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Navigating a Challenging Lemmel's Syndrome Case: An Atypical Presentation of a Rare Complication

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Abstract **Case Report**

Duodenal diverticula are uncommon anatomical anomalies that can lead to significant clinical challenges, particularly when associated with complications such as lemmel's syndrome. We report the case of a 72-year-old male admitted to our department with epigastric pain, vomiting, Keto-acidosis, and elevated C-reactive protein (CRP) levels. Initial gastroscopy revealed a gastric stasis, and a large duodenal diverticulum. Subsequent computed tomography (CT) imaging showed a dilated common bile duct (CBD) and main pancreatic duct (MPD), along with signs of pancreatitis and a liver abscess, likely secondary to cholangitis. The patient was managed conservatively with intravenous antibiotics and supportive care, including fluid resuscitation and analgesia. Despite the initial severity of the condition, the patient's symptoms improved significantly with medical management alone, obviating the need for surgical intervention. Follow-up imaging demonstrated resolution of the liver abscess and reduction in ductal dilatation. The patient was discharged in stable condition and remained asymptomatic during subsequent follow-ups. This case underscores the potential complications of duodenal diverticula and the importance of considering these diagnoses in patients presenting with duodenal diverticula and non-specific abdominal symptoms and elevated inflammatory markers. The successful conservative management highlights the viability of non-surgical and non-endoscopic treatments in selected cases, reducing the risks associated with such procedures. Comprehensive diagnostic imaging, a multidisciplinary treatment approach and a close follow-up are crucial for avoiding the need for surgery and achieving favorable outcomes. This case contributes to support conservative management in certain clinical scenarios.

Keywords: Duodenal Diverticula, Lemmel's Syndrome, (implied complication), Conservative Management, Pancreatitis/Cholangitis, Imaging (CT/Gastroscopy).

INTRODUCTION

Duodenal diverticula, acquired outpouches of the duodenal wall, are frequently encountered as incidental findings during endoscopic or imaging studies, with a reported prevalence of up to 22% [1]. While most remain asymptomatic, a subset may lead to significant complications [2], including pancreatitis, biliary obstruction, cholangitis, or, rarely, hepatic abscesses. These complications arise from the diverticulum's proximity to the ampulla of Vater and its potential to distort biliary anatomy, predisposing to bacterial colonization, bile stasis, and subsequent infection. Traditionally, management of such complications has leaned toward invasive interventions, such as endoscopic retrograde cholangiopancreatography (ERCP), percutaneous drainage, or surgery. However, emerging case reports suggest that select cases of duodenal diverticulum complications may respond to conservative strategies involving targeted antibiotics and supportive care, particularly in high-risk surgical candidates or anatomically complex scenarios [1, 3, 4].

This case report describes a patient with a large periampullary duodenal diverticulum complicated by an atypical presentation of lemmel's syndrome with Gastric outlet obstruction, absence of jaundice common bile duct (CBD) dilation, acute cholangitis, and a solitary liver abscess, successfully managed with conservative measures alone. The clinical course underscores the potential for non-invasive approaches in mitigating severe complications, challenging the conventional reliance on procedural interventions mainly ERCP. By highlighting this paradigm, we aim to contribute to the

growing discourse on individualized therapeutic strategies, underscoring the importance of individualized treatment strategies guided by clinical stability, close blood-panel monitoring, and patient-specific comorbidities.

CASE REPORT

A 72-year-old male with a history of diabetes on insulin and no prior surgery presented to our department with complaints of acute severe epigastric pain and persistent vomiting, associated with epigastric bloating with sensation of postprandial fullness and early satiety complicated by late postprandial food vomiting, without notion of dysphagia nor Upper gi bleeding. No jaundice, septic signs, tenderness or mass was found on the physical exam.

Laboratory investigations revealed a keto-acidosis, elevated C-reactive protein (CRP) levels at 113, no anemia and high WBC at 10000. Given the patient's age and the chronic presentation, a gastroscopy was performed, which identified a gastric stasis two duodenal diverticula, with deviation of the first duodenal part most likely due to the large peri-papillary diverticulum, and participation in the gastric outlet syndrome.

