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Case Report

Endoscopic Clearance Of An Impacted Periampullary Diverticulum In Lemmel's Syndrome Presenting With Severe Transaminitis: A Case Report.

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Abstract

Lemmel's syndrome is a rare cause of obstructive jaundice resulting from compression of the common bile duct by a periampullary duodenal diverticulum (PAD) in the absence of choledocholithiasis or malignancy, usually with food impaction. We report the case of a 78-year-old woman presenting with fever, right upper quadrant pain, and markedly elevated transaminases suggestive of hepatocellular injury. Initial CT imaging demonstrated a distended PAD causing biliary compression. ERCP was attempted following clearance of the PAD from impacted food. Cannulation was unsuccessful due to an intradiverticular papilla, despite 2 separate attempts at cannulation including a needle knife papillotomy. Subsequent endoscopic ultrasound confirmed biliary dilation with tapering at the ampulla and absence of choledocholithiasis. The patient improved on intravenous antibiotics following PAD clearance despite failed bile duct cannulation attempts. To our knowledge, this case represents the most severe transaminitis reported in Lemmel's syndrome and reinforces the importance of including it in differential diagnoses for cholangitis with atypical liver biochemistry, particularly when imaging reveals periampullary diverticula.

Keywords: Lemmel's syndrome; periampullary diverticulum; transaminitis; endoscopic retrograde cholangiopancreatography; food impaction; biliary obstruction.

INTRODUCTION

Lemmel's syndrome is a rare cause of obstructive jaundice in the absence of choledocholithiasis or malignancy, resulting from extrinsic compression of the common bile duct by a periampullary duodenal diverticulum (PAD) [1, 2]. The compressive mechanism is typically food impaction within the diverticulum, which distends the diverticular sac and exerts mass effect on the adjacent biliary tree [2, 3]. Duodenal diverticula are common, with a reported prevalence of up to 23% at upper gastrointestinal endoscopy, but fewer than 5% become symptomatic [3, 4].

The classical presentation of Lemmel's syndrome resembles that of choledocholithiasis: right upper quadrant or epigastric pain, nausea, vomiting, fever, and a cholestatic liver biochemical profile, often complicated by ascending cholangitis [4, 5]. Marked hepatocellular injury is uncommon and is infrequently emphasised in the existing literature, which can delay recognition when transaminases dominate the biochemical picture [2, 4, 6].

Endoscopic retrograde cholangiopancreatography (ERCP) is the diagnostic and therapeutic intervention of choice; however, periampullary diverticula are well-recognised anatomical risk factors for difficult or failed cannulation, particularly when the major papilla lies within the diverticulum (Li–Tanaka Type I) [6, 7]. In the setting of dense food impaction, the technical challenge is twofold: the operator must first achieve mechanical clearance of the impacted bolus before any attempt at biliary access. We report a case of Lemmel's syndrome with the most severe transaminitis described to date, in which advanced endoscopic debris clearance from a Type I periampullary diverticulum produced complete clinical

