ORIGINAL ARTICLE

Modified Laparoscopic Cholecystectomy; a prospective study focusing on the complications and association in comparison to umblical port diameter

Fareya Usmani, Mehmooda Wasim, Amtullah Sheikh, Syed Muhammad Shafqatullah, Adnan Anwar

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Sir Syed College of Medical Science, Karachi, Pakistan.
F Usmani
M Wasim
A Sheikh
SM Shafqatullah
A Anwar

Correspondence:
Dr Mehmooda Wasim, Consultant General Surgeon and Assistant Professor of Surgery, Sir Syed College of Medical Sciences, ST-32, Block-5, Boating Basin, Clifton, Block 5 Clifton, Karachi, Karachi City, Sindh 75600.
Cell: (+92)321-8981154
Email: drmaha.khans@gmail.com

Abstract

Objective: The objective of this study was to assess the safety and effectiveness of the modified laparoscopic cholecystectomy in terms of complications. Furthermore it also signified the importance of the size of incision during the surgery and its association with surgical complications

Study design: Prospective observational study

Materials and Methods: After taking ethical approval, a prospective observational study conducted from January 2015 till August 2017 for a period of 2.5 years through non-probability convenient sampling technique. The study comprised of a total of 101 patients from the Surgical Department of Sir Syed Hospital, Qayyumabad, Korangi Road, Karachi. All the patients who had undergone laparoscopic cholecystectomy for symptomatic gall-bladder stones with chronic cholecystitis, benign polyp and biliary colic were included in the study. Visual analogue pain scale was used to assess the intensity of pain. The complications were observed and documented. Data was analysed using SPSS version 20.0. The test for normality was applied and Mann Whitney u-test was used to assess the difference. P-value of less than 0.05 was considered as significant.

Results: In a total of 101 patients 27(26.7%) were males and 74(73.3%) were females. The mean age of patients was 38.5±14.27. Patients who had surgical port diameter of 5mm were 53(52.5%) and 10mm were 48(47.5%). No to mild pain was recorded in 24(45.3%) patients, moderate in 19(35.8%) and severe in 10(18.9%) patients in group I. No to mild pain was recorded in 23(47.9%) patients, moderate in 13(27.1%) and severe in 12(25%) patients. The complication of wound infection was recorded at 5th and 7th post-operative day and found to be present in 2(3.8%) and 4(8.3%) of patients in group I and group II , respectively. Port site hernia was present in 4(3.8%) of patients with 5mm port and 15(14.6%) in patients with 10mm port diameter. Mean value of pain in all the patients was 4.7±2.62. Males had a mean rank of 40.76 and females 54.74 with a substantial p-value of 0.03.

Conclusion: The present study concluded that Modified laparoscopic cholecystectomy is harmless and clinically beneficial procedure. The difference in the visual pain scale of MLC in 5 mm and 10 mm port diameter was minor. However substantial variance existed on visual analogue pain scale on gender basis.

Keywords: Modified laparoscopic cholecystectomy, complications, Visual analogue scale, port site hernia

Introduction:

The recent evolution in cholecystectomy is the modified laparoscopic cholecystectomy (MLC) using as low as 1 umbilical port, which been proven to be a minimally invasive technique for management and treatment of benign gall-bladder disease by avoiding scarring due to entry point being concealed in the umbilicus.[1] In our study, we did laparoscopic cholecystectomy using four ports being the modification in umbili-

