Revisiting Mini-Cholecystectomy in Laparoscopic Era – A Retrospective Study

Phungreikan Ningshen[1], Khumallambam Ibomcha Singh[2], Ningombam Minita Devi [3], S. Malem Devi[4], Yumkhaibam Sabir Ahmed[5], Khamlalmuan Hatlang[6], Nidin P.A.[7]

[1, 2, 4, 5, 6, 7] Department of General Surgery, Jawaharlal Nehru Institute of Medical Sciences, Imphal, Manipur, India.
[3] Department of Community Medicine, Jawaharlal Nehru Institute of Medical Sciences, Imphal, Manipur, India.

ABSTRACT

BACKGROUND

Mini-cholecystectomy (MC), with its varied incision length, has long been considered feasible with comparable results to laparoscopic cholecystectomy (LC) [1-6,7] We undertook this study, driven by resource-constraints, by well-experienced surgeons, using 3 - 5 cm incision length, in our patients with low BMI. The aim of this study is to compare the results and outcomes between MC and LC.

METHODS

In this retrospective study of a prospectively maintained database, first 50 patients each were selected for MC and LC respectively. Operative time, pain-score, SSI (Surgical Site Infection), hospital stay, return to normal activity and complications were compared.

RESULTS

Both groups were matched for age, sex, BMI (Body Mass Index) and American Society of Anesthesiologists (ASA) grading. The mean operating time for MC was 43 minutes and for LC, 64 minutes. Hospital stay for MC was 1.9 days and for LC was 1.8 days, which was statistically not significant. Return to normal activity was 8 days for MC and 6.6 days for LC. In a subset analysis of eight lean and thin patients using 3 - 3.5 cm length incision with rectus muscle splitting, the return to normal activity was 6.9 days which is comparable to LC patients.

CONCLUSIONS

Mini-cholecystectomy and laparoscopic cholecystectomy produce comparable patient outcomes. In lean and thin patient, MC may be slightly more advantageous than LC in terms of less operating time.

KEYWORDS

Mini-Cholecystectomy, Laparoscopic Cholecystectomy, Outcome, Lean and Thin Patient

Corresponding Author:
Dr. Phungreikan Ningshen,
Department of General Surgery,
Jawaharlal Nehru Institute of Medical Sciences, Imphal, Manipur, India.
E-mail: drphungreikan@yahoo.com

DOI: 10.18410/jebmh/2020/539

How to Cite This Article:
Ningshen P, Singh KI, Devi NM, et al. Revisiting mini-cholecystectomy in laparoscopic era – a retrospective study. J Evid Based Med Healthc 2020; 7(45), 2617-2620. DOI: 10.18410/jebmh/2020/539

Submission 27-07-2020,
Peer Review 12-08-2020,
Acceptance 05-10-2020,
Published 09-11-2020.

BACKGROUND

Gall stone disease is one of the most common digestive tract diseases worldwide with prevalence differing widely between age, sex, ethnic groups and countries.[8] It is more prevalent in western countries and within America it affects about 10 – 15 % of the adult population which translate into 20 to 25 million Americans.[9] The steadily increasing cholecystectomy rate since 1950 escalated 28 % from 1990 to 1993 with the introduction of LC. Cholecystectomy is now the most common elective abdominal surgery performed in the U.S., with over 750,000 operations being performed annually.[9]

Prevalence of gallstones was found to be 6.2 % in Northern India by ultrasound.[10] In this technological-driven era of medical science, LC has been established as the gold standard treatment for symptomatic cholelithiasis.[11-14] MC, with its varied definitions, is considered feasible with comparable outcomes to LC.[1-6] MC has not been given its deserved attention even in resource-poor hospitals. The aim of this study is to re-visit MC and compare its results and outcomes with LC.