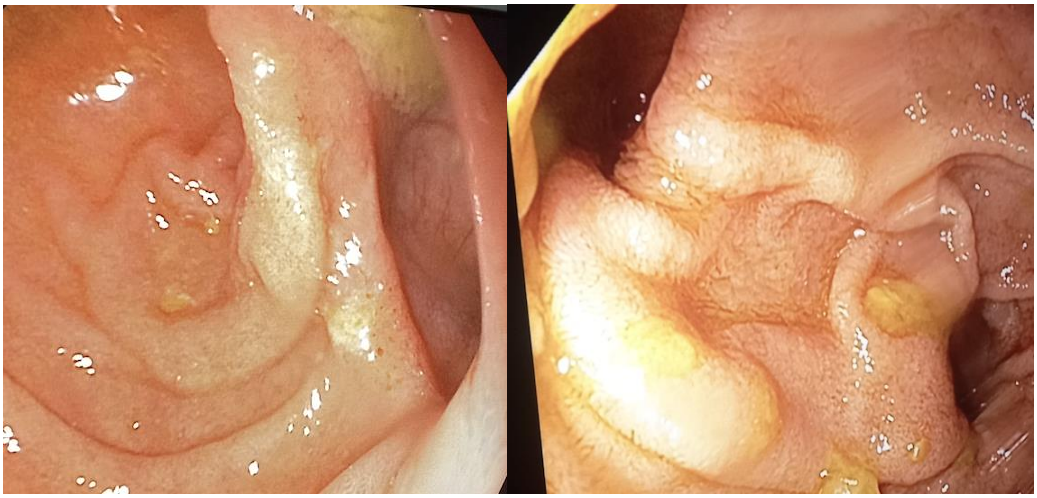

Figure 1, 2: Endoscopic images of two diverticulum, a small juxta-papillary and a large periampullary diverticulum

Further evaluation with a contrast-enhanced computed tomography (CT) scan revealed a periampullary diverticulum measuring 35 mm × 30 mm, accompanied by dilation of the common bile duct (CBD) and main pancreatic duct (MPD), indicative of biliary obstruction, along with signs of acute pancreatitis with fat stranding in the duodenum-pancreatic region and the hilar region, and also the presence of a liver abscess (50*30mm). Which was likely secondary to cholangitis originating from the diverticula compression. On contrast imaging, the diverticulum appeared excluded as it did not fill with oral contrast and was filled with food debris with enhanced walls. These findings solidified the diagnosis of duodenal diverticulitis with complications including cholangitis, pancreatitis, and a liver abscess, a sort of 'anicteric form' of a complicated lemmel's syndrome.

Additionally, due to suspicion of a right colonic tumor potentially causing the liver abscess, a colonoscopy was performed, which showed no abnormalities.

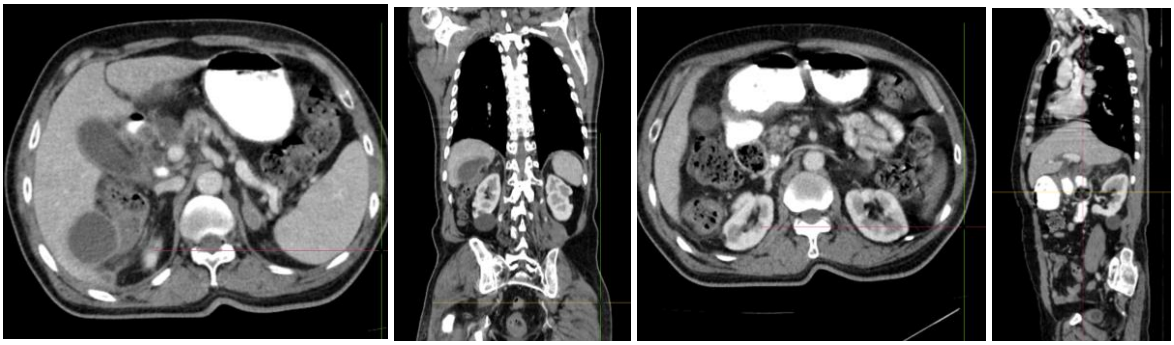

Figure 3, 4, 5, 6: Oral contrast Ct-scan showing the 3cm diverticulum, liver abscess and bile duct dilation

Given the patient's frailty, absence of jaundice and clear clinical signs of sepsis, and the technical challenges and high risk of complications associated with ERCP in this case, the patient was managed

conservatively with a combination of intravenous antibiotics(third generation Cephalosporins, Metronidazole) and supportive care, including fluid resuscitation and analgesia. The primary goal was to treat the infection, reduce inflammation, and prevent further complications. No intervention was deemed necessary at this stage due to the patient's stable condition and positive response to medical management. At the 21-day follow-up, patient was asymptomatic, laboratory results were within normal limits, showing no elevation in liver enzymes and low CRP levels. Follow-up CT scans at 21 days and 6 months, showed gradual resolution of the liver abscess, reduction in ductal dilatation and retraction of the diverticulum. The patient's symptoms improved significantly, with complete resolution of epigastric pain and partial resolution of vomiting.

