Common bile duct stones after laparoscopic cholecystectomy and its treatment

The role of ultrasound and intravenous and intraoperative cholangiography

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Abstract. In the present work we recount our experience in handling common bile duct stones (CBDS) in our first 100 cases of laparoscopic cholecystectomy. In the first 50 cases our diagnostic procedures involved the use of ultrasound exploration and intravenous cholangiography 48 h before laparoscopic surgery. We found three cases of residual CBDS. One of the cases was treated by means of ERCP. The other two cases were resolved by carrying out a transparietohepatic cholangiography after the ERCP procedure failed. After this experience, we changed our strategy, introducing the intraoperative cholangiography in the cases with an unclear diagnosis. With this new approach, no residual CBDS occurred in the following 50 cases. These findings demonstrate the following: (1) In our hands, intravenous cholangiography is not more effective than ultrasound exploration in resolving dubious cases. (2) These dubious cases are more effectively diagnosed by means of selective intraoperative cholangiography. (3) When CBDS is treated by transparietohepatic cholangiography it proves to be less uncomfortable for the patient than ERCP and, as we found, even more efficient in removing the stones, although our experience is based on only two cases.

Key words: Laparoscopic cholecystectomy — Common bile duct stones — Intravenous cholangiography — Intraoperative cholangiography — ERCP — Transparietohepatic cholangiography

Laparoscopic cholecystectomy (LC) is rapidly becoming the chosen treatment for gallstone diseases because of the great advantages it confers on the patient [7]. However, at present, one important limitation of this technique concerns the diagnosis and handling of common bile duct stones (CBDS).

The ideal solution would be to perform in a single laparoscopic operation both a cholecystectomy and choledochus exploration. Otherwise, the resolution of CBDS by means of LC necessarily involves two closed interventions (LC + ERCP or transparietohepatic cholangiography). The alternative is laparotomy (Table 1).

So, preferably, CBDS should be diagnosed before cholecystectomy and the decision should be taken to remove them either by closed procedures or by means of laparotomy directly. Then, if closed procedures are unsuccessful, open cholecystectomy and common bile duct exploration are inevitable (Table 1).

Since the introduction of LC, the routine use of ultrasound for the diagnosis of cholelithiasis has been supplemented by some groups [5, 9] with intravenous cholangiography (IVC-T). The purpose was to trace a preoperative "road map" of the biliary tree [7] as well as to gain precise information about its permeability, since, with the ultrasonic exploration, it is difficult to visualize adequately the lower third of the choledochus, which could lead to false negatives. However, IVC-T has been criticized for its potential provocation of allergic reactions. The alternative would be to perform an intraoperative cholangiography which would be diagnostically superior to the two previous methods although both time consuming and difficult during the initial stages.

However, in reviewing our experience after the first 50 cases of LC using both ultrasound and IVC-T as diagnostic methods, we detected three cases of residual CBDS [15]; in response, we decided to perform an intraoperative cholangiography (IOC) as a complement to the two previous methods in those cases in which the diagnosis was uncertain.

The aim of the present work is to study the efficacy of selective IOC in the prevention of residual CBDS...
Table 1. Evaluation of laparoscopic surgery and the treatment of common bile duct stones (CBDS)

<table>
<thead>
<tr>
<th>Limitations</th>
<th>Alternatives</th>
</tr>
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<tbody>
<tr>
<td>Difficult manipulation by laparoscopy</td>
<td>LC + preoperative ERCP</td>
</tr>
<tr>
<td>Little experience at present</td>
<td>LC + preoperative TPHC</td>
</tr>
<tr>
<td>Very time consuming</td>
<td>Laparotomy</td>
</tr>
</tbody>
</table>

Current procedure

CBDS confirmed before LC:
1. ERCP or TPHC, and then LC
2. if ERCP or TPHC failed → laparotomy

CBDS confirmed after LC:
1. LC (first general anesthesia)
2. if ERCP or TPHC failed → laparotomy and second general anesthesia

Table 2. Indications for laparoscopic cholecystectomy (n = 50)

<table>
<thead>
<tr>
<th>Indication</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic cholelithiasis</td>
<td>5</td>
</tr>
<tr>
<td>Colic occasionally</td>
<td>50</td>
</tr>
<tr>
<td>Frequent colic + analgesics</td>
<td>27</td>
</tr>
<tr>
<td>Acute cholecystitis</td>
<td>18</td>
</tr>
</tbody>
</table>

after laparoscopic cholecystectomy and to evaluate our findings in the treatment of CBDS in the first 100 patients operated on laparoscopically for cholecystectomy.

