

## CASE REPORT

## Periampullary Diverticulum Perforation Following Endoscopic Retrograde Cholangiopancreatography (ERCP); a Case Report

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### Abstract

Endoscopic Retrograde Cholangiopancreatography (ERCP) is widely used for the diagnosis and treatment of biliary and pancreatic tract disease. Perforation is a rare complication of it, but it is associated with high rate of mortality, an overall mortality rate of 1.0-1.5%. Here, a case of massive subcutaneous emphysema following ERCP was reported without an obvious retroperitoneal or peritoneal perforation.

**Key words:** Cholangiopancreatography, endoscopic retrograde; subcutaneous emphysema; pneumomediastinum, diagnostic

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### Introduction:

Endoscopic Retrograde Cholangiopancreatography (ERCP) is widely used for the diagnosis and treatment of biliary and pancreatic tract disease (1). Although this is considered as a safe diagnostic tool, if operated by experts, it still carries a significantly high rate of complications including hemorrhage, perforation, infection, pancreatitis and cardiopulmonary events. Perforation is a rare complication, but it is associated with high rate of mortality, an overall mortality rate of 1.0-1.5% (2). Here, a case of massive subcutaneous emphysema following ERCP was reported without an obvious retroperitoneal or peritoneal perforation.

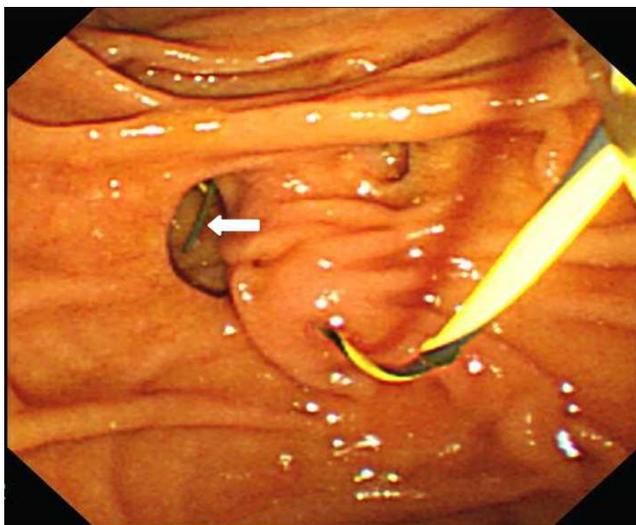
### Case presentation:

A 94-year old woman was presented to the emergency department (ED) because of general weakness, abdominal pain, and dyspepsia for 4 days. She had diabetes mellitus, chronic atrial fibrillation, hypertension, and coronary artery disease with multi-vessel stenting in her medical history. The patient's vital sign at the admission time included blood pressure of 182/86 mmHg, heart rate of 78 beats/minute, respiratory rate of 22 beats/minute, and oxygen saturation of 97% on room air. She was afebrile and physical examination showed the abdominal right upper quadrant tenderness without peritoneal signs. The rest of physical examinations were unremarkable. Abdominal ultrasonography demonstrated

on a small gallbladder without gallstone as well as dilatation of the main bile duct and bilateral intra-hepatic ducts. The complete blood cell count showed the following results: leukocyte count 5100/mm<sup>3</sup> with 77.8% of segmented neutrophils, hemoglobin 12 gram/deciliter, and platelet 180000/microliter. Other laboratory findings included: glucose 134 milligram/deciliter, blood urea nitrogen (BUN) 24 milligram/deciliter, serum creatinine 1.8 milligram/deciliter, sodium 134 milliequivalent/liter, potassium 3.8 milliequivalent/liter, serum glutamic oxaloacetic transaminase (SGOT) 26 unit/liter, albumin 3.5 gram/deciliter, total bilirubin 1.0 milligram/deciliter, lipase 31 unit/liter, and with an International Normalized Ratio (INR) of 1.52.

