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Uncommon Cause of Bile Duct Dilation: A Case of Duodenal Diverticulum Compressing the Lower Common Bile Duct (Lemmel's Syndrome)

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Abstract **Case Report**

Lemmel's syndrome is a rare and often underdiagnosed condition characterized by the compression of the common bile duct by a duodenal diverticulum, leading to the dilation of both intra- and extra-hepatic bile ducts. We present the case of a 55-year-old woman with unexplained bile duct dilation, where imaging studies, including biliary MRI (bili-IRM), revealed a duodenal diverticulum compressing the lower common bile duct. The patient was initially suspected to have obstructive cholangiopathy, but further evaluation through bili-IRM confirmed the diagnosis of Lemmel's syndrome. This case highlights the importance of considering Lemmel's syndrome in patients with unexplained biliary dilation, especially in the absence of identifiable stones or tumors. Timely recognition and differentiation of this rare condition from more common bile duct pathologies are crucial to avoid unnecessary interventions. The case is discussed in the context of its clinical presentation, diagnostic challenges, and management strategies.

Keywords: Lemmel's Syndrome, Duodenal Diverticulum, Bile Duct Dilation, Biliary Obstruction, Surgical Indication.

INTRODUCTION

Duodenal diverticula are typically found in the second portion of the duodenum, close to the ampulla of Vater. These diverticula are pseudo-diverticula, formed by mucosal protrusions that lack a muscular layer. When situated within 2-3 cm of the ampulla of Vater, they are known as periampullary diverticula [1]. While these diverticula are usually asymptomatic, they can, in rare cases, cause complications involving the pancreas and bile ducts if they become inflamed [2]. In the context of Lemmel syndrome, obstructive jaundice can occur due to periampullary diverticula without the presence of choledocholithiasis [3]. We report the case of a woman presenting with Lemmel syndrome, revealed during the etiological investigation of dilatation of the common bile duct.

CLINICAL OBSERVATION

A 55-year-old woman, who had undergone cholecystectomy three years prior, presented with recurrent episodes of intermittent abdominal pain, without any associated symptoms. The pain was not relieved by symptomatic treatment, and the patient did not exhibit signs of jaundice or fever. On physical examination, the abdomen was soft and non-tender. Laboratory tests showed a mild elevation of C-reactive protein (CRP) at 15 mg/L, a normal white blood cell count of 7000/mm³, and a negative procalcitonin (PCT). Hepatic cholestasis markers were within normal limits. Abdominal CT imaging revealed dilation of the intrahepatic bile ducts and the common bile duct, measuring 12.4 mm, with an empty gallbladder fossa. Biliary MRI (bili-IRM) demonstrated a duodenal diverticulum causing mass effect on the distal common bile duct, resulting in upstream dilation of both the common bile duct and intrahepatic bile ducts. These findings were consistent with a diagnosis of Lemmel syndrome.

Following the diagnosis of Lemmel syndrome, the patient was managed conservatively due to the absence of severe complications. The primary treatment included supportive care with pain management and hydration. Given the mild inflammatory markers and the absence of cholangitis or pancreatitis, no immediate surgical intervention was deemed necessary. The patient was started on intravenous antibiotics, including metronidazole and levofloxacin, to address any potential underlying infection associated with the duodenal diverticulitis. A nasogastric (NG) tube was inserted for decompression and set to suction to alleviate any potential pressure caused by the diverticulum. The patient's clinical condition improved with this treatment

approach, and she was closely monitored through follow-up imaging to assess the resolution of bile duct dilation.

The decision for long-term management involved periodic imaging follow-up and symptomatic management. Given the reduction of inflammation and the absence of symptoms, surgery was postponed at this point in time but remains a potential option if the patient's condition worsens or complications arise. The patient was also advised to return for evaluation if new symptoms developed or if the biliary dilation worsened. Informed consent was obtained from the patient for all procedures and treatments.

