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Clinical Communications

PNEUMOBILIA: BENIGN OR LIFE-THREATENING

Scott C. Sherman, MD and Huy Tran, MD

Cook County Hospital, Chicago, Illinois
Reprint Address: Scott C. Sherman, MD, Cook County Hospital, 1900 W. Polk Ave., 10th Floor, Chicago IL 60612

□ **Abstract—Pneumobilia, or air within the biliary tree of the liver, suggests an abnormal communication between the biliary tract and the intestines, or infection by gas-forming bacteria. Pneumobilia usually can be distinguished from air in the portal venous system by its appearance on computed tomography (CT) scan. The most common conditions associated with pneumobilia include: 1) a biliary-enteric surgical anastamosis, 2) an incompetent sphincter of Oddi, or 3) a spontaneous biliary-enteric fistula. Three cases of pneumobilia associated with its most common causes are presented and further differential diagnostic possibilities as well as the implications of this finding on patient management are discussed. © 2006 Elsevier Inc.**

□ **Keywords—pneumobilia; sump syndrome; choledochoduodenostomy; biliary-enteric fistula; sphinterotomy; cholangitis; emphysematous cholecystitis**

INTRODUCTION

Pneumobilia is defined as the presence of gas in the biliary tree of the liver. Its presence suggests an abnormal communication between the biliary tract and adjacent organs, commonly the gastrointestinal tract. Pneumobilia may reflect a benign incidental finding or herald a life-threatening disease state. The most common conditions associated with pneumobilia include: 1) a biliary-enteric surgical anastamosis, 2) an incompetent sphincter of Oddi, or 3) a spontaneous biliary-enteric fistula (1–3). We report three cases of pneumobilia associated with its most common causes and discuss further differential diagnostic possibilities as well as the implications of this finding on patient management. A waiver was obtained from the Institutional Review Board at our hospital.

CASE 1

Biliary-Enteric Anastamosis and Sump Syndrome

A 67-year-old woman presented to the Emergency Department (ED) with epigastric abdominal pain. The patient stated the pain had begun 5 h earlier. She described it as crampy in nature and severe. She had associated nausea, but no vomiting or diarrhea and had no prior history of similar pain. The past medical history was significant for peptic ulcer disease and a "gall bladder" surgery many years ago. Physical examination revealed an elderly woman in moderate abdominal distress. Vital signs were as follows: temperature 36.4°C (97.5°F); blood pressure 150/75 mm Hg; heart rate 78 beats/min; respiratory rate 20 breaths/min. The abdomen was tender to percussion in the epigastric area. There was no rebound and bowel sounds were normoactive. Rectal examination revealed guaiac negative brown stool without masses. The remainder of the physical examination was within normal limits.

Laboratory testing revealed a white blood cell count of 11.4 K/UL with a left shift. Electrolytes and lipase were normal. An abdominal series did not reveal free air or obstruction. Due to the significant nature of the pain and the mildly elevated white blood cell count, a computed tomography (CT) scan of the abdomen was ordered. The CT scan was significant for extensive pneu-

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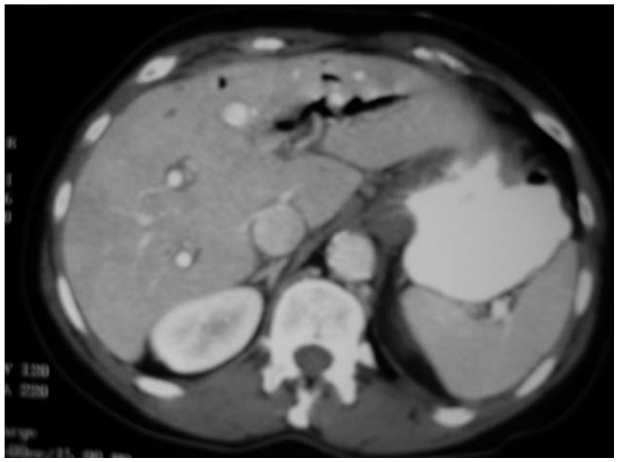

Figure 1. Pneumobilia in a patient with sump syndrome (Case 1).

mobilia, particularly in the left lobe of the liver (Figure 1). The gallbladder was not present and surgical clips were noted in the region of the gallbladder fossa. The patient was admitted after surgical consultation and antibiotics were initiated. On the floor, the patient became febrile to 38.6°C (101.5°F) and the white blood cell count increased to 17.9 K/UL by the next morning. Blood cultures obtained in the ED grew Klebsiella pneumoniae.