METHODS

A retrospective study was taken up from a prospectively maintained database of patients of symptomatic cholelithiasis aged 18 to 65 years from March 2018 to February 2019 at Jawaharlal Nehru Institute of Medical science, Imphal, Manipur. First 50 patients each of MC and LC respectively were then studied and compared. The type of operation was decided by the patient's choice and availability of the limited laparoscopic instrument set. All patients were studied with reference to duration of surgery, post-operative analgesia, postoperative hospital stay, complications and return to normal activity. Operations were performed by surgeons having more than 7 years of experience in both the procedures with senior residents and / or post graduate trainees assisting it.

Exclusion Criteria

Patients with acute cholecystitis, choledocholithiasis, jaundice, pregnancy, ASA > 2, history of upper abdominal surgery, mental illness, obesity with BMI > 40, suspected carcinoma gall bladder and cirrhosis were excluded from the study.

Procedure

All patients were asked to pass urine just before surgery and Foleys catheterization was done postoperatively, if required. All the patients underwent surgery under general anaesthesia. Oro-gastric tube was inserted and gastric decompression done intraoperatively if there is gastric distension hindering vision and surgery, only to be removed just before extubation.

For MC, sand-bag of approximate size 10 cm*12 cm*30 cm was inserted at the back of lower chest to lift up the gall bladder and hepato-duodenal structures. An oblique right subcostal incision with length varying from 3 cms to 5 cms was given. Incisions longer than 5 cm are considered conversion to standard open cholecystectomy and excluded from the study. In thin individuals, rectus muscle fibres were split instead of cutting it. Upon entering the abdomen, proper exploration was done and through dynamic retraction with mini deavers, gall bladder fundus is grasped with two allis forceps and surrounded by betadine soaked gauze. Then a 1 - 2 cm incision is made with electrocautery and bile aspirated, stones removed and then closed by trans- fixation suture with Mersilk 2 - 0 round body. Cholecystectomy is then completed through fundus first method with dynamic retractions and economy of movements.

Inj. Ceftriaxone–sulbactum (1500 mg) is administered within 1 hour of intubation and a further two doses at 8 hrs and 20 hrs postoperatively given. Decision regarding further doses of antibiotics was left to the surgeon´s discretion .Liquid sips and then liquid diet were allowed 8 hours postoperatively if the patient is fully conscious with no nausea or vomiting. Soft diet is allowed the next day as tolerated.

Inj. Diclofenac 1 amp intramuscularly thrice daily was given for the first 24 hours after which analgesics were given according to Visual analogue scale (VAS). Oral Aceclofenac 100 mg for VAS 0 - 3; Oral Aceclofenac plus paracetamol for VAS 4 - 7 and paracetamol infusion for VAS 8 - 10 were given. Patients were followed up at 1 week, 1 month and 3 months after discharge in the OPD or through telephonic conversation.

Statistical analysis was done using SPSS Ver-22 software. T test was used for comparison of quantitative data and chi square test was done for comparison of qualitative data with $p < 0.05$

RESULTS

During the study period from March 2018 to February 2019, a total of 100 patients who underwent cholecystectomy were selected. Out of which, 50 underwent MC and 50 LC respectively. Out of the 100 patients, 74 % were female and 26 % were male. The mean average age of all the patients was 33.34 ± 9.89 (Mean ± SD). Age range from 18 years to 64 years. In the MC group, 70 % were female and 30 % male whereas in the LC group, 78 % were female and 22 % male. Mean average BMI of all the patients was 23.44 ± 5.07 while range was 16.8 to 35. Among the patients who underwent MC, 64 % were ASA-I and 36 % ASA-II whereas in the LC group, 56 % were ASA-I and 44 % ASA-II.

