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A Comparative Study between Laparoscopic Cholecystectomy and Minicholecystectomy in a Rural Medical College

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Abstract **Original Research Article**

Cholecystitis is a very common disease among Indian population. It can be of two types: calculus or acalculus. Treatment options for chronic calculus cholecystitis include conservative management and cholecystectomy. There are two different approaches for cholecystectomy: open and laparoscopic. This study was conducted to compare minicholecystectomy with laparoscopic cholecystectomy. A total of 80 patients coming to our outdoor in the study period from March, 2017 to February, 2018 were included. Patients were randomly allocated into two groups, the first consisting of those in whom laparoscopic cholecystectomy (LC) was done whereas the second had undergone minicholecystectomy (MC). The mean operative time, duration of hospital stay, wound infection and pain were better in the LC group compared to the MC. We conclude that laparoscopic cholecystectomy is superior to minicholecystomy.

Key words: cholecystitis, calculus, cholecystectomy, laparoscopic, minicholecystectomy.

INTRODUCTION

Cholecystitis is a very common surgical condition which can be of calculus (commonest) or acalculus type. Gall stones are major health problem worldwide. A patient of acute cholecystitis usually presents with severe colicky upper abdominal pain with nausea and vomiting. In the initial phase there may be presence of fever. The clinical signs include Murphy's sign, Boas sign and guarding or rigidity in upper abdomen. Diagnosis is confirmed by ultrasonography, sometimes with HIDA or PIPIDA scan [1].

Treatment options for chronic calculus cholecystitis include conservative management and surgical removal of the gall bladder i.e. cholecystectomy. Cholecystectomy is the treatment of choice for chronic calculus cholecystitis [2]. There are two different approaches of cholecystectomy. One is an open approach and another by laparoscopy. Laparoscopic cholecystectomy (LC) brought a revolutionary change in the field of gall bladder surgery. After the documented first operation by Enrich Muhe in 1985, it was greatly accepted by surgeons as well as patients in late 1980s and was practiced by surgeons owing to its much more advantages over open cholecystectomy which includes smaller wound scar and others [3].

In this modern era of surgery, it is established that patients undergoing LC have a shorter recovery time compared with those undergoing open cholecystectomy (OC) [4, 5]. Laparoscopic cholecystectomy (LC) can now be considered as the standard operation for gallstone disease. The advantages of laparoscopic cholecystectomy include reduced postoperative hospital stay, earlier return to work, decreased post-operative pain, improved aesthesis, minimum surgical incisions, bleeding and so better cosmetic results and lesser postoperative complications[6-8]. Only limitations of LC include expensive instruments, specialized training and long learning curve.

In early 1980s, "small incision cholecystectomy" (SIC), also known as mini cholecystectomy (MC), made its debut. SIC is performed with a small transverse subcostal incision of around 5 cm starting just below the tip of 9th costal cartilage. The anterior rectus sheath is incised transversely; the muscle fibres are separated, the posterior rectus sheath and the parietal peritoneum is

incised thereafter. MC is also reported to be safe alternative compared to LC with respect to lesser operative time, lesser complications and without financial resources for costly laparoscopic equipment [4, 9-11].

The present study is designed to compare MC and LC with respect to operative time, any conversion to open cholecystectomy, intraoperative as well as postoperative complications and the total days of hospital stay as there is less number of data regarding comparison between these two procedures on management of gall stone abnormalities.

MATERIAL AND METHODS

This randomized control study was conducted in the elective surgery operating room of the department of general surgery in North Bengal medical college & hospital, West Bengal. Approval of the ethical committee was taken before collecting data. Data was collected for one year starting from March, 2017 to February, 2018. Newly diagnosed patients with chronic cholecystitis coming to the surgical outdoor of our institute were included in the study. The enrolled patients were in the age group of 20 to 60 years of either sex.

Patients with previous cholecystectomy or any abdominal major surgery or those diagnosed as a case of acute cholecystitis or choledocholithiasis and patients with any other co-morbid conditions such as diabetes mellitus (DM), hypertension (HTN), deranged liver function test (LFT), coagulation abnormalities, angina, stroke, renal failure, COPD, tuberculosis, coronary artery disease were excluded from the study. Among 110 patients taken for the study the eligible population was 80 patients after the exclusion process. 40 patients were randomly allocated into two groups, the first one was laparoscopic cholecystectomy and the second one was minicholecystectomy. Two experienced surgeons, who had performed at least 30 laparoscopic surgeries within last 12 months, performed all the surgeries in the study to minimize interpersonal difference. For postoperative complications like biliary leakage and hemorrhage, they were followed up for 7 days and other complications like pain , wound infection and abdominal distension were followed up for 7days as well as 15 days.

