

MINI LAPAROTOMY CHOLECYSTECTOMY; MUSCLE SPLITTING VS MUSCLE DIVIDING INCISION; A RANDOMIZED STUDY

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ABSTRACT

Objective: TO compare the short term outcome in muscle splitting vs muscle dividing incision in mini laparotomy cholecystectomy.

Material and Methods: It was a randomized controlled trial conducted at surgery department, Khyber Teaching Hospital, Peshawar-Pakistan. The study period was from May, 2019 to Nov, 2019. Total of 94 patients (47 in each group) with indication of cholecystectomy fulfilling the inclusion criteria were subjected to mini laparotomy cholecystectomy. The pain, mobility after 1st postoperative day and hospital stay was noted in each group and were compared through SPSS (Statistical Package for Social Sciences) version 21.

Results: A total of 94 patients with indication of cholecystectomy were operated, which were divided in two equal groups. Average age was 43.19 years+ 10.85SD. Male to female ratio was 0.70:1. Short term outcome in term of postoperative pain, early mobility and hospital stay were significantly better in muscle splitting as that of muscle dividing groups.

Conclusion: The muscle splitting incision outclasses the conventional muscle dividing incision owing to its less post-op discomfort, less hospital stay and early mobility.

Keywords: Mini Cholecystectomy, Muscle splitting, Muscle dividing, Cholelithiasis.

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INTRODUCTION

Gallstone disease is a worldwide problem, previously confined to resource rich countries, but the cases have ever been on rise even in resource poor countries, owing to alteration in diet. This study will aid and encourage surgeons to bring in practice the muscle splitting or muscle dividing technique whenever they need to use mini laparotomy approach for open cholecystectomy. Gallstone disease remains one of the most common surgical problems which lead to the necessity of surgery^{1,2}. The overall prevalence rate is about 10% in adult population. Based on age statistics, approximately 20% of population in age group above 40 years and around 30% in age group

above 70 years have gallstone disease¹. Minimal invasive technique has taken over for the past to decades for the treatment of symptomatic gallstone disease, laparoscopic cholecystectomy being considered the gold standard^{2, 3}. The two cardinal minimal invasive techniques, one being laparoscopic cholecystectomy (LC) and another being the mini- laparotomy cholecystectomy (MC) are widely used worldwide for the treatment of gallstone disease⁴⁻¹¹. Owing to the complications of laparoscopic approach, it is estimated that 10% of population would still require open technique for treatment of gallstone disease².

Moreover, the laparoscopic approach requires surgeon's expertise as well as the expensive tools, thus the mini laparotomy cholecystectomy is still very much popular minimal invasive technique in the third world countries was started in 1980's and 1990, proving that conventional open cholecystectomy has a better alternative, that is mini-laparotomy cholecystectomy⁶⁻⁸. Even in the face of complicated cases of cholecystitis such as purulent destructive gallbladder, the technique can be safely applied⁷.

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The overall outcome of MC is much better in the form of early and late complications as well as the hospital stay of patients reduced⁵⁻¹².

Whenever there is a need of open cholecystectomy, it is known that muscle splitting incision is better than the muscle dividing incision². The muscle dividing incision has been held responsible for the post-operative pain along with local and systemic effects, thus the use of muscle splitting incision is favored. The muscle splitting group experienced less pain as compared to muscle dividing group. Moreover, the muscle splitting group required less post-op analgesia as compared to muscle dividing group¹³.

In our population of developing countries, the laparoscopic technique and expertise is still not widely available, thus surgeons still practice the open technique for gallstone disease. In order to minimize the short term complications in form of pain, immobilization and length of hospital stay, it is evident in open techniques that muscle splitting technique is better than muscle dividing incision. For MC, there is no evidence present currently on the short term outcomes of patients' recovery in the muscle splitting and muscle dividing technique. Thus, this study will help me provide the evidence needed to know whether muscle splitting incision has any positive aspects in mini laparotomy cholecystectomy. This will further aid and encourage surgeons to bring in practice the muscle splitting technique whenever they need to use mini laparotomy approach for open cholecystectomy.

