

Experience with partial cholecystectomy in severe cholecystitis

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Backgrounds/Aims: Partial cholecystectomy (PC) is often an inevitable operative procedure when Calot triangle is severely inflamed and fibrosed with conglomerated structures. We reviewed our clinical outcomes of PC to compare its feasibility with conventional total cholecystectomy (TC), especially for its possible application to laparoscopic procedure. **Methods:** From Aug. 2000 to July 2008, 20 cases of PC by laparotomy were performed, including converted cases during laparoscopic cholecystectomy. Sixty-eight cases of TC by open method during the same period were compared in a mean follow-up period of 108 months. **Results:** Bile fistula was observed in 3 cases of PC; one case needed endoscopic biliary stent for management and a second case showed fistula that closed by supportive care in 2 months. The last patient died from peritonitis. No bile fistula was observed in PC. Morbidities were found in 9 cases of PC (45%) and in 11 cases of TC (16.2%). Bile fistula (n=3) and wound infection (n=3) were prominent in the PC group, and wound infection (n=7) in the TC group. Reoperations were necessary for 5 (25.0%) and 4 (5.9%) patients from PC and TC, respectively. Mortality occurred in 2 (2/10 10%) and 4 cases (4/68 5.9%) of PC and TC, respectively. Two mortalities in each group resulted from direct extension of cholecystitis. **Conclusions:** Considering the higher risks of complications and mortality, PC should be avoided as long as possible, and patients should always be informed of its clinical outcomes postoperatively. Further elaboration of a safer operative plan should be sought. (*Korean J Hepatobiliary Pancreat Surg 2013;17:171-175*)

Key Words: Cholecystitis; Partial cholecystectomy

INTRODUCTION

When a surgeon faces difficulty in dissecting Calot triangle, in fear of right hepatic ductal injury or troublesome vascular tearing or fragmental loss of cystic duct by severe inflammatory change, partial cholecystectomy (PC) becomes an inevitable option during cholecystectomy, as long as the intent is a curative surgical procedure and not just drainage.

More and more reports have been advocating partial PC as a safe and efficient method,¹⁻³ and this includes laparoscopic PC.⁴⁻⁹ However, few systematic publications are established on this item, and sporadic reports seem to prevail instead.

The efficiency of PC is reported to be reliable, frequently without specified methodology or guidelines about the concrete operative procedure and the general management. No presentation of definitively superior or comparable data of clinical outcomes to other manage-

ment methods can be found.

This survey was designed to examine the clinical outcomes of PC and assess whether it can be expanded to a laparoscopic procedure when the method thoughtfully planned, as some recent reports suggest.⁴⁻⁹

METHODS

Patients

A retrospective review of medical records and various methods of patient follow-up observation were employed. Patient's epidemiologic features and clinical courses are shown in Table 1. Twenty patients received PC unexpectedly in the middle of conventional total cholecystectomy (TC) from August 2000 to July 2008.

In the same period, 68 patients had open TC and were compared with the PC group in clinical outcomes, where patients generally free from serious septic state were selected for even comparison between the two groups under

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Table 1. Baseline demographics and clinical features of patients

	Partial cholecystectomy	Total cholecystectomy	Total
Patient numbers (M/F) (n)	20 (11/9)	68 (32/36)	88 (43/45)
Median age (range) (years)	61.4 (54-82)	60.5 (37-83)	
Postoperative hospital stay (days)*	13.2±3.1	10.2±2.5	
Follow-up period (months)			108±38
Follow-up evaluation (n)			
CT scan	15	4	
Ultrasound	10	4	
ERCP	3	1	
Total	28	9	
Morbidities (Reoperations) (n)			
Bile fistula	3 (1)	0	
Peritonitis	1 (1)	2 (1)	
Retained stones	1 (1)	0	
Wound infection	3 (1)	7 (2)	
CBD injury	0	1 (1)	
Bowel obstruction	1 (1)	1	
Total	9 (5)	11 (4)	
Mortalities			
Peritonitis	2	2	
Pneumonia	0	1	
Cardiac problem		1	
Total	2	4	

CT, computed tomography; ERCP, endoscopic retrograde cholangiopancreatography; CBD, common bile duct

the same indication of cholecystectomy. Those with a serious preoperative septic condition warranting gallbladder drainage were excluded, in order to compare PC with TC under similar preoperative physical conditions, while considering different management options. Patients having conditions from simultaneous biliary ductal stones or from previous upper abdominal major operative history were excluded from the study.

