

A Retrospective Study of Lemmel's Syndrome: Single Centre 15-year Experience

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Abstract: Lemmel's syndrome is obstructive jaundice due to periampullary duodenal diverticula in the absence of a neoplasm or choledocholithiasis. The aim of this study is to present our 15-year experience on this rare pathology. Endoscopy, imaging, and histopathology records of all the patients with obstructive jaundice who were managed in surgical unit 3 in our institute between January 2010 and December 2024 were reviewed retrospectively. Patients who were found to have periampullary duodenal diverticula were included in this study. Descriptive statistics were used to summarize the data. Of 10 cases of Lemmel's syndrome, there were 4 male and 6 female patients. Contrast enhanced computed tomography was done in all the cases and confirmed the diagnosis. Upper gastrointestinal endoscopy was done in all the cases to rule out any other associated mucosal pathology of stomach or duodenum. Surgical intervention was done in 4 cases. Duodenal diverticula were detected in up to 27% of patients requiring upper gastrointestinal endoscopy and imaging studies; while they became symptomatic in only 1–2% of the cases and were causing complications in up to 5% of the cases. Before attributing periampullary diverticula as a cause of obstructive jaundice, it is important to rule out other benign as well as malignant pathologies causing obstructive jaundice.

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Introduction

Lemmels’s syndrome is obstructive jaundice due to periampullary duodenal diverticula in the absence of a neoplasm or choledocholithiasis. This was first described by a German Surgeon, Gerhard Lemmel in 1934 (Khan et al., 2017; Bakula et al., 2021). It occurs when a diverticulum arising from the second part of the duodenum causes obstructive jaundice due to mechanical obstruction of the common bile duct. Duodenum diverticula are common. Duodenum is the second most common site in the intestine for diverticula formation, but most of the cases remain asymptomatic and thus undiagnosed (Kang et al., 2014; Somani and Sharma, 2017). They are usually an incidental finding. The diverticula arising from the second part of duodenum in the periampullary region are rare and often give rise to symptoms of obstructive jaundice and patients rarely present with complications (Somani and Sharma, 2017).

Lemmel’s syndrome is a rare cause of obstructive jaundice, and it should be considered in absence of periampullary mass lesion or choledocholithiasis to avoid mismanagement. The aim of this study is to present our 15-year experience on this rare benign pathology.

Methods

Endoscopy, imaging, and histopathology records of all the patients with obstructive jaundice who were managed in surgical unit 3 in our institute between January 2010 and December 2024 were reviewed retrospectively. Patients who were found to have periampullary duodenal diverticula were included in the study.

Records of these patients were then reviewed in detail. The parameters such as age, gender, clinical features, associated co-morbidities, associated

Table 1: Shows ten cases

Case	Age/sex	Symptoms/signs	Associated comorbidity	Liver function tests	Imaging studies	Treatment	Follow-up
1	42/M	Yellowish discoloration of skin and sclera and anorexia × 15 days	None	Raised serum bilirubin, AST, ALT and ALP	Barium meal study: presence of duodenal divercula in second part near ampulla of Vater CECT: duodenal diverticula arising from second part of duodenum causing compression of CBD, dilatation of CBD and intrahepatic biliary radical dilatation	Endoscopic papillotomy	6-months alive
2	45/M	Recurrent right upper abdomen pain, anorexia, nausea 2 months	None	Raised serum bilirubin and ALP, low total protein/albumin	USG: dilated proximal CBD, CECT: dilated CBD and IHBRD, duodenal diverticula arising from second part of duodenum causing compression of CBD	Choledocho-jejunostomy with excision of diverticula	6-months up follow-up, alive
3	52/F	Non-specific diffuse pain abdomen × 1 month	None	Normal	CECT: mild dilatation of CBD, duodenal diverticula arising from second part of duodenum	Managed conservatively	6-months, alive
4	65/F	Malaise, high coloured urine × 7 days	Diabetic and hypertensive for 3 years	Raised serum bilirubin, AST, ALT and ALP	CECT: diverticula arising from D2 with dilated CBD and IHBRD	Choledocho-jejunostomy without excision of diverticula	6-months follow-up, alive
5	45/F	Presented with symptoms of acute cholecystitis with jaundice 15 days	Hypothyroid	Raise TLC, bilirubin, and ALP	USG: dilated CBD, with no stones, CECT: duodenal diverticula arising from D2 causing compression of CBD, mild dilatation of CBD	Endoscopic papillotomy	6-months follow-up, alive

anomalies, complications, investigations, treatment modalities, prognosis and follow up were evaluated. The protocol was approved by the ethical review board of the institute. Individual informed consent was waived as the design of the study was retrospective. Data anonymization was utilized to maintain patient confidentiality.