Data were analysed using IBM SPSS statistics version 21 for windows inferential statistics like chi square tests, independent sample t test and fisher's exact test was used to test the significance. P value of <0.05 was considered as statistically significant.

RESULTS

Among the 80 patients of the study 55% belonged to 31-50 years age group followed by 16.2% in <30 years age group and 15.0% in 51-60 years age group. Rest of the patients belonged to >60 years age group and the mean age was 43.78±12.14 years. Majority of the study subjects were female (75.0%) and rest (25.0%) were male. Most of the patients were hindus (73.8%) by religion and rest (26.3%) were muslims. There was no statistically significant difference between the two groups as far as preoperative sociodemographic variables are concerned.

Table-1: analysis of data according to age, sex and religion

Factors	Divisions	N (%)
Age of the patients(years)	<30	13(16.2)
	31-40	22(27.5)
	41-50	22(27.5)
	51-60	12(15.0)
	>60	11(13.8)
Sex	Male	20(25.0)
	female	60(75.0)
Religion	Hindu	59(73.8)
	Muslim	21(26.3)

The mean operative time was higher in the MC group (88.8±16.0min) compared to the LC group (75.2±19.7min) and the difference was found to be statistically significant with a P value of 0.001(P<0.05). Two patients from each group needed conversion to open cholecystectomy and the difference was not found to be statistically significant (P=1.000). The mean duration of hospital stay was higher in the MC group (4.70±0.791days) compared to the LC group (2.65±1.00 days) and the difference was found to be statistically significant (P=0.001).

Intraoperative biliary leakage was found among 12.5% of the patients who underwent LC whereas the same was found among 15% of patients of MC but the difference was not statistically significant with a P value of 0.745. The proportion of patients having intraoperative hemorrhage in LC and MC groups was 2.5% and 7.5% respectively but the difference was not found to be statistically significant (P=0.615).

Postoperative complications like pain (27.5% with MC, 10.0% with LC), wound infection (15.0% in MC, 2.5% in LC) were higher in the MC group compared to the LC group. Postoperative abdominal distension was 10% in those who underwent LC and the same was 7.5% in patients with MC whereas

postoperative biliary leakage was 7.5% in patients with LC and 5% in patients with MC. But the difference between the two groups was not statistically significant as shown in the table2.

Table-2: Outcome of surgeries performed

Outcomes	Laparoscopic cholecystectomy N=40(%)	Minicholecystectomy, N=40(%)	P value
Mean operative time(min)	75.2±19.7	88.8±16.0	0.001
Conversion to open cholecystectomy	2(5)	2(5)	1.000
Duration of hospital stay(days)	2.65±1.00	4.70±0.791	0.001
Intraoperative biliary leakage	5(12.5)	6(15.0)	0.745
Intraoperative hemorrhage	1(2.5)	3(7.5)	0.615
Postoperative biliary leakage	3(7.5)	2(5.0)	1.000
Wound infection	1(2.5)	6(15.0)	0.108
Abdominal distension	4(10.0)	3(7.5)	1.000
Pain	4(10.0)	11(27.5)	0.615

DISCUSSION

Cholecystitis is a major health problem worldwide. Laparoscopic cholecystectomy (LC) has brought a paradigm shift in the approach to modern surgical care for pathological condition related to gall bladder. There are many advantages of laparoscopic cholecystectomy which further increases its popularity [12]Numerous studies, as well as a Cochrane Systematic Review, have reported a shorter hospital stay, shorter period of recovery, postoperative pain reduction, and better cosmetic results compared with open surgery [13]. Small-incision (open) cholecystectomy (SIC) was introduced as another alternative to open cholecystectomy and indeed has also been shown to be associated with a shorter hospital stay (random effects 2.8 days; 95 % confidence interval) and quicker recovery time compared with open cholecystectomy in a Cochrane meta-analysis [5]. Another systematic review comparing the three procedures - open, small-incision or laparoscopic cholecystectomy - showed no difference in mortality and complications; however, laparoscopic cholecystectomy and SIC were preferred over the conventional open cholecystectomy due to faster recovery times. In this hospital based open label randomized control trial study total eighty patients were enrolled, forty (40) in laparoscopic cholecystectomy group and forty (40) in minilaparotomy group. Out of 110 patients attended in the department of Surgery, North Bengal Medical College & Hospital, West Bengal, 80 were randomized into two groups. 24 patients did not fulfil inclusion and exclusion criteria and 6 patients did not give consent to participate in this study. Thus response rate was 72.73%.

