ORIGINAL ARTICLE

Fortuitous discovery of common bile duct stones: Results of a conservative strategy

Lithiase de la voie biliaire principale de découverte fortuite : résultats d’une attitude conservatrice

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Summary
Objective. — The incidence of fortuitously discovered stones in the common bile duct is about 5%. The purpose of this study was to determine the rate of spontaneous clearance of asymptomatic stones in the common bile duct discovered fortuitously during cholecystectomy.

Patients and methods. — Intraoperative cholangiography was performed in all patients undergoing cholecystectomy for symptomatic gallbladder stones. If a filling defect of the common bile duct was discovered, a transcystic drain was inserted. Surgical or endoscopic extraction was not proposed initially. A control cholangiogram was performed on the second postoperative day then during the sixth postoperative week. If a stone persisted at the sixth week, endoscopic extraction was undertaken.

Results. — Cholecystectomy was performed in 124 patients with symptomatic gallstones and no signs predictive of stones in the common bile duct. A stone was found fortuitously in 12 patients. The control cholangiogram was normal in two of these patients on day two (16.7%) and in six others (50%) at the six-week control. All 12 patients remained free of symptoms suggesting the presence of a stone in the common duct. Presence of the drain had no impact on quality-of-life. Endoscopic extraction was finally performed for four patients (33.3%) to remove a stone from the common bile duct.

Conclusion. — Early surgical or endoscopic extraction of stones in the common bile duct should not be undertaken systematically in asymptomatic patients. Spontaneous asymptomatic clearance of the common bile duct is observed in about half of patients.

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Résumé L’incidence de la lithiase de la voie biliaire principale de découverte fortuite est d’environ 5%. Le but de cette étude était de déterminer la fréquence de la migration
Fortuitous discovery of common bile duct stones

It is known that a certain number of the stones detected in the common bile duct will migrate spontaneously, and 50% after simple transcystic drainage [5]. The purpose of this study was to determine whether this finding could be reproduced by a team of several operators using the same protocol.

**Introduction**

Debate continues concerning the appropriate strategy when a stone is found fortuitously in the common bile duct during cholecystectomy for a symptomatic gallbladder [1]. For many, the risk of a potentially life-threatening complication (acute pancreatitis or cholangitis) warrants systematic extraction of all stones in the common bile duct, whether symptomatic or not [2]. With adapted equipment and a well-trained team, this can be done during the same operation, but necessarily requires more time. Furthermore, both the endoscopic and the surgical method lengthen the hospital stay, possibly leading to organizational problems when cholesystectomy was scheduled as an outpatient procedure or within the framework of a very short hospitalization [3,4].

It is known that a certain number of the stones detected in the common bile duct will migrate spontaneously, and asymptomatically [5–8]. One recent monocentric study noted that the rate of asymptomatic clearance is more than 50% after simple transcystic drainage [5]. The purpose of this study was to determine whether this finding could be reproduced by a team of several operators using the same protocol.

**Patients and methods**

All patients who underwent cholecystectomy in our unit between January 2004 and October 2005 for gallbladder stones were eligible for inclusion in this prospective study.

After history taking and physical examination, preoperative explorations included laboratory tests (cell counts, liver battery) and hepatobiliary ultrasound. Patients presenting one or more signs predictive of lithiasis of the common bile duct — preoperative jaundice, acute pancreatitis, abnormal liver tests, dilatation of the common bile duct greater than 8 mm at ultrasound or visualization of a stone in the common bile duct [9] — were not retained for the study.

Transcystic intraoperative cholangiography was performed as part of the cholecystectomy procedure, with two objectives: detection of stones in the common bile duct and search for anatomic anomalies of the biliary tree [10]. This cholangiography (opacification with Hexabrix® diluted 50%) was a two-phase procedure: first thin slice images to detect stones in the common bile duct, then a complete cholangiogram to rule out any biliary wound. Two senior surgeons (PB and ET) interpreted the opacification images.

If the transcystic intraoperative cholangiography revealed a filling defect in the common bile duct, a transcystic drain (escat or pedinielli, Porges®) was inserted, with no other surgical maneuver. A control transcystic cholangiography was performed on the second postoperative day. The drain was temporarily clamped at patient discharge. Patients were given detailed information about what to do in the event of pain, shivers or fever, pruritis or jaundice, and were shown how to open the drain for gravity drainage before emergency consultation.

If the control cholangiography performed on the second postoperative day was considered normal, the drain was withdrawn the second postoperative week at an outpatient clinic. If the cholangiography was considered abnormal, follow-up included control visits (physical examination and laboratory tests) during the third and sixth postoperative weeks. A transcystic cholangiography was performed systematically at the sixth-week visit.

If the common bile duct lithiasis persisted at six weeks, endoscopic extraction of the main stone or stones was proposed.

All patients were informed about the study protocol and gave their oral consent for participation. Before patient discharge, the investigators checked carefully that the patient was well aware of the maneuvers to be performed should an emergency situation arise.