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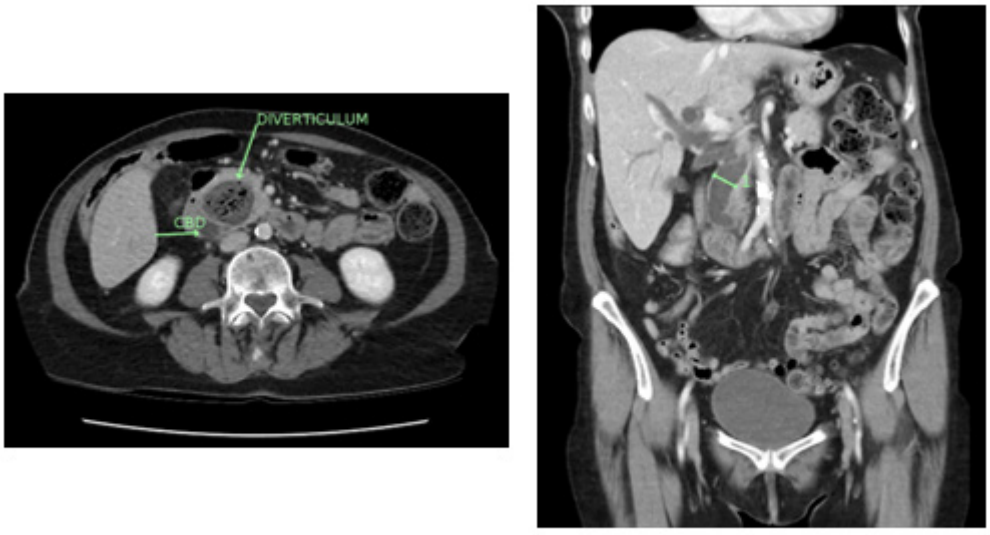
and biochemical resolution despite repeated unsuccessful bile duct cannulation.

CASE DESCRIPTION

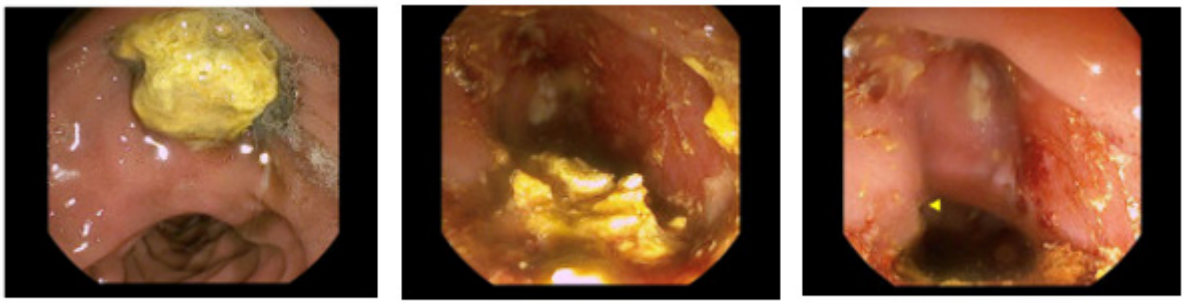
A 78-year-old woman presented to a regional emergency department with a three-day history of right upper quadrant pain, nausea, vomiting and fever. She denied diarrhoea, rigors, jaundice, dark urine or pale stools. Her medical history comprised laparoscopic cholecystectomy seven years earlier for acute cholecystitis and well-controlled essential hypertension. She was a lifelong non-smoker and did not consume alcohol or illicit substances. On examination she was febrile (38.0 °C), tachycardic (heart rate 108 beats per minute) and normotensive. The abdomen was soft with localised tenderness in the right upper quadrant and no peritonism, palpable mass or organomegaly. The remainder of the examination was unremarkable. Initial laboratory investigations demonstrated a marked transaminitis with modest cholestatic derangement: alanine aminotransferase 930 U/L (reference 10–35), aspartate aminotransferase 885 U/L (10–35), alkaline phosphatase 534 U/L (30–110), gamma-glutamyl transferase 448 U/L (5–35) and total bilirubin 26 µmol/L (≤20). The C-reactive protein was elevated at 63.1 mg/L (≤5) with a normal full blood count. Blood cultures returned positive for *Escherichia coli*. Computed tomography of the abdomen and pelvis with intravenous contrast demonstrated marked dilatation of the common bile duct to 19 mm and a 37 × 33 mm gas- and debris-filled outpouching arising within the duodenum, abutting and exerting mass effect upon the distal bile duct (**Figure 1**). No choledocholithiasis, intra-abdominal collection or pancreatic mass was identified.

Figure 1. Axial (a) and coronal (b) computed tomography of the abdomen and pelvis with intravenous contrast demonstrating a gas- and debris-filled outpouching arising from the second and third parts of the duodenum (37 × 33 mm), exerting mass effect on the distal common bile duct, with upstream biliary dilatation (common bile duct 19 mm).