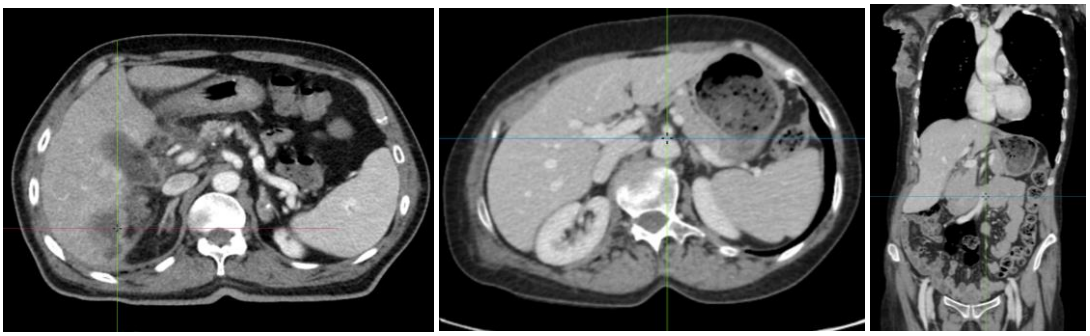

Figure 7, 8, 9: Partial then complete resolution of the lesions

DISCUSSION

Duodenal diverticula (DD) are sac-like protrusions of the duodenal wall, predominantly acquired rather than congenital. They most commonly occur in the second part of the duodenum within 2 cm of the ampulla of Vater, likely due to inherent wall weakness at the papilla, where the common bile duct and pancreatic duct enter [1, 4–7]. The duodenum is the second most common site for intestinal diverticula after the colon, with reported incidence rates ranging from 2% to 23% across radiological studies, endoscopic retrograde cholangiopancreatography (ERCP), and necropsy examinations [8]. DD occur more frequently in individuals over the age of 40, as intestinal muscle integrity diminishes with age, and show no sex predilection [9, 10]. The incidence of complicated DD is estimated at 0.03% per year, with fewer than 1% of cases requiring treatment [1, 5].

Duodenal diverticulitis presents a significant diagnostic challenge due to its nonspecific and generalized clinical manifestations [11]. Although duodenal diverticula (DD) are asymptomatic in 90–95% of cases, they can occasionally lead to complications, which remain rare, with an estimated annual incidence of 0.03% [4, 5, 10].

The most frequent complications involve biliopancreatic stasis, which may progress to pancreatitis and cholangitis. Of particular interest is Lemmel's syndrome, characterized by obstructive jaundice secondary to a periampullary duodenal diverticulum in the absence of choledocholithiasis or neoplasia [12]. While traditionally associated with jaundice, diagnosis can occur without this hallmark feature [13]. This was evident in our case, where, despite radiological evidence of biliary obstruction, clinical jaundice was absent. We hypothesize that early hospital admission may have prevented the full development of Lemmel's syndrome.

An additional, exceptionally rare complication observed in our patient was gastric outlet obstruction (GOO). To our knowledge, the first similar case reported in the literature was described by J. Stephen Love *et al.*, in 2022 [13]. Interestingly, their patient also lacked clinical jaundice despite radiological evidence of common bile duct and pancreatic duct dilation, mirroring our findings.

Other potential complications primarily affecting the luminal aspect of the diverticulum include ulceration with bleeding, perforation, and diverticulitis. The underlying pathophysiology in these cases resembles that of colonic diverticula; however, food retention rather than stool accumulation is implicated. Clinically, patients typically present with upper abdominal pain accompanied by nausea and vomiting. Inflammatory and compressive effects may also result in cholestasis and elevated lipase levels [1].

Laboratory investigations play a crucial role in the evaluation of complicated duodenal diverticula (DD). Common abnormalities include hyperbilirubinemia, elevated hepatic enzymes, alkaline phosphatase, and gamma-glutamyl transferase [14]. These findings are particularly relevant in cases complicated by Lemmel's syndrome, where hyperbilirubinemia is reported as the most frequent laboratory abnormality, followed by elevated hepatic enzymes and cholestatic markers.

