Extensive cervical, thoracic, and abdominal wall emphysema and pneumomediastinum following ERCP: a rare scenario

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A 42-year-old woman underwent endoscopic retrograde cholangiopancreatography (ERCP) for cholangitis due to choledocholithiasis and biliary sphincterotomy with double pigtail biliary stent placement was performed. Four-six hours after the procedure, she developed subcutaneous swelling over the neck with crepitus over it. In the next few hours the swelling extended all over the abdomen and chest. Abdominal computed tomography (CT) scan showed extensive subcutaneous emphysema in abdomen, thorax, neck, pneumoretroperitoneum and pneumomediastinum (Fig. 1). There was no evidence of contrast leak on CT indicative of overt bowel perforation. She did not have any other symptoms and was managed with intravenous antibiotics and fluids. The subcutaneous emphysema started to resolve in another 48 h. Patient was discharged after resolution of emphysema and underwent repeat ERCP with stone extraction 4 weeks later. She is asymptomatic on follow up.

Duodenal perforation leads to retroperitoneal air collection, which tracks into thorax and subsequently into subcutaneous tissues. It is believed that congenital or acquired pores in the diaphragm allow air to move between the abdominal and thoracic cavity [1]. Another hypothesis is that trauma to the duodenal wall by the endoscope allows air to enter the mucosa and extend along the perineural and perivascular sheaths to enter the mediastinum [2]. The visceral space of the deep fascia in the neck surrounds the trachea and esophagus and is contiguous with the diaphragmatic and/or esophageal hiatus and major airways of the thorax [3]. This establishes free communication between the retroperitoneum, mediastinum, and subcutaneous tissues of the neck. Subcutaneous emphysema emerges in the neck and extends to the chest wall through the endotracheal and esophageal fascia and then to abdomen through transversalis fascia.

ERCP-related perforations are classified by 2 systems. Howard et al. proposed a 3-group classification system based on the mechanism of ERCP-related perforation (group 1: guidewire related; group 2: periampullary; and group 3: duodenal perforations) [4]. Alternatively, Stapfer et al classified perforations into 4 types based on severity and anatomical location (type I: lateral or medial duodenal wall perforations (Howard group III); type II: peri-Vaterian injury (Howard group II); type III: bile or pancreatic duct injury (comparable to Howard group I since the majority of these perforations are caused by guidewire handling); and type IV: presence of retroperitoneal air alone [5].

Treatment of ERCP-related perforations depends on the type of injury and the patient's clinical status. All Stapfer type I perforations require immediate surgery [4,5]. The type of surgery depends on the size of perforation (oversewing with omental patch, gastrojejunostomy, tube duodenostomy, and extensive debridement). The approach to management of type II perforations is variable. Most tend to seal spontaneously by 48-72 hours, but 10-40% of patients may require surgical repair [6,7]. Type III perforations usually close spontaneously. They can be conservatively managed with placement of a biliary stent [4]. Type IV perforations result in retroperitoneal air leak. They may not have an overt transmural perforation as in the index case and can be managed non-operatively. There are only few reports of such extensive subcutaneous emphysema subsequent to ERCP [2].

References