Statistical analysis

Descriptive statistics were used to summarize the data.

Results

Of 10 cases of Lemmel's syndrome, there were 4 male and 6 female patients; the youngest patient was 42 years old while the oldest was 74 years of age. Four patients presented with non-specific diffuse pain abdomen, 3 had yellowish discoloration of sclera while it was an incidental finding in one patient. The

other presenting symptoms were fever, malaise and high coloured urine. There were no local clinical signs except for epigastric and right hypochondrial tenderness in 4 patients. Liver function tests were deranged in 4 while normal in 3 patients. None of the patients presented with or developed pancreatitis or gastrointestinal haemorrhage.

There were no associated co-morbidities except for diabetes mellitus in two, hypothyroidism and hypertension in one patient each. Two patients underwent laparoscopic cholecystectomy in the past for symptomatic gall stone disease. Two patients had cystolithiasis while, there was no choledocholithiasis in any of the patients. One patient underwent truncal vagotomy with pyloroplasty in the past.

Contrast enhanced computed tomography (CECT) was done in all the cases and confirmed the diagnosis. The consistent findings on CECT were duodenal diverticula arising from second part of duodenum causing compression of CBD, dilatation of intra- and extrahepatic biliary radicals. Barium meal was done

Case	Age/sex	Symptoms/signs	Associated comorbidity	Liver function tests	Imaging studies	Treatment	Follow-up
6	46/M	Fever, yellowish discoloration of sclera, high coloured urine, anorexia × 1 month	None	Raised serum bilirubin and ALP, mildly raised AST and ALT	Duodenal diverticula arising from D2 causing compression of CBD, dilatation of CBD and IHBRD, stricture of distal CBD	Choledocho-jejunostomy with excision of diverticula	6-months up follow-up, alive
7	55/F	No symptoms incidental finding on imaging	None	Normal	CECT: dilated CBD with smooth tapering of its distal end with central and mild peripheral IHBRD and duodenal diverticula arising from D2	No intervention done	6-months follow-up, alive
8	62/M	Pain upper abdomen, jaundice, fever, clay-colour stools, high colour urine	None	Raise TLC, raise serum bilirubin and ALP	Duodenal diverticula arising from D2 causing compression of CBD, dilatation of CBD and IHBRD	Choledocho-jejunostomy with excision of diverticula	6-months follow-up, alive
9	73/F	Non-specific pain abdomen × 1 month	Diabetes mellitus	Normal	CECT: mild dilatation of CBD, duodenal diverticula arising from second part of duodenum	No intervention done	6-months follow-up, alive
10	70/F	Presented with symptoms of acute calculous cholecystitis	None	Deranged LFT	CECT: duodenal diverticula arising from second part of duodenum causing compression of CBD, dilatation of CBD and intrahepatic biliary radical dilatation, no gall bladder or CBD stone	Endoscopic papillotomy done	6-months follow-up, alive

M – male; F – female; AST – aspartate aminotransferase; ALT – alanine aminotransferase; ALP – alkaline phosphatase; CBD – common bile duct; CECT – contrast enhanced computed tomography; USG – ultrasonography; IHBRD – intrahepatic biliary radical dilatation; TLC – total leucocyte count; LFT – liver function test

in 2 patients, and upper gastrointestinal endoscopy was done in all the cases. The diameter of diverticula ranged from 12 to 25 mm with a mean diameter of 18 mm. When these cases were encountered, endoscopic ultrasound (EUS) was not available in our institute, therefore, it was not done in any of the cases; though, now EUS is done in our institute. Upper gastrointestinal endoscopy was done in all the cases to rule out any other associated mucosal pathology. There was no associated mucosal pathology and impacted diverticular bezoars.

Two patients underwent surgery while 5 were managed conservatively. Two patients underwent choledochojejunostomy without excision of the diverticula, while the diverticula were excised in the other case. Endoscopic papillotomy was done on four patients to relieve symptoms. Endoscopic cannulation was not difficult in these 4 patients and there was no procedure related complication. The patients were kept on six monthly follow-ups. Those who were managed conservatively did not experience further episodes of symptoms during 6 months of follow-up. There was no mortality. Table 1 shows description of 10 cases.

