Preliminary Experience with Endoscopic Papillotomy

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Endoscopic papillotomy is a non-operative technique used to manage choledocholithiasis and papillary stenosis. Considerable experience in Europe and initial results in a few medical centers in the United States indicate that it is effective and safe. Six papillotomy procedures were performed at Henry Ford Hospital without complication, and with a successful outcome in five. Endoscopic papillotomy is the procedure of choice for retained common bile duct stones less than 2 cm in diameter.

After a lateral viewing duodenoscope (Olympus JFB 3) has been inserted in order to view the major papilla of the duodenum, under fluoroscopic visualization, contrast material is injected into the common bile duct through a catheter inserted in the papillary orifice. The position and size of the retained stones are then confirmed. To perform endoscopic papillotomy, the papillotome (Fig. 1), a catheter containing a wire exposed 3 cm at the distal end, is introduced into the ampulla of Vater. When bowed, the papillotome provides a taut cutting edge. After its position has been documented by film, a high-frequency blended current is passed through the wire to provide simultaneous cutting and coagulation of the papilla and sphincter (Fig. 2). An incision of 15 mm is adequate for most stones, but larger incisions may be required for larger stones. Most stones pass spontaneously, but in 25% of cases a Dormier basket must be used for extraction.

**Materials and Methods**

Based on an experience of over 400 endoscopic retrograde cholangiopancreatography cases at Henry Ford Hospital (8), endoscopic papillotomy was first successfully done in April 1977, and 13 patients have since been accepted for the procedure.
Fig. 2
The papillotome catheter is inserted into the ampulla and the exposed cutting wire incises the papillary wall. The stone is extracted with a Dormier basket via another catheter.

Fig. 3
Stone 1.8 cm in diameter in common bile duct (arrow) (Patient No. 4).

Results
Of 13 patients referred for endoscopic papillotomy for choledocholithiasis, six were successfully treated without complication (Table I). Of these six, three postcholecystectomy patients (aged 67, 81, and 88) with symptomatic choledocholithiasis passed stones spontaneously after papillotomy (Figs. 3-5). Of two patients who had evidence of retained common bile duct stones by T-tube cholangiography, one required basket extraction (Figs. 6,7). A sixth patient refused a second procedure to extract a stone that had not passed after papillotomy.

However, seven of the 13 patients could not be treated. Three could not be treated because of stricture distal to the stone and two because of large periampullary diverticula. Another patient was rejected for the procedure because multiple stones 3 cm in diameter were identified by endoscopic cholangiography, and a papillotomy incision long enough to permit extractions of these stones was considered too hazardous. In the seventh case, an attempt to recannulate the common bile duct orifice with the papillotome failed.

**TABLE I**

<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>T-Tube</th>
<th>Gall Bladder</th>
<th>Extraction</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>81</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Successful EP after basket extraction though T-tube track failed</td>
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<tr>
<td>2.</td>
<td>67</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Successful EP</td>
</tr>
<tr>
<td>3.</td>
<td>80</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>EP unsuccessful because of stricture. Side-to-side choledocholedodenostomy diversion</td>
</tr>
<tr>
<td>4.</td>
<td>88</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Successful EP</td>
</tr>
<tr>
<td>5.</td>
<td>57</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Unsuccessful EP cholecystostomy and drainage</td>
</tr>
<tr>
<td>6.</td>
<td>83</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>3 cm stones in CBD contraindicated EP</td>
</tr>
<tr>
<td>7.</td>
<td>83</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Periampullary diverticulum and ampullary villous adenoma prevented EP</td>
</tr>
<tr>
<td>8.</td>
<td>55</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Long distal CBD stricture contraindicated EP</td>
</tr>
<tr>
<td>9.</td>
<td>76</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Successful EP</td>
</tr>
<tr>
<td>10.</td>
<td>74</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>EP contraindicated by large periampullary diverticulum</td>
</tr>
<tr>
<td>11.</td>
<td>70</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Successful EP</td>
</tr>
<tr>
<td>12.</td>
<td>80</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Failure of CBD cannulation with papillotome</td>
</tr>
<tr>
<td>13.</td>
<td>71</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>EP incision did not allow stone passage. Patient refused second procedure.</td>
</tr>
</tbody>
</table>

EP = Endoscopic papillotomy  
CBD = Common bile duct
Endoscopic Papillotomy

Fig. 4
As the papillotome catheter is withdrawn from the ampulla, the exposed wire incises the papillary orifice (Patient No. 4).

Fig. 5
After papillotomy the stone has passed (Patient No. 4).

Fig. 6
Post-papillotomy Dormier basket extraction of stones (curved arrow). The pancreatic duct (straight arrow) crosses the spine (Patient No. 11).

Fig. 7
Successful extraction of stones from the common bile duct. The T-tube was removed following the cholangiogram (Patient No. 11).
Endoscopic papillotomy, strictly interpreted, means that an incision of less than 10 mm is made to allow passage of stones 9 mm or smaller. If a longer incision is made (15-30 mm), then, in effect, a sphincterotomy is performed (7) because the incision involves superior sphincter fibers. This choledochoduodenostomy-type incision allows passage or extraction of larger stones (2-3 cm), but of course carries a greater risk of complication.

Candidates for endoscopic papillotomy include postcholecystectomy patients who have retained common bile duct stones that are causing symptoms. In some instances, patients who are a poor surgical risk for cholecystectomy and in whom choledocholithiasis is primarily responsible for their symptoms may also be considered. In addition, patients with papillary stenosis as determined by manometry or clinical criteria have been successfully treated (7). Some patients with malignant obstruction at the ampulla have received treatment as a temporizing measure to relieve jaundice or cholangitis, to make the patient a better risk for later surgical intervention.

A survey of 21 American centers that perform papillotomies revealed an 89% success rate in 1250 patients; retained common duct stones were the most common reason (88%) for the procedure (9). The failures were caused by the inability to position the papillotome or to extract a large stone. The overall complication rate was 8.7%, with pancreatitis in 41 patients, hemorrhage in 20, cholangitis in 24, and perforations in 14 patients. Twenty-three patients (1.8%) required surgery, and 15 (1.2%) died. The experience in the United States mirrors that previously reported from European centers (10-12).

The procedure is contraindicated if a patient has acute pancreatitis or a bleeding tendency. A long distal stricture of the common bile duct, biliary tract anatomical anomalies, and periampullary duodenal diverticula may interfere with the performance of a safe papillotomy.

Most patients who undergo the procedure have had their gallbladder removed and are considered poor risks for surgical exploration of the biliary tract. However, the European experience indicates that, in view of the relatively high success rate (over 75%) and low risk of papillotomy, it should be the first approach in all patients with choledocholithiasis (2). Successful, uncomplicated papillotomy or sphincterotomy also prevents a prolonged and costly hospitalization, permitting the patients to eat the next day and return home in two or three days. Spontaneous passage of the stone(s) usually occurs within the week.

Endoscopic papillotomy does carry some risk, however, and patients must be carefully selected to minimize the hazards (6). Acute pancreatitis or cholangitis may follow catheter manipulation of the biliary tract. Bleeding from the papillotomy incision may occur, although the cephaled portion of the ampulla is fortuitously free of major blood vessels. A periampullary diverticulum, found in two of our cases, increases the likelihood of perforation of the duodenum from an overextended sphincterotomy incision.

Our initial experience with endoscopic papillotomy at Henry Ford Hospital, together with that of other European and American medical centers, indicates that it is a safe, effective therapy for choledocholithiasis. Patients with common bile duct stones of less than 2 cm should be considered for endoscopic papillotomy.

References