

Pneumothorax complicating endoscopic sphincterotomy successfully treated conservatively

Emmanuel E. Lagoudianakis, Dimitrios Tsekouras, Artemisia Papadima, Michael Genetzakis, Michael Pattas, Panagiotis Giannopoulos, Manousos M. Konstadoulakis, Andreas Manouras

First Department of Propaedeutic Surgery, Hippocrateion Hospital, Athens Medical School, Athens, Greece ; Department of Anesthesiology, Hippocrateion Hospital, Athens, Greece.

Key words : emphysema, ERCP, pneumothorax, endoscopic sphincterotomy.

Dear Sir,

Endoscopic retrograde cholangiopancreatography is an invasive procedure routinely performed for the diagnosis and treatment of biliary and pancreatic diseases. Pneumothorax complicating endoscopic sphincterotomy is an exceedingly rare complication while the appropriate management of this clinical situation remains controversial. Duodenal perforation occurs in 1.1% of ERCP procedures and is associated with certain risk factors namely precut sphincterotomy, length and direction of sphincterotomy, multiple attempts and a short intramural segment of the distal CBD (1-6).

We report on a male patient of 55 years old with known cholelithiasis who underwent endoscopic retrograde cholangiopancreatography for investigation of obstructive jaundice. Endoscopy revealed an ectopic ampulla of Vater situated high in the second part of the duodenum. The papilla was small in diameter and catheterization of the common bile duct was unsuccessful even after Needle-Knife papillotomy. Therefore, the patient returned to the ward having another session scheduled. Complete physical examination, blood count and chemistry were performed at the ward without any findings. The patient complained for a crackling sensation in the neck region, 12 hours after the procedure. Clinical evaluation revealed the presence of extensive subcutaneous emphysema extending from the right flank to the chest and neck. Radiological examination of the neck, chest and abdomen showed extensive subcutaneous emphysema, voluminous retroperitoneal air and a right pneumothorax (Fig. 1). Abdominal computed tomography did not demonstrate continuing leakage (Fig. 2). The patient was asymptomatic, blood gas examination and CRP was normal. Expectant management was carried out with serial chest x-rays and clinical examinations. Complete absorption of the pleural air and subsequent resolution of the pneumothorax were evident by the 10th day post-ERCP. The patient underwent laparoscopic cholecystectomy two weeks after the endoscopic precut sphincterotomy. He had an uneventful

recovery and discharged the next day after 16 days of hospitalization.

Duodenal perforation is a serious complication of ERCP most commonly associated with endoscopic sphincterotomy (7). Usually the leak is minor and only small amounts of retroperitoneal air are present establishing the diagnosis. The general condition of the patient is considered to be the most important criterion for the selection of the appropriate management. Conservative management is successful in the great majority of the cases and rarely surgical intervention is indicated (7). This distressful clinical situation is even further complicated when pneumothorax supervenes as it implies that the leak is significant. Pneumothorax complicating ERCP is scarcely reported in the literature (8,9,10,11). According to our knowledge, conservative treatment has been instituted in two such cases (10,11). We feel that in such a case, expectant management could be safely instituted if the abdominal computed tomography shows no extravasation of the water soluble contrast in the retroperitoneum while repeated clinical evaluation and serial chest x-rays shows no signs of progression to tension pneumothorax.

According to our postulate, the pathogenetic mechanism responsible for pneumothorax is that insufflation of pressured air during papillotomy caused leakage of air through the ruptured duodenum in the retroperitoneal space and through the caval and aortic hiatuses of the diaphragm in the mediastinum. Mediastinal air progressed slowly to pneumothorax.

The rapid absorption of the pleural air and subsequent resolution of the pneumothorax permitted uneventful laparoscopic cholecystectomy during the same hospitalization.

According to Stapfer et al there several possible causes of intraluminal air escape into extraluminal tissues during ERCP. He classified them into 4 classes on the

Corresponding author : Andreas Manouras, M.D., Ph.D., Associate Professor in General Surgery, First Department of Propaedeutic Surgery, Hippocrateion Hospital, Athens Medical School, Q. Sophia 114, 11527, Athens, Greece. E-mail : amanouras@hippocratio.gr.

Submission date : 17.05.2006.

Acceptance date : 06.07.2006.



Fig. 1. — The radiological evaluation of the neck, thorax, and abdomen showed the presence of extensive retroperitoneal air delimiting the kidney, subcutaneous emphysema extending from the right flank to the neck and right pneumothorax.

