

# Duodenal perforation in course of endoscopic retrograde cholangiopancreatography-endoscopic sphincterotomy.



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## Therapeutic considerations

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## Duodenal perforation in course of endoscopic retrograde cholangiopancreatography-endoscopic sphincterotomy. Therapeutical considerations

**AIM OF THE STUDY:** *To define the therapeutic program for the treatment of perforative complication of the duodenum in course of endoscopic retrograde cholangio-pancreatography (ERCP) with endoscopic sphincterotomy (ES).*

**MATERIAL OF THE STUDY:** *In the period from 1997 to 2003, 5 duodenal perforations occurred during 101 ERCP/ES (4.95%), executed in two digestive endoscopic centres. Three patients were operated in emergency (duodenostomy, external biliary drainage, gastric-enteric-anastomosis). The other two were treated conservatively with nasal-duodenal drainage in aspiration.*

**RESULTS:** *The postoperative complications were modest. Anyway there were no signs of sepsis nor of retro/endoperitoneal purulent collections. Biliary drainage, upon radiologic control, and duodenostomy, were removed within the 4<sup>th</sup> postoperative week. There was no mortality.*

**DISCUSSION:** *Immediate surgery was performed when the presence of the radio-contrast in the retroperitoneum was persistent. In case of retroperitoneal and/or small perforations, we preferred early oral intake, trusting on the diversion of the biliary and duodenal secretions. The pointform perforations, without persistence of radio-contrast, were treated by the conservative approach.*

**CONCLUSION:** *The proposed treatment of duodenal perforation in course of ERCP was efficacious and safe, and avoided in our experience every risk of septic evolution.*

**KEY WORDS:** Duodenal perforation, Endoscopic sphincterotomy, Surgical therapy.

## Introduction

Pancreatitis, cholangitis and, less frequently bleeding, are complications of endoscopic sphincterotomy (ES), which usually are managed with conservative therapy. Duodenal perforation, which is often retroperitoneal, presents more problems regarding choice of therapy: several therapeutic programs may be proposed, since often the initial lesion is not easily recognized and may vary. The aim of the study was to determine, with uniformity, the criteria of the therapeutic choice.

## Material and method

In the period from October 1997 to December 2003, 101 ERCP were performed. In 90 cases ES was associated for therapeutic aims: 47 acute biliary pancreatitis (5 severe acute pancreatitis, 42 mild acute pancreatitis), 25 choledocholithiasis without pancreatic compromise and 18 cases of positioning an endoscopic stent in patients with non operable neoplastic pathology. However, ERCP often turned out to be only diagnostic, since lithiasis had in the meantime passed spontaneously. ERCP/ES were executed in two different centers of digestive endoscopy, outside our Department. We registered 5 duodenal perforations (4.95%). In these cases, the initial pathology, the radiological picture of the ERCP, computer tomography (CT) control and the post-ERCP clinical picture were evaluated in order to establish the therapeutic program.

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In two patients indication of ERCP/ES was acute pancreatitis; there was no evidence of radio-contrast leakage during the examination, but signs of perforation, evidenced by retropneumoperitoneum during a CT scan, performed some days after ERCP (carried out for morphological evaluation of the acute pancreatitis). A conservative therapeutic approach was used in these patients: positioning of a nasal-gastric tube for some days and suspending oral alimentation. In both patients the clinical evolution was completely favorable. In the other three patients, also affected by acute biliary pancreatitis, radio-contrast leakage was observed during ERCP; the immediate radiological and CT controls showed retropneumoperitoneum and the persistence of the contrast leakage. These patients also had presented fever (38.5°C in mean) and upper abdominal pain during the last hours before the subsequent operation. These three patients were submitted to urgent surgical intervention of cholecystectomy, external biliary drainage, gastric-enteric-anastomosis (GEA) and duodenostomy with a Foley catheter.

## Results

The results of both therapeutic choices were fully favorable: there was no mortality nor development of retroperitoneal septic collections. Oral alimentation was resumed in all cases on 8<sup>th</sup> day. Specific complications occurred in the operated patients after the 3<sup>rd</sup> week: one evenience of post-operative vomiting and electrolyte unbalance, and in one case stenosis of the afferent jejunal loop of the GEA after 4<sup>th</sup> week necessitating another surgical intervention.