Character		MC (N = 50)	LC (N = 50)	Total (%)	p-Value
Sex	Female n (%)	35 (70.0)	39 (78.0)	74 (74.0)	.362
	Male n (%)	15 (30.0)	11 (22.0)	26 (26.0)	
Age (Yrs.) (Mean ± SD)		31.96 ± 10.68	34.72 ± 8.93	33.34 ± 9.89	.164
BMI (Mean ± SD)		23.08 ± 4.45	23.80 ± 5.65	23.44 ± 5.07	.479
ASA	ASA-I (%)	32 (64.0)	28 (56.0)	60 (60.0)	.414
	ASA-II (%)	18 (36.0)	22 (44.0)	40 (40.0)	

Table 1. Demographic Data in Both Groups

Groups		MC	LC	P-Value
Operating time (Mean ± SD)		42.70 ± 9.96	64.08 ± 14.76	.000*
Pain (Mean ± SD)		4.14 ± 0.969	4.30 ± 0.974	.412
Nausea	Yes n (%)	7 (14.0)	8 (16.0)	.779
	No n (%)	43 (86.0)	42 (84.0)	
Vomiting	Yes n (%)	2 (4.0)	1 (2.0)	.558
	No n (%)	48 (96.0)	49 (98.0)	
Surgical site infection	Yes n (%)	2 (4.0)	0	.153
	No n (%)	48 (96.0)	50 (100)	
Hospital Stay (Mean days ± SD)		1.90 ± .931	1.80 ± .857	.578
Return to normal Activity (Mean days ± SD)		8.02 ± 1.04	6.64 ± .942	.000*
3 - 3.5 cms with muscle-splitting	Yes n (%)	8 (16.0)	0	.006*
	No n (%)	42 (84.0)	50 (100)	
Return to normal activity (muscle - splitting) (Mean days ± SD) (n = 8)		6.5 ± .535	-	.042*
Oro-gastric tube insertion n (%))	Yes n (%))	0	4 (8.0)	.041*
	No n (%))	50 (100)	46 (92.0)	
Foley's Catheter Insertion	Yes n (%))	2 (4.0)	3 (6.0)	.646
	No n (%)	48 (96.0)	47 (94.0)	

Table 2. Operative and Postoperative Variables Evaluated in Both Groups

*p-value < 0.05, Significant

In our study, the mean operating time for MC and LC was 43 minutes and 64 minutes respectively. The duration of hospital stay for MC and LC were 1.9 days and 1.8 days respectively, which was statistically not significant. Mean pain score (VAS) for MC and LC was 4.1 and 4.3 respectively, which is similar. The time for return to normal activity for MC and LC were 8 days and 6.6 days respectively. In the subset analysis of lean and thin 16 % patients, out of the 50 patients who underwent MC, using 3 - 3.5 cm length incision with rectus muscle splitting, the mean time for return to normal activity was 6.5 days which is comparable to LC patients (p-value < 0.05). In the LC group, oro-gastric tube was inserted intra-operatively for decompression in 8 % (n = 4 patients) but none in MC patient which was statistically significant (p-value < 0.05). Foley's catheter which was inserted in 4 % (n = 2 patients) and 6 % (n = 3 patients) for MC and LC group respectively, at the night of surgery, only to be removed the next day, was statistically not significant. SSI occurs in two patients of MC but none in LC which doesn't reach statistical significance. There were no major complications like bleeding, bile duct injury, bowel injury and conversion to standard open cholecystectomy in the two groups.

