

Evaluation of usefulness of laparoscopic subtotal cholecystectomy in complicated cholecystitis

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Abstract

Background: Laparoscopic Cholecystectomy is made hazardous by distortion of anatomy of calot's triangle by acute or chronic inflammation. A significant portion of patients with unclear anatomy are still converted to open to complete the procedure. The other option is subtotal cholecystectomy and increasing laparoscopic experiences has made laparoscopic subtotal cholecystectomy a feasible option in patients with complicated acute or chronic cholecystitis. In our study, we tried to evaluate its safety and effectiveness with reference to literatures available. **Materials and Methods:** This prospective study evaluated all the patients Scheduled for laparoscopic cholecystectomy between January 2012 to December 2014 in our institution. Among them Laparoscopic subtotal cholecystectomy was performed in 74 patients due to various complicated form of cholecystitis. **Results:** Laparoscopic subtotal cholecystectomy was performed in 74 patients of the total 1039 laparoscopic cholecystectomies. There were 38 males, 36 females with a median age of 60 years. The mean operating time was 80 +/- 12 mins and mean hospital stay was 4+/- 1 days .Twelve patients had postoperative bile leak, which resolved spontaneously in 9 patients and 3 patients required endoscopic retrograde cholangiopancreatography for extraction of bile duct stones and placement of stent in CBD . There was no bile duct injury and no mortality. We encountered 2 conversions in our series. **Conclusion:** In a given situation of difficult dissection of calot's triangle, laparoscopic subtotal cholecystectomy is a safe procedure. The Complications like bile leak is predictable and can be readily managed. It is not a substitute to open conversion if deemed necessary.

Key words: bile leak, cholecystitis, laparoscopic cholecystectomy, Laparoscopic subtotal cholecystectomy (LSC)

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INTRODUCTION

Laparoscopic cholecystectomy (LC), first introduced in 1987, has replaced open cholecystectomy and is now well accepted as the treatment of choice in symptomatic gallstone disease. Although thought to be a simple and common procedure, it requires a safe dissection in the cystic duct and artery in calot's triangle. It is particularly more difficult and even dangerous in severe inflammation and fibrosis in complicated cholecystitis, risking the most feared bile duct injury. The traditional approach is

conversion to open procedures, but this may results in increased postoperative pain, delayed mobility, prolonged hospital stay, adhesion formation and incisional hernia. It definitely prolongs hospital stay and patient will lose all the privileges of laparoscopic surgery.^{1,2} In addition, a dissection that is difficult laparoscopically is often equally difficult in open surgery and conversion doesn't guarantee the avoidance of inadvertent biliary or vascular injury. Increasing laparoscopic experiences and technique have made laparoscopic subtotal cholecystectomy (LSC) a safe and feasible option and alternative to open conversion in difficult laparoscopic cholecystectomies. In recent years, few studies with a few cases of LSC have shown good results in patients with various forms of cholecystitis.^{3,4} This present study describes our experience and evaluates the safety and effectiveness of LSC in the management of complicated cholecystitis.

METHODS

This is a prospective study of all the patients who underwent laparoscopic cholecystectomy in Kalinga

Institute of Medical Sciences between January 2012-December 2014. Total 1039 patients underwent laparoscopic cholecystectomy out of which laparoscopic subtotal cholecystectomy was done in 74 patients due to various complicated cholecystitis. They are the patients with severe inflammatory or fibrotic changes in Calot's triangle, or when excessive bleeding occurred because of difficulty in finding a plane of dissection between the gallbladder and liver bed. In the LSC group, 36 patients were female and 38 patients male with median age 60 years (range 25-84 years). Fifty six patients had acute calculic cholecystitis (3 with Mirizzi type 1 syndrome), 09 had chronic calculic cholecystitis, 07 had chronic calculic atrophy cholecystitis with severe fibrosis with 1 patient of cholecystoduodenal fistula, and 1 patient of cirrhotic portal hypertension. These patients constituted 7.12% per cent of the total patients who underwent LC (74/1039). Preoperative biliary investigations included liver function tests and ultrasonography of abdomen and serum amylase and lipase in few selected cases. Endoscopic retrograde cholangiopancreatography (ERCP) was performed on few patients in whom common bile duct (CBD) stones or other bile duct disease was suspected because of symptoms (e.g. jaundice, pancreatitis), raised alkaline phosphatase and bilirubin levels or dilated CBD on ultrasonography. Other preoperative examinations included conventional blood tests, chest radiograph and electrocardiography. All our patients were operated under general anaesthesia and Prophylactic dose of second-generation cephalosporin was given with induction. The technique of Lap subtotal cholecystectomy involved standard 4 port approach. An early assessment was made about the safety and feasibility of laparoscopic cholecystectomy. If dissection of calot's triangle was deemed unsafe because of unclear anatomical landmark, an LSC was performed. No attempt was made to dissect out, divide or seal the cystic duct and

