

NEW VARIANTS OF LAPAROSCOPIC SUBTOTAL CHOLECYSTECTOMY IN MANAGEMENT OF ACUTE CHOLECYSTITIS

Dilip Gode, C Palanivelu, Zahiruddin Quazi Syed

JN Medical College, Datta Meghe Institute of Medical Sciences, Wardha, Maharashtra, India

Correspondence to: Zahiruddin Quazi Syed (zahirquazi@rediffmail.com)

DOI: 10.5455/ijmsph.2014.300120141

Received Date: 23.01.2014

Accepted Date: 30.03.2014

ABSTRACT

Background: Laparoscopic Subtotal Cholecystectomy has successfully brought down the conversion rate to a very low in difficult patients where the only option was conversion to open.

Aims & Objective: To determine a new classification of Laparoscopic Subtotal cholecystectomy and their various types/variants like Type-I, Type-II and Type III and determine the use of port positions in LSC.

Materials and Methods: The patients were recruited from specialized hospitalized which is recognized training centre for Laparoscopic Surgery. The 661 subjects were enrolled in the study. Both males and females were included in the study. All 14485 patients were subjected to Laparoscopic Cholecystectomy during the past 2 years and 5 months from February 2009 to June 2012. All surgical procedures were performed at a single tertiary level hospital. Among them, 661 patients (4.46%) with various types of cholecystitis were treated by Laparoscopic Subtotal Cholecystectomy and were included in the study.

Results: The 48 patients belonging to Laparoscopic subtotal cholecystectomy-Type-I, only 4 ports were used in all 48 (100%) patients. No extra port was required. 591 patients belonging to laparoscopic subtotal cholecystectomy-type-II, 4 ports were used in 546 (92.39%) patients, 5 ports in 42 (7.10%) patients and 3 ports in 3 (0.50%) patients. Of 22 patients belonging to laparoscopic subtotal cholecystectomy-Type-III, only 4 ports were used in all 22 (100%) patients. No extra port was required. In all, in 616 (93.19%) procedures, 4 ports were used. In 42 (6.35%) procedures 5 ports were used (all Laparoscopic Subtotal cholecystectomy -Type-II), and in 3 (0.45%) procedures only 3 ports were used (all Laparoscopic Subtotal cholecystectomy -Type-II).

Conclusion: In this study. Laparoscopic subtotal cholecystectomy has been further classified into Type-I, Type-II, Type-III. Laparoscopic subtotal cholecystectomy Type-I is used for difficult gall bladder bed. Laparoscopic subtotal cholecystectomy Type-II in difficult hilum, and laparoscopic subtotal cholecystectomy Type-III for difficult hilum with difficult gall bladder bed. In this study, laparoscopic subtotal cholecystectomy Type-III has been newly classified and this has helped us to bring down the conversion rate and other complications like bleeding and injury to biliary tree.

Key Words: Laparoscopic Subtotal Cholecystectomy; Classification; Type-I; Type-II; Type-III; Acute Cholecystitis

Introduction

Since its introduction in the early 1990s, laparoscopic cholecystectomy has replaced open cholecystectomy as the surgical procedure of choice for symptomatic gallstones.^[1] Laparoscopic subtotal cholecystectomy, due to presence of one or combination of described risk factors encountered during the procedures, viz difficult gall bladder bed and difficult hilum, makes the dissection very difficult but could be performed without complications.^[2] Various liver pathologies like hard fibrotic liver tissue as seen in chronic cholecystitis, severe adhesion between the liver and gall bladder wall, edematous tissue as present in severe acute cholecystitis, adhesions and neo-vascularity as seen in cirrhotic liver, make the dissection at gall bladder bed very difficult and dangerous.^[3]

