MANAGEMENT OF DUODENAL PERFORATION AFTER ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY

By

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Traditionally, duodenal perforations hove been managed surgically; however, recently, management has shifted to a more selective approach.

The authors reviewed retrospectively, from January 1998 to June 2001, at the endoscopy units of El-Minia & Sohag University Hospitals, identified 12 instances of duodenal perforations related to EPCP, a rate of 2.5% of total procedures done. Charts were reviewed for the following: ERCP findings, mechanisms of injury, clinical presentation of perforation, diagnostic methods, time to diagnosis, methods of management, surgical procedures and outcome.

Twelve patients had a duodenal perforation. Eight patients were initially managed conservatively. Two of the eight patients failed non-surgical management and a decision to operate was delayed to end fatally. Four patients were managed initially by surgery and one patient had a delayed surgical management due to missed diagnosis with fatal outcome on the 4th post - operative day.

Clinical and radiographic features of ERCP-related duodenal injuries can be used to categorize patients into surgical or non-surgical groups. A selective management scheme is proposed.

Key words*: Duodenal perforation- ERCP - Endoscopic sphincterotomy.*

INTRODUCTION

Endoscopic retrograde cholangiopancreatography (ERCP) is now a well-established technique and is the treatment of choice for certain biliary disorders [1]. ERCP is commonly used in the treatment of common bile duct stones[2] it is widely regarded as a safe procedure, but the major complication rate approaches 10%. Common complications include pancreatitis, bleeding. Cholangitis, and perforation [3].

ERCP-related perforations occur in about 1% of patients, and the injury carries a death rate of 16% to 18%[2]. Traditionally, traumatic and atraumatic duodenal perforations have been managed surgically; however, in the past decade, management of limited and contained endoscopic duodenal perforations has evolved towards a more selective approach [4].

In this study, we report 12-patients series from two centers and define the management strategy for ERCP - related perforations based on clinical and radiographic features.

PATIENTS AND METHODS

Between January 1998 to June 2001, at the endoscopy units of El-Minia and Sohag University Hospitals, 480 ERCP procedures with or without sphincterotomy were performed. Twelve patients (2.5%) had duodenal perforations during ERCP. The median age was 52.5 (range was 40 to 60 years). There were 8 women and 4 men.

Data was collected retrospectively on the twelve

patients with duodenal perforations during ERCP. Their charts were reviewed for the following data: Indications of ERCP, ERCP findings, clinical presentation, diagnostic methods, time to diagnosis and surgery, methods of management, surgical procedures and outcome.

Conservative management was adopted in the presence of the following criteria: benign abdominal examination, absence of sepsis, minimal contrast leakage, and absence of retroperitoneal fluid collections.

Patients were managed surgically if any of the following was present: extensive contrast leakage, intraperitoneal fluid collection, retained stones or massive subcutaneous emphysema. Fever and leucocytosis alone were not considered justification for surgery.

RESULTS

ALL PATIENTS

-Indications of ERCP:

The indications for ERCP in these patients were choledocholithiasis before cholecystectomy, retained stones after laparoscopic cholecystectomy and cancer head of pancreas (Table 1).

-EPCP Findings:

Cannulation of the ampulla by the standard cannula had failed in all the twelve patients, so trial of cannulation by sphincterotome in all patients (100%) was adopted. Needle knife papillotomy was done in six patients (50%). One procedure (8.3%) was terminated before connulation due to perforation by the tip of the endoscope (Table 2).

Duodenal diverticulae were detected in 5 patients (41.7%). The presence of a duodenal diverticulum was associated with increased incidence of duodenal perforation.

-Clinical Presentation

The clinical presentation was variable. Ten patients (83%) had mild abdominal tenderness and pain. One patient developed generalized peritonitis within 2 days of the procedure and one patient had a biloma, three days after the procedure.

Five patients (41.5%) had temperature greater than 39 degrees Celsius, four patients (33.4%) had low-grade fevers, and three remained afebrile.

-Diagnosis of Perforation:.

In four patients (33.4%), the diagnosis was established by chest radiography demonstrating air under the diaphragm. In seven patients (58%), a formal gastrographin UGI revealed contrast extravasation very variable in amount. Diagnosis was missed in one patient for three days until a conventional abdominal U.S revealed a subhepatic cystic smelling.

Non-surgical Managcment.

Eight patients were managed conservatively, seven intentionally; and one unintentionally due to delay in diagnosis. The clinical presentation of the seven patients characterized by minimal abdominal tenderness, afebrile or low-grade fever a small leak at UGI gastrographin study.