The patient was commenced on empirical intravenous piperacillin–tazobactam and transferred to our tertiary centre for ERCP. At the index ERCP, a large periampullary diverticulum with dense, solid food impaction was identified; the impacted bolus completely obscured the major papilla (**Figure 2a**). Using a combination of a snare, Rat tooth forceps and a tripod grasper over a period of 45mins, the impacted food was finally cleansed from the diverticulum (**Figure 2b**). Pressure ulceration was noted within the cleared diverticulum, as well as dark bile exuding from the papilla, which was wholly within the diverticulum (**Figure 2c**). Cannulation of the bile duct was unsuccessful at this index ERCP due to the eccentric location of the papilla, despite a small needle knife incision. A second ERCP three days later, undertaken in anticipation of a clearer post-inflammatory anatomy, was similarly unsuccessful.

Figure 2. Endoscopic appearances during ERCP. (a) Periampullary diverticulum with solid food impaction obscuring the major papilla. (b) Progressive mechanical clearance using sequential snare, rat-tooth forceps and tripod grasper. (c) Intradiverticular major papilla visualised after clearance, with dark bile efflux (yellow marker).



(a) (b) (c)

Despite the failed cannulations, the patient demonstrated steady clinical and biochemical improvement following diverticular clearance and antibiotic therapy. Fever resolved within 48 hours, the C-reactive protein down-trended, and liver biochemistry normalised over the subsequent week (alanine aminotransferase fell from 930 U/L to 64 U/L by day 8) (See **Table 1**). A planned percutaneous transhepatic cholangiogram was deferred and ultimately cancelled in light of this resolution. She was discharged home with outpatient follow-up arranged with her referring gastroenterologist and a recommendation for delayed magnetic resonance cholangiopancreatography to confirm duct clearance.

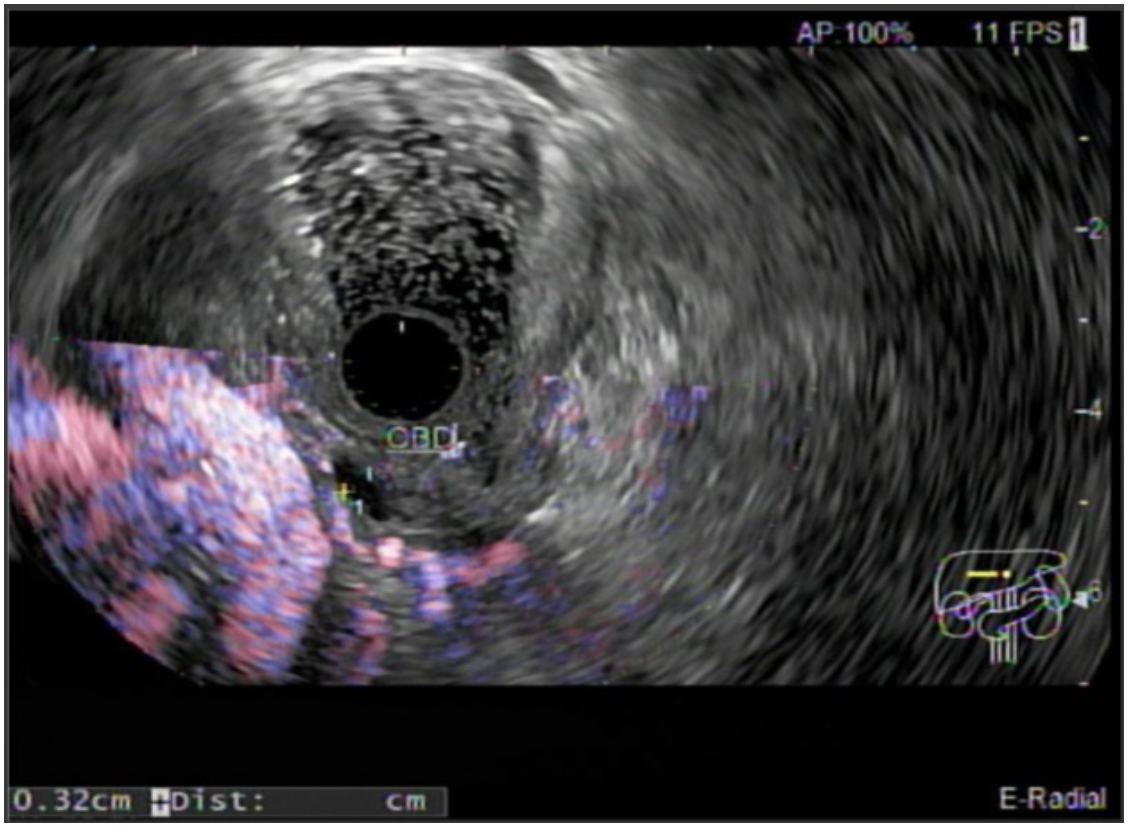
Table 1. Laboratory investigations on admission and after diverticular clearance.