During the past few years taking the clue from the Open Subtotal Cholecystectomy the laparoscopic surgeons started its laparoscopic version which was proved to be safer than the open subtotal cholecystectomy. This modification of Laparoscopic Cholecystectomy (LC) came

to be known as Laparoscopic Subtotal Cholecystectomy. It has successfully brought down the conversion rate to a very low in difficult patients where the only option was conversion to open. But, this modification of Laparoscopic Cholecystectomy (LC) needs more expertise.^[4]

However a significant proportion of patients with complicated cholecystitis are still converted to open to complete the procedure. The Laparoscopic subtotal cholecystectomy, is an option, which is still too infrequently used. Safe dissection of the structure in Calot's triangle can pose a considerable challenge during both Laparoscopic and Open Surgery. During Open surgery a partial Cholecystectomy with drainage of the Gall Bladder stump is used occasionally when the tissues in Calot's triangle are hostile. As in many other areas of surgical practice, the lessons of the open surgery can be relearned and adopted to Laparoscopy. Therefore the use of Laparoscopic Subtotal Cholecystectomy now in patients of Acute cholecystitis (AC) is more effective in terms of conversion to open and bile duct injury.^[5]

Increasing laparoscopic experience and techniques have made laparoscopic subtotal cholecystectomy (LSC) a feasible option. In recent years, few studies with patients of Laparoscopic Subtotal cholecystectomy have shown good results in patients with various forms of cholecystitis.^[6,7] The learning curve which was there for laparoscopic cholecystectomy initially is not there for Laparoscopic Subtotal Cholecystectomy (LSC). Laparoscopic subtotal cholecystectomy (LSC) has been reported as a safe and feasible alternative to conversion to open surgery during difficult laparoscopic cholecystectomy.^[8-11] However, its indications, feasibility, benefits and technical characteristics are less well documented

As the feasibility, benefits and technical characteristics of Laparoscopic Subtotal Cholecystectomy are not well documented therefore this study has been undertaken extensively to evaluate whether Laparoscopic Subtotal cholecystectomy predisposes to a high or low risk of complications, safety, effectiveness, postoperative hospital stay, mortality, in the management of Acute Cholecystitis and its complications like Gangrenous, Perforated, Fibrotic, and Empyema of the Gall Bladder. The study is aimed to give a new classification of Laparoscopic Subtotal cholecystectomy and their various types/variants like Type-I, Type-II and Type III and determine the use of port positions in LSC.

Materials and Methods

The patients were recruited from specialized hospitalized which is recognized training centre for Laparoscopic Surgery by the National Board of Examination (NBE), Medical council of India (MCI), Accredited - NABH & Society of the American Gastroenterology Surgeons (SAGES). The specialized hospital offers Basic & Advanced skill Courses in Laparoscopic Surgery.

Institutional Ethical Committee clearance was obtained for the study. The 661 subjects were enrolled in the study. Both males and females were included in the study. All 14485 patients were subjected to Laparoscopic Cholecystectomy during the past 2 years and 5 months from February 2009 to June 2012. All surgical procedures were performed at a single tertiary level hospital.

Among them, 661 patients (4.46%) with various types of cholecystitis were treated by Laparoscopic Subtotal Cholecystectomy and were included in the study. Laparoscopic Subtotal Cholecystectomy was performed only on patients with severe inflammatory or fibrotic

changes in Calot's triangle, or when the gallbladder was thick walled grossly edematous and inflamed with marked adhesions or when excessive bleeding occurred because of difficulty in finding a plane of dissection between the gallbladder and liver bed.

Pre-operative characteristics gathered from the medical records included age, gender, pre-operative laboratory values, at the time of surgery and indication for Laparoscopic Subtotal Cholecystectomy. Gallstone or biliary disease was diagnosed with ultrasonography (USG), computed tomography (CT) of abdomen, Endoscopic retrograde cholangiopancreatography (ERCP), magnetic resonance cholangiopancreatography (MRCP). Pre-operative imaging with CT of the abdomen/MRCP was performed in selected patients. This was done most often at the request of the surgical team as part of the pre-operative work-up for laparoscopic cholecystectomy. Intra-operative data recorded from the operative and anaesthesia records included the following: operative time, estimated blood loss, intra-operative transfusion requirement. Furthermore, conversion to open cholecystectomy and reasons for doing so were also noted. Information regarding placement of additional laparoscopic ports including location, size and indication was obtained. Post-operative features that were gathered from the medical record included: intensive care unit (ICU) admission, length of hospital stay, 30-day mortality and hospital re-admission, and post-operative infectious complications.