The conservative management included absolute fasting (N.P.O), intensive care admission, parentral I.V fluids and hyperalimentation and I.V antibiotics. Close monitoring and follow up of total leucocytic count every 12 hours, daily abdominal ultrasound.

Abdominal C.T scan was done in four patients when the U.S findings were not identical with the clinical examination and revealed a preipancreatic collections in two patients (16.6%).

Two patients failed to respond to non-surgical management. Both of them had initially had minimal abdominal tenderness but progressed to septic peritonitis. One of them had peripancreatic collections as evidenced by CT, which progressed quickly to generalized peritonitis. The other one had a delay in diagnosis and was managed non-surgically until she was diagnosed after 3 days with septic peritonitis.

Surgical Management

The surgical procedure included gastrojejunostomy with pyloric exlusion and retroperitoneal drainage in two patients. Common bile duct exploration with T-tube placement and drainage in two patients. Primary duodenal repair and drainage in one patient who underwent delayed surgical treatment after period of conservative treatment. One patient with missed perforation died on the 4th post-operative day after simple drainage due to septic shock.

None of the four patients treated by primary surgical management required re-operation for duodenal leakage. One patient underwent delayed surgical treatment developed retroperitoneal abscess and required open drainage.

Indications for surgery in this group included any of the following findings: large contrast extravasation, computed tomography scans showing intra or retroperitoneal fluid collection, massive subcutaneous emphysema or perforation in association with retained material as stone or basket.

-Surgical Findings.

We had four patients (33.4%) treated primarily by surgery. One patient had 2-cm lateral duodenal wall

perforation that appeared to be caused by the tip of the endoscope. This patient was reported to have duodenal diverticulum on ERCP (Figs. 2 & 3). The other three patients had large duodenal leaks with retroperitoneal or intraperitoneal fluid collections.

One of the two patients underwent delayed surgical treatment, had a large duodenal perforation on the lateral aspect of the duodenum with septic peritonitis. It appeared to be caused by the wire of the sphicterotome due to its maldirection and the excessive use of the cut current instead of blend type (Fig. 4).

Table (1): *Indications of ERCP (12 Patients).*

Pathology	No. of Patients	%
Choledocholithiasis	5	41.7%
Retained stones after lap. Cholecystectemy	4	33.4 %
Cancer head of Pancreas	3	24.9 %

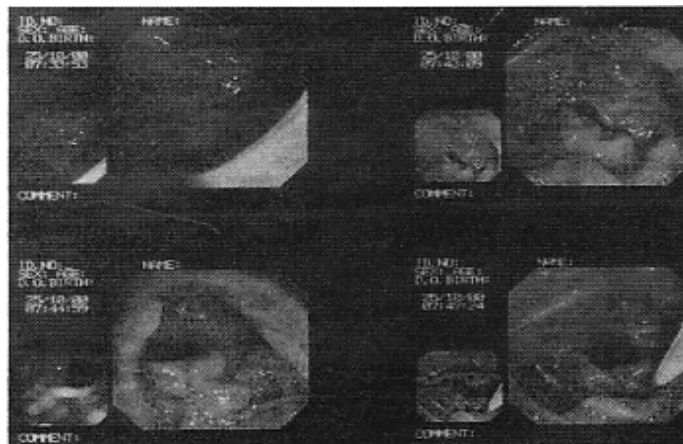**Table (2):** *Mechanism of Injury during ERCP, (12 patients).*

| Mechanism of Injury	No. of Patients	%
Pre-cut needle	6	49.8%
Sphincterotome (Fig 1)	3	24.9%
Guide Wire	1	8.3%
Impacted Dormia basket	1	8.3%
Tip of the Endoscope	1	8.3%
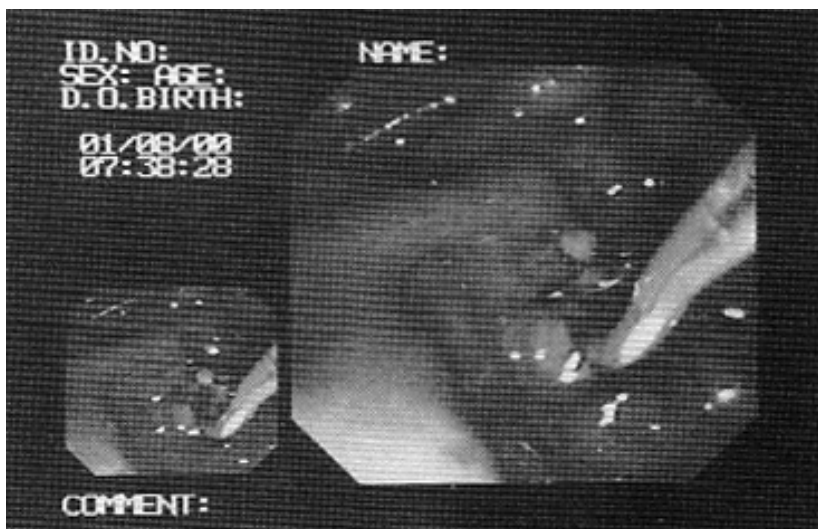
Fig. (1): Extensive wide sphincterotomy extending beyond the sup. Papillaiy fold.