In patients treated with conservative therapy, the nasal-gastric tube was removed on 8<sup>th</sup> day. External biliary drainage and the duodenostomy were removed during 4<sup>th</sup> week. These data are shown in Table I.

## Discussion

In the past, the incidence of post-ERCP/ES complications was evaluated to be about 10% <sup>1-3</sup>: such compli-

cations referred to perforation, pancreatitis, cholangitis and bleeding. In literature post-ERCP perforation is about 1%.

Perforative complications have 2 aspects which are yet to be clarified: is it necessary to distinguish minimal perforations from real lacerations thus facilitating therapeutic intervention? The second aspect still open to debate is how to define risk factors so as to allow for efficacious prevention.

The complications of the medical procedures cannot be completely eliminated; moreover, it is important to identify the risk factors in order to lower risk rates. As regards to duodenal perforations in course of ERCP/ES, we can refer to physiopathologic conditions, such as Oddi sphincter dysfunction, biliary duct dilatation, the technical difficulties of the performed maneuvers: the necessity to perform the pre-cut, the use of a guide-wire, many attempts to complete the examination, or the presence of biliary stenosis to be dilated. Finally, in the prevention of the ERCP complications, we can conclude that a key role is given to the technical skill and to the identification of the cases at risk <sup>4-6</sup>.

The therapeutic problem referred to the duodenal perforative post-ERCP complication is today basically modified thanks to the anatomical-clinical differentiation of the cases before any operative decision.

In fact, in the past, without the anatomo-clinical evaluation, there was an extensive application of the surgical indication, that, in some cases, implied over treatment.

The selective therapeutic approach offers two options: urgent surgical intervention and conservative therapy <sup>7</sup>.

The decision of the therapeutic program depends on clinical and diagnostic criteria. The clinical scenario may be very variable, comprehending clinical signs and symptoms of generalized peritonitis or normal conditions of the abdominal objectivity, without pain or fever. As is well known ES may on its own reactivate pancreatitis and cause abdominal pain with de novo induced a further increase of the specific laboratory parameters: this condition must be differentiated from the perforative scenarios. The variability of the clinical

TABLE I – Results of management of 5 perforations in course of ERCP/ES

	Surgical therapy in urgency	Conservative therapy
Retro or endoperitoneal septic gatherings	No	No
Mortality	No	No
Resumption of the alimentation	7 <sup>th</sup> day	8 <sup>th</sup> day
Efferent loop stenosis in GEA	1	–
Vomit from electrolytic unbalances	1	–
Removal of the nasal-duodenal drainage in aspiration	–	8 <sup>th</sup> day
Removal of the external biliary drainage	4 <sup>th</sup> week	–
Removal of the duodenostomy	4 <sup>th</sup> week	–

picture is definitely determined by the location (retro or intraperitoneal), and by the size (true laceration or simple pointform lesion), of the duodenal perforation. The radiological and ultrasonographic data are fundamental to program the therapeutic choice. Besides, we must consider that in many cases the diagnosis was made during the examination at the moment of the injection of the contrast media. In our experience, this last event occurred in three of the five patients. In the remaining two patients there was no evidence of contrast leakage during the examination, and the silent clinical scenario did not lead to specific exams (radiocontrast examination of the upper intestinal tract). In fact, the diagnosis was made some days later, during CT-scan (with oral and intravenous radiocontrast) that had been programmed to control the evolutive morphologic scenario of the pancreatitis. In both patients the conservative medical therapy was programmed and it was identical to our usual dietetic-therapeutic prescriptions for acute pancreatitis and for the post-ERCP/ES phase: suspension of alimentation, antibiotic therapy, gabesate mesilate, somatostatin.

Thus, the conservative therapy is chosen when clinical findings are negative and there are no signs of incipient sepsis. Furthermore, patients with a minimal retroperitoneal perforative lesion are eligible for only a medical therapy when there is a minimal radiocontrast leakage during the ERCP, and when contrast agent disappears in a short time upon radiographic control.