MATERIAL AND METHODS

This randomized study was conducted in Surgery Department, Khyber Teaching Hospital once the ethical board committee gave its approval. The study took place from May, 2019 to Nov, 2019 over 94 patients selected by non-probability consecutive sampling method. All patients meeting the inclusion criteria which included patients with symptomatic gallstones between age of 20 and 60 years of either gender were counted in the study and a written informed consent were obtained. All the patients after history and clinical examination were subjected to baseline and specific investigations.

The patients were randomly allocated in two groups by lottery method; Group A were muscle splitting while group B being the muscle dividing group. The cholecystectomy was performed through mini right transverse subcostal laparotomy incision for both the group keeping the incision length between 3 to 5cm.

Post operatively, all patients in both the group were kept under observations for 3 days for pain, mobility and days taken to be discharged. Postoperative pain scoring was assessed using Verbal rating scale as 0=no pain, 1=mild pain, 2=moderate pain 3=severe pain measured at several times for the 1st three post-operative days. Mobility was also measured 8 hours post-operative as pre-determined distance (50 meters) walked by patient from his/her resting bed and declared completely mobile once the patient traveled this distance. Time period from day of operation till day of discharge was recorded as well. The final outcome of all three variables was measured on day of discharge. A single experienced Fellow Surgeon performed all procedures.

Strict exclusion criteria (HBs Ag or HCV positive, pregnant, jaundiced, diabetic, complicated cholecystectomy and placement of drain) was followed to control confounders and bias in the study results. SPSS 21.0 was used to analyze data. Mean \pm Standard deviation were calculated for quantitative variables like age, weight and outcome variables (pain score, hospital stay). Chi square test was applied to compare the mobility between muscle splitting and muscle dividing technique while independent T-test was applied to compare the hospital stay and post-op pain. P value of < 0.05 was considered significant. Outcome was stratified among age, gender, weight, education level and residence and post stratification chi-square test or independent T-test (as appropriate) were applied keeping p-value ≤ 0.05 to see the effect modifications.

RESULTS

A total of 94 patients with indication of mini open cholecystectomy were operated, which were divided in two equal groups A & B. Group A were subjected to muscle splitting and patients in Group B were subjected to muscle dividing. Sex wise distribution shows that out of 47 patients 20(42.6%) were male and 27(57.4%) were female in Group A while group B contains 19(40.4%) male and 28(59.6%) were female. Male to female ratio was 0.70:1. Sex distribution among the groups was insignificant with p-value=0.834

Average age was 43.19 years+ 10.85SD with range of 20-60 years. Group A contained 9(19.1%) patients in less than 30 years, 8(17%) patients 31-40 years, 13(27.7%) patients 40-50 years and 17(36.2%) patients have the ages of more than 50 years. While group B contained 10(21.3%) patients in less than 30 years, 5(10.6%) in 31-40 years, 16(34%) patients 41-50 years and 16(34%) patients were over 50 years. The age distribution among the group was also insignificant with p-value 0.781. Education wise stratification shows that short term outcome were insignificant. Similar results were found when residence was stratified among short term outcome in both the groups.

Table 1: Short term outcome of patients in both the groups.

		Groups		P-value
		A	B	
Mobility	Yes	39	30	0.036
		83.0%	63.8%	
	No	8	17	
		17.0%	36.2%	
Hospital Stay (in days)	<= 2.00	39	30	0.036
		83.0%	63.8%	
	3.00+	8	17	
		17.0%	36.2%	
Postop Pain	Yes	27	37	0.027
		57.4%	78.7%	
	No	20	10	
		42.6%	21.3%	

DISCUSSION

For over a century, surgeons performed open cholecystectomy routinely¹⁵. With the advent of minimal invasive techniques, laparoscopic cholecystectomy replaced the conventional methods^{20,21}. Gallstone disease, with a prevalence of about 16% in Pakistan is a very common problem^{1,2}. Majority of them will go unnoticed but many of them will experience its symptoms once complicated which warrants timely intervention³.

