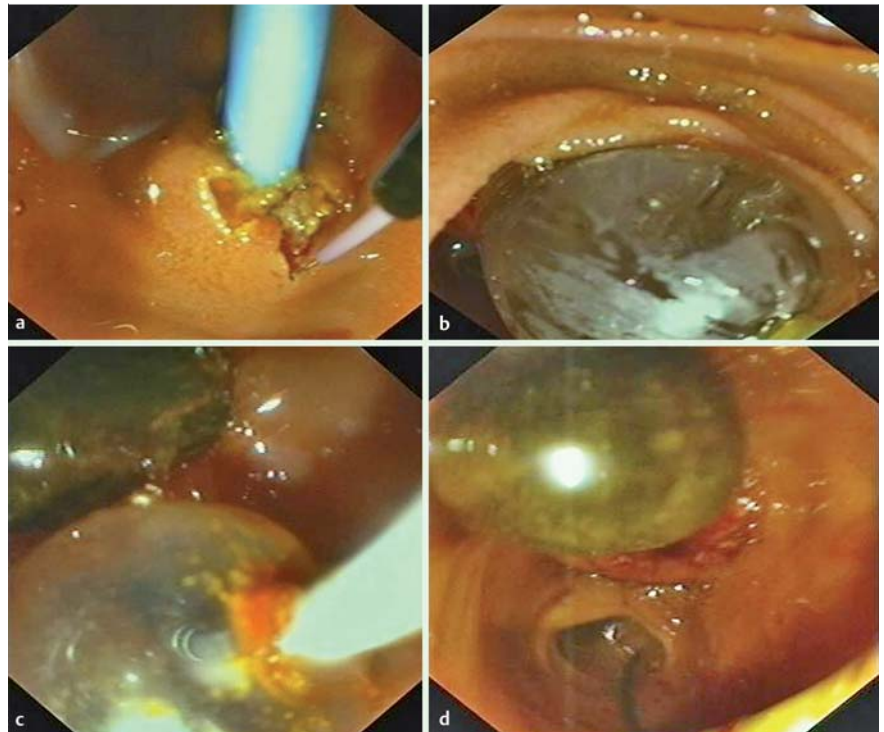


## Fatal perforation with subcutaneous emphysema complicating ERCP

An 80-year-old man was admitted for cholestatic jaundice. He had undergone Billroth II gastrectomy 32 years earlier due to an ulcer. Magnetic resonance cholangiopancreatography revealed choledocholithiasis. At endoscopic retrograde cholangiopancreatography (ERCP), reverse sphincterotomy, balloon dilation of the sphincterotomy, and bile duct stone removal were performed (● Fig. 1 and ● Fig. 2). Shortly afterwards the patient complained of epigastric pain accompanied by abdominal, thoracic, and supraclavicular crepitus. Computed tomography (CT) revealed significant subcutaneous emphysema, pneumomediastinum, left pneumothorax, pneumoperitoneum, retropneumoperitoneum, fluid collection in the abdomen and pelvis, and pleural effusion with atelectasis (● Fig. 3 and ● Fig. 4). Surgical intervention was not undertaken, due to the patient's comorbidities and poor performance status; he was treated with nasogastric suction, hydration, and antibiotics, but 1 day later became febrile. Emergency CT (● Fig. 5) showed reduction of the pneumoperitoneum, retropneumoperitoneum, pneumothorax, and subcutaneous emphysema, but an increase in the right pleural effusion and atelectasis. He gradually deteriorated and finally succumbed to his illness amidst respiratory distress and sepsis.