Results

The Laparoscopic Subtotal Cholecystectomy Type has been classification into three variants Type I, II & III. LSC Type I: Cystic Duct and Cystic Artery are dissected and clipped and cut. Anterior wall of the gallbladder is excised leaving behind the posterior wall of the gallbladder attached to liver, the mucosa is ablated. LSC Type II: Calot's triangle is not dissected. Cystic duct and Cystic Artery are not clipped. Incision over the infundibulum is taken circumferentially. Whole gallbladder is dissected from its liver bed. Mucosa of left over infundibulum (2 to 4 mm) is ablated and the infundibulum is loosely sutured. LSC Type III: Callot's triangle is not dissected. Cystic duct and Cystic Artery are not clipped. Incision on the infundibulum is taken anteriorly. The contents of gallbladder are removed. The Anterior wall of the gallbladder is excised, leaving behind the posterior wall. The mucosa of the posterior wall along with the mucosa of infundibulum is ablated. Infundibulum is loosely sutured. Table 1 shows that of 48 patients belonging to Laparoscopic subtotal cholecystectomy-Type-

I, only 4 ports were used in all 48 (100%) patients. No extra port was required. 591 patients belonging to laparoscopic subtotal cholecystectomy-type-II, 4 ports were used in 546 (92.39%) patients, 5 ports in 42 (7.10%) patients and 3 ports in 3 (0.50%) patients. Of 22 patients belonging to laparoscopic subtotal cholecystectomy-Type-III, only 4 ports were used in all 22(100%) patients. No extra port was required. In all, in 616 (93.19%) procedures, 4 ports were used. In 42 (6.35%) procedures 5 ports were used (all Laparoscopic Subtotal cholecystectomy -Type-II), and in 3 (0.45%) procedures only 3 ports were used (all Laparoscopic Subtotal cholecystectomy -Type-II). Cholecystitis was present in all the 661 patients. Acute cholecystitis, Chronic cholecystitis, CBD calculi, and cirrhosis of liver were the main diagnoses. Of 591 patients belonging to Laparoscopic Subtotal cholecystectomy -Type-II procedures 535 (96.6%) had Acute cholecystitis, 49 (90.7%) had chronic cholecystitis, 7 (58.3%) had CBD calculi with cholecystitis. Of 48 patients from Laparoscopic Subtotal cholecystectomy -Type-I group, 29 (4.9%) had Acute cholecystitis, 3(5.8%) had chronic cholecystitis, 3 (30.0%) had CBD calculi with cholecystitis, 13 (100%) had Cirrhosis. Of 22 patients from Laparoscopic Subtotal cholecystectomy Type-III group, all 22 (100%) patients had Acute Cholecystitis. In all 586 (88%) had Acute Cholecystitis, 52 (8.16%) had Chronic cholecystitis, 10 (1.96%) had CBD calculi with cholecystitis and 13 (1.96%) had Cirrhosis of liver with cholecystitis.