Not until late 1980s and 1990, surgeons realized they could perform open cholecystectomy with much smaller incision, giving rise to a concept of mini laparotomy cholecystectomy, the pioneers being Dubois and Berthelot²². In our study majority of the patients were female (90-97%), which is inconsistent with the national and international studies^{14,16,17}. Meanage and minimum age is slightly less than reported in other studies^{18,19}.

The average pain in muscle splitting group was 4.74±0.73SD while in muscle dividing group was 5.08±0.71SD which shows that muscle splitting group have significantly less pain as that of other group. Muscle splitting technique preserves the neurovascular supply of muscle, as indicated by Merrill, hence its outcome would be less painful in comparison to spasmodic condition of muscle once its divided²³. The mobility in muscle splitting group was quick due to non-complaint of pain and due to which the hospital stay of the patients in this group was also less as that of muscle dividing group. Baguley in his study reported the same results to that of our study²⁴.

While laparoscopic cholecystectomy has become the standard procedure for symptomatic gallstones, it is likely that 10% of patients will require an open cholecystectomy whether owing to contraindications to the laparoscopic approach or because conversion to the open technique became necessary following laparoscopy. Although the trend towards smaller open cholecystectomy incisions

has led to a reduced hospital stay, much of the postoperative morbidity can be ascribed to wound pain. Muscle splitting incisions tend to be less painful than muscle dividing incisions. The muscle splitting technique was significantly (P < 0.001) less painful than the muscle dividing method as evaluated by the short form of the McGill pain questionnaire. Similarly, a significantly greater proportion of patients were fully mobile on the first and second postoperative day in the muscle splitting group compared with the muscle dividing group. Analgesia requirements, however, were not statistically significant between the two groups. When compared to our study, Age a wise distribution in both the groups shows that short term outcome was better in younger age group and decreases with the increase of age. The patients having less than or equal to 30 years of age have shown mobility in 7(77.8%) in Group A while 4(40%) in Group B. We can see that mobility in both the group when stratified among the age, it shows insignificance. Almost similar results were found for postoperative pain and hospital stay, which is consistent with the studies mentioned^{23,24}.

When short term outcome were stratified among the gender in both the groups it showed all the short term outcome were significantly better in female as that male patients in both the groups, hence consistent with the said studies²³.

We recommend it in setups where the facility of laparoscopic cholecystectomy is not available or resource poor areas, mini laparotomy cholecystectomy can be safely applied which has attained almost comparable results to the minimal invasive technique. The study being carried out in a single setup makes it a limited data resultant study; hence a more comprehensive study would be the need of the hour to assess whether this could be applied to a larger population.

CONCLUSION

Overall, the muscle splitting approach resulted in better outcome in terms of pain, hospital stay and mobility. Thus, it is safe to conclude that this technique outclasses the muscle dividing technique, hence gaining the popularity for mini laparotomy cholecystectomy in resource poor countries.

REFERENCES

- Schirmer B, Winters K, Edlich R. Cholelithiasis and Cholecystitis. *J Long Term Eff Med Implants*. 2005;15(3):329-38.
- Baguley PE, de Gara CJ, Gagic N. Open cholecystectomy: muscle splitting versus muscle dividing incision: a randomized study. *J R Coll Surg*. 1995;(40):230-2.
- Watanapa P. Mini-cholecystectomy: a personal series in acute and chronic cholecystitis. *J IntHepatoPancreato Biliary Assoc*. 2003;5(4):231-4.

