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**CASE REPORT**

## Life threatening complications after an unsuccessful Endoscopic retrograde cholangiopancreatography: A rare case scenario

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### Abstract:

Endoscopic retrograde cholangiopancreatography (ERCP) is one of the main-stay diagnostic as well as therapeutic procedure for hepato-biliary and pancreatic diseases. Life-threatening complications such as pneumo-peritoneum, pneumo-retroperitoneum, pneumo-mediastinum, subcutaneous emphysema and pneumo-thorax related to this procedure rarely occur and only a few of these have been reported in the literature.

### Case Report:

Here we report a case of 38-year-old female patient in which she developed acute abdominal symptoms with subcutaneous emphysema and left-sided pneumo-thorax due to duodenal perforation following Endoscopic retrograde cholangiopancreatography on 17<sup>th</sup> of June 2019.

**Keywords:** Endoscopic retrograde cholangiopancreatography (ERCP), pneumo-peritoneum, pneumo-retroperitoneum, pneumo-mediastinum, subcutaneous emphysema and pneumo-thorax

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### Introduction:

Endoscopic retrograde cholangiopancreatography (ERCP) is a diagnostic as well as therapeutic procedure for diseases located in the biliary-pancreatic duct and the peri-ampullary region, with combination of endoscopic and fluoroscopic technique.<sup>1,2</sup> An endoscope is passed down orally and while en-route to the second part of the duodenum, its side viewing eyes can be used to look inside esophagus, stomach, and intestines.<sup>3</sup> After recognizing ampulla of Vater and it is injected with the contrast medium, by cannulating it, into the ducts of biliary tree and pancreas for their better anatomical visualization, any obstruction and its possible cause such as any malignant stricture or calculi.<sup>4</sup> Even though considered a relatively safe procedure if performed by an expert, but it still has a morbidity and mortality rate of 1-1.5%.

Its common complication includes haemor-

rhage, perforation, infection, pancreatitis and cardio-pulmonary events.<sup>5,6</sup> Subcutaneous emphysema in mediastinal, cervical, and periorbital region can also be developed rarely, due to retro duodenal perforation secondary to gas pressure during Endoscopic retrograde cholangiopancreatography (ERCP).<sup>6-8</sup>

Post-Endoscopic retrograde cholangio-pancreatography perforations related mortality rate is high, about 8-23%,<sup>9-15</sup> and is usually related to sepsis and multi-organ failure resulted from late diagnosis.<sup>14,15</sup>

The current study reports a case with life-threatening complications secondary to duodenal perforation after an unsuccessful Endoscopic retrograde cholangio-pancreatography.

### Case Report:

A 38-year-old female patient admitted with the



Figure 1: Subcutaneous emphysema extending till peri-orbital region

diagnosis of choledocholithiasis in distal Common Bile Duct (CBD) and cholelithiasis. She was planned for ERCP followed by laparoscopic cholecystectomy. ERCP was done and stones were extracted from CBD by papillotomy and balloon sweeping technique. Soon after the



Figure 2: CT scan showing left sided pneumothorax with collapsed lung

procedure, she developed restlessness, dyspnea, tachycardia, and her O<sub>2</sub> saturation to 87%. Patient was resuscitated, but after 10 to 15 minutes she developed subcutaneous emphysema ex-

tending from right upper abdomen to periorbital region as shown in figure-1, involving face, neck trunk, and upper extremities. Patient was shifted to the ICU. Non-ionic contrast computed tomography (CT) scan of chest and abdomen was done, which revealed pneumo-mediastinum and evidence of extensive surgical emphysema along with moderate left-sided pneumo-thorax with passive atelectasis and collapsed lung as shown in figure-2. Chest intubation was done on left side and patient's dyspnea was improved. There was significant retro-pneumo-peritoneum and mild to moderate pneumo-peritoneum and mild ascites associated with mild pneumo-bilia and inflammatory changes in the region of the head of the pancreas and proximal duodenum likely due to perforation of 2<sup>nd</sup> part of the duodenum.

She was kept on intravenous (IV) fluids, antibiotics, and analgesics. Nasogastric tube and Foley's catheter was passed. Patient improved on conservative measures. Air entry was increased on the left side and lungs were fully inflated, chest tube was removed after 10 days. After she passed flatus and faeces, nasogastric tube was removed and fluids were allowed. Abdomen became soft, non-tender, and no fever spikes were recorded. Patient was shifted to the general ward and was allowed oral diet. After 5 days her condition improved further and patient was discharged.

Patient was then re-admitted after one-week due to right side flank pain and cellulitis. In her second admission, her COVID PCR was positive. CT scan of abdomen showed large collection in pelvis and in both paracolic gutters. Laparotomy was performed which revealed 3 liters of foul-smelling pus with air drained from pelvis and both paracolic gutter, cavity washed with 8 litres of normal saline. Drains were placed in pelvis and right paracolic gutter. She remained in the COVID ward post-operatively. In the post-operative period, her condition kept on deteriorating. Liquid faecal matter mixed with blood and bile continuously came in both drains. Her haemoglobin dropped to 4 g/dl. During this course of admission, 12 units of packed cell blood vol-

ume were transfused total parental nutrition, antibiotics, analgesics, intravenous fluids were given along with O<sub>2</sub> support. Patient didn't show any improvement and expired after 1 month.