The present study has revealed that majority of the study participants belonged to 31-50 years age group followed by 16.2% in ≤ 30years‘ group and 15.0% in 51-60 years‘ age group. Least proportion of patients belonged to >60 years‘age group. This finding correlates with finding by Singla *et al*. who denotes majority of their study participants in both the groups were in the age group of 26 to 55 years [14]. The mean age of all patients was 43.78±12.14 years. The mean age of patients in minicholecystectomy group was 44.18 ± 10.79 years which was higher than lap cholecystectomy (43.10±13.67 years) group. The finding of this study was similar with the study conducted by Mehrvarz S *et al*. who reported the mean age of the participants was 49.3 ± 14.1 years for the small incision cholecystectomy group and 48.4 ± 16.2 years for the lap cholecystectomy group.

This study has also reported no statistical significant difference between age distributions among the two study groups (p=0.770). Thus study participants were comparable in respect to their age distribution. Similar finding was presented by Iftikhar M *et al*. [15]. This study has showed that majority of the study subjects were females (75.0%) and 25.0% were male. Similarly present study has also reported that there was female predominance among the selected patients in both laparoscopic cholecystectomy and minilaparotomy groups, 80.0% and 70.0% respectively. Study conducted by Ros A *et al*. also reported similar finding in their study, 69.61% female in laparoscopic cholecystectomy group and 68.78% in minilaparotomy group [16]. This study has also concluded that there was no statistical significant difference between gender distributions among the two study groups (p=0.302). That means our study participants were comparable in respect to their gender distribution. Similar finding was presented by Iftikhar M *et al*. [15].

Present study also reported that majority of the study subjects (73.8%) were Hindus and 26.3% were Muslims. It has also reported that Hinduism is the dominant religion in both LC and MC group and this relation was not statistically significant (p>0.05). Thus the present study depicted that the study population were comparable in respect to age, sex and religion. Present study has revealed that mean operative time was 88.82±16.09 minutes in Mini Cholecystectomy group and 75.22±19.71 minutes in Lap cholecystectomy. That denotes Mini Cholecystectomy required longer operative time (in minutes) than Lap cholecystectomy

and this association was found statistically significant (p<.05).

Table-3: Comparison of duration of hospital stays among two techniques in other studies

Serial no.	Studies	Laparoscopic cholecystectomy(n=40)	Minicholecystectomy (n=40)	P value
1	Mehrvarz S *et al*. [4]	2.4±1.1	2.9±0.5	0.001
2	Ros A *et al*. [16]	2.6±3.3	3.2±5.1	0.04
3	Iftikhar M *et al*. [15]	2.7±0.5	3.2±0.6	0.00001
4	Singla *et al*. [14]	3.16 days	4.3 days	0.03
5	Naik S *et al*. [17]	3.7 days	5.46 days	0.06

The results obtained by Ros *et al*. [16] and Keus *et al*. [5] are not in accordance with this finding indicating that the duration of operation in SIC is 12 – 14 minutes shorter than that of LC (SIC = 94 minutes and LC = 108 minutes, SIC = 60 minutes and LC = 72 minutes, respectively. Many other studies reported that SIC had a shorter duration compared to LC [16-19]. Recent study has showed that there was no difference in the rate of conversion in both group, only 5.0% patients from both the groups needed conversion to open cholecystectomy (p>.05) due to technique failure. This result was in accordance with the study conducted by Naik S *et al.* in a prospective randomized study in Dr. D Y Patil Medical College Pimpri, Pune [17]. In other study 8% patients of minicholecystectomy group had to be converted to standard open cholecystectomy and in lap cholecystectomy only 6% patients had to be converted to standard open cholecystectomy [14]. Conversion rates in laparoscopic cholecystectomy range from 3% to 15% in well trained hands as depicted by different other studies also [17]. This study has reported that the overall mean duration of hospital stay after cholecystectomy was 3.68 ± 1.37 days. The mean duration of hospital stay was 4.70 ± .791 days in the mini cholecystectomy and 2.65 ± 1.00 days in the laparoscopic cholecystectomy group (p<.05). Study conducted by Naik S *et al*. and Singla, *et al*. also reported similar finding where mean post-operative hospital stay was shorter among patients who underwent laparoscopic cholecystectomy (3.7 days and 3.16 days respectively) than patients in mini laparotomy cholecystectomy group (5.46 days and 4.3 days respectively). But Similar studies conducted by Majeed A.W. *et al*. [19] and McGinn FP *et al*. [20] had reported no difference in the hospital stay of both group of patients while study conducted by Mcmohan AJ *et al.* [21] had reported shorter hospital stay for patients of laparoscopic cholecystectomy group.

CONCLUSION

In our experience laparoscopic cholecystectomy is superior to minicholecystectomy as far as the postoperative hospital stay, duration of surgery, pain and wound infections are concerned. Minicholecystectomy cannot be recommended as gold standard approach to the patients with calculous cholecystitis.

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