Surgical management of ERCP-related complications

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ABSTRACT

Aim: The aim of this study was to analyze clinical findings and treatment outcomes of patients with endoscopic retrograde cholangiopancreatography complications.

Background: Endoscopic retrograde cholangiopancreatography has become a very common procedure for the evaluation and treatment of biliary and pancreatic diseases.

Patients and methods: A retrospective review of 2447 endoscopic retrograde cholangiopancreatography procedures and their complications since Apr 2006 till Dec 2010 was conducted to identify their incidence, optimal management, and clinical outcomes.

Results: 2447 endoscopic retrograde cholangiopancreatography procedures were performed. Overall, complications developed in 168 (6.9%) cases: perforation in 10 (0.4%), hemorrhage in 4 (0.16%) and mild to severe pancreatitis in 154 (6.3%). The patients mean age was 66± 6 yrs with females/ males of 1432(58.5%)/ 1015(41.5%). Abdominal pain, nausea, leukocytosis and hyperamylasemia were most common findings in these patients. Surgery was performed for 6 patients (0.24%). The most hospital station was 20 days: surgical group 7±2 days, pancreatitis 11± 4 days and average 6 days for others.

Conclusion: Endoscopic retrograde cholangiopancreatography remains the endoscopic procedure that carries a high risk for morbidity and or mortality. The majority of events are of mild-to-moderate severity and when surgery should be done, it depends upon the clincopathological condition and we don’t advise pyloric exclusion, gastrojejunostomy and duodenal diversion for these patients.

Keywords: Endoscopic retrograde cholangiopancreatography, Complication, Surgery.

Introduction

Since its introduction in 1968, endoscopic retrograde cholangiopancreatography (ERCP) has become a very common procedure for the evaluation and treatment of biliary and pancreatic diseases. Sphincterotomy is used mainly to remove biliary stones, drain the biliary tree, and the placement of stents in the common bile and pancreatic duct (1).

However, the rate of complications, such as pancreatitis, bleeding, cholangitis, and perforation has been reported to range from 4% to 30% (2). Duodenal injury was reported to have an incidence of 0.3% to 1.3% (3-5) with a relatively high mortality rate of 16% to 18% (6). In other studies, the rate of mortality after ERCP was reported between 1.0% to 1.5% (7, 8). The incidence of post-ERCP pancreatitis (PEP) varies from 1% up to 7% (9-13), it may exceed 25% in very high risk populations (14).

Perforations are usually in the duodenum and retroperitoneal. The majority of cases are due to
papillotomy, whereas intraperitoneal perforations are less common and caused by the endoscope itself (5). The management of the latter is not discussed in the report. Until now, some authors classified ERCP-related perforations according to the site and mechanisms of injury and suggested management guidelines accordingly (3, 6, 15). However, despite these guidelines, the classification of perforations remains poorly defined and the management of ERCP-related perforation still remains controversial.

The aim of this study was to investigate our findings and treatment outcomes in patients with ERCP-related complications.

**Patients and Methods**

Between April 2006 till July 2010, 2447 ERCP procedures with or without sphincterotomy were performed at the Taleghani Hospital, in Tehran, Iran. A retrospective review of ERCP-related duodenal perforations was conducted to identify their incidence, management, and clinical outcome. Medical records were reviewed for the following data: patient demographics, ERCP indications, clinical presentation after the suspected perforation, diagnostic laboratory and radiologic studies, intraoperative findings, length of hospital stay, clinical course and final outcome. 188 complicated cases were enrolled in the present study.

**Results**

2447 ERCP procedures were performed in our hospital, of which 65% were therapeutic and 35% were diagnostic. Complications developed in 168 (7%) cases: pancreatitis in 154 (6%), hemorrhage in 4 (0.16%) and duodenal perforation in 10 (0.4%). The patients mean age was 66 ± 6 years with females/males: 1432(58%)/ 1015(42%). Abdominal pain, nausea, leukocytosis and hyperamylasemia were most common findings in these patients (table 1). ERCP indications are showed in table 2.
Table 2. ERCP indications and patient’s data in each group

<table>
<thead>
<tr>
<th></th>
<th>Stone</th>
<th>Cholangiocarcinoma</th>
<th>Periampullary Carcinoma</th>
<th>SOD†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number (%)</td>
<td>1492(61)</td>
<td>117(4.8)</td>
<td>407(16.6)</td>
<td>431(17.6)</td>
</tr>
<tr>
<td>Age</td>
<td>61.4±5</td>
<td>68.3±4</td>
<td>(69.8±7.9)</td>
<td>52.3±6.1</td>
</tr>
<tr>
<td>Sex (F/M)†</td>
<td>59/41</td>
<td>43/57</td>
<td>46/54</td>
<td>36/64</td>
</tr>
</tbody>
</table>

Mean±Standard deviation; †F/m: Female/Male; ‡SOD: Sphincter of Oddi dysfunction

154 cases (6.29%) suffered from mild to severe pancreatitis. On examination, most patients with PEP had abdominal tenderness, usually localized to the epigastric and periumbilical regions, without rebound tenderness or abdominal distention. Laboratory investigations revealed leukocytosis, hyperamylasemia and hyperlipidemia (table 1).