#### **Discussion:**

Endoscopic retrograde cholangio-pancreatography is an effective and relatively safe procedure for diagnosing and treating various biliary diseases but it also carries risks, like any other interventional procedure, of multiple complications the most common being post-ERCP pancreatitis, bleeding, perforation, and sepsis.<sup>16-19</sup> Although the incidence rate is low of post-ERCP perforation, the mortality rate is reported as high as 20%, the spillage of biliary and pancreatic contents into abdomen results in sepsis, the most common cause of death.<sup>15,20-24</sup> Post-ERCP perforation may be intraperitoneal or retroperitoneal anatomically but for the purpose of managing its treatment, it has been classified based on anatomical location mechanism and severity of the injury by Stapfer et al.<sup>25</sup>

**Type I** duodenal injuries are lateral or medial wall perforations, caused by the endoscope itself.

**Type II** duodenal injuries are medial wall perforations and mostly occur during endoscopic sphincterotomy.

**Type III** duodenal injuries are distal bile duct perforations, usually due to wire or basket instrumentations.

**Type IV** duodenal injuries are minute retroperitoneum perforations due to excessive compressed gas use to maintain a patent bowel.

However, it is quite hard to differentiate whether the duodenal perforations were caused by endoscope or by either sphincterotomy or by instrumentation since all of them can cause leaks. Similarly, in accordance with Howard et al,<sup>26</sup> another classification on the basis of mechanism injury, ERCP-related perforations is classified into 3 types.

**Group I** guide wire perforations of the duct

**Group II** peri-ampullary perforations

**Group III** duodenal perforations remote from the ampulla.

The pathophysiology of rare and dramatic complicated post ERCP surgical emphysema<sup>16-19</sup> along with pneumo-mediastinum, pneumo-peritoneum, pneumo-retroperitoneum, and pneumo-thorax is possibly because of the spread of luminal air through deep facial planes occurred due to insufflation of pressurized air via iatrogenic perforation.<sup>27,28</sup> The spreading of retroperitoneal air through the facial planes or dissection of pleural or peritoneal cavities, results in pneumo-thorax, pneumo-peritoneum, or pneumo-mediastinum this manifestation is known as Ginkgo sign.<sup>6,29</sup> Altered or varied anatomy, secondary to tumours, diverticula or other causes, in many cases is likely to be of importance.<sup>30,31</sup> Diagnosis is generally supported by radiological evidence along with clinical sign and symptoms. It is quite difficult to differentiate the patients who require early surgery from those who could be treated medically.<sup>32</sup> The only recommendation of early surgery is if the primary biliary pathology demands so because sometimes all that can be done is placement of retroperitoneal drains.<sup>16,18</sup> The principle of surgical management of post-ERCP injury are two-fold: (i) control of sepsis and removal of source; (ii) repair of the leak with or without diversion. Surgical experience with blunt duodenal trauma revealed a poorer outcome and the development of duodenal fistula if primary repair alone was performed after 24 hours from the injury.<sup>33,34</sup>

The above mechanism may explain the clinical presentation in our patient, but the resolution of symptoms after initial conservative management would not be expected in case of duodenal perforation as suggested by literature<sup>35</sup> and it was thought that it was small perforation or leak which has sealed spontaneously and doesn't require surgical intervention at this stage as our patient responded well to the conservative treatment.<sup>35,36</sup> But after one-month post-procedure, she was readmitted with right flank pain and cellulitis due to massive collection of fluids in ab-

domen and pelvis suggested on imaging, possibly duodenal perforation. But unfortunately the surgical as well as medical management failed and patient expired due to sepsis, peritonitis, and COVID infection.

Decision on whether or not to operate on a patient are based on the type of perforation, clinical status and radiographic imaging,<sup>27</sup> but in our case prompt response of patient to conservative management created a false delusion and later surgical intervention to control sepsis by drainage of extra-peritoneal and intra-abdominal collection failed as well.

### Conclusion:

Endoscopic retrograde cholangio-pancreatography related perforation is one of its most feared complications. In Pakistan, we do not have enough data regarding the incidence of ERCP's complications and their increasing or decreasing trends. Early recognition and prompt surgical intervention can be life saving as suggested by the literature.

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### Role and contribution of authors:

Dr Muhammad Hamza Sheik, collected the data, references and did the initial write up.

Dr Maira Jamal, collected the data, references and helped in introduction writing.

Prof Muhammad Ali Channa, critically review the article and made the final changes.

Dr Rabbia Zubair, collected the data, references and helped in writing the article.

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