Endoscopic Stenting in the Treatment of Bile Leakage after Laparoscopic Cholecystectomy

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Background. Bile leak age is one of the most common complications after laparoscopic cholecystectomy surgery, and biliary decompression is a key factor in treatment. We retrospectively investigated 6 patients with bile leak age after laparoscopic cholecystectomy who were treated with endoscopic stent.

Methods. From March 1995 to May 1999, six patients (4 men and 2 women) aged 30-64 years (mean, 51 years) with bile leak age after laparoscopic cholecystectomy were enrolled. Biliary stent (10 French, 6-10 cm) placement with (n = 4) or without (n = 2) sphincterotomy was attempted. The symp toms, re sults and out comes were re viewed.

Results. The interval from operation to presentation of bile leakage ranged from 1 to 10 days. Bile leak age was de tected from cystic duct stump in 5 patients (83%) and from right IHD in 1 patient (17%). Plastic stent placement was successfully in all patients. Endoscopic stenting healed bile leak age suc cess fully in 5 cases (83%). One patient re quired sur gi cal cor rec tion due to per sis tent bile leak age. The mean du ra tion between stent place ment and ces sa tion of bile leak age was 6.8 days (range 1 to 24 days).

Conclusions. Endoscopic stenting is a safe, rapid and ef fec tive treat ment for bile leak age after laparoscopic cholecystectomy.

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Original
age after laparoscopic cholecystectomy.

**Methods**

From March 1995 to May 1999, six patients with bile leakage after laparoscopic cholecystectomy were enrolled. All patients had a 6 French infrahepatic drain inserted after operation. Bile leakage was suspected if there was persistent bile stained drainage for more than 24 hours, accompanied with severe abdominal pain or vomiting. Endoscopic retrograde cholangiography was performed using Olympus side-viewing endoscope (TJF130). Endoscopic retrograde pancreatocholangiography (ERCP) was performed after buscopan (hyoscine-N-butylbromide) 20 mg intravenous injection with patient in the oblique left lateral position (Fig. 1).

If ERCP revealed leakage of contrast medium, stent placement was performed. Sphincterotomy was performed if there was stone extraction or difficulty of cannulation. The stent length was such that the stent crossed the leakage site by at least 2 cm. All patients received 10 French, 6-10 cm single plastic stents (Wilson-Cook Medical Inc., Winston-Salem, NC, USA) (Fig. 2).

The patients were followed up on external drainage characteristics, improvement of clinical symptoms of fever, vomiting or abdominal pain after stent placement to evaluate treatment effectiveness and to detect complications. The leakage was considered healed if no more bile drained or there was improvement.

**Fig. 1.** Contrast leaks at cystic duct on endoscopic retrograde cholangiography.

**Fig. 2.** Endoscopic stenting in the patient shown in Fig. 1.

**Fig. 3.** No extravasation was found after stent removal 3 months later.
ment of clinical symptoms. Follow-up ERCP was performed 3 months after placement and the stent was removed if no bile leakage was found (Fig. 3).

Results

In this study, there were four men and two women ranging in age from 30 to 64 years, with a mean age of 51 years. Clinical results are shown in Table 1. Four patients (67%) presented with bile drainage from external drains and five patients (83%) with severe abdominal pain. The interval from operation to presentation of bile leakage was 3.8 days (range 1 to 10 days). All patients except case 1, who was referred from another hospital, underwent ERCP immediately after bile leakage presented. Bile leakage was detected from cystic duct stump in 5 patients (83%) and from intrahepatic duct in 1 patient (17%). Endoscopic stent placement was successfully performed in all patients and sphincterotomy was performed in 4 patients. One patient (case 4) with bile leak age at right intrahepatic duct received Roux-en-Y hepatojejunostomy due to persistent bile stained drainage after successful placement of stent. The interval from ERCP to leak age dis appeared ranged from 1 to 24 days, with a mean of 6.8 days. The second ERCP was performed after 3 months and the plastic stent was removed at that time. No more bile leak age demonstrated in all patients.

Discussion

The occurrence of bile leak age ranges from 0.2 to 2.7%. Bile leak age may arise from one of three sites: the cystic duct, the duct of Luschka or the common bile duct. The reasons for bile leak age after laparoscopic cholecystectomy include dislodgement of clips, electrocautery injury of biliary tree, or damage of subvesical duct. Most patients present with bile leakage within one week of operation. The most common manifestations are abdominal pain that worsens, nausea, and low grade fever. Laboratory studies may indicate mild elevated bilirubin level and elevated transaminase level or alkaline phosphatase level. Biliary scintigraphy, in combination with sonography, has proven useful as an initial screening test for bile leak age. Any suspicion of a biliary leak age should be the indication for ERCP.