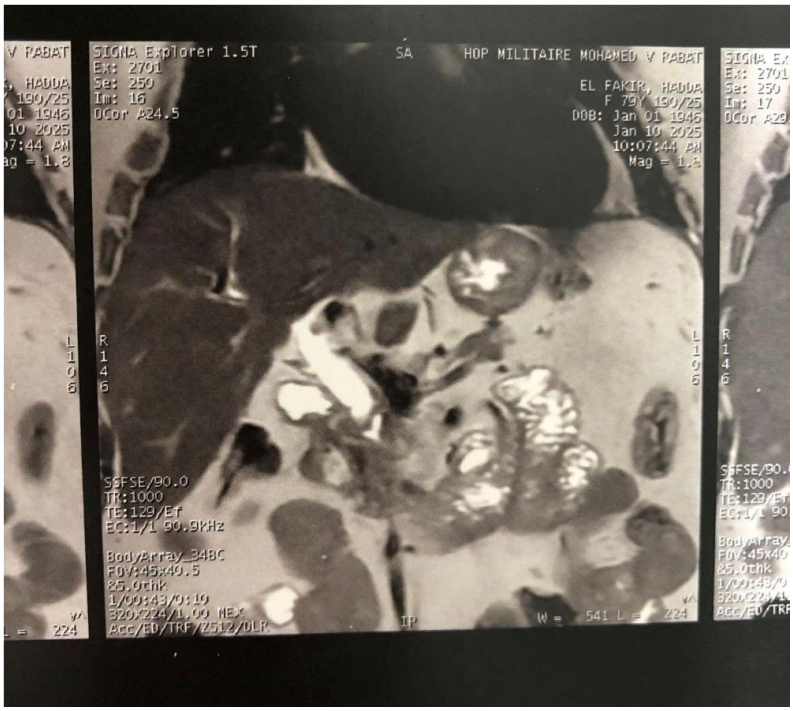

Figure 1: Radiological image showing bile duct dilation due to compression by a duodenal diverticulum

DISCUSSION

Gastrointestinal diverticula are protrusions of the intestinal wall that can develop at any location along the gastrointestinal tract, with the colon being the most frequently affected site, followed by the duodenum. Duodenal diverticula are classified based on their location, with periampullary duodenal diverticula being the most commonly encountered [4]. While the majority of periampullary diverticula remain asymptomatic, some may lead to complications, which can be categorized as either non-pancreaticobiliary or pancreaticobiliary. Non-pancreaticobiliary complications, though rare, may include diverticulitis, bleeding, perforation, or fistula formation. In contrast, pancreaticobiliary complications can manifest as recurrent gallbladder or bile duct stones, obstructive jaundice, cholangitis, or acute pancreatitis [4].

Lemmel syndrome was first described in 1934 by Lemmel as a cause of obstructive jaundice in the absence of gallstones, resulting from extrinsic compression of the common bile duct by a periampullary duodenal diverticulum. This condition may be recurrent or complicated by cholangitis, which is attributed to mechanical compression of the terminal bile duct by the diverticulum [5]. The pathogenesis of Lemmel syndrome is thought to involve multiple mechanisms. First, direct mechanical irritation from the periampullary diverticulum can lead to chronic inflammation of the ampulla, ultimately causing fibrosis of the papilla. Second, periampullary diverticula may disrupt the function of the sphincter of Oddi. Third, mechanical compression of the distal common bile duct or ampulla by the diverticulum, as observed in our case, can occur [6].

Imaging plays a crucial role in diagnosing Lemmel syndrome. Computed tomography is the most commonly performed imaging modality in emergency settings for patients presenting with acute symptoms. Magnetic resonance cholangiopancreatography or endoscopic retrograde cholangiopancreatography are also indicated [7], with the latter offering both diagnostic and therapeutic advantages. Endoscopic retrograde cholangiopancreatography enables interventions such as sphincterotomy and the placement of a biliary stent. In high-risk patients, it may be the preferred treatment option due to its association with a lower risk of complications and mortality [8]. However, it is essential to consider the possibility of procedural failure and complications, as the papilla is frequently located within or near the diverticulum [9].

Surgical intervention is considered in severe cases. When biliary obstruction, hemorrhage, or perforation occurs, diverticulectomy has been proposed as a treatment option. However, this procedure is technically demanding and carries a higher risk of morbidity and mortality. Consequently, it is generally reserved for select cases where less invasive approaches have failed or are not feasible [10].

CONCLUSION

Lemmel syndrome remains a rare and often underdiagnosed cause of biliary obstruction, primarily due to extrinsic compression of the common bile duct by a periampullary duodenal diverticulum. In the absence of gallstones or tumors, it is crucial to consider this condition in patients presenting with unexplained bile duct dilation to avoid unnecessary interventions. Imaging modalities such as biliary MRI and computed tomography play a vital role in confirming the diagnosis and guiding management decisions.

The management of Lemmel syndrome largely depends on the severity of symptoms and the presence of complications. In asymptomatic or mildly symptomatic cases, conservative treatment with symptomatic management, hydration, and close monitoring is often sufficient. Endoscopic interventions, such as sphincterotomy or biliary stent placement, may be beneficial in select cases, particularly when associated with functional obstruction or cholangitis.

However, in cases complicated by persistent biliary obstruction, recurrent cholangitis, or perforation, surgical intervention should be considered. While diverticulectomy is technically challenging and associated with increased morbidity and mortality, it remains the definitive treatment for refractory or severe cases. A careful evaluation of surgical risks versus benefits is essential, and surgery should be reserved for patients in whom less invasive approaches fail or are contraindicated. Long-term follow-up is necessary to monitor disease progression and assess the need for further intervention.

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