ERCP is widely used for the management of pancreatobiliary pathologies [1]. The most common cause of luminal air leakage at ERCP is duodenal perforation [2]. Less often, any site of reduced resistance (a diverticulum, ulcer, or tumor) may serve as a "release valve" during insufflation, even without obvious perforation [3,4]. In our case, air leakage became clinically apparent due to massive subcutaneous emphysema, after which CT established the diagnosis. However, in smaller leakages, clinical manifestations may be subtle; therefore the clinician may overlook this rare complication of ERCP. If perforation is suspected, conservative treatment may be discussed, but surgical intervention should be prompt once a perforation is diagnosed [5]. In our case, air leakage was most probably a result of microperforation and valve formation due to balloon dilation post sphincterot-



**Fig. 1** Endoscopic retrograde cholangiopancreatography (ERCP): **a** reverse sphincterotomy, **b** balloon dilation, and **c, d** extraction of a gallstone.

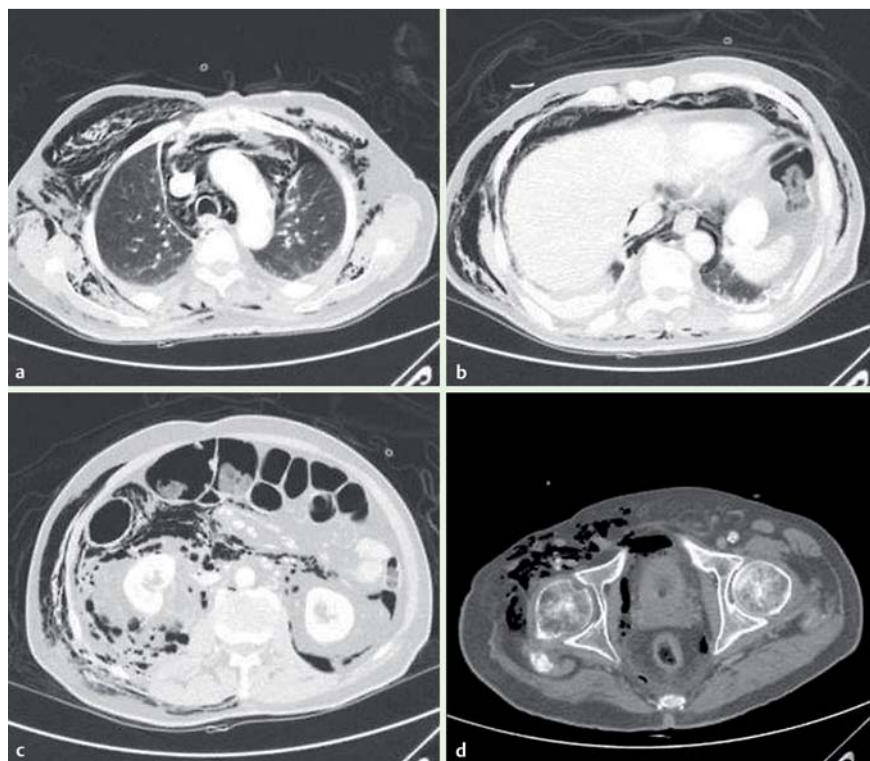


**Fig. 2** Fluoroscopy during endoscopic retrograde cholangiopancreatography (ERCP), demonstrating an impacted bile duct stone.

omy, from the retroperitoneal space to the thorax via the diaphragmatic hiatuses, into the mediastinum, pleural space, and subcutaneous tissue.

Endoscopy\_UCTN\_Code\_CPL\_1AK\_2AC

**Competing interests:** None



**Fig. 3** Contrast-enhanced abdominal computed tomography (CT) obtained with a soft-tissue window shows free air in: **a** the mediastinum; **b** the subcutaneous tissues; **c** the peritoneal cavity, retroperitoneum, and subcutaneous tissues, **d** the peritoneal cavity and subcutaneous tissues.



**Fig. 4** A coronal multiplanar reconstruction shows a large amount of free air.



**Fig. 5** Repeat computed tomography (CT) (coronal reconstruction) obtained 6 days after the earlier CT scan. There was a significant decrease in the amount of free air, but increased fluid diffusely in the peritoneal cavity and right pleural effusion.

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**DOI** <http://dx.doi.org/10.1055/s-0032-1309758>  
Endoscopy 2012; 44: E313–E314  
© Georg Thieme Verlag KG  
Stuttgart · New York  
ISSN 0013-726X

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