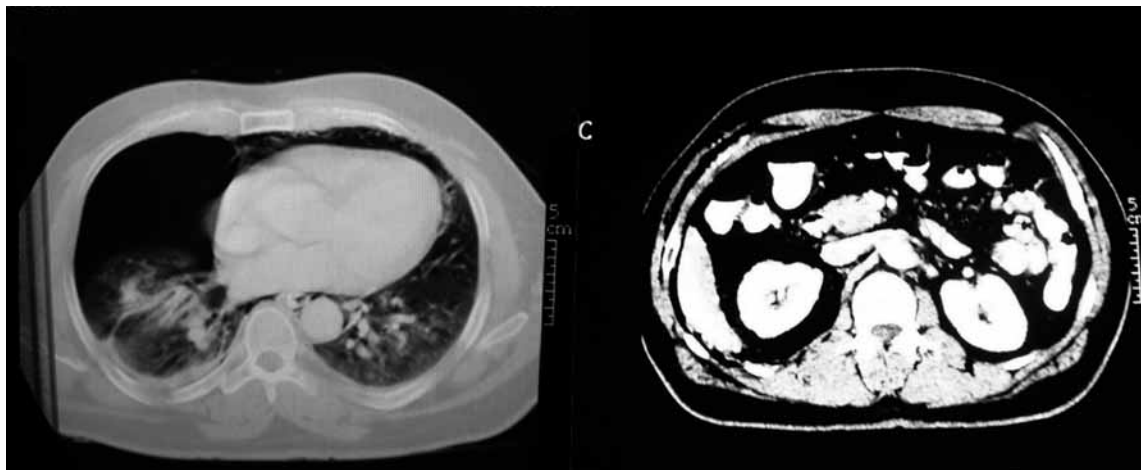


Fig. 2. — Computed tomography of the abdomen after ingestion of contrast material showed that there was no leakage of the contrast material to the retroperitoneum. Absence of free intra-peritoneal air excluded intra-peritoneal rupture of the duodenum. Right pneumothorax was verified.

basis of the mechanism of injury. Type I lesions are described as medial or lateral duodenal wall perforations caused by the endoscope. Type II lesions are perivaterian lesions while type III injuries represent disruptions of the distal CBD. Finally type IV lesions are not considered to be true perforations but rather represent transmural diffusion of compressed air into the retroperitoneum and thus warrant no therapy. The treatment plan depends on clinical, radiographic and anatomical information. Surgery is required if there is large extravasation of contrast at the time of ERCP, when a fluid collection in the retroperitoneum or peritoneum is detected on follow up CT, if perforation is associated with gallstone disease or retained hardware, in cases of massive subcutaneous emphysema presentation and finally when failure of non-surgical management is recorded (6). Our

case report shows that the presence of pneumothorax after endoscopic sphincterotomy is not a clear indication for surgical intervention or chest tube placement. Conservative treatment may be appropriate in a stable patient with no signs of continuing leakage through the ruptured duodenum, sepsis or respiratory compromise.

References

- MARTIN D.F. *et al.* The management of perforation of the duodenum following endoscopic sphincterotomy. *Endoscopy*, 1990, **22** : 174-175.
- FREEMAN M.L. *et al.* Complications of endoscopic biliary sphincterotomy. *N. Engl. J. Med.*, 1996, **335** : 909-918.
- NAM J.S. *et al.* Massive pneumoperitoneum and pneumomediastinum with subcutaneous emphysema after endoscopic sphincterotomy. *Clin. Gastroenterol. Hepatol.*, 2004, **2**.

4. EVRARD S. *et al.* Massive gas spread through a duodenal perforation after endoscopic sphincterotomy. *Gastrointest. Endosc.*, 1993, **39** : 817-8.
5. CIACCA D. *et al.* Pneumomediastinum after endoscopic sphincterotomy. *Am. J. Gastroenterol.*, 1995, **90** : 475-7.
6. STAPFER M., SELBY R.R., STAIN S.C., KATKHOUDA N., PAREKH D., JABBOUR N., GARRY D. Management of duodenal perforation after endoscopic retrograde cholangiopancreatography and sphincterotomy. *Ann. Surg.*, 2000 Aug., **232** (2) : 191-8.
7. ENNS R., ELOUBEIDI M.A., MERGENER K., JOWELL P.S., BRANCH M.S., PAPPAS T.M., BAILLIE J. ERCP-related perforations : risk factors and management. *Endoscopy*, Apr. 2002, **34** (4) : 293-8.
8. HUI C.K., LAI K.C., YUEN M.F., LAM S.K. Tension pneumothorax complicating ERCP in a patient with a Billroth II gastrectomy. *Gastrointest. Endosc.*, Aug. 2001, **54** (2) : 254-6.
9. MORLEY A.P., LAU J.Y., YOUNG R.J. Tension pneumothorax complicating a perforation of a duodenal ulcer during ERCP with endoscopic sphincterotomy. *Endoscopy*, May 1997, **29** (4) : 332.
10. GYA D., SALI A., ANGUS D. Subcutaneous emphysema and pneumothorax following endoscopic sphincterotomy. *Aust. N. Z. J. Surg.*, Nov. 1989, **59** (11) : 900-2.
11. SCARLETT P.Y., FALK G.L. The management of perforation of the duodenum following endoscopic sphincterotomy : a proposal for selective therapy. *Aust. N Z J. Surg.*, 1994 Dec., **64** (12) : 843-6.