Ann R Coll Surg Engl 1996; 78: 206–208

Surgery in perforation after endoscopic sphincterotomy: sooner, later or not at all?

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Key words: Endoscopic sphincterotomy; Complications; Perforation

During a period of 8 years we managed ten patients with perforations resulting from endoscopic sphincterotomy. Four patients underwent operation within 24 h of the perforation, while six underwent operation later than 24 h. All the deaths and complications occurred in the latter group. Our experience underscores the importance of early diagnosis of perforation after endoscopic sphincterotomy and supports an aggressive surgical approach.

Complications of endoscopic sphincterotomy (ES) include haemorrhage, pancreatitis, perforation and sepsis. Perforation is probably the most serious of these and is associated with a mortality of up to 25% (*1–3*) a figure which is not surprising considering the high bacterial inoculum in stagnant bile. A review of over 12 000 ES performed in various centres cited a perforation rate of 1.3% with a mortality of 16% (*4*). The controversial issue in the management of patients with ES perforation is whether to advise surgical repair or to treat conservatively. As the number of patients seen by any individual is small, it is difficult to give precise guidelines regarding management, but certain broad principles may be followed. We report our experience in the management of ten patients with perforations after ES.

Patients and methods

Between 1986 and 1993 ten patients were referred to the Department of Gastrointestinal Surgery, GB Pant Hospital, New Delhi, for the management of perforation of the lower end of the common bile duct (CBD) and duodenum after ES, during which period approximately 750 endoscopic sphincterotomies were performed. There were six males and four females, with ages ranging from 36 years to 72 years. The indications for ES were CBD stones in seven patients and carcinoma of the head of the pancreas in three patients. Six patients had jaundice, four had hypertension and two patients had diabetes mellitus. In three patients the perforation was diagnosed during ES by noticing extravasation of the contrast material. In the remaining seven patients it was diagnosed from 7 h to 14 days after the procedure.

Depending on the clinical features, the patients have been classified into three groups: Group 1, two patients (both with CBD stones) with signs of peritonitis soon after the ES and who were referred for surgery within 12 h; Group 2, six patients (CBD stones 4, carcinoma of the pancreas 2) with equivocal signs of systemic sepsis and abdominal contamination who were treated conservatively by nasogastric aspiration, intravenous fluids and antibiotics. They were subsequently referred for surgery because of lack of improvement or deterioration, 12–40 h after the procedure. Group 3, two patients (CBD stone 1, carcinoma of the pancreas 1) who presented 9 days and 14 days, respectively, after ES with persistent abdominal pain and fever.

Plain radiographs of the abdomen in the eight patients in groups 1 and 2 showed retroperitoneal gas in five patients and intraperitoneal gas in two patients. Plain radiographs of the abdomen in one of the group 3 patients showed a large fluid collection in the subhepatic space, while a barium study in the second patient showed a leak from the second part of the duodenum (Fig. 1).

Results

All ten patients underwent laparotomy. Four patients (two from group 1 and two from group 2) underwent operation within 24 h of ES, four patients (all from group 2) underwent delayed operation 24–48 h after ES, while

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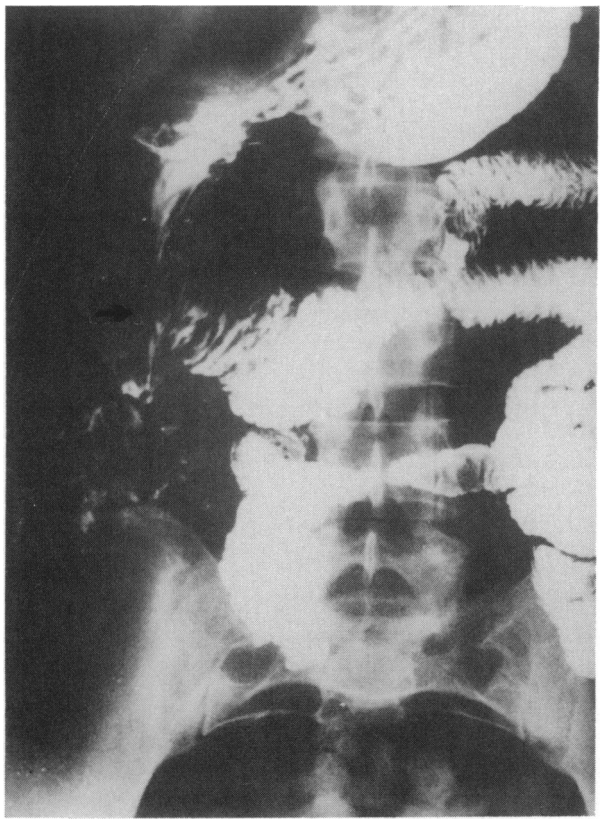

Figure 1. Barium meal study showing extravasation of dye from the second part of the duodenum (arrow).

both patients in group 3 underwent operation later than 48 h. Delayed operation in the four group 2 patients was because of persistence with conservative management even though the perforation was known. Surgery was considered only when these patients either failed to improve or deteriorated.