**Results**

During the study period, 161 patients underwent laparoscopic cholecystectomy for symptomatic gallbladder stones. Among these 161 patients, 124 did not have any sign predictive of lithiasis of the common bile duct and were thus included in this study. Mean age was 55 years (range: 37–75 years); the M/F sex ratio was 0.37. Eighty-one...
Patients with a stone in the common bile duct \( n = 12 \) Other patients \( n = 112 \)

<table>
<thead>
<tr>
<th>Characteristic feature</th>
<th>Patients with a stone in the common bile duct</th>
<th>Other patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years (range)</td>
<td>63 (21—85)</td>
<td>53 (22—88)</td>
</tr>
<tr>
<td>Male/female</td>
<td>5/7</td>
<td>38/74</td>
</tr>
<tr>
<td>Median operative time, minutes (range)</td>
<td>85 (70—140)</td>
<td>55 (35—160)</td>
</tr>
<tr>
<td>Median hospital stay, days (range)</td>
<td>4 (3—13)</td>
<td>3 (1—21)</td>
</tr>
<tr>
<td>Indications</td>
<td>Acute cholecystitis ( n = 4 )</td>
<td>Acute cholecystitis ( n = 38 )</td>
</tr>
<tr>
<td></td>
<td>Hepatic colic ( n = 8 )</td>
<td>Hepatic colic ( n = 73 )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Polyp ( n = 1 )</td>
</tr>
</tbody>
</table>

Conversion to laparotomy was required for seven of the 124 patients (5.8%). Transcystic intraoperative cholangiography was performed successfully in 90.3% of patients. The main causes of failure were small-caliber cystic duct \( n = 9 \) and pediculitis \( n = 3 \).

A fortuitous diagnosis of lithiasis of the common bile duct was established in 12 patients (9.7% of the patients undergoing cholecystectomy without signs predictive of lithiasis of the common bile duct). The time course of the liver tests from these 12 patients is presented in Table 2. All 12 patients who had a fortuitously discovered stone in the common bile duct agreed to the planned schedule. The control cholangiography performed on the second postoperative day was considered normal in two patients (16.7%). The control cholangiography performed during the sixth postoperative week was considered normal in six patients (50%). The four other patients were symptom-free at six weeks and underwent endoscopic extraction of the stone(s) in the common bile duct (Figs. 1 and 2). The median hospital stay for these 12 patients was four days; the median hospital stay for the other 112 patients was three days. The median cumulative hospital stay for the four patients who underwent endoscopic retrograde cholangiopancreatography (including the stay for cholecystectomy and for the stay for endoscopic retrograde cholangiopancreatography) was six days.

The largest stone which migrated measured 8 mm. The largest proportion of the stones which migrated measured 5 mm. Residual stones at six weeks measured less than 5 mm in two patients (a single stone for one patient, more than 20 stones for the other). No stones could be individualized in the two other patients whose common bile duct contained sludge.

All 12 patients remained symptom-free during the six-week postoperative follow-up; none of them opened their drain in an emergency situation and none of them complained about having the drain.

Table 2  Time course of liver tests in 12 patients with stones in the common bile duct.

<table>
<thead>
<tr>
<th>Characteristic feature</th>
<th>2nd postoperative day</th>
<th>6th week</th>
<th>Preoperative endoscopic retrograde cholangiopancreatography ( n = 4 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaline phosphatases (IU/L)</td>
<td>61 (56—98)</td>
<td>68 (53—121)</td>
<td>71 (55—126)</td>
</tr>
<tr>
<td>Gamma glutamyltransferase (IU/L)</td>
<td>61 (12—83)</td>
<td>48 (29—96)</td>
<td>53 (43—123)</td>
</tr>
<tr>
<td>Total bilirubin (( \mu \text{mol/L} ))</td>
<td>7 (5—16)</td>
<td>6 (5—13)</td>
<td>9 (5—12)</td>
</tr>
<tr>
<td>Serum lipase (IU/L)</td>
<td>38 (32—112)</td>
<td>41 (34—135)</td>
<td>43 (34—127)</td>
</tr>
</tbody>
</table>

Discussion

Excepting cases where the clinical situation enables prediction of stones in the common bile before cholecystectomy, fortuitous discovery of a filling defect in the common duct...
Fortuitous discovery of common bile duct stones

Figure 2 Cholangiogram at six weeks: clearance of the common bile duct.

Cholangiographie à six semaines : vacuité de la voie biliaire principale.

during intraoperative cholangiography raises the question of the appropriate management strategy. First an artifact effect must be ruled out. Fortuitous discovery of a stone in the common bile duct is reported in 4 to 6% of all cholecystectomy procedures [5,11]. About 90,000 cholecystectomy procedures are preformed annually in France [12] (about 400,000 in the United States [13]), mostly for symptomatic gallstones with no sign predictive of lithiasis of the common duct. If one considers that about half of the surgeons perform an intraoperative cholangiography systematically and that more than 5% of these procedures yield a fortuitous diagnosis of a stone in the common duct, this situation would occur more than 2000 times a year in France (10,000 in the United States).

