

SCW Cheung 張志偉  
 FL Chan 陳富六  
 M Ng 吳馬太

# Abdominal pain after endoscopic intervention

## 內窺鏡檢查後的腹痛

.....  
**Quiz**

A 72-year-old woman presented to the Queen Mary Hospital with a history of jaundice and pruritus for 2 weeks. Serum investigation revealed a total bilirubin of 30 mmol/L (normal range, 7-19 mmol/L) and an alkaline phosphatase of 1300 U/L (normal range, 54-140 U/L). Ultrasound examination of the liver demonstrated dilatation of the intrahepatic bile ducts and proximal common duct. The distal common duct could not be fully assessed owing to overlying bowel gas. Endoscopic retrograde cholangiography (ERC) was performed to look for the cause of the biliary obstruction. A papillary growth was found in the common duct near the cystic duct insertion. A plastic biliary stent was inserted after sphincterotomy.

On the day after the ERC, the patient complained of abdominal pain. A plain radiograph was obtained of the abdomen with her in the erect position (Fig 1). What acute condition is she suffering from?

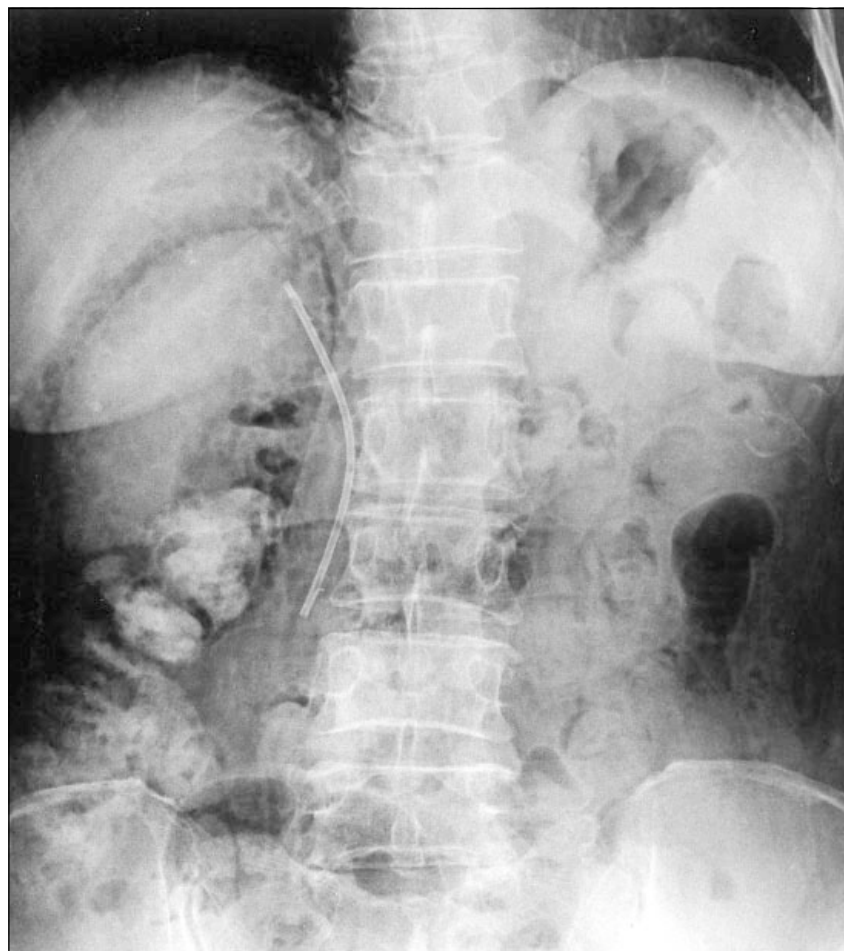


Fig 1. Quiz film

**Key words:**

*Bile duct diseases;  
 Cholangiopancreatography,  
 endoscopic retrograde;  
 Intestinal perforation;  
 Retroperitoneal space;  
 Tomography, X-ray computed*

**關鍵詞：**

膽管病；  
 胰膽管造影術，內窺鏡逆行性；  
 小腸穿孔；  
 腹膜後間隙；  
 體層照相術，電腦化的X光

HKMJ 2001;7:281-3

The University of Hong Kong, Queen Mary Hospital, 102 Pokfulam Road, Hong Kong:  
**Department of Radiology**  
 SCW Cheung, MRCP, FRCR  
 FL Chan, FRCR, FHKAM (Radiology)  
**Department of Medicine**  
 M Ng, FRCP (Edin), FHKAM (Medicine)