C-reactive protein (CRP) serves as an essential biomarker in acute diverticulitis, with levels correlating strongly with disease severity. Markedly elevated CRP concentrations may indicate the presence of perforation, necessitating more aggressive management [15].

Alongside CRP, procalcitonin (PCT) is a valuable marker, given its rapid elevation during bacterial infections. Both CRP and PCT are particularly useful for monitoring therapeutic response, especially in patients managed conservatively [15].

Diagnosing duodenal diverticula (DD) and their associated complications remains a clinical challenge due to nonspecific presentations and anatomical complexity. Historically, preoperative radiologic diagnosis of duodenal diverticulitis demonstrated poor sensitivity, as low as 11.7% [16]. However, advances in imaging techniques have significantly enhanced detection rates, with current sensitivity ranging from 25% to 89% for conditions such as duodenal diverticulitis and biliary obstruction [1, 7, 16].

Despite ERCP's diagnostic and therapeutic advantages, cannulation of the papilla may be technically challenging due to anatomical distortions, with literature supporting the superiority of lateral-viewing endoscopes for improving diagnostic yield [17, 12, 18, 19]. In our case, initial gastroscopy failed to detect a complicated duodenal diverticulum, highlighting the limitations of forward-viewing endoscopes in visualizing the papilla. Side-viewing duodenoscopes provide superior visualization in such scenarios. Several classifications have been proposed for periampullary DD, including the Li-Tanaka, Boix, and Lobo systems. Among these, the Li-Tanaka classification is particularly valuable for its clinical relevance in ERCP, aiding in the prediction of cannulation challenges and success rates based on diverticulum type [18].

Magnetic resonance cholangiopancreatography (MRCP) offers a non-invasive alternative with high diagnostic utility, especially in excluding choledocholithiasis, pancreatic tumors, or abscesses. MRCP can also demonstrate the absence of communication between the diverticulum and the biliary or pancreatic ducts and may reveal upstream bile duct dilation when a periampullary DD exerts a mass effect [20].

Timely and accurate diagnosis is essential, as delayed recognition of duodenal diverticulitis can lead to perforation, which carries a mortality rate of up to 30% [21]. Encouragingly, mortality rates associated with perforated diverticula have declined markedly, from earlier reports of 34% to approximately 3% in recent series [22].

The management of duodenal diverticula (DD) is dictated by clinical presentation and patient stability. Asymptomatic DD requires no intervention. In complicated cases, nonoperative management is particularly appealing for hemodynamically stable individuals, as well as frail or high-risk patients. This approach typically involves broad-spectrum intravenous antibiotics, fluid resuscitation and dietary modifications [10, 16, 23].

For biliary or pancreatic complications, endoscopic sphincterotomy remains the preferred treatment, although procedural success may be limited by technical challenges. Despite these challenges, ERCP remains the simplest and most frequently described treatment modality for Lemmel syndrome in the literature. In cases where cannulation proves difficult, rendezvous techniques can serve as viable alternatives [14]. Additionally, endoscopic transluminal water irrigation has emerged as a potential conservative treatment option for patients with diverticulitis [24]. In our case and also in Love, J *et al.*, case conservative management alone was sufficient to alleviate Gi tract, biliary and pancreatic obstruction.

When conservative and endoscopic interventions fail—particularly in younger patients with recurrent symptoms—surgical management may be warranted [1].

Lemmel syndrome, first described nearly a century ago, remains a rare and challenging condition, with only a limited number of cases reported in the literature. Its diverse clinical manifestations and treatment responses have hindered the establishment of standardized diagnostic and therapeutic guidelines [13]. This complexity extends to surgical management, where no consensus exists on the optimal approach due to the risks inherent in each procedure. While diverticulectomy offers a definitive solution, it carries a high complication rate, requiring precise identification of the ampulla of Vater to prevent adverse outcomes. In select cases, alternative surgical strategies such as choledochojejunostomy or gastrointestinal bypass may be more appropriate. The choice of intervention should be tailored to the patient's clinical profile and guided by institutional expertise [25].

CONCLUSION

This case highlights the diagnostic challenges of duodenal diverticulum complications presenting atypically as Lemmel's syndrome with hepatic abscess and gastric outlet obstruction, despite lacking jaundice. Successful conservative management despite the complexity of the initial presentation underscores the viability of non-invasive strategies in clinically stable or high risk scenarios. Our findings advocate for an individualized, multidisciplinary approach. Further research is needed to refine patient selection criteria and optimize conservative protocols, advancing precision medicine in managing such intricate gastrointestinal pathologies.

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