cal port diameter (standard is 10mm umbilical port, we did with 5mm umbilical port). Patients undergoing MLC have the benefit of early post-operative mobilization, decreased pain and early return to daily routine.[2-3] MLC indications have increased substantially to include patients of old age, cirrhosis and those with absolute contraindication to open surgery.[4] MLC is now becoming more of a standard procedure for most cases of cholecystitis and can be performed easily.[5,6] Observation at every step along the procedure with proper application of standardized surgical and medical measures along with adequate skills must be undertaken to decrease risk of complications during the procedure.[7] Sometimes the visualization of Calot's triangle becomes difficult because of inflammation, adhesions, and sclerosing of the normal anatomy so the inability to find the "critical view of safety" (CVS) and locate the cystic duct, cystic artery, creating problems and increases the risk of complications.[8] Patients undergoing MLC have the benefit of early post-operative mobilization, decreased pain and early return to daily routine. MLC indications have increased substantially to include patients of old age, cirrhosis and those with absolute contraindication to open surgery.[9] MLC is now becoming more of a standard procedure for most cases of cholecystitis and can be performed easily.[10] According to Tamura et al, MLC has decreased operating time, while post-operatively least complications have been reported in follow ups whether be it abscess, pus or cancer in any remaining gall-bladder tissue.[11] Studies have shown that less post-operative complications have been linked with reduction in either size or number of ports.[12] Difficulty in cholecystectomy might be predicted pre-operatively in elderly patients, those with a longer duration of symptoms, co morbids such as portal hypertension, ultrasound findings as well as history of choledocholithiasis which makes MLC a much safer alternate due to added advantages in avoiding common bile duct injury and liver bed bleeds.[13,14] MLC is also indicated in the patients having an obscure anatomy in Calot's triangle, dilated cystic duct, very short cystic duct or in patients with Mirizzi syndrome.[15,16] Conversion of MLC to open surgery (laparotomy) is rarely a part of laparoscopic cholecystectomy in order to insure maximum safety to the patient where conversion rates are usually 5 to 7%, decreasing in many centers with accumulation of experience in LC where the main reason for conversion is obscure anatomy in 55%, followed by adhesions in 26%, bleeding in 8%, suspected choledocholithiasis in 4.3% and failure of progression (5.3%).[17]

The objective of this study was to assess the safety and effectiveness of the modified laparoscopic cholecystectomy (only umblical port diameter is reduced to 5mm) in terms of complications. Furthermore it also signified the importance of the size of incision during the surgery and its association with surgical complications

Materials and Methods:

A prospective observational study conducted for a period of 2.5 years from January 2015 till August 2017 in which patients were selected through non-probability convenient sampling technique. The study comprised of a total of 101 patients, divided in two groups (group-I umbilical port diameter 5mm, group-II umbilical port diameter 10 mm) from the Surgical Department of Sir Syed Hospital, Qayyumabad, Korangi Road, Karachi. Ethical approval was pursued from institutional review board of Sir Syed Hospital.

Patients were admitted through outpatient department. All the patients who had undergone modified laparoscopic cholecystectomy for symptomatic gall-bladder stones without acute cholecystitis, benign polyp and chronic cholecystitis were included in the study. The patients whose modified laparoscopic cholecystectomy was converted into laparotomy, who could not tolerate laparoscopic surgery, patients with acute cholecystitis, jaundice, CBD stones and those with previous major abdominal surgery and those with incomplete data were excluded. Surgery was done by same surgeon in both groups to avoid bias. Patients were discharged the very next day and follow up in OPD on 5th, 7th day and 3rd month post-operatively.

Table-1: Patient's baseline characteristics at the time of surgery

Variable n=101		Mean ±S.D / Frequency (%)
Age		38.5±14.27
Gender	Male	27(26.7%)
	Female	74(73.3%)
Comorbid	Hypertension	11(10.9%)
	Asthma	3(3%)
	Nil	87(86.1%)
Port Diameter	5mm	53(52.5%)
	10mm	48(47.5%)

Table-2: Pain comparision in between two groups

Variable	Group I	Group II
	Mean ±S.D	Mean ±S.D
Age	36.64±13.07	40.56±15.36
BMI	22.85±3.37	22.25±2.52
Pain	4.64±2.58	4.83±268

Table-3:Table showing comparision of wound infection, port site hernia and post-operative pain in both groups