Discussion

Duodenal diverticula are detected in up to 27% of patients requiring upper gastrointestinal endoscopy and imaging studies (Leivonen et al., 1996; Lobo et al., 1999); while they become symptomatic in only 1–2% of the cases (Aourarh et al., 2021) and can cause complications in up to 5% of the cases (Lobo et al., 1999). Lemmel's syndrome is a rare type of duodenal diverticula situated in periampullary area (within 2–3 cm of ampulla) causing benign obstructive jaundice. As the entity is extremely rare, it is rarely considered as differential diagnosis for obstructive jaundice. Diagnosis is difficult; however relatively easy to manage. There are no specific presenting symptoms and signs. The etiopathogenesis is uncertain and usually not associated with any other anomaly or syndrome.

The incidence increases with age (Lobo et al., 1999), therefore in this study and other published studies (Lobo et al., 1999; Chiang et al., 2006; Kang et al., 2014), the mean age of presentation was higher. In a study on 123 patients, the mean age at presentation was 63 years (Bernshteyn et al., 2020). The oldest reported case is 81 years old (Lobo et al., 1999). The presentations vary from incidental finding to non-specific pain abdomen requiring frequent admissions and biliary obstructive symptoms. The patients are usually asymptomatic and require no

intervention. The complications such as biliary, pancreatic, or duodenal obstruction can occur. Other complication such as perforation, diverticulitis, cholangitis, bile duct stones and haemorrhage are extremely rare. Pain and jaundice are the most common presenting symptoms (Leivonen et al., 1996). The cause for non-specific pain in the abdomen is usually the debris filled in diverticula. The jaundice is usually because of the external compression over the ampulla created by periampullary diverticula. The presence of stone or debris in the diverticula increases pressure over the ampulla causing obstruction. The other proposed mechanisms of obstructive jaundice are direct irritation of the ampulla, or dysfunction of the sphincter of Oddi leading to its chronic inflammatory changes and eventually fibrosis of the papilla, or longstanding diverticulitis causing stenosing fibrosing papillitis (Lobo et al., 1999; Figueroa-Rivera et al., 2017).

Studies have reported that the incidence of choledocholithiasis is more in patients with periampullary duodenal diverticula but in the present study, none of the patients was found to have associated choledocholithiasis (Hagege et al., 1992; Leivonen et al., 1996; Christoforidis et al., 2002).

Before attributing periampullary diverticula as a cause of obstructive jaundice it is important to rule out other common and important, benign as well as malignant pathologies causing obstructive jaundice. The study of choice to diagnose periampullary diverticula and to rule out other pathologies of obstructive jaundice, is endoscopic retrograde cholangiopancreatography (ERCP) with endosonography (Hagege et al., 1992; Egava et al., 2010) or magnetic resonance cholangiopancreatography (MRCP) (Egava et al., 2010). Ultrasonography is the initial study of choice demonstrating dilatation of extrahepatic and intrahepatic biliary radicles and also shows any other associated pathology. CECT demonstrates duodenal diverticula compressing the intrapancreatic portion of the common bile duct (Kang et al., 2014). CECT may also show any other associated anomaly. Percutaneous transhepatic cholangiography is indicated only in cases with distorted anatomy. MRCP confirms the diagnosis in majority of cases, eliminates other important, common differential diagnosis and other associated anomalies of the biliary tree.

Any intervention or surgical procedure which facilitates free bile flow relieves symptoms. The surgical procedures range from endoscopic papillotomy, open or laparoscopic transduodenal sphincteroplasty, common bile duct exploration with stone extraction, choledochojejunostomy, open or laparoscopic inversion or excision of diverticula (Lobo

et al., 1999; Chiang et al., 2006; Khan et al., 2017). In asymptomatic patients, usually no treatment is required. In such asymptomatic and incidental cases conservative management is recommended. Any form of intervention is indicated for symptomatic patients and in the presence of complications, early intervention is recommended. The presence of debris or stone in the diverticula can be removed with ERCP alone and/or papillotomy may be added to prevent future recurrences of obstructive jaundice. Endoscopic sphincterotomy is indicated in patients with obstructive jaundice and stenting should be done in patients with cholangitis and choledocholithiasis. Failed cannulation is a possibility as presence of diverticula in the close vicinity of ampulla blocks the passage into it but in the present study, there was no case with failed cannulation of the ampulla.

To conclude, Lemmel's syndrome is a rare curable and benign cause of obstructive jaundice. There are no specific clinical or pathophysiological features that remain unknown. For incidentally diagnosed patients, conservative management is recommended, while surgical and/or endoscopic intervention is indicated for symptomatic disease and complications.

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