Bile leak age may become serious if treatment is not effective. Usually, the leak age is from the cystic duct stump or common bile duct. Spontaneous healing may happen in cystic duct stump, but life-threatening peri toneal may develop. Surgical intervention with bile drain age was considered the treatment of choice for bile leakage in the past. In recent years, internal stenting, endoscopic sphincterotomy, percutaneous biliary drainage and transnasal biliary drainage have been applied to the treatment of bile leakage.

There is no doubt that ERCP can map the anatomy of the biliary system and can precisely detect the site of leak age. It is also recognized as the confirmatory procedure for bile leak age. Other complications,

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age (years)</th>
<th>Sex</th>
<th>Symptoms onset to ERCP (days)</th>
<th>Leakage of Sit</th>
<th>Sphincterotomy</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (^a)</td>
<td>63</td>
<td>M</td>
<td>38</td>
<td>CD</td>
<td>yes</td>
<td>healed</td>
</tr>
<tr>
<td>2</td>
<td>61</td>
<td>M</td>
<td>3</td>
<td>CD</td>
<td>yes</td>
<td>healed</td>
</tr>
<tr>
<td>3</td>
<td>43</td>
<td>M</td>
<td>1</td>
<td>CD</td>
<td>no</td>
<td>healed</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
<td>F</td>
<td>5</td>
<td>Right IHD</td>
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<td>surgery</td>
</tr>
<tr>
<td>5</td>
<td>45</td>
<td>F</td>
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</tr>
<tr>
<td>6</td>
<td>64</td>
<td>M</td>
<td>2</td>
<td>CD</td>
<td>yes</td>
<td>healed</td>
</tr>
</tbody>
</table>

\(CD = \text{cystic duct; IHD = intrahepatic duct; GB = gall bladder.}\)

\(^a\) referred from other hospital.
such as biliary stricture or retracted stones, may also be
dem on strated on ERCP. Ther a peu tic pro ce dure, such
as sphincterotomy, stenting or en do scop ic nasobiliary
drain age (ENBD), may be per formed im me di ate ly af-
ter di ag no sis of bile leak age. An early re port has sugg-
ested nasobiliary drain age for treat ing cystic duct
stump leak age. Fol low up cholangiography may be
per for med eas ily with lit tle dis com fort to the pa tient
using the ENBD tube. Disad va n tages of the nas-
obiliary tube in clude a bol ic and nu tri tional com-
pli ca tions of con tin u ous bile loss and dis com fort. On
the other hand, an internal endoprosthesis is more
com for tal able for the pa tient and avoids bile loss.

The du ra tion of stent place ment var i ies. Smith et al.
left stents for 8 weeks in two pa tients with full heal ing
of biliary leak age. Sauerbruch et al. left a stent in
place for 1 month in a pa tient with a mas sive bile duct
leak age and re ported full heal ing. Binmoeller et al.
rec om mended stents in place for biliary leak age in the
ab sence of dis tal ob struc tion could prob a bly be re-
moved with in 3 months. In our pa tients, stents were
at least long enough to cross the leak age site, and 10
French stent was con sid ered suit able for drain age
func tion. En do scop ic sphincterotomy is an es tab lished
pro ce dure but car ries a risk of early or late com plc i-
a tions. On the other hand, Libby et al. found that
sphincterotomy did not in crease the chance of bile
leak age fol low ing cholecystectomy, but nei ther did it
ap pear to lessen the risk sig nif i cantly. The de ci sion
to com bined sphincterotomy or not de pended on ne-
nec es sity of stone ex trac tion for re tained stone, di f ficulty
of can nu la tions and stent place ment. Bjorkman et al.
con cluded that equal iza tion of bile duct pres sure and
duodenal pressure is im por tant in the treat ment of
postsurgical bile leak age. The en do scop ic place ment
of shorter trans pa pil lary stents with out sphin-
cterotomy is a tem porary, ef fective, and tech ni cally
simple method of pres sure equal iza tion.

In our study group, one pa tient (case 4) with right
intrahepatic duct in jury showed per sis tent bile leak age
in spite of suc cess ful plastic stent place ment. This
could be at trib uted to in com pletely brid ing over the
leak age site with the plas tic stent. There fore, cer-
ning the ef fi cacy of in ter nal endoprosthesis in treat ing
bile leak age af ter lap aro scopic cholecystectomy, the
lu men di am e ter as well as the length of plas tic stent
were both im por tant fac tors. Con sider ing drain age
func tion and the ef fect on life qual ity, we pre fer en do-
scop ic stenting to ENBD and per cu taneous drain age
for treat ing bile leak age.

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