Fig. (2): Papilla at the edge of duod. diverticulum

Fig. (3): Duod. Diverticulum with papilla inside with trial of Sphincterotomy ended by perforation.
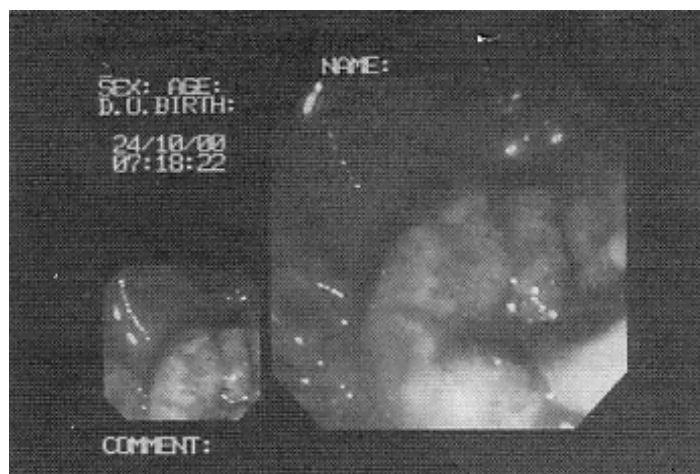
Fig. (4): Excessive coagulation during sphincterotomy ended by duodenal perforation

DISCUSSION

ERCP sphincterotomy is standard procedure for diagnosis and treatment of pancreaticobiliary pathology. One is of the complications of the procedure is duodenal perforation. There is controversy in the management of duodenal perforations after ERCP. Some authors have recommended routine non-surgical management and others advocate mandatory surgical exploration [5,6].

We reviewed our patients of ERCP-related duodenal perforation to identify clinical and radiographic features that would permit safe non-operative management and those that would dictate surgical intervention.

The diagnosis of perforation is usually made during ERCP. Eleven of our twelve patients (91.7%) were suspected at the time of ERCP. Bell and Associates have reported a similar frequency in 1991[7].

Peritonism, but not necessarily peritonitis, was a common early feature of duodenal perforation. Leucocytosis and fever were often present early but were not useful to distinguish a management approach. Similarly, early abdominal examination was not helpful in determining who should undergo surgery within the first few hours. Most patients requiring surgery. had peritonitis, but this was often a late finding and as such, was related to poor outcome [8,9]. Early peritonitis should dictate surgery, but the retroperitoneal nature of the injuries may mask the severity; therefore, negative findings on an abdominal examination should not exclude surgery.

The mechanism of injury correlated with the radiological findings; considered together, were the best guide to select the optimum line of management. The duodenal perforations caused by the tip of endoscope tend to be large and require an immediate surgery. The distal bile duct perforations or duodenal perforations with mechanical lithotripsy or by basket require surgery.

Duodenal perforations caused by endoscopic sphincterotomy or by the use of pre-cut knife, tend to be small and respond well to non-operative management (65% in our series) which is similar to the results obtained by Stapfer M. and Associates in 2000[2]. They tend to seal spontaneously and thus lend themselves to non-surgical management. Fluid collections with computed tomography in the retro or intraperitoneum in these cases is an indication for surgery [10].

Large extravasation during ERCP or perforation with retained stones or basket is anther indication for surgical management [11].

Finally, the failed non-surgical management is an indication for surgery. Therefore, the decision to manage patients without surgery is a dynamic one and should undergo frequent reevaluation.

CONCLUSION

The diagnosis of duodenal perforation is usually made at ERCP. Clincoradiographic features of ERCPrelated duodenal perforations used to stratify patients into surgical and non-surgical groups. Patients who have late recognition of duodenal perforation and non-surgical treatment failures have a high complication rate, with a potentially fatal outcome.

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