Operative methods

All patients had an incision of right paramedian trans-rectal vertical approach, including converted cases during laparoscopic procedure (n=7).

Stones were retrieved through a wide round opening at the antimesenteric fundus of gallbladder extended toward cystic duct. Removal of possible impacted stone in cystic duct origin was carried out by forceps exploration and saline irrigation and confirmed by bile flow into view from ductal opening.

Closure of cystic ductal opening was attempted in various ways, especially when stitches were impossible (n=11). Cauterization at ductal opening (n=20), stapling (n=10), packing with collagen fiber material (n=14), and blunt stitch closure of remnant gallbladder (n=9) were at-

tempted in most cases, using a combination of the above methods. Even plugging the ductal opening with collagen fiber wrapping a small stone was tried (n=1) after cauterization of the mucosa around the ductal opening. In 4 cases of PC, the cystic duct could be dissected and cut between ligatures.

Suction drains (Jackson-Pratt drain) were always left in place from near cystic duct to the outside of the body and removed according to output, usually more than a week after the operation.

Statistical analysis

Descriptive analyses were carried out throughout the study, and on smaller number of cells less than 5. Chi-square tests were added on some comparisons like morbidity rate or follow-up evaluations between PC and TC, presuming a normal distribution of variants, within the 95% confidence interval.

RESULTS

Clinical outcomes after PC were described and compared with TC performed during the same period under the indication of cholecystectomy (Table 1).

Patients in the PC and TC groups had similar age and sex distributions.

The incidence of partial cholecystectomy (PC) among cholecystectomies, including converted laparoscopic procedures, was around 4.2% (20 of 481) during the eight years of the survey from August 2000 to July 2008.

The initial hospital stay for recovery after the operation was a mean of 13.2 days for PC patients, a longer time before going home than for TC patients (10.2 days), although there was no statistically meaningful difference ($p > 0.5$).

Follow-up imaging evaluations were conducted in all patients when PC was practiced (n=28, 140%), sometimes more than once, because of various complaints (n=20) and complications (n=9) including reoperations (n=5), while imaging follow-up evaluations took place in 9 cases (13.24%) in the TC group, showing a significant difference between the groups ($p < 0.01$). All patients undergoing PC complained of subjective symptoms such as indigestion, epigastric pain, bowel habit changes, change of stool color, weight loss, or other symptoms, forcing further evaluations.

Morbidities and mortalities are 9 (45.0%) and 2 (10.0%) cases, respectively, in 20 PC patients, higher rates than the well-acknowledged average rates and than the 11 cases of morbidity (16.2%) ($p < 0.05$) and 4 mortalities (5.9%) among TC patients. The difference in the morbidity rate was statistically meaningful, but that for mortality was not.

Bile fistula occurred in 3 cases: one closed spontaneously, one needed endoscopic retrograde cholangiography with stenting for closure, and the last one succumbed to death by extension of fistula to peritonitis and sepsis. No case of bile fistula was observed in the TC group.

Fatal peritonitis occurred in 2 cases of each group and led to death.

A retained stone in the cystic duct caused reoperation in one case in PC patients, where the remaining cystic ductal area of the gallbladder with the stone could be removed by re-exploration.

Wound infection was a frequent complication in 3 (15.0%) and 7 (10.3%) cases of the PC and TC groups, respectively, where associated disruption of wounds was repaired under general anesthesia in 1 and 2 cases.

One case of CBD stricture during follow-up was ob-

served in a TC patient and re-explored for management by hepaticojejunostomy.

Symptomatic bowel adhesive ileus occurred in one case in each group; the patient in the PC group needed adhesiolysis during follow-up.

Reoperations were necessary for 5 cases (25.0%) of PC patients as described above: for revision of fistula (n=1), irrigation of peritonitis (n=1), revision of remnant cystic duct stone causing pain (n=1), wound repair (n=1), and adhesiolysis of bowel obstruction (n=1). Only 4 (4/68, 5.9%) TC patients needed reoperation in correcting peritonitis (n=1), wound revision (n=2), and CBD stricture (n=1). The reoperation rate difference between PC and TC was significant ($p < 0.05$).

Mortality was 2 cases (10.0%) from fistula (n=1) and peritonitis (n=1) in PC patients, directly related with extension of cholecystitis into sepsis. In TC patients, 4 cases (5.9%) of death occurred from peritonitis (n=2) and indirectly related condition to acute cholecystitis (n=2).