Laparotomy in those patients undergoing early operation revealed a retroduodenal collection of bile in three patients, the fourth patient having an intraperitoneal perforation. Suture closure of the perforation, proximal biliary diversion by T-tube drainage and drainage of the retroduodenal space was performed as well as cholecystectomy in two patients who had associated gallstones.

All patients undergoing delayed surgery had thick purulent bile in the retroduodenal, retrocolic and pelvic regions. One patient in this group also had an intraperitoneal perforation. In two patients the perforation was closed by suture but in the other two the exact site of leak was not apparent. T-tube drainage of the CBD was performed in all four patients along with drainage of the areas of bile collection.

The two patients who underwent late operation had dense adhesions between the liver, hepatic flexure of the colon and duodenum. In both there was a large retroduodenal collection of pus which was drained. In one patient a cholecystojejunostomy was added to relieve the jaundice.

Three patients, two from the delayed group and one from the late group needed re-exploration for persistent sepsis, 7, 9 and 15 days, respectively, after the initial operation. One of these patients developed a faecal fistula which was managed conservatively and closed 3 weeks later.

The hospital stay of the patients undergoing early operation ranged from 7 to 11 days (mean 8 days) compared with a mean of 27 days with a range 14–39 days in those patients in the delayed and late groups. Of the three patients with pancreatic cancer, one underwent surgery in each of the early, delayed and late groups and one (delayed group) died. Three patients with CBD stones had early surgery, three had delayed and one had late surgery. One patient in the delayed surgery group died. The cause of death in the two patients who died was persistent sepsis leading to multisystem organ failure.

Discussion

The incidence of perforation after ES has been reported to range from 0.8% to 3% (*1,5*). The perforation may occasionally be large enough to be recognised during the procedure itself by the extravasation of the contrast medium into the abdominal cavity, as was the case in three of our patients, or it may become obvious later. The perforation is usually confined to the retroperitoneum, but may occasionally be intraperitoneal. Signs and symptoms may include abdominal pain, fever and ileus, but small perforations may remain unrecognised as they can be completely asymptomatic. The presence of subcutaneous emphysema or yellowish discoloration in the flanks suggests perforation (*6*). A plain abdominal radiograph may show free retroperitoneal or intraperitoneal gas, as was seen in seven of eight of our patients, but the amount of gas is not related to the size of the perforation. It may be useful to radiograph the abdomen at the end of the procedure as a routine so that conservative treatment can be started immediately if intraperitoneal or retroperitoneal gas is noted. Computerised tomographic (CT) assessment has been reported to be helpful in the early diagnosis and also in differentiating perforation from pancreatitis after endoscopic retrograde cholangiopancreatography (*7*).

When an ES perforation has been detected, which patients should be managed conservatively and which should undergo surgery? There is no disagreement that patients without systemic or abdominal signs of sepsis should be managed conservatively and that operation should be performed in patients with signs and symptoms of intra- or retroperitoneal contamination. The real clinical challenge, and also the area of controversy, is the management of those patients who have early or indefinite signs of abdominal contamination. Six of our patients (Group 2) fell into this category.

Most gastroenterologists believe that since the majority of perforations after ES are small in size, they are best managed conservatively and that in patients with malignant lesions a conservative approach is justified. Recommendations range from periodic assessment with serial CT scans (*7*) to re-endoscopy (*8*) and insertion of nasobiliary drainage (*9*). Insertion of a nasobiliary

catheter or an endoprosthesis is useful if the perforation is detected early, but in cases of delayed diagnosis the abdominal contamination by the stagnant infected bile is widespread, necessitating surgical drainage. Moreover, patients undergoing ES are often old and ill and therefore poorly tolerate the consequences of prolonged sepsis. Despite significant retro- or intraperitoneal contamination such patients may have few abdominal signs and persistence with non-operative measures without rapid improvement may be dangerous. In four of our patients in group 2, where surgery was delayed, the results were poor with two dying and two needing re-exploration for drainage of residual abscesses. In contrast, the two patients in this group who had early surgery had an uncomplicated recovery. Furthermore, the longer intervention is delayed, the more surgery becomes technically difficult owing to the formation of adhesions and the loss of tissue planes (*10*).

It may be argued that a policy of early surgical intervention may subject some patients to unnecessary risk as they might be managed successfully by conservative means. However, like Bell *et al.* (*11*), we believe that the risks of early operation are less than the hazards of operating later when conservative measures have failed. The two deaths in our series both occurred in patients who underwent operation later than 24 h after ES. The single most important factor adversely affecting survival in patients with small bowel perforation is delay in diagnosis and initiation of treatment (*12*), and all efforts should be directed towards reducing this delay. In short, when managing patients with ES perforation it is safer to operate than to observe.

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Received 17 August 1995