Unusual occurrence of massive subcutaneous emphysema during ERCP under general anaesthesia

INTRODUCTION

Endoscopic retrograde cholangiopancreatography (ERCP) is associated with retroperitoneal perforation in 2.1% of cases and is usually related to extensive sphincterotomy.[1] Not infrequently, retroperitoneal air, pneumoperitoneum, pneumomediastinum, pneumothorax, and subcutaneous emphysema are also reported which may or may not be associated with retroperitoneal perforation.[2-4] Usually, these conditions respond to conservative management. Recently, we encountered a case developing subcutaneous emphysema without pneumomediastinum and pneumothorax while undergoing ERCP. This communication aims at highlighting a variant of presentation of extraluminal air during ERCP and current status of surgical approach to such situations.

CASE REPORT

A 62-year-old woman with obstructive jaundice and deranged liver function tests was referred for an elective ERCP and stenting/sphincterotomy. Her past medical history and examination were unremarkable. She was given a general anaesthetic with endotracheal intubation. During ERCP which was indeed difficult, a peripapillary mass and a narrowed common bile duct without stones was noted. A sphincterotomy was tried repeatedly without success. There were no

adverse anaesthetic events till late into the procedure when there was sudden drop in oxygen saturation from 99% to 88%. This prompted the anaesthesiologist to auscultate the chest who noted the presence of crepitus over the anterior as well as posterior aspect of chest. As the patient was in the semi-prone position and draped, further closer examination of the patient's face and neck revealed emphysematous swelling predominant on the right side, previously non-existent [Figure 1]. Suspecting retro-peritoneal perforation, the patient was turned supine and then she was noted to have slightly distended abdomen too. Oxygen saturation improved immediately after change of position and ventilation with 100% oxygen. A gastrointestinal surgery consultation was obtained and it was decided to undertake surgical exploration immediately. However, laparotomy did not reveal any definitive perforation even though there was minimal retro-duodenal staining with bile. Roux-en-Y hepaticojejunostomy and gastrojejunostomy was performed as a palliative measure. After surgery, the patient was shifted to intensive care unit (ICU) for elective ventilation where a chest X-ray revealed diffuse subcutaneous emphysema without any evidence of pneumothorax and pneumomediastinum [Figure 2]. She was weaned off the ventilator next morning, had a steady resolution of subcutaneous emphysema, and was discharged on day 12 without any jaundice and emphysema.

Figure 1: Post procedure emphysema

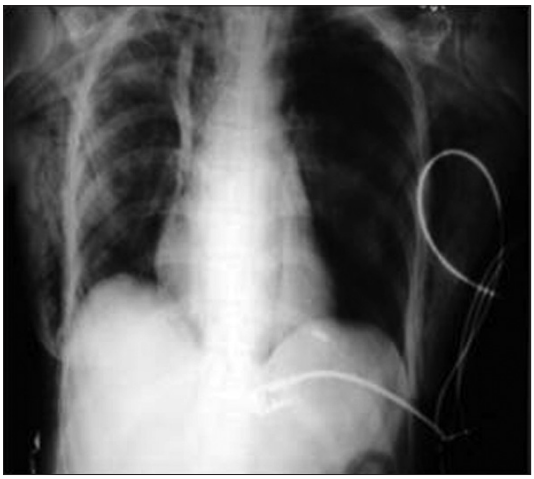

Figure 2: Subcutaneous emphysema on X-ray chest

DISCUSSION

Majority of reports of extraluminal air describe the presence of pneumothorax as well as pneumomediastinum along with subcutaneous emphysema following ERCP.[2-6] This is expected when one looks at the mechanisms of progress of extraluminal air (vide infra). In addition, non-surgical management is the preferred approach to such complications since all instances of extraluminal air are not associated with retroduodenal perforations. In our case, it was anomalous that massive emphysema without pneumothorax/pneumomediastinum occurred rapidly leading to presumption of a retro-duodenal tear followed by surgical exploration with negative results. In a similar report, a patient was noted to develop right sided subcutaneous emphysema from the umbilicus upward till the forehead without evidence of extraluminal air anywhere else.[3] Besides this report, we were unable to find any report of pure subcutaneous emphysema though a case of subcutaneous emphysema of penis and scrotum and an intriguing report of isolated periorbital emphysema have been reported following ERCP.[4,5]

Second aspect of this report is to highlight that the current approach to the presence of extraluminal air with suspicion of perforation is non-surgical.[6,7] In our case, immediate surgery was contemplated as an extensive emphysema appeared in a short time. Additionally, the patient was under general anaesthesia which allowed quick surgical intervention. However surgery proved to be beneficial for her since her jaundice resolved subsequently. The absence of any tear on exploration did come as a surprise; however, extraluminal air during ERCP can occur in the absence of overt perforation as reported by Stapfer *et al*.[8] Ferrarra *et al*. and others have reported pneumomediastinum, pneumothorax, and subcutaneous emphysema after

endoscopic sphincterotomy without evidence of perforation.[2] Like Ferrara, *et al.*, we too did not find any evidence of true perforation, hence it is likely that this complication probably occurred because of prolonged air insufflation and interstitial air extravasation from the duodenum. Retroperitoneal perforation usually presents in the post-procedure period with abdominal discomfort, difficulty in breathing, low-grade fever and the condition is confirmed by chest and abdominal X-rays and contrast enhanced CT. Majority of cases can be managed conservatively.[7,9]

Trauma to the duodenal wall by the endoscope allows insufflated air under pressure to enter the mucosa and track along the perineural and perivascular sheaths to enter the mediastinum. Subsequent rupture of the mediastinal pleura allows air to decompress into the pleural cavity and cause a pneumothorax. In addition, the visceral space of the deep cervical fascia in the neck surrounds the trachea and oesophagus and is contiguous with the diaphragmatic/oesophageal hiatus, hilar vessel interstitium and major airways of the thorax.[10] This contiguity allows free movement of air and formation of subcutaneous emphysema around upper cervical region, which then tracks down the endothoracic fascia of the chest wall and transversalis fascia of abdomen to cause diffuse subcutaneous emphysema. Thus it is indeed baffling to observe subcutaneous emphysema without any pneumothorax or pneumomediastinum.

CONCLUSION

Subcutaneous emphysema, pneumothorax and pneumomediastinum are infrequent complications of ERCP and do not appear to change the prognosis of these subjects. Subcutaneous emphysema can occur in isolation and if patient is stable, conservative treatment is an appropriate first-line approach.

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