cystic artery was isolated only if possible. Then gallbladder was incised at the level of Hartmann's pouch and divided circumferentially, gradually excised the anterior wall of the gallbladder, and then tried to find the pathway of the cystic duct, or just suture the neck of the gallbladder. Continuous single layer suturing of the gall bladder stump was performed, using vicryl 2/0 sutures; (Fig.1) Posterior wall was excised selectively in few cases only if it can be removed without undue bleeding. All gallstones were retrieved and extracted in a bag along with excised gallbladder wall. The gall bladder fossa was lavaged. Wide bore-free drainage tube or a corrugated PVC drain was placed in the subhepatic region and brought out through the right iliac fossa port site. These were left in place for 72hrs or if any postoperative bile drainage ceased. Postoperative ERCP was used selectively if there was prolonged biliary leakage, or if common bile duct stones were suspected on postoperative ultrasound scan.

RESULTS

Table 1: Various indications of lap subtotal cholecystectomy

ac.calculi cholecystitis	53
mirrizi syndrome type-1	3
ch.calculi cholecystitis	9
ch.atrophic fibrotic cholecystitis	7
cholecystoduodenal fistula	1
cirrhotic PHT cholecystitis	1

Table 2: Overall intraoperative and postoperative complications

	N
Bile duct injury	0
Duodenal injury	0
Missed CBD stone	2
Biliary Peritonitis	1
Bile leak	12
Conversion to open	2
Wound infection	5
Recurrent gallstone	1



Figure 1



Figure 2

Legend

Figure 1: Neck sutured with 2.0 vicryl

Figure 2: Remaining gallbladder stump with stone

Between January 2012-December 2014, total 1039 patients underwent laparoscopic cholecystectomy out of which laparoscopic subtotal cholecystectomy (LSC) was performed in 74 patients. Of these 1039 patients, 749

patients presented with ch. Cholecystitis and rest 290 patients of ac.cholecystitis. Out of the acute group, only 56 required lap subtotal cholecystectomy and in the rest standard lap. Cholecystectomy was performed. There

were 38 male patients and 36 female patients of median age 60 years (range 25-84 years). The various indications of laparoscopic subtotal cholecystectomy were given below. (Table 1) Twelve patients had postoperative bile leak, which was resolved spontaneously in 9 patients and 3 patients required endoscopic retrograde cholangiopancreatography for persistent leak and extraction of bile duct stones and placement of stent in CBD. Most of the leaks subsided within 1 wk, except one patient discharged with tube drainage, removed on 28th day on follow up. We also had the problem of blocked tube drainage in 2 patients which required radiological drainage. Out of 3 patients who required postop. ERCP, 2 patients had unsuspected CBD stone and 1 patient had blocked tube drainage, presented with biliary peritonitis. We did emergency relaparoscopy, replaced the tube with corrugated PVC drain and adopted the policy of only corrugated PVC drain in all patients of LSC subsequently. There was no death or bile duct injury in our series. The mean operating time was 80mins \pm 12mins compared to 50mins \pm 10mins in standard lap. Cholecystectomy. The average duration of hospitalisation was 4 \pm 1days compared to 2 \pm 1 day in lap. Cholecystectomy. The estimated operative blood loss was 60 \pm 15ml; average time to start oral feeding was 2 \pm 1days. We converted in total 2 patients to complete the same open subtotal cholecystectomy due to severely contracted atrophic cholecystitis. One patient had recurrent gall stone in the stump detected on ultrasound for recurrent urinary tract infection 2yrs after surgery. There was minor wound infection in 5 patients, which subsided on wound dressings and appropriate antibiotics according to wound swab culture. The overall intraoperative and postoperative complications were given below. (Table 2)