DISCUSSION

Since the first open cholecystectomy performed by Carl Langenbuch in 1882, changes have been brought about by surgeons and technology. Mini Cholecystectomy was earlier described by Dubois and Berthelot in 1982 being performed safely and with better patient outcomes as compared to conventional open cholecystectomy.[4,14,15,16] The first laparoscopic cholecystectomy performed by professor Muhe in 1985 was initially rejected. It was propagated by French surgeons later on and has established it as the gold standard for symptomatic cholelithiasis.[11-14] Increased cholecystectomy rate after the introduction and popularisation of LC is reported while MC advocacy diminishes. C M Lam et al reported in Scotland that the total cholecystectomy rate (open and laparoscopic) rose considerably by 18.7 % from 1989 - 93 (p < 0.05).[18] Systematic review and meta-analysis by F. Keus et al in 2009 and recently by Castro et al in 2014 reported comparable patient outcome between LC and MC. In addition to its lesser acceptance, MC is varied by difference in incision length from 3 - 8 cm and also its technique.[6,19,20] In our study, we give 3 - 5 cm subcostal incision and compare it with LC. There were a total of 26 males and 74 females out of which 11 males and 39 females were in the LC group and 15 males and 35 females in the MC group. Mean age was 42 years (18 - 64 years). Mean BMI was 23.4 Kg / m^2 (16.5 to 32) which was similar to 23.4 kg / m^2 by Watanapa but lower to 27.3 kg / m^2 by Ros.[21,1] In our study, the operative time taken for MC was 43 minutes (25 – 60 mins) being similar to A. Balasubramanian, et al. which showed a median operative time of 40 minutes (18 - 56 mins) but shorter than 94 + / - 45 minutes of Axel Ros, et al.[19,1] The mean operating time for LC was 64.08 ± 14.76 minutes (45 - 90 mins) which was comparable to Almahjoub et al. of 63.8 ± 23.7 but shorter than 158 ± 45 minutes of Axel Ros, et al.[22,1] The mean hospital stay for LC was 1.80 ± .857 (1 - 3 days) which is shorter than 2.63 ± 0.79 of Almahjoub et al and 2.6 ± 3.3 of Axel Ros et al.[22,1] The length of hospital stay was 1.90 ± .931 days (1 - 3 days) in the MC group which is comparable to Almahjoub et al, of 1.97 ± 0.55 and Chalkoo et al of 2 days (1 - 5 days) but shorter than 3.2 ± 5.1 days of Axel Ros, et al.[22,6,1] The hospital stay is similar between MC and LC group in our study which corresponds to Keus et al. and Almahjoub et al but in contrast to RCT by Axel Ros et al and systematic review and meta-analysis by Castro et al.[3,22,1,2]

The return to normal activity was 8.02 ± 1.04 days for MC and 6.64 ± .942 days for LC which was lower at 10.7 ± 7.2 and 8.6 ± 7.7 respectively by Axel Ros et al. but correspond to decreased time to return to normal activity in LC as compared to MC in studies by Axel Ros et al, and Castro et al.[1,2]

In our present study, the safety and efficacy of MC is highlighted with comparable, if not better, result to LC. There was decreased operative time with MC but the significant finding was similar hospital stay with LC.

In the sub group analysis, eight (16 %) lean and thin patients using 3 - 3.5 cm length incision with rectus muscle splitting surgery, return to activity was similar with LC.

The study have been performed by experienced surgeons in both the group but training can be imparted to young trainees in both the group. With the increasing application of laparoscopic surgery, young trainee have been less exposed to open surgery and mini-cholecystectomy can restore some balance without compromising patient safety and result.

The study may have bias of not including obese patients and comparing the result of obese patients undergoing MC and LC.

CONCLUSIONS

MC with minimal training, can be employed as a good alternative to LC especially in resource-poor hospital. It should be kept in the armamentarium for the treatment of

gall stone disease and can be expanded for training post-graduate training in open surgery. In lean and thin patient, it may be a better choice.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.
Financial or other competing interests: None.
Disclosure forms provided by the authors are available with the full text of this article at jebmh.com.