Table-1: Ports used in different types of Laparoscopic Subtotal Cholecystectomy

| LSC Type | LSC with 4 ports | LSC with 5 ports | LSC with 3 ports | Total | χ^2 Value | P value |
|--------------|------------------|------------------|------------------|--------|----------------|---------|
| Type II | 546 | 42 | 3 | 591 | 6.26 | 0.394 |
| | 88.6% | 100.0% | 100.0% | 89.4% | | |
| Type III | 22 | 0 | 0 | 22 | | |
| | 3.6% | 0% | 0% | 3.3% | | |
| Type I | 48 | 0 | 0 | 48 | | |
| | 7.8% | 0% | 0% | 7.3% | | |
| Total | 616 | 42 | 3 | 661 | | |
| % | 100.0% | 100.0% | 100.0% | 100.0% | | |

Table-2: Types of Laparoscopic Subtotal Cholecystectomy performed based on preoperative diagnosis

| LSC Type | Diagnosis | | | | Total | χ^2 Value | P value |
|--------------|-----------|--------|--------|--------|--------|----------------|---------|
| | 1 | 2 | 3 | 4 | | | |
| Type II | 29 | 3 | 3 | 13 | 48 | 25.69 | 0.001* |
| | 4.9% | 5.8% | 30.0% | 100% | 7.3% | | |
| Type III | 535 | 49 | 7 | 0 | 591 | | |
| | 96.6% | 90.7% | 58.3% | 0% | 89.4% | | |
| Type I | 22 | 0 | 0 | 0 | 22 | | |
| | 3.8% | 0% | 0% | 0% | 3.3% | | |
| Total | 586 | 52 | 10 | 13 | 661 | | |
| % | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | | |

1: Acute Cholecystitis; 2: Chronic Cholecystitis; 3: CBD Cal with Cholecystitis; 4: Cirrhosis of liver with cholecystitis; * Significant p<0.05

Discussion

The aim of present study was to find out whether laparoscopic subtotal cholecystectomy is a better and

feasible and safe option in difficult situations during performing standard laparoscopic cholecystectomy in regards to conversion rate, post-operative morbidity and complications, duration of post-operative hospital stay, resumption of diet, operating time, peri-operative blood loss in all age groups and gender.

In all 661 patients studied underwent laparoscopic subtotal cholecystectomy (LSC). The conversion rate to open surgery in this study was found to be very low of only 0.6% (4 patients). The third modification of laparoscopic subtotal cholecystectomy - Type III emerged as a viable, safe and feasible option to prevent conversion even in laparoscopic subtotal cholecystectomy Type I and II. Laparoscopic subtotal cholecystectomy and its variants were found to be equally safe and could be practiced in both sexes across all age groups.

Laparoscopic subtotal cholecystectomy Types and Port Positions:

Out of total 591 laparoscopic subtotal cholecystectomy (LSC) – Type II, 546 (92.38%) were performed with 4 standard ports, 42 (7.10%) procedures needed one extra port (5 ports). The extra port was taken between the epigastric and the umbilical port about one inch lateral to the mid-line, and 3 (0.50%) Laparoscopic Subtotal Cholecystectomy (LSC) could be completed with just 3 ports. Laparoscopic Subtotal Cholecystectomy (LSC) Type III in 22 patients and Laparoscopic Subtotal Cholecystectomy (LSC) Type - I in 48 patients required 4 ports.

In general, 613 (92.73%) procedures were done with 4 ports, 42 (6.35%) with 5 ports and 3 (0.4%) with 3 ports. R.K.Annamaneni^[12] used 4 ports in his 46 [100%] patients and none required extra port. SB Kolla et al used 4 ports in 38 [95%] out of 40 patients of Laparoscopic Cholecystectomy (LC) and in only 2(5%) patients 5th port was needed.^[12] Catherine Hubert and others in their study of 552 patients of Laparoscopic Cholecystectomy (LC), performed Laparoscopic Subtotal cholecystectomy in 39 patients and in all 39 [100%] patients used only 4 ports.^[14] Our use of 4 ports in 92% patients of Laparoscopic Subtotal cholecystectomy is consistent with various studies in literature^[13], and which also used 5th port in 5% patients, comparable to our use of 5th port in 7.1% patients. No 5th port was needed in laparoscopic subtotal cholecystectomy Type - I. We believe that number of ports required should always be considered as regards to safety of patient and do not hesitate to create extra port which is usually required to retract the stomach or the floppy caudate lobe of liver to gain good access at the target area. This also helps in reducing the total operating time which

is lower in our series as compared to others in the literature. The Laparoscopic Subtotal cholecystectomy Type - III [22 patients] too did not require 5th port.