Table 3. Descriptive statistics of patient’s data (n=2447)

<table>
<thead>
<tr>
<th></th>
<th>Perforation</th>
<th>Mild/Severe pancreatitis</th>
<th>Bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number (%)</td>
<td>10(0.4)</td>
<td>154(6.3)</td>
<td>4(0.2)</td>
</tr>
<tr>
<td>Management</td>
<td>n=6/10; PR+d; GI rest±; AB±ED</td>
<td>GI rest+</td>
<td>OB</td>
</tr>
<tr>
<td>ICU station (day)</td>
<td>3.3±0.8</td>
<td>3.7±1</td>
<td>0</td>
</tr>
<tr>
<td>Hospital station (day)</td>
<td>6.7±2.4</td>
<td>11±3.7</td>
<td>6±1.4</td>
</tr>
</tbody>
</table>

PR: primary repair, d: drainage, GI: gastrointestinal, AB: antibiotic, ED: external drainage, OB: observation

Treatment included putting patients ‘nil by mouth’ for gastrointestinal rest. Patients were treated with intravenous fluids and broad-spectrum intravenous antibiotics such as Imipenem, Ceftriaxone, and Metronidazole (even if patients were afebrile). One case was undergone computerised tomography (CT) guided percutaneous external drainage because of pancreatic necrosis. The mean length of hospital admission was 11±4 days with 3.5 ±1 day on an intensive care unit (table 3).

10 cases (0.4%) had duodenal perforation. Six of them (0.24%) were treated surgically. Four patients were operated on early within 12 hours after ERCP. Symptoms included abdominal pain, nausea and vomiting. On examination all had abdominal tenderness at epigastric and/or periumbilical with rebound tenderness and abdominal distention. These patients had a leukocytosis (above 11000/ml with shift to left). Patients were kept nil by mouth for bowel rest and treated with intravenous fluids, antibiotics and analgesia. One case had undergone cholecystectomy and choledocho-duodenostomy procedure seven years ago.

Four cases with duodenal perforation had no surgical procedures and were treated by conservative management. They were not systemically unwell or septic. A little retroperitoneal air was in their abdominal X-rays. They had no any rebound tenderness or free air in chest x-ray. In this group, there is not any free fluid in abdominal ultrasound. After observation, all of them were discharged in good condition without any complication.

In the surgically treated group there was bile collection at laparotomy in two cases and 1-2cm perforations were found in lateral wall of duodenum after Kocher’s maneuver. Surgical procedures included duodenal primary repair and drainage, common bile duct exploration and choledocho-duodenostomy (n=1). Patients were admitted to intensive care unit for 3±1 days and then discharged on the 7±2 postoperative days.

Discussion

Generally, ERCP is regarded as a safe procedure in the hands of experienced gastroenterologists. However, the rate of major complications approaches 10%, with bleeding, pancreatitis, cholangitis, and perforation among the most commonly reported serious complications. The overall mortality rate of the procedure is approximately 1% to 1.5% (7, 8), but in our study there was no any mortality. Careful patient selection combined with skilled
cannulation minimizes complications and higher-risk procedures should be performed in specialist centers.

154 cases (6.29%) suffered from mild to severe pancreatitis. Our reported rates of PEP are within the range of other cohort studies and randomized, clinical trials (16-21).

Perforation of the duodenum is a major complication that may lead to great mortality if left untreated. As a serious complication after ERCP, perforations have been reported in some series to occur in 0.35% to 2.1% of patients (3, 4, 8) and it was 0.28% in our study.

ERCP-related perforations are diagnosed more frequently by experienced endoscopists, because of either contrast extravasations or appearance of retro-/intraperitoneal air during the procedure.

There are some reports that scope-related perforations presented in gastric, esophageal, and lateral wall of duodenum and jejunum tend to be large and remote from the ampulla and require immediate surgery (3, 6).

In our series, early surgery, with primary repair, was the preferred operation. The surgical procedure selected is based upon the mechanism and degree of injury and patient’s condition.

Some authors performed pyloric exclusion and gastrojejunostomy in patients with duodenal perforation and failed conservative management (6). Options include cholecdochyotomy with stone extraction and T-tube drainage, repair of the perforation, drainage of abscess or phlegmon, choledochojunostomy, or pancreatoduodenectomy (22, 23). Whereas, duodenal diversion has been reported frequently in patients with peri-Vaterian perforations and those operated on late (6). In our study none of the patients were treated with pyloric exclusion, gastrojejunostomy and duodenal diversion. The decision to treat patients with primary repair appears justified given the favorable outcomes that we reported.

If the physical examination after ERCP is indicative of perforation, then a decision regarding operative or nonoperative treatment must be made. Clinical decisions can be supported, but not guided by investigations such as an erect chest X-ray, supine and upright abdominal radiographs and an abdominal CT scan in patients with severe pancreatitis if their symptoms and clinical parameters worsen.

The extent of the operation was proportional to the degree of injury and the intra-abdominal contamination. The two basic principles of our surgical procedures were: a) primary repair of the perforation site and b) extensive drainage and/or debridement.

Our patients hospital stay were significantly less than another studies (less than 11 days versus 31 days in Ji Hun Kim study (24) and 21 days in Dimitrios V. Avgerinos’s study (25) and mean ICU station was 3.66 days Vs. 9 days of their studies (24, 25).

In conclusion, patients should be kept fasting while receiving hydration, nasogastric suction and/or intravenous antibiotics. Percutaneous drainage may be an alternative to surgical drainage in patients who develop retroperitoneal collections. Surgery should be recommended for patients with toxic condition, peritonitis signs, abdominal distention and free air in chest x-ray. The type of surgical intervention depends upon the clinicopathological condition. Our study supports primary repair.

References
2. Freeman ML. Adverse outcomes of ERCP. GastrointestEndosc 2002; 56: S273–82.