An endoscopic retrograde cholangiopancreatography (ERCP) was performed that revealed a choledochoduodenostomy with an enlarged papilla obstructed with debris. A papillotomy and multiple balloon sweeps were performed to remove debris. The patient recovered uneventfully and was discharged.

CASE 2

Post-Sphincterotomy

A 40-year-old man presented with abdominal pain of 2 days duration. He stated the pain was constant, diffuse, and did not radiate. He had no previous history of similar pain. The patient reported multiple episodes of vomiting, but no diarrhea or fever. The past medical history was significant for Type II diabetes mellitus, a cholecystectomy, and an ERCP with sphincterotomy performed "years" ago for gallstones. He was noncompliant with his diabetes medications and could not remember the medication names. Physical examination revealed a man in mild abdominal distress. Tenderness was elicited to deep palpation in the epigastric area. There was no rebound tenderness. Bowel sounds were normoactive. Rectal examination revealed guaiac negative stool without masses. The remainder of the physical examination was within normal limits.

Laboratory studies revealed a bedside glucose of 500 mg/dL and the urine dipstick for ketones was strongly positive. Chemistry analyses returned with glucose of 514 mg/dL and bicarbonate of 6 mEq/L. White blood cell count, lipase and liver function testing were within normal limits. Due to the epigastric tenderness and the history of significant biliary disease, a CT scan of the abdomen was obtained and revealed mild thickening of the stomach wall and pneumobilia in the left lobe of the liver (Figure 2).

The patient was started on an insulin drip and admitted to the hospital. His abdominal symptoms improved with insulin and fluids. He was discharged with a final diagnosis of diabetic ketoacidosis secondary to medication non-compliance and incidental pneumobilia after ERCP with sphincterotomy.

CASE 3

Spontaneous Biliary-Enteric Fistula

A 60-year-old man presented with right upper quadrant and epigastric abdominal pain of 3 days duration. The pain was described as sharp, constant, and radiated to the back. The patient reported anorexia and nausea, but no vomiting or fevers. The patient had a history of Type II diabetes, gastroesophageal reflux, and peptic ulcer disease. He did not drink alcohol. Physical examination revealed an obese male in no acute distress. Vital signs revealed a temperature of 36.1°C (97.0 °F); blood pressure of 145/65 mm Hg; heart rate of 69 beats/min; and respiratory rate of 22 breaths/min. The abdomen was soft, but revealed tenderness in the right upper quadrant. There was no guarding or rebound.

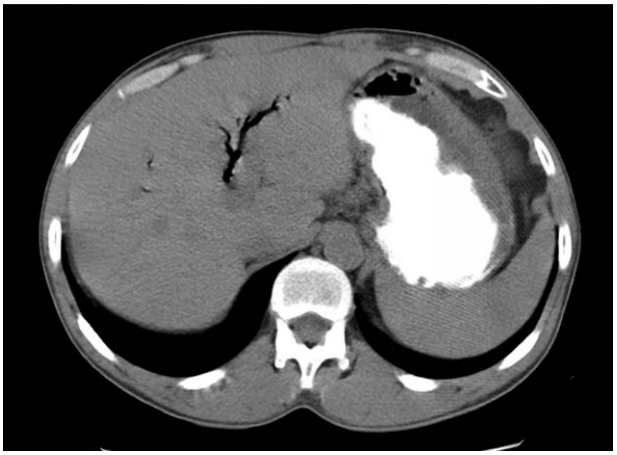

Figure 2. Pneumobilia after ERCP (Case 2).