DISCUSSION

Laparoscopic cholecystectomy (LC) is now accepted as the 'gold standard' procedure for cholecystectomy. However, a significant proportion of patients with complicated cholecystitis are still converted to open to complete the procedure. The difficulties may be due to the severe adhesion of the gallbladder to surrounding organs, fibrosis of the gallbladder bed between the gallbladder and liver, and difficulty in identifying and dissecting structures in Calot's triangle.⁵ As lessons of open surgery can be relearned and adopted, increasing laparoscopic experience and sophisticated techniques have made LSC a feasible option. This series evaluates the feasibility and safety of performing subtotal cholecystectomy laparoscopically, thus avoiding conversion to open operation in most patients. In some respects, the laparoscopic approach may have certain advantages over the open technique.^{6,7} The operative view and approach to Calot's triangle are superior,

allowing easier identification and isolation of the cystic duct Hartmann's pouch junction, which is the key to safe cholecystectomy. Although the number of female patients was more presenting with acute cholecystitis, our study recruited 74 patients with difficult subtotal cholecystectomy and 38 (51.3%) patients were men. As per the different studies of predictors for a difficult cholecystectomy, male sex is believed to be one of the preoperative predictors that increases the likelihood of difficult cholecystectomy.^{8,9} The incidence of bile duct injuries in total cholecystectomies performed for difficult cholecystectomies is higher; it is up to 3.4%.^{10, 11} In our study, there was no bile duct injury, although there were difficult cholecystectomies, and this could be attributed to the fact that only subtotal cholecystectomy was performed. Hence, our dissection usually stopped away from Calot's triangle and this is in agreement with the results published by other authors who studied the subtotal cholecystectomy as an alternative approach in difficult cholecystectomy.¹⁰ All operations were performed with the initial purpose of total removal of the gallbladder and were only converted to the subtotal technique either when dense inflammation or fibrosis resulted in difficult identification of Calot's triangle with at times inadvertent entry into the gallbladder or when excessive bleeding from the gallbladder bed. In cases with obscured Calot's anatomy or in Mirizzi syndrome, the Hartmann's pouch was incised to decompress and extract the impacted stones; the anterior wall was excised and posterior wall selectively only if possible without significant bleeding. We used to suture the neck in all cases with 2,0 vicryl. Applying endoloop to the gallbladder stump is another alternative, the Endo-GIA stapling system has also been used to close Hartmann's pouch or the gallbladder neck. The effect is unquestionable, but it is comparatively costly. When all these are impossible, we convert to open surgery. Because of severe fibrosis with obscured Calot's anatomy, without achieving these goals laparoscopically, 2 patients were converted to open procedure to complete subtotal cholecystectomy. We are not adopting this technique as an absolute substitute for conversion to open. We cannot use our data to comment on reduction of rate of conversion, but many authors cross-examined this point in their work and concluded that using this technique in difficult cholecystectomies will reduce the need to conversion.¹²⁻¹⁴ Drainage of the operative field was performed routinely for all patients in this study and the drain was removed 72 hours after operation. There were total 12 bile leaks, all expected from intraoperative findings and no leak was observed if stump was dry at the end of LSC. All such bile leaks subsided within 1 wk of conservative expectant management, except in 3 patients

where ERCP stenting was required because of missed CBD stone in 2 patients and biliary peritonitis due to blocked tube drain in 1 patient. We adopted the policy of putting only corrugated drain in all our patients of LSC and found our results quite encouraging without any drain block, except just adding little patient discomfort. In LSC, the rate of bile leakage ranges from 1.8% to 15.4%^{5,6,7,15} and rate of postoperative peritoneal abscess 2.2 to 3.8%. We had no postoperative abscess formation as we routinely perform complete lavage with careful visual confirmation and also continued postoperative antibiotics coverage. In a difficult scenario like cholecystitis complicated with cirrhosis portal hypertension large venous collaterals in the liver bed and hilum may provide a major challenge, and LSC is a safer alternative adopted in one patient to prevent major bleeding. Similarly one patient with cholecystoduodenal fistula had undergone LSC because of severe fibrotic Calot's triangle and the scenario is well accepted to prevent major bile duct injury. In long term follow up, one of our patient had recurrent gallstone formation in the stump.(Figure 2) The fact that more mucosa remains after LSC may cause lumen distention resulting in gallstone recurrence. So one of the technical consideration is to dissect as close down up to the cystic duct junction minimising the surface mucosa and also to close deep to obliterate any stump space in neck. Henceforth we have measures not to leave more mucosa in the gallbladder stump. There was no cancer on gallbladder remnant.