4. Harju J, Aspinen S, Juvonen P, Kokki H, Eskelinen M. Ten-year outcome after minilaparotomy versus laparoscopic cholecystectomy: a prospective randomised trial. *Surg Endosc.* 2013;27(7):2512-16.
5. Shulutko A, Kazaryan A, Agadzhanov V. Mini-laparotomy cholecystectomy: Technique, outcomes: A prospective study. *Int J Surg.* 2007;5(6):423-8.
6. Chalkoo M, Ahangar S, Durrani A, Chalkoo S, Shah M, Bashir M. Mini-lap cholecystectomy: Modifications and innovations in technique. *Int J Surg.* 2010;8(2):112-7.
7. Alievlu G, Kurbanov FS, Chinnikov MA, Popovich VK, Panteleeva IS, Sushko AN et al. Minilaparotomy cholecystectomy in patients with acute calculous cholecystitis. *Khiri Mo.* 2014;(1):30-3.
8. Rozsoz I, Ferenczy J, Afshin D, Rozsoz T. Cholecystectomy performed by macro- and modern mini- laparotomy. *OrvHetil.* 1995;136(9):475-81.
9. Keus F, Gooszen H, Van Laarhoven C. Systematic review: open, small-incision or laparoscopic cholecystectomy for symptomatic cholecystolithiasis. *Aliment Pharmacol Ther.* 2009;29(4):359-78.
10. Balasubramanian A, Cheddie S, Naidoo N, Singh B. An evaluation of mini-laparotomy cholecystectomy in the laparoscopic era: a rural experience. *S Afr J Surg.* 2018;56(2):36-40.
11. Aspinen S, Kärkkäinen J, Harju J, Juvonen P, Kokki H, Eskelinen M. Improvement in the quality of life following cholecystectomy: a randomized multicenter study of health status (RAND-36) in patients with laparoscopic cholecystectomy versus minilaparotomy cholecystectomy. *Quality of Life Research.* 2017;26(3):665-71.
12. Muhammad E Adam, Saadeldin A. Idris. Open minimally invasive Cholecystectomy in Khartoum North Teaching Hospital, Sudan. *Sch. J. App. Med. Sci.*, 2014; 2(1A):121-4.
13. Singla S, Singla M, Singla S, Thami G, Mallik P, Aggarwal N. Comparative analysis of muscle splitting versus muscle dividing incision in Open Cholecystectomy. *J Evo Med Dent Sci.* 2015;4(93):15896-8.
14. Ledowski T, Schneider M, Gruenewald M, Goyal RK, Teo SR, Hruby J. Surgical pleth index: prospective validation of the score to predict moderate-to-severe postoperative pain. *Brit J anaesth.* 2019;123(2):328-32.
15. Naeem M, Waheed R, Maroof SA, Ahmad M. Frequency of conversion of lap Chole with open Cholecystectomy. *Journal of Medical Sciences.* 2017 Mar 2;25(1):68-71.
16. 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;30:1698-704
17. Daradkeh S. Laparoscopic cholecystectomy: analytical study of 1208 cases. *Hepatogastroenterol.* 2005;52:1011-4
18. Nizam S, Ashraf S, Ul-islam U. Factors responsible for conversion of laparoscopic cholecystectomy. *Pak J Surg.* 2009;25(2):132-5.
19. Zinner MJ, Ashley SW. editors. *Maingot's Abdominal Operations.* 11th Edition. New York: McGraw-Hill; 2007
20. Keus F, de Jong JA, Gooszen HG, van Laarhoven CJ. Laparoscopic versus open cholecystectomy for patients with symptomatic cholecystolithiasis. *Cochrane Database Syst Rev.* 2006;18(4): CD006231.
21. Livingston EH, Rege RV. A nationwide study of conversion from laparoscopic to open cholecystectomy. *Am J Surg.* 2004;188: 205-11
22. Dubois F, Berthelot B. Cholecystectomie par mini-laparotomie. *Nouv Presse Med* 1982;11:1139-41.
23. Khan MA, Naeem M, Manan F, Haleem A, Ahmad I, Alam Q. Laproscopic Versus Minichloecystectomy. *J of Med Sci.* 2014 Mar 3;22(1):9-12.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

- Naeem M:** Concept.
- Mabood W:** Design, drafting, data acquisition, proofreading
- Waheed MR:** Data Collection.
- Khattak IA:** Drafting.
- Mabood J:** Data collection, proofreading.
- Urooj H:** Bibliography.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.