		Group I (5mm)		Group II (10mm)		P-value
		n	%	n	%	
Gender	Male	16	30.2	11	22.9	0.410
	Female	37	69.8	37	77.1	
	Total	53	100	48	100	
Pain	Mild	24	45.3	23	47.9	0.582
	Moderate	19	35.8	13	27.1	
	Severe	10	18.9	12	25.0	
Wound Infection	Yes	2	3.8	4	8.3	0.333
	No	51	96.2	44	91.7	
	Total	53	100	48	100	
Post Op Day 5	Yes	3	5.7	4	8.3	0.597
	No	50	94.3	44	91.7	
	Total	53	100	48	100	
Post Op Day 7	Yes	1	1.9	3	6.3	0.262
	No	52	98.1	45	93.8	
	Total	53	100	48	100	
Port Site Hernia 3 Months	Yes	2	3.8	7	14.6	0.057
	No	51	96.2	41	85.4	
	Total	53	100	48	100	

Data collection process was done after taking informed consent. The demographic variables were documented. Visual analogue pain scale was used to assess the intensity of pain and the patients were explained about the pain scale. The complications were observed and recorded. Dependent variables indication of surgery, post-operative pain, wound infection and port site hernia were assessed.

Data Analysis: Data was analysed using SPSS version 20.0. Data was presented as descriptive analysis statistics. The test for normality was applied and Mann Whitney u-test was used to assess the difference. Bar graphs were used to present the qualitative data. P-value of less than 0.05 was considered as significant.

Results:

A total of 101 patients who had undergone laparoscopic cholecystectomy were selected for the study. Out of them 27(26.7%) were males and 74(73.3%) were females. The mean age of patients was 38.5±14.27. Patients who had umbilical port diameter of 5mm were 53(52.5%) and 10mm were 48(47.5%). 11(10.9%) were known to be hypertensive, only 3(3%) were asthmatic and 87(86.1%) had no co-morbid. No to mild pain was recorded in 47(46.5%) patients, moderate in 32(31.7%) patients and severe in 22(21.8%) patients. (Table 1) The complication of wound infection was recorded at 5th and 7th post-operative day in both groups and found to be present in 2(3.8%) patients in group I and 4(8.3%) patients in group II of patients which is a significant difference. (Fig.1) Port site hernia was observed at 3rd months and seen to be present in 4(3.7%) of patients with 5mm port and 15(14.5%) in patients with 10mm port diameter. (Fig.2). Mean value of pain in all the patients was 4.7±2.62. Mean rank of pain in patients below 37 years of age was 51.97. Mean rank of pain in patients above 38 years of age was 49.97 with an insignificant p-value of 0.726. Males had a mean rank of 40.76 and females 54.74 with a substantial p-value of 0.03. Mean rank of pain with 5mm port diameter was 50.07 and with 10mm was 52.03 with a p-value of 0.731. Patients having port site hernia had a mean rank of 52.17 and without hernia were 50.89 with insignificant p-value of 0.898. (table 2 and 3)

Discussion:

In today's era of laparoscopic surgery, decreased postoperative pain and early recovery are main goals to achieve better patient care.[18] Some studies have shown that less postoperative complica-

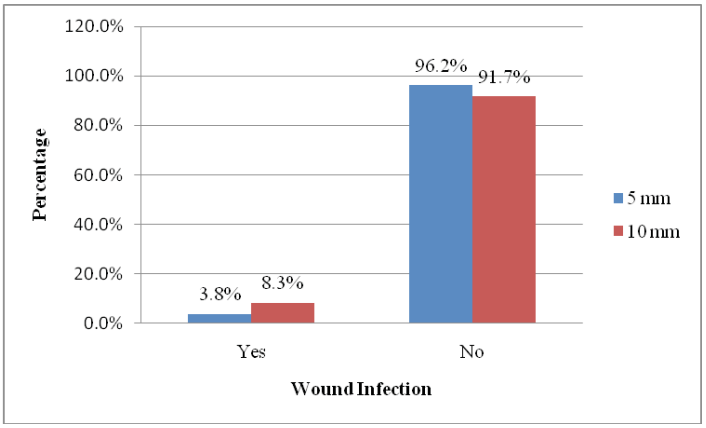

Figure. 1: Percentage of wound infections in 5mm and 10mm port site diameter

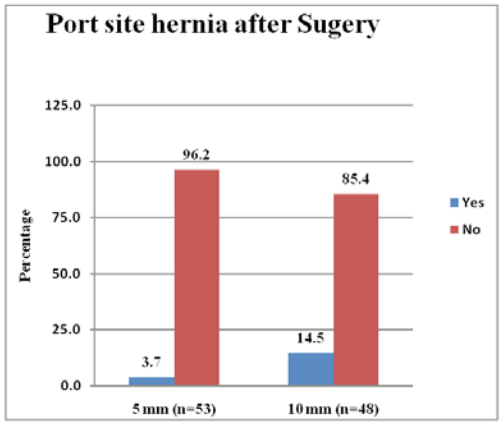

Figure. 2: Port site hernia in 5mm and 10mm port diameter (at 3 months)