REFERENCES

[1] Ros A, Gustafsson L, Krook H, et al. Laparoscopic cholecystectomy versus mini-laparotomy cholecystectomy: a prospective randomized, single-blind study. Ann Surg 2001;234(6):741-749.
[2] Castro PMV, Akerman D, Munhoz CB, et al. Laparoscopic cholecystectomy versus mini laparotomy in cholelithiasis: systematic review and meta-analysis. Arq Bras Cir Dig 2014;27(2):148-153.
[3] Keus F, De Jong JAF, Gooszen HG, et al. Laparoscopic versus small-incision cholecystectomy for patients with symptomatic cholecystolithiasis. Cochrane Database Syst Rev 2006;18(4):CD006229.
[4] Dubois F, Berthelot B. Cholecystectomie par mini-laparotomie. Nouv Presse Med 1982;11:1139-1141.
[5] Chalkoo M, Ahangar S, Duranni AM, et al. Mini-lap cholecystectomy: modifications and innovations in technique. Int J Surg 2010;8(2):112-117.
[6] Shulutko AM, Kazaryan AM, Aghadzanov VG. Mini-laparotomy cholecystectomy: technique, outcomes: a prospective study. Int J Surg 2007;5(6):423-428.
[7] Harju J, Aspinen S, Juvonen P, et al. Ten-year outcome after minilaparotomy versus laparoscopic cholecystectomy: a prospective randomised trial. Surgical Endoscopy 2013:27(7):2512-2516.
[8] Dhamnetiya D, Goel MK, Dhiman B, et al. Gallstone disease and its correlates among patients attending teaching hospital of North India. J Family Med Prim Care 2019;8(1):189-193.
[9] Stinton LM, Shaffer EA. Epidemiology of gallbladder disease: cholelithiasis and cancer. Gut Liver 2012;6(2):172-187.
[10] Unisa S, Jagannath P, Dhir V, et al. Population-based study to estimate prevalence and determine risk factors of gallbladder diseases in the rural Gangetic basin of North India. HPB (Oxford) 2011;13(2):117-125.
[11] Begos DG, Modlin IM. Laparoscopic Cholecystectomy: From gimmick to gold standard. J Clin Gastroenterol 1994;19(4):325-330.
[12] Litynski GS. Profiles in laparoscopy: Mouret, Dubois and Perissat: the laparoscopic breakthrough in Europe (1987-1988). JSLS 1999;3(2):163-167.
[13] Blum CA, Adams DB. Who did the first laparoscopic cholecystectomy? J Minim Access Surg 2011;7(3):165-168.
[14] Reynolds W Jr. The first laparoscopic cholecystectomy JSLS 2001;5(1):89-94.
[15] O'Dwyer PJ, Mcgregor JR, McDermott EW, et al. Patient recovery following cholecystectomy through a 6cm or 15cm transverse subcostal incision: a prospective randomized clinical trial. Postgrad Med J 1992;68(804):817-819.
[16] Assalia A, Schein M, Kopelman D, et al. Mini-cholecystectomy vs conventional cholecystectomy: a prospective randomized trial-implications in the laparoscopic era. World J Surg 1993;17(6):755-759.
[17] Schmitz R, Rohde V, Treckmann J, et al. Randomized clinical trial of conventional cholecystectomy versus mini-cholecystectomy. Br J Surg 1997;84(12):1683-1686.
[18] Lam CM, Murray FE, Cuschieri A. Increased cholecystectomy rate after the introduction of laparoscopic cholecystectomy in Scotland. Gut 1996;38(2):282-284.
[19] Balasubramanian A, Cheddie S, Naidoo NM, et al. An evaluation of mini-laparotomy cholecystectomy in the laparoscopic era: a rural experience. S Afr J Surg 2018;56(2):36-40.
[20] Seenu V, Misra MC. Mini-lap cholecystectomy- an attractive alternative to conventional cholecystectomy. Trop Gastroenterol 1994;15(1):29-31.
[21] Watanapa P. Mini-cholecystectomy: a personal series in acute and chronic cholecystitis. HPB (Oxford) 2003;5(4):231-234.
[22] Almahjoub A, Elfaedy O, Mansor S, et al. Mini-cholecystectomy versus laparoscopic cholecystectomy: a retrospective multicentric study among patients operated in some Eastern Libyan hospitals. Turk J Surg 2019;35(3):185-190.