributed to ulcerations and hemorrhage from diverticulum (Simões et al. 2014). However, their association with perforation was not reported. In this case, we believe that taking ibuprofen may be the cause of perforation since we do not find any other possible cause. Although the perforated DD is associated with the signs and symptoms that are usually nonspecific, imaging studies such as CT abdomen with contrast is required to reach correct diagnosis preoperatively (Valencia et al. 2014). Findings suggestive of perforated DD include mesenteric fat stranding, collection of fluid or air in the extraluminal, thickened bowel wall, and retroperitoneal collection of fluid or air (Park and Park 2016). In 75% of the patients, EDD is identified in the ampulla of Vater within 2 cm (Valencia et al. 2014). Because of proximity of DD to the pancreatic duct and common bile duct (CBD), some authors

have provided the idea of inserting a feeding tube before carrying out dissection of the diverticulum into the ampulla of Vater (Saha et al. 2015). In this case, because the diverticulum arise from the third part of duodenum, we found that cannulation of ampulla of Vater is not essential before starting the dissection of diverticulum. There are some controversies regarding the appropriate operative procedure for perforated DD. Some authors advocate tube duodenostomy and feeding jejunostomy. Others advocated a laparoscopic approach or combined endoscopic and percutaneous management. However, many authors advocate trans-duodenal diverticulectomy and 2-layer closure (Valencia et al. 2014). In this patient, 2-layer closure is practically difficult because both duodenum and adjacent tissue are extremely inflamed, rendering excessive mobilization of distal duodenum to be difficult and hazardous. Therefore, we found diverticulectomy, interrupted single layer closure of diverticular neck, plus feeding jejunostomy to be a reasonable procedure in such high risk patient.

Conclusion

Therapeutic and diagnostic dilemmas are associated with perforated duodenal diverticulum. Association with chronic use of ibuprofen in this case may highlight the impact of chronic use of NSAIDs on asymptomatic diverticulum.

List of abbreviations

DD: Duodenal Diverticulum

IDD: Intraluminal Duodenal Diverticulum

EDD: Extraluminal Duodenal Diverticulum

NASIDs: Non-steroidal anti- inflammatory drugs

CBD: Common Bile Duct

Consent

Written informed consent was obtained from the patient for publication of this Case Report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Competing interests

All the authors of this study declared that they do not have any competing interests.

Authors' Contributions

Mansour TI: Conceived the study and did the literature search, coordinated the write-up, editing, and submission of the article.

Bashier OH, Alshareef AM and AlSahlkhdi AB: Participated in the writing of the manuscript and editing. All authors read and approved the final manuscript.

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List of Figures