When a stone is discovered, surgical extraction during the same procedure can be proposed, either via a transcystic approach or by cholecystotomy [14,15]. This significantly lengthens the operative time, and when difficult, may require conversion to laparotomy [16–18]. For Lauter et Froines [18], the mean operative time for cholecystectomy with transcystic extraction of a stone in the common duct was 159 min; the time for extraction via cholecystotomy was 255 min. The caliber of a common duct with a stone is often small, making cholecystotomy a delicate task with a high risk of postoperative stenosis. Nathanson et al. [19] reported that more than 2% of the procedures led to postoperative stenosis of the common bile duct.

The alternative would be "systematic" endoscopic extraction. The main drawbacks of this option are the associated risks of early complications, sometimes affecting more than 10% of patients [20], such as severe acute pancreatitis, reported in nearly 1% of patients [20,21]. Long-term complications include reflux cholangitis with backflow contamination of the bile and formation of pigment stones. These late complications are observed in nearly 10% of patients [22–24]. The endoscopic method is often performed during a second operative phase requiring a second general anesthesia and a longer hospital stay. Endoscopic extraction, like surgical removal, is more difficult when the common duct is small. These two empiric options do not take into consideration the possibility of false positives [10] and the fact that duct clearance can occur spontaneously [5–8,11,25].

Our protocol was established following the work reported by Collins et al. [5] who found that the cholangiogram returned to normal in 52% of patients (24 of 46 patients) after transcystic drainage for six weeks. These authors considered that spontaneous clearance was authentic in 12 patients, while for the 12 others (with normal cholangiography on the second day), the transcystic intraoperative cholangiography had yielded a false positive. The rate of spontaneous clearance was thus 26% and surgical exploration or endoscopic extraction was avoided in 52% of patients. In that series, there was no correlation between the size or number of stones and spontaneous clearance. The authors observed spontaneous ductal clearance for stones measuring 15 mm while other stones measuring 5 mm were still in the common bile duct at the sixth week.

In our series, we considered that the intraoperative opacification gave a false positive for the two patients whose day-2 cholangiogram was normal [26,27]. This gave a false-positive rate of 16.7%.

Our strategy allowed us to avoid surgical exploration of the common bile duct in eight of 12 patients (66.7%), and postoperative endoscopic stone extraction in six of 12 (50%). As also reported by Collins et al., we did not find any link between the size or number of stones and spontaneous clearance.

Spontaneous clearance has been reported by many authors in 16% to 75% of patients [6–8,11,25]. Hainsworth et al. [25] compared the pre- and postoperative endoscopic retrograde cholangiopancreatograms. In their postoperative group, the rate of spontaneous clearance was 75% (8/12 patients). Ryberg et al. [7] studied patients who had an abnormal cholangiogram who did not have to have an exploration of the common bile duct. They found spontaneous clearance in 14 to 64% of patients depending on the signs used to define an abnormal transcystic intraoperative cholangiogram: absence of stone passage into the duodenum, doubtful or univocal image of intraductal lithiasis.

Tranter et Thompson [8] reported that spontaneous clearance could be observed in patients with preoperative signs predictive of bile duct stones. They analyzed the records of 1000 consecutive patients after cholecystectomy and found that preoperatively, 532 had signs predictive of a stone in the common duct. At the time of surgery, only 142 patients had bile duct stones. They concluded that spontaneous clearance had occurred in 390 patients (73% of the stones). Elevated liver or pancreatic enzymes (poorly specific signs) were used as preoperative signs suggestive of common bile duct stones.

In 1956, Fitzgibbons et al. [6] were the first to propose transcystic drainage for patients with a fortuitously discovered lithiasis of the common bile duct, after observing spontaneous clearance in 11 out of 24 cases. O’Sullivan
instituted transcystic drainage as a standard protocol and published the first prospective series [5,11].

In our clinical practice, we consider that the main objective for transcystic drainage is to avoid excessive pressure in the common bile duct. The transcystic drain can also be used for the control cholangiography. This is one of the most sensitive and most specific explorations available for the diagnosis of residual stones in the common bile duct [26]. It can easily be performed in an outpatient clinic. Furthermore, if endoscopic extraction should be required, the transcystic drain facilitates the procedure by allowing transapillary descent of the guidewire. This protocol has some drawbacks related to the drain and the dressing as well as the need for good patient comprehension should an emergency maneuver be required.

The best duration for the drainage remains to be determined. We opted for six weeks for better comparison with earlier reports.

**Conclusion**

Most asymptomatic common bile duct stones have a favorable natural history. Fortuitous discovery during a cholecystectomy procedure should not lead to systematic surgical or endoscopic extraction. The exact characteristics of common bile duct lithiasis enabling this favorable course remain to be determined.

**References**