tions were linked with reduction in either size or number of ports.[19] A study by Markar SR et al. demonstrated that single-incision LC is safer procedure for the treatment of uncomplicated gall-stone disease, with post-operative outcomes similar to that of standard multiport LC.[20] The findings of the above studies are in accordance with our study in which the complication rate was much reduced and offered better outcome. The only difference is that we used four ports and umbilical port diameter is reduced to 5mm (standard is 10mm umblical port). In a study by Zhu J et al., among 67 patients undergoing MLC, 2(3%) patients developed wound infection, only 1 of the MLC was converted to open cholecystectomy due to celiac adhesion.[21] These findings are consistent with our study in terms of frequency of complications. In another study by Nasser MF et al., among 530 patients undergoing MLC, 14(2.6%) patients developed port-site bleeding and 11(2.1%) patients got minor wound infection, 2(0.3%) patients developed port-site hernia. Perforation of the gall-bladder was noted in 12(2.3%) patients.[22] A study by Singh S et al., showed that in 80 patients of MLC, 12(15%) of patients developed wound infection post-operatively.[23] In a study by Diezrel et al., reported 13 patients out of 77,604 patients undergoing Laparaoscopic cholecystectomy suffered aortic injuries[24] The above studies concluded that MLC is superior to multi-port LC in terms of post-operative outcome, but not in terms surgical time and post-operative pain. A similar result of MLC was observed in our study in which single post-incision of 5mm was more effective in terms of decreased complications as compared to 10mm incision. One of the study by Su WL et al., predicted that the mean pain on VAS pain scale for MLC was 3.98±0.84 where as in our study it was 4.7±2.62.[25] In another study by Antoniou et al., of MLC it was observed that only 42(3.6%) out of 1,166 patients had developed wound infection which is slightly higher in our study in which 7(7%) of patients developed wound infection. the practice to suspend the gall-bladder with the use of sutures was correlated with a significant increase of the complication rate from 3.3% to 13.3%.[26] In a study by Jan H et al. of 1,345 patients undergone MLC, the conversion rate to open cholecystectomy was 6.4%. 9(0.67%) patients developed bleeding from the port site, 30(2.23%) port site infection, 43(3.20%) umbilical port hernia.[27] Usual pain scores reported in literature range from 2.62 to 4.3±1.5 for MLC while in our study it was observed to be higher with the mean of 4.7±2.62.[28]

The qualitative approach and large sample size of our study has assured that we have assessed the extensive range of patients undergoing through modified laproscopic cholecystectomy. However the study might not be immune from observer and practise bias. Considering the finding of our study and to what extend they are consistent with their experience of the surgeons performing the procedure would be illuminating and favourable to regulate the misinterpretation about the modified laproscopic cholecystectomy in future.

Conclusion:

The present study concluded that Modified laproscopic cholecystectomy is harmless and clinically beneficial procedure. The study also recognized numerous benefits of MLC in terms of complications. The difference in the visual pain scale of MLC in 5mm and 10mm port diameter was minor. However substantial variance existed on visual analogue pain scale on gender basis.

Conflicts of interests: No

Funding Resource: No

Role and contribution of authors:

Dr Fareya Usmani, collected the data and references and did the initial write-up.

Dr Mehmooda Wasim, collected the data, references and review the article and advice changes

Dr Amtullah Sheikh, critically review the article and made changes

Dr Syed Muhammad Shafqatullah, critically review the article and made the final changes

Dr Adnan Anwar, collected the data, references and helped in discussion and conclusion writing.

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