DISCUSSION

Recently, efficiency of PC was reported to be recommendable in some reports without specified methodology or guidelines for a concrete surgical procedure or general management during PC.

Davis et al.¹ reported a complication rate of half when PC was performed compared to TC. And in prevailing publications insisting on the safety of PC, the reported complication rate is quite high at around 27.0% or at more than 22.2%,^{2,3} showing much more frequent postoperative complication rates than expected.

Our complication and mortality rates after PC were unacceptably high with 9 (45.0%) and 2 (10.0%) cases, and the difference was statistically significant when compared to 11 (16.2%) and 4 (5.9%) cases after TC.

During follow-up observation, imaging examinations were necessary in 140% of PC patients indicating that many problems prevailed postoperatively, including patient's prolonged discomfort from symptoms and the added expenditures for evaluations; in contrast, only 13.2% (9/68) of TC patients needed follow-up imaging examinations. Readmission for evaluation and reoperations was also a hardship for these patients.

More re-operations were needed after PC [9 cases

(25.0%)] than after TC [4 cases (4/68, 5.9%)]. Half of the reoperations were from direct extension of cholecystitis and occurred at a higher rate than the surgeon expected.

Mortality occurred in 2 cases (10.0%) of PC, both from associated bile fistula and septic condition; both patients were in their seventies. In TC cases, 4 deaths (4/68 5.9%) occurred, 2 from peritonitic sepsis and 2 from combined underlying disease. Totally mortality was 6 in 88 among open cholecystectomy cases (6.8%). Considering these findings, TC should be planned and performed as much as possible against difficulties of dissection around the Calot triangle.

Three cases of bile fistula occurred in PC (3/20, 15.0%); other publications presented similar rates for this.^{2,3} Bile fistula is the most feared and worrisome complication, especially when cystic ductal circumferential dissection and closure could not be secured. The key process in cholecystectomy is closure of the cystic duct. Actually, when the cystic duct can be securely ligated, it can be regarded as similar to TC in effect.⁴ All our cases of bile fistula happened after closure of the cystic duct from an intraluminal direction, maybe with poor closure of the cystic duct origin. Closure of the origin of the cystic duct was said to decrease the incidence of complications in a systematic review of 15 publications by Henneman et al.⁴ Better methods are needed to reduce the incidence in any way for the patient's sake. More advanced techniques or instrumentation for closure of the cystic duct from an intraluminal direction, other than those performed in this study, will help. Before surgery, more detailed anatomical imaging information might help dissection of the area; more scrupulous timing of cholecystectomy to coincide with expected subsidence of inflammation might also help.

Preoperatively forecasting PC during evaluation is not always the case. Many patients undergo TC out of expectation. Insistent dissection against tissue resistance and oozing is encouraged.

Recent trends show laparoscopic procedure overtaking open procedure, making each indication similar. Laparoscopic partial cholecystectomy has some technical problems, due to the poor operation view around the cystic duct from the intraluminal gallbladder body and the surgical instrument for reliable closure of the ductal opening from the same direction. We need a more acceptable

complication rate than 10.6% bile leak in Henneman et al.⁴ and at least 8.3% local complications in Tian et al.⁹ to justify using the laparoscopic procedure; these rates are very similar to our open PC results. Throughout the learning period, without affinity in the technical aspects, our complication rates might rise alarmingly. When it comes to laparoscopic PC, experiences regarding possible obstacles should be further accumulated from publications in advance or should be pioneered.

PC is similar in effect with percutaneous transhepatic gallbladder drainage in the sense that draining can alleviate some of the inflammatory process. However, the drainage process leaves the cause of inflammation in place, which can trigger further inflammation at any time that may require operative intervention. Thus the draining procedure is used to bridge infective condition to operation, when operation is not indicated due to sepsis or old age.

PC is a definite curative surgical procedure for removing a stone that is causing inflammation and occluding bile flow at cystic ductal opening, but it requires anesthesia, leads to operative stress, and has a high risk of reoperation (up to 25% of our cases). We should always be alert about this difference in clinical practice and clinical surveying.

In conclusion, every effort should be made to avoid PC if possible. Secure closure of the cystic duct is the key process and should be attempted as much as possible. Laparoscopic partial cholecystectomy has yet to be more accurately observed for its efficiency related to its technical ability to secure the cystic duct to avoid bile fistula.

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