Conclusion

It is observed that LSC is safe feasible option to open surgery. In this study. Laparoscopic subtotal cholecystectomy has been further classified into Type-I, Type-II, Type-III. Laparoscopic subtotal cholecystectomy Type-I is used for difficult gall bladder bed. Laparoscopic subtotal cholecystectomy Type-II in difficult hilum, and laparoscopic subtotal cholecystectomy Type-III for difficult hilum with difficult gall bladder bed. In this study, laparoscopic subtotal cholecystectomy Type-III has been newly classified and this has helped us to bring down the conversion rate and other complications like bleeding and injury to biliary tree.

References

1. Shikata S, Fukui T. Early versus delayed cholecystectomy for acute cholecystitis: a meta-analysis of randomized controlled trials. *Surg Today*. 2005; 35: 553-560.
2. Beldi G. Laparoscopic subtotal cholecystectomy for severe cholecystitis. *Surg Endosc*. 2003; 17: 1437-1439.
3. Palanivelu C, Jategaonkar P A, Madankumar M V, Natesan V A. Laparoscopic Management of Remnant Cystic Duct Calculi: A

- Retrospective Study. *Ann R Coll Surg Engl*. 2009; 91(1): 25-29.
4. Hoem D, Horn A, Gislason H, Søndena K. Cholecystectomy improves long-term success after endoscopic treatment of CBD stones. *Hepatogastroenterology*. 2006; 53(71): 655-9.
 5. Sinha I, Smith ML, Safranek P, Dehn T, Booth M. Laparoscopic subtotal cholecystectomy without cystic duct ligation. *Brit J Surg*. 2007; 94: 1527-1529
 6. Palanivelu C. *Art of Laparoscopic Surgery – textbook and atlas*. 1st ed. Coimbatore, India: Jaya Publications. 2005.
 7. Kiviluoto T, Luukkonen P, Kivilaakso E. Randomized trial of laparoscopic versus open cholecystectomy for acute and gangrenous cholecystitis. *Lancet*. 1998; 351(9099): 321-5.
 8. Zucker KA, Flowers J. Laparoscopic management of acute and chronic cholecystitis. *Surg Clin North Am*. 1992; 72(5): 1045-67.
 9. Suc B, Fourtanier G, Escat J. 3606 cholecystectomies under celioscopy. The Register of the French Society of Digestive Surgery. *Ann Chir*. 1992; 46(3): 219-226.
 10. Flowers JL, Scovill WA, Zucke KA. The Baltimore experience with laparoscopic management of acute cholecystitis. *Am J Surg*. 1991; 161(3): 388-92.
 11. Fontes PR, Eilers RJ, Chem EM, Riedner CE. Is acute cholecystitis a contraindication for laparoscopic cholecystectomy? *Inr Surg*, 1998; 83(1):28-30.
 12. Casaccia M, Torelli P, Cavaliere D, Santori G, Panaro V. Minimal-Access Splenectomy: a Viable Alternative to Laparoscopic Splenectomy in Massive Splenomegaly. *JLS*. 2005; 9(4): 411-414.
 13. Kolla SB, Kumar A, Kumar R, Chumber S, Parshad R, Seenu V. Early versus delayed laparoscopic cholecystectomy for acute cholecystitis: a prospective randomized trial. *Surg Endosc*. 2004;18(9):1323-7.

Cite this article as: Gode D, Palanivelu C, Syed ZQ. New variants of laparoscopic subtotal cholecystectomy in management of acute cholecystitis. *Int J Med Sci Public Health* 2014;3:397-400.

Source of Support: Nil

Conflict of interest: None declared