Correspondence to: Dr SCW Cheung

## Answer

### ***Perforation of duodenum after endoscopic biliary procedure***

#### **Findings on radiography**

Figure 1 shows, in addition to a biliary stent, the presence of retroperitoneal air, presenting as a radio-lucent cuff that renders the right renal outline unduly clear. This is typical of the presence of air in the right pararenal space. In the clinical context of the patient under discussion, this probably resulted from retroperitoneal perforation of the duodenum after biliary tract intervention. The second part of the duodenum and the pancreas are both retroperitoneal structures located in the anterior pararenal space. Any leakage of their contents, including air, bowel content, or pancreatic enzymes, can track into this space and extend to surround the right kidney. A small amount of intraperitoneal air is also observed under the medial aspect of the right hemidiaphragm on the film. There was no extension of the retroperitoneal air into the mediastinum and a chest radiograph did not reveal any pneumothorax.

#### **Clinical management and progress**

Apart from some abdominal pain, the patient was largely asymptomatic, with no signs of sepsis or peritonitis. She was treated conservatively with parenteral nutrition and prophylactic antibiotics. She remained afebrile throughout, and leucocytosis was not observed on serial blood sampling. She was discharged after 10 days of uneventful in-patient management. For the original biliary pathology, the plan was surgical resection of the bile duct tumour and hepaticojejunostomy.

### **Perforation of bile duct and gastrointestinal tract after endoscopic retrograde cholangiopancreatography**

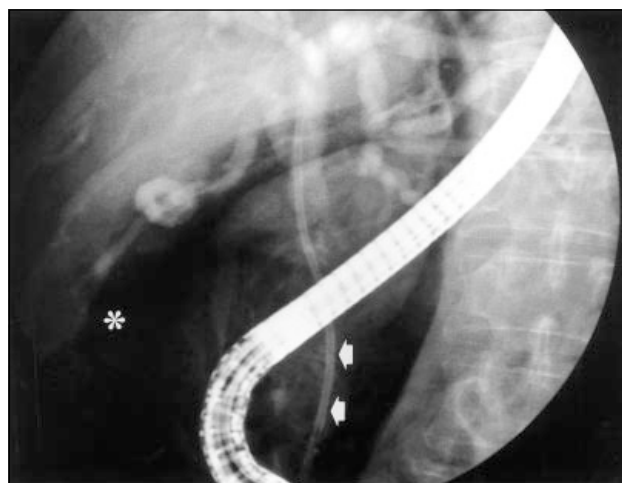
Like any endoscopic procedure, ERC with biliary intervention carries with it a risk of perforating the gastrointestinal tract. Oesophageal or gastric perforation is very rare. Duodenal or bile duct perforation occurs in about 1% of cases, and has an associated mortality rate of up to 18%. Unrecognised perforation at the time of the procedure runs an even greater risk of death, making prompt and accurate diagnosis of this complication very important indeed.

The cause of perforation varies. It may be caused by the scope, the guide wire, the sphincterotome, or insertion of the endoprosthesis (stent).<sup>1</sup> It occurs more commonly in interventional (as opposed to diagnostic) procedures, although this is not agreed universally.

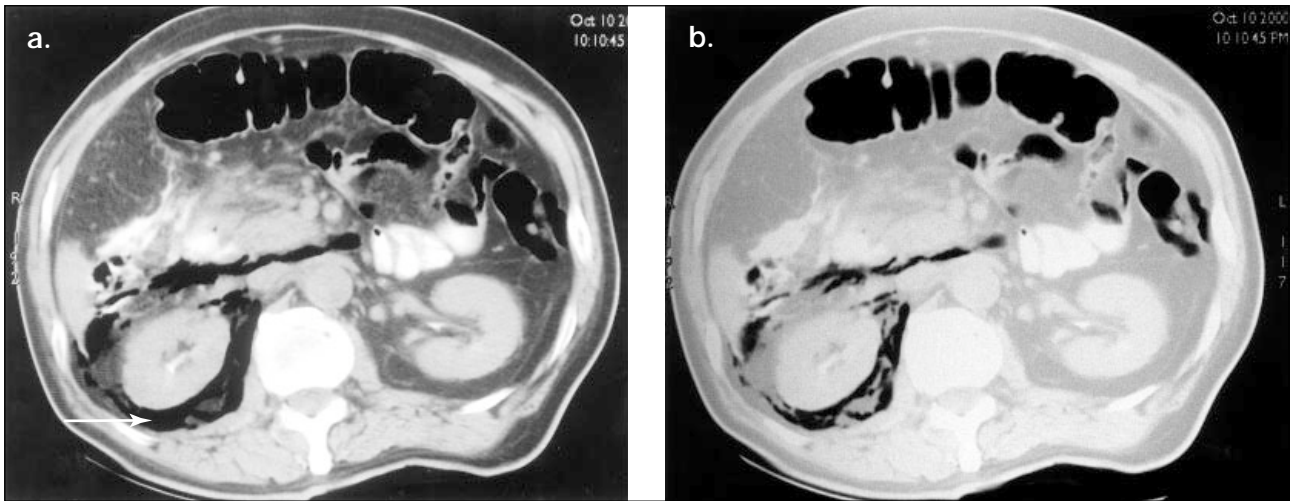
The site of perforation also varies. Lateral duodenal wall perforation is usually caused by the scope, is large, and frequently requires surgical intervention. Perforation of the medial wall or the lower common duct, on the other hand, is often smaller, is associated with fewer symptoms, and is sometimes amenable to conservative management.