Materials and methods

Patients

We selected 100 patients with ages ranging from 14 to 79 years presenting a clinical picture of cholelithiasis and operated on electively by means of LC. In these 100 patients we checked the efficacy of CBDS treatment together with LC. The last 50 patients operated on by LC were studied in order to determine the value of IOC as a means of avoiding postoperative residual CBDS. The breakdown of operative indications of this group of patients is shown in Table 2.

Diagnostic procedures

Besides undergoing the standard preoperative study procedure, all the patients were submitted to a biliary tract ultrasonographic examination and liver biochemistry. Furthermore, 48 h before the operation an IVC-T was performed to detect the presence of CBDS. If this proved positive, the patient was operated on by laparotomy. We agree with other authors that there is currently a greater incidence of morbidity when LC + ERCP are applied than when CBDS are treated directly by open surgery [4, 12]. Where the presence of CBDS was uncertain, an IOC was performed using our own method with material already at our disposal. This method involved the use of an intravenous needle, an Abbocath 14 gauge, and a vascular lavage catheter with a wire guide to prevent any possible obstruction of it, which was clipped in the cystic duct in order to keep it in position and avoid leakage of the contrast [16]. Patients with residual CBDS returned complaining of acute colic pains. The presence of residual stones was confirmed by ultrasound examination, increased liver biochemistry, and ERCP or TPHC (when choledochus diameter was greater than 5 mm).

Treatment strategy

When CBDS were detected preoperatively we performed open surgery. When the detection was intraoperative, we switched to open surgery. In the case of postoperative diagnosis of CBDS the chosen treatment was ERCP. If ERCP failed to remove the CBDS, we resorted to the transpapertiohepatic cholangiography (TPHC) approach with balloon catheter in order to avoid open surgery. This procedure was only possible when choledochus diameter was greater than 5 mm. After the visualization of the biliary tree, an internal-external catheter was inserted in the CBD as far as the lumen of the duodenum. It was left in this position over a period of 48 h, thus providing a conduit which enabled us to manipulate the CBDS. Following the established insertion period, we attempted to pass the stones into the duodenum either by pushing them directly or by first dilating the papilla with the inflated balloon catheter. Once the stones had passed into the duodenum the catheter was extracted and the patient was placed under observation for a period of 24 h.

Results

Intraoperative cholangiography

We performed six IOCs on 50 cases, the characteristics of which are summarized in Table 3. From these, we detected CBDS in two of the cases. In each of them, the ultrasound revealed a multiple cholelithiasis, and the IVC-T led us to suspect the presence of a foreign body in the distal third of the choledochus. The IOC established the presence of CBDS and the subsequent laparotomy confirmed the existence of two stones in each of the cases. The whole procedure lasted 2½ h in the first case and 3 h in the second. In the other four cases the reason for performing the IOC was either an undefined visualization of the distal third of the choledochus or increased liver biochemistry with intraoperative finding of a dilated choledochus. In these cases the duration of the whole procedure ranged from 75 to 90 min. The result of using IOC was a negative incidence of residual CBDS in these 50 cases.

Treatment of the residual CBDS

In three cases CBDS were detected postoperatively. The first of them was resolved by ERCP. However, in the second case the ERCP exploration failed to clear the CBD and so the TPH approach was tried. This was successful and the patient found it more comfortable. As a result, we repeated the TPH procedure in the third case as a primary treatment and achieved an equally successful outcome. According to our findings, the TPHC aided by balloon catheter succeeded in cases where ERCP failed to extract the stones. The postoperative evolution after each of the methods was uncomplicated in all the cases mentioned.

Discussion

The great advantages emerging from the introduction of laparoscopic cholecystectomy come up against an important limitation when the cholelithiasis is accom-