A 52-year-old African-American female patient status post diagnostic laparoscopy, cholecystectomy, and lysis of adhesions presented with persistent left upper quadrant pain, nausea, and vomiting. The patient denied recent fever, chills, headaches, shortness of breath, diarrhoea, constipation, and dysuria. Laboratory results revealed elevated liver enzymes with a normal complete blood count, serum lipase, and total bilirubin.

Imaging Findings:

CT demonstrated both intrahepatic and extrahepatic biliary ductal dilation with the common bile duct measuring up to 1.6 cm, but there was no visualised intraductal mass or choledocholithiasis. There was also prominence of the pancreatic duct without peripancreatic inflammation, pancreatic head mass, annular pancreas, or pancreas divisum.

Hepatobiliary scintigraphy revealed prompt hepatic uptake but peak hepatic activity at 13 minutes. Hepatobiliary transit was normal with visualisation of the biliary tree at 10 minutes, but there was progressive radiotracer accumulation within the prominent intrahepatic and extrahepatic bile ducts. The bowel was visualised at 37 minutes. The Sincalide/Semiquantitative score was 11.

Discussion:

The sphincter of Oddi (SO) is a segment of smooth muscle within the wall of the duodenum at the junction of the distal common bile duct and pancreatic duct that coordinates the release of bile and pancreatic secretions through the ampulla of Vater [1]. Historical nomenclature has created confusion in regards to the classification of dysfunction of the biliary tract. Biliary dyskinesia is a broad term that includes dyskinesia of both the gallbladder and the SO. Sphincter of Oddi dysfunction (SOD) comprises functional or mechanical obstruction of the SO and involves the biliary sphincter and/or the pancreatic sphincter. Hepatobiliary scintigraphy can distinguish between disorders of the gallbladder and the SO [2].

SOD has two primary clinical presentations: repetitive biliary pain or recurrent acute pancreatitis. Biliary SOD is associated with epigastric or right upper quadrant pain, and laboratory values may reveal elevated liver enzymes.
Pancreatic SOD presents with mid-abdominal pain that radiates to the back and elevated serum amylase and lipase [2].

SOD is more common in women, and there are several risk factors for SOD including cholecystectomy, preoperative cholelithiasis, gallstone lithotripsy, liver transplantation, alcoholism, hypothyroidism, and opiate use [2].

Various imaging modalities have been used to diagnose SOD, but SO manometry continues to be the gold standard. However, there is limited availability of this invasive procedure which is difficult to perform and has an increased risk of pancreatitis [2, 3, 4]. Ultrasonography is not a sensitive examination for the diagnosis of SOD as a dilated common bile duct can be due to prior disease or aging. If the common bile duct diameter increases greater than 2 mm following the consumption of a fatty meal or administration of cholecystokinin, then SOD is suggested [1].

Hepatobiliary scintigraphy can detect structural or functional partial biliary obstruction in the setting of prior cholecystectomy [3]. Using the static images and time-activity curves, the following exam parameters are scored: time of peak hepatic activity, time of biliary visualisation, biliary dilatation, time of bowel visualisation, percent CBD emptying, and CBD-to-liver ratio [5]. With SOD, there will be increased time to hepatic peak, delayed biliary visualisation, protracted clearance of radiotracer from the dilated bile ducts, and prolonged biliary to bowel transit [5, 6]. A score of < 5 corresponds to a normal scintigram [5].

The diagnosis of SOD is reliant upon clinical history, physical exam, laboratory data, and imaging.

**Differential Diagnosis List:** Sphincter of Oddi dysfunction, Choledocholithiasis, Hepatitis, Small bowel obstruction

**Final Diagnosis:** Sphincter of Oddi dysfunction

**References:**

Figure 1

Description: CBD time-activity curve with continuously increasing activity. Origin: Department of Radiology and Imaging Medical College of Georgia at Augusta University
Figure 2

Description: Hepatic time-activity curve with time of peak hepatic activity at 13 minutes. Origin: Department of Radiology and Imaging Medical College of Georgia at Augusta University
Description: Static images reveal progressive radiotracer accumulation within the prominent intrahepatic and extrahepatic bile ducts. Origin: Department of Radiology and Imaging Medical College of Georgia at Augusta University
Description: Coronal CT demonstrating common bile duct dilatation without visualised intraductal mass, choledocholithiasis, or pancreatic head mass. Origin: Department of Radiology and Imaging Medical College of Georgia at Augusta University
Figure 5

Description: Axial CT demonstrating common bile duct dilatation without visualised intraductal mass or choledocholithiasis. Origin: Department of Radiology and Imaging Medical College of Georgia at Augusta University