With assumption of obstructive biliary tract process, the patient underwent ERCP. During cannulation of the bile duct, a guidewire was applied to enter via the ampulla of Vater. In spite of iatrogenic penetrating of a periampullary diverticulum in the first try (Figure 1), the guidewire was inserted into the bile duct for sphincterotomy, intraductal ultrasonography, biopsy, and stenting. The final diagnosis was distal common bile duct stenosis. Due to old age and comorbidities of the patient, she was shifted to the ED for more observation. After 2 hours, patient became symptomatic with dyspnea and abdominal pain. Repeated physical examination revealed generalized subcutaneous emphysema with extensive puffiness and



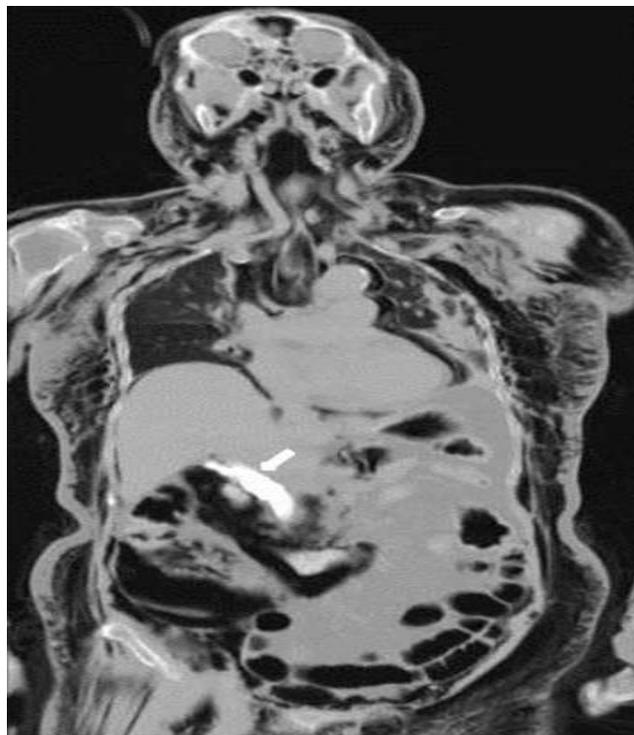


**Figure 1:** Endoscopic view shows guidewire (arrow) perforation of a periampullary diverticulum.

palpable crepitation in all over the body from head to the extremities. She had mild fever and abdominal distention without any peritoneal signs. Her oxygen saturation was 94% on room air. Laboratory test results showed leukocyte count of 18400/mm<sup>3</sup> with left shift. The whole body computed tomography (CT) scan revealed extensive subcutaneous emphysema (Figure 2). Since there was no evidence of either contrast leakage from the biliary tract or fluid collections in the peritoneal and retroperitoneal cavity, she was conservatively managed with oxygen supplement, nasogastric tubing, parenteral nutrition, and broad-spectrum antibiotics. The patient responded well and gradual resolution of the subcutaneous emphysema was happened after 9 days.

#### Discussion:

The presence of subcutaneous emphysema following ERCP is an uncommon but well-recognized complication. The most common cause of this problem is duodenal perforation resulting in retroperitoneal collections of free air. Perforation is now reported in less than 1% of ERCs with sphincterotomy (3). Periampullary diverticulum perforation during ERCP is the rarest complication, which is usually manifested by abdominal pain, fever, leukocytosis, and hemodynamic compromise. A high index of suspicion is required for timely correct diagnosis of ERCP-related perforations because of signs and symptoms, often mimic other intra-abdominal processes (4, 5). Retroperitoneal air may spread through the fascial planes to the subcutaneous space or dissect into the peritoneal or pleural cavities, resulting in pneumoperitoneum, pneumothorax, or pneumomediastinum. This manifestation is known as Ginkgo sign (6). Isolated neck and scrotal subcutaneous emphysema as well as cases of generalized subcutaneous emphysema extended to the



**Figure 2:** Computed tomography scan (coronal view) shows extensive subcutaneous emphysema. Contrast retention in the common bile duct (arrow) after ERCP is also shown without evidence of leakage.

face, neck, trunk, and upper extremities have been reported (7). In such situation, the first imaging study is usually an abdominal X-ray. CT scans can help assessing contrast leakage and identify any retroperitoneal or intraperitoneal free air (8). The treatment outcome depends on clinical manifestations and the type and severity of the leak (9).

Although patients with perforations may be conservatively treated perforations, which are remote from the papilla and those with free contrast extravasation with or without evidence of sepsis may need surgical intervention (10-12). This case shows that periampullary diverticulum perforation secondary to ERCP may be managed conservatively with intravenous fluid therapy, broad-spectrum antibiotics, nasogastric tube decompression, and parenteral nutrition.

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#### Authors' contributions:

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