Parameter	Admission (day 0)	Day 8	Reference range
Alanine aminotransferase (U/L)	930	64	10–35
Aspartate aminotransferase (U/L)	885	28	10–35
Alkaline phosphatase (U/L)	534	185	30–110
Gamma-glutamyl transferase (U/L)	448	203	5–35
Total bilirubin (μmol/L)	26	9	≤20
C-reactive protein (mg/L)	63.1	3.3	≤5
White cell count (×10⁹/L)	8.2	4.1	4.0–11.0

Reference ranges from the institutional laboratory. Day 8 values demonstrate near-complete biochemical resolution after endoscopic debris clearance.

Outpatient endoscopic ultrasound was performed in lieu of magnetic resonance cholangiopancreatography and demonstrated a non-dilated common bile duct with smooth tapering at the ampulla and no intraductal lesions, consistent with complete relief of obstruction (**Figure 3**). No choledocholithiasis was identified, and no further intervention was required. At three-month review the patient remained asymptomatic with normal liver biochemistry.

Figure 3. Outpatient endoscopic ultrasound after diverticular clearance, demonstrating a non-dilated common biliary duct measuring 3.2 mm with smooth distal tapering and no intraluminal obstructive lesion.



DISCUSSION

This case is distinguished by two features that are uncommonly co-located in Lemmel's syndrome: a markedly hepatocellular pattern of liver injury at presentation, and the technical resolution of biliary obstruction through advanced endoscopic clearance of impacted food debris from a Li–Tanaka Type I periampullary diverticulum, despite repeated failure of bile duct cannulation.

The published literature on Lemmel's syndrome predominantly describes a cholestatic or mixed hepatobiliary derangement consistent with extrahepatic biliary obstruction [1, 2, 4, 5]. While transaminase elevations are recognised, the magnitude of hepatocellular injury observed in this patient (alanine aminotransferase 930 U/L; aspartate aminotransferase 885 U/L) substantially exceeds previously reported values in case reports and case series of Lemmel's syndrome [4, 5, 8]. The dissociation between hepatocellular and cholestatic markers can mislead clinicians toward alternative diagnoses such as ischaemic, drug-induced or viral hepatitis, with the potential to delay imaging and definitive endoscopic management. This case underscores the importance of correlating biochemistry with cross-sectional imaging and of including Lemmel's syndrome in the differential of acute hepatocellular injury when imaging features are concordant.