In all the other conditions, in our opinion, the urgent surgical intervention is to be considered: relevant when retroperitoneal contrast leakage persists and the lesion is intraperitoneal even if small. Duodenal wall lacerations, even if small, in any case should be operated. In these cases we believe that waiting for the first signs of sepsis, in order to avoid the surgical operation, is very risky. In fact, in these cases, risk of sepsis is high and then difficult to control.

Of fundamental importance in this perspective is that clear criteria should be defined for a timely decision when to operate.

We completely agree with the following points shown by Stapfer <sup>7</sup>: persistent contrast leakage during ERCP, that is during the radiological examination of the stomach-duodenum (with hydro-soluble radiocontrast), within 2 to 8 hours from the ERCP; CT-scan demonstration of intra or retroperitoneal contrast spreading, massive subcutaneous emphysema; persistence of intra-choledoch material, such as stones, Dormia basket, etc. On the other hand this choice of therapy is not advisable for patients in whom perforation has been demonstrated, but the clinical data (peritoneal signs, fever, leukocytosis, etc.) are considered negligible.

The other point of discussion concerns the timing and the choice of the surgical treatment. If necessary the surgical intervention must be immediate, as is the case for the perforation of the cave organs. Conservative therapy

is justified only for retroperitoneal or pointform perforations, with minimal contrast leakage.

In the doubtful cases, where a septic evolution is to be expected, non-surgical medical therapy is not acceptable, but on the contrary it is preferable to program the surgical intervention in emergency.

The choice of the type of surgical intervention to treat the perforation depends from the kind of anatomical lesion.

The great lacerations may need a local revision, in order to suture the lesion. But, this therapeutic moment is, in our opinion, in most other cases unnecessary, and perhaps harmful.

Generally these are little perforations which are the result of the pre-cut or a false path of the catheter or of the guide wire into the retroperitoneum. In this condition duodenum mobilization could cause an intraperitoneal perforation.

So, excluding the rare cases of major lacerations, we think that it is useful not to directly treat the site of the perforation. But in both cases the surgical treatment should be completed by the duodenal transit exclusion with a gastric-enteric-anastomosis (GEA), by duodenostomy and external biliary drainage if there is dilatation of the principal biliary duct, and finally periduodenal drainage. In this way the alimentation can be restarted at the end of the first week, while the duodenostomy and the external biliary drainage should be removed by 4th week. Our therapeutic choices, based on the criteria for selection of the patients above indicated, did not register failures as to the development of septic collections.

The clinical and instrumental scenario is not reliable, because it does not allow for a detailed and precocious selection of the patients, since, if it is positive (peritoneal signs, even if minimal and circumscribed, fever, etc.), it will foresee surgery, but it could be quite late if there retroperitoneal leakages have occurred, dangerous septic collections could follow.

Then the trend of our choices is decisively for an early surgery because a perforation which is not treated surgically is at high risk and could have an unfavorable evolution. In these cases late surgical intervention is often inefficacious.

In our experience the presence of a minimal lesion in the two patients became evident by the clinical evolution and by the signs shown during routine diagnostic control.

## Conclusions

Patients should be selected on the basis of the anatomic kind of perforation, and on the basis of indirect data, supplied by both the contextual radiological study during the examination, and, immediately afterwards, by a CT-scan study.

If the clinical and instrumental evaluation of the patients

shows an intraperitoneal perforation or if there is the evident and persistent leakage of the radio-contrast in the retroperitoneum the surgical intervention must be programmed at once. On the contrary, the cases with a minimal lesion and negligible or absent retroperitoneal contrast leakage, without any modification of the clinical findings, must be conservatively treated.

In our experience these proposed treatments of duodenal perforation in course of ERCP was efficacious and safe, and always avoided every risk of septic evolution.

### Riassunto

La pancreatite, la colangite e in misura minore il sanguinamento sono complicanze della sfinterotomia endoscopica che in prima istanza sono gestibili con terapia conservativa e spesso in tal modo vanno a risoluzione. La perforazione duodenale, molto spesso retroperitoneale, pone sicuramente maggiori problemi di scelta terapeutica: il quadro clinico spesso non univoco, la lesione iniziale non ben conosciuta e comunque variabile, la possibilità indefinita di autolimitazione del quadro anatomico-clinico lasciano proponibili diversi programmi terapeutici. Lo scopo dello studio è di determinare in modo uniforme i criteri della scelta terapeutica.

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