CONCLUSION

The results of our series indicated that LSC for patients with complicated cholecystitis is feasible and relatively safe, particularly in preventing most feared bile duct injury. It reduces the need for conversion to open surgery. Bleeding and bile leak complications are significantly more common, but easily predictable and well managed in majority of patient, In this corrugated drain is much useful drainage with very less propensity for blockage, thus adding much safety of its purpose. The long term consequence of this procedure in terms of stone recurrence in the gallbladder stump and cancer in the gallbladder remnant are areas of concern, which must be carefully selected by the surgeons to further validate the usefulness of the procedure.

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REFERENCES

1. Keus F, de Jong JA, Gooszen HG, van Laarhoven CJ, Keus F, de Jong JA, et al.. Laparoscopic versus open cholecystectomy for patients with symptomatic cholelithiasis. *Cochrane Database Syst Rev* 2006; 18:CD006231.
2. Ibrahim S, Hean TK, Ho LS, Ravintharan T, Chye TN, Chee CH. Risk factors for conversion to open surgery in patients undergoing laparoscopic cholecystectomy. *World J Surg* 2006; 30:1698–1704.
3. Beldi G, Glattli A. Laparoscopic subtotal cholecystectomy for severe cholecystitis. *Surg Endosc* 2003;17:1437-1439.
4. Michalowski K, Bornman PC, Krige JE, Gallagher PJ, Terblanche J. Laparoscopic subtotal cholecystectomy in patients with complicated acute cholecystitis or fibrosis. *Br J Surg* 1998; 85:904-906.
5. Ji W, Li LT, Wang ZM, Quan ZF, Chen XR, Li JS. A randomized controlled trial of laparoscopic versus open cholecystectomy in patients with cirrhotic portal hypertension. *World J Gastroenterol* 2005;11: 2513-2517
6. Chowbey PK, Sharma A, Khullar R, et al.. Laparoscopic subtotal cholecystectomy: a review of 56 procedures. *J Laparoendosc Adv Surg Tech A* 2000;10:31-34.
7. Zayyan KS, Sellu DP. Laparoscopic subtotal cholecystectomy in patients with complicated acute cholecystitis or fibrosis. *Br J Surg* 1999;86: 715-716.
8. Vivek MA, Augustine AJ, Rao R. A comprehensive predictive scoring method for difficult laparoscopic cholecystectomy. *J Minim Access Surg* 2014; 10:62–67.
9. Nachnani J, Supe A. Pre-operative prediction of difficult laparoscopic cholecystectomy using clinical and ultrasonographic parameters. *Indian J Gastroenterol* 2005; 24:16–18.
10. Tamura A, Ishii J, Katagiri T, Maeda T, Kubota Y, Kaneko H. Effectiveness of laparoscopic subtotal cholecystectomy: perioperative and long-term postoperative results. *Hepatogastroenterology* 2013; 60: 1280–1283.
11. Kaplan D, Inaba K, Chouliaras K, Low GM, Benjamin E, Lam L, et al.. Subtotal cholecystectomy and open total cholecystectomy: alternatives in complicated cholecystitis. *Am Surg* 2014; 80:953–955.
12. Nakajima J, Sasaki A, Obuchi T, Baba S, Nitta H, Wakabayashi G. Laparoscopic subtotal cholecystectomy for severe cholecystitis. *Surg Today* 2009; 39:870–875.
13. Semenisa G, Rosenberg J, Gögenur I. Laparoscopic subtotal cholecystectomy for complicated gallstone conditions. *Ugeskr Laeger* 2010; 172:2168–2172.
14. Kuwabara J, Watanabe Y, Kameoka K, Horiuchi A, Sato K, Yukumi S, et al.. Usefulness of laparoscopic subtotal cholecystectomy with operative cholangiography for severe cholecystitis. *Surg Today* 2014; 44:462–465.
15. Philips JAE, Lawes DA, Cook AJ et al.,The use of laparoscopic subtotal cholecystectomy for complicated cholelithiasis, *Surg.Endosc*;2008,22:1697-1700.

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