In many cases, the endoscopist can visualise the perforation during endoscopic retrograde cholangiopancreatography (ERCP). Perforations can, however, be mistaken for duodenal diverticula or fistula, and be missed initially. If a perforation is suspected, contrast material can be injected via the scope to look for leakage. Large leakages are usually associated with persistent contrast pooling around the duodenum, whereas the contrast tends to disperse more quickly with smaller leakages. In this case, the perforation was detected when the fluoroscopic image (Fig 2) showed a large amount of air in the right pararenal space. It should be noted, however, that the mere presence of scanty retroperitoneal air is not always indicative of perforation: this can be due to over distension by the air introduced.<sup>2</sup>

The radiographic signs of retroperitoneal air or free intraperitoneal air should be sought on films taken after ERCP if a perforation is suspected. Computed tomographic (CT) scan viewed in the appropriate window settings would be a more sensitive method to look for retroperitoneal or intra-abdominal collections (Fig 3). When in doubt, water-soluble contrast examination of the upper gastrointestinal tract can be performed. Most of these collections cannot be drained adequately by percutaneous procedures under imaging guidance.<sup>3</sup>



**Fig 2. Radiographic film of the patient after endoscopic retrograde cholangiopancreatography and biliary stent insertion**  
Note the plastic biliary stent in the common duct (arrows). A large amount of air occupies the right pararenal space (\*)



**Fig 3. Axial computed tomographic scan images at the upper abdominal level in another patient with duodenal perforation after endoscopic retrograde cholangiopancreatography**  
 (a) at a window width and level setting that is optimal for soft tissue visualisation, the kidneys and the second part of the duodenum can be seen. The retroperitoneal air (arrow) is hypodense to the retroperitoneal fat which, in turn, is hypodense to the soft tissues (viscera and muscles); (b) at a lung window setting, the air collection stands out and can be differentiated readily from pararenal fat. Paraduodenal collection is absent

Massive subcutaneous emphysema usually indicates the necessity of surgical treatment.

Many cases of perforation are actually concealed and a negative study cannot exclude the possibility that this complication has occurred. In such cases, a conservative management approach is favoured by some clinicians. Fever and leucocytosis are commonly seen in these patients and may not indicate treatment failure. The lack of leucocytosis in the patient under discussion is therefore unusual, especially as no cause of immuno-incompetence can be identified. The development of clinical sepsis or peritonism are important signs to look for.

### Summary points

- Endoscopic retrograde cholangiopancreatography-related perforations occur in about 1% of patients and are associated with significant mortality.
- Plain radiographic evidence of contrast leakage,

retroperitoneal or intra-abdominal air, subcutaneous emphysema, and pneumothorax are important suggestive signs of perforation.

- Upper gastrointestinal studies with water-soluble contrast and CT scan of the abdomen help in the early identification of surgical candidates and also with monitoring of medical treatment.
- Some cases of perforation can be managed successfully without resorting to surgery.

### References

1. Stapfer M, Selby RR, Stain SC, et al. Management of duodenal perforation after endoscopic retrograde cholangiopancreatography and sphincterotomy. *Ann Surg* 2000;232:191-8.
2. Dunham F, Bourgeois N, Gelin M, et al. Retroperitoneal perforations following endoscopic sphincterotomy; clinical course and management. *Endoscopy* 1982;14:92-6.
3. Genzlinger JL, McPhee MS, Fisher JK, Jacob KM, Helzberg JH. Significance of retroperitoneal air after endoscopic retrograde cholangiopancreatography with sphincterotomy. *Am J Gastroenterol* 1999;94:1267-70.