Periampullary diverticula are common, identified in approximately 9–23% of patients undergoing ERCP, and are typically asymptomatic [4, 7, 10]. This high rate of incidental, non-pathological discovery contributes to a tendency to overlook these structures or dismiss them as clinically insignificant, potentially delaying diagnosis when they do become symptomatic, as in Lemmel's syndrome [9]. The Li–Tanaka classification stratifies their relationship to the major papilla into four types, with Type I (papilla wholly contained within the diverticulum) carrying the highest risk of cannulation failure and of Lemmel's syndrome [7]. In our patient, the papilla was fully intradiverticular, satisfying Type I criteria, and was further obscured by impacted, partially organised food residue. The combination of a Type I anatomy and dense impaction creates an unusually demanding endoscopic environment in which cannulation cannot even be attempted until mechanical clearance has been achieved.

The endoscopic technique applied in this case is the principal therapeutic lesson. Sequential mechanical extraction was undertaken using three complementary instruments: a polypectomy snare to fragment the bezoar, Rat tooth forceps to grasp partially loosened residue, and a tripod grasper to remove larger fragments that were not amenable to forceps. Forty-five minutes of staged clearance were required to fully evacuate the impacted bolus. Although bile duct cannulation was ultimately unsuccessful, this technical effort alone produced complete clinical and biochemical resolution - a finding consistent with the hypothesis that, in Lemmel's syndrome, biliary obstruction is principally generated by the

distended diverticulum rather than by a fixed anatomical narrowing of the bile duct itself [2, 4]. Clearance of the diverticular contents alone may therefore be sufficient to relieve the obstruction even when sphincterotomy or stenting cannot be performed.

Although alternative endoscopic approaches (such as cap-assisted cannulation, double-balloon enteroscopy-assisted ERCP, percutaneous transhepatic cholangiography, or surgical sphincteroplasty/diverticulectomy) are reported options when cannulation fails [4, 6, 11, 12], they were rendered unnecessary in this patient by the response to debris clearance alone. This observation is concordant with prior endoscopic series suggesting that ERCP-based therapeutics for cholangitis associated with juxtapapillary duodenal diverticula are not associated with a higher rate of complications [13].

Although debris clearance produced a definitive response in this admission, the underlying anatomical substrate - a Type I periampullary diverticulum - persists, and recurrent food impaction with subsequent biliary obstruction or cholangitis remains a foreseeable risk [2, 4, 11]. Conservative dietary advice and a low threshold for early reinvestigation in the event of recurrent right upper quadrant pain or biochemical derangement were communicated to the patient and her referring gastroenterologist. Definitive surgical management (diverticulectomy with or without sphincteroplasty) is reserved for patients with recurrent or complicated disease in whom endoscopic management has failed [12].

CONCLUSION

This case extends the recognised biochemical phenotype of Lemmel's syndrome to include severe hepatocellular injury, with transaminase elevations exceeding any previously reported in the literature. It also demonstrates that advanced endoscopic clearance of impacted food debris from a Li–Tanaka Type I periampullary diverticulum, using sequential snare, rat-tooth forceps and tripod grasper extraction, can produce complete clinical and biochemical resolution even when bile duct cannulation cannot be achieved. Lemmel's syndrome should be considered in the differential of acute obstructive jaundice or cholangitis presenting with a hepatocellular biochemical pattern, particularly when imaging demonstrates a debris-filled periampullary diverticulum. Endoscopic debris clearance should be regarded as a primary therapeutic step in this setting, and definitive surgical or alternative endoscopic strategies reserved for those who do not respond.

Author contributions

OA: literature review, original draft, review and editing.
DS: critical analysis and review.
DA: manuscript review, critical analysis, editing and supervision.

Conflicts of interest

The authors declare that they have no conflicts of interest relevant to this work.

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Ethics

An ethics waiver was sought from the Bellberry Human Research Ethics Committee (HREC) for this case report, as it involved a single patient and did not constitute systematic research. The project met the criteria for exemption from full ethical review in accordance with the National Statement on Ethical Conduct in Human Research. All information was de-identified.

Data availability

All data relevant to this report are included within the manuscript. Further de-identified information may be made available by the corresponding author on reasonable request.

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