

SHORT-TERM OUTCOMES OF CLASSICAL VS MINI LAPAROTOMY CHOLECYSTECTOMY FOR SYMPTOMATIC GALLSTONE DISEASE

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ABSTRACT

Background: Gallstone disease is one of the most common surgical conditions worldwide, traditionally managed by open cholecystectomy. With advancements in surgical techniques, mini laparotomy cholecystectomy has emerged as a less invasive alternative that may shorten hospital stay and enhance recovery without compromising safety. **Objective:** To compare the discharge criteria of patients undergoing classical versus mini laparotomy cholecystectomy within 48 hours of surgery. **Study Design:** Randomized Controlled Trial. **Setting:** Department of General Surgery, Mercy Teaching Hospital, Peshawar, Pakistan. **Duration of Study:** From 05-12-2024 to 05-05-2025. **Methods:** Ninety-four patients with symptomatic gallstones were enrolled and randomly assigned to two groups. Group A (n=47) underwent mini cholecystectomy through a 3–5 cm subcostal incision, while Group B (n=47) underwent classical cholecystectomy through an 8–12 cm incision. The primary outcome was the proportion of patients fulfilling discharge criteria within 48 hours postoperatively, defined as tolerating oral intake, passing stools, having no respiratory issues, a clean wound, no further need for analgesia, and full mobility. Data were analyzed using SPSS version 20, and statistical significance was set at $p < 0.05$. **Results:** The demographic characteristics were comparable between the two groups. A significantly higher proportion of patients in the mini cholecystectomy group (83.0%) met all discharge criteria within 48 hours compared to the classical cholecystectomy group (61.7%) ($p = 0.02$). The mean postoperative hospital stay was significantly shorter in the mini cholecystectomy group (1.91 ± 0.69 days) than in the classical cholecystectomy group (2.45 ± 0.88 days). **Conclusion:** Mini laparotomy cholecystectomy demonstrated superior short-term outcomes compared to classical laparotomy, with earlier fulfillment of discharge criteria and shorter hospital stays. It represents a safe and effective alternative for the management of symptomatic gallstones, particularly in resource-limited settings.

Keywords: Mini Laparotomy Cholecystectomy, Classical Cholecystectomy, Gallstone Disease, Discharge Criteria, Hospital Stay

INTRODUCTION

Gallstone disease is a prevalent surgical condition that often necessitates surgical intervention. The overall incidence rate among the adult population is approximately 10% (1, 2). The minimally invasive method has dominated the management of symptomatic gallstone disease for the past two decades, alongside laparoscopic cholecystectomy, which is regarded as the Gold standard. The two primary minimally invasive methods used to treat gallstones are laparoscopic cholecystectomy (LC) and mini-laparotomy cholecystectomy (MC), both of which have become popular worldwide (3, 4). Due to the complexities related to the laparoscopic method, it is projected that people may still necessitate an open surgical technique for the management of gallstone disease (5).

The laparoscopic strategy requires a surgeon's expertise and the use of costly instruments. Consequently, MC remains a widely utilised minimally invasive procedure in developing nations, having emerged in the 1980s and 1990s. This indicates that traditional open cholecystectomy encounters a viable alternative in MC. In cases of cholecystitis, including purulent destructive cholecystitis, the technique might be applied safely (6, 7). The overall outcome of MC demonstrates significant improvements in both early and late complications, as well as reduced hospital stays for patients. In cases where open cholecystectomy is needed, it is established that MC offers advantages over the traditional incision. The discharge criteria, which include being orally allowed, passing stools, maintaining a clean wound, and being fully mobile, were satisfied by 86% of cases in the MC group within 48 hours post-surgery. In contrast, the classical group met this criterion in 64% of cases within 72 hours following surgery (8-10). The objective of this study is to

compare discharge criteria for patients undergoing classical versus MC procedures at Mercy Teaching Hospital, Peshawar, within the 48-hour postoperative period. The outcomes will contribute to the current body of understanding and provide local evidence. Practitioners will utilise the results and will enhance awareness among the population.

METHODOLOGY

This study was conducted as a randomized controlled trial in the Department of Surgery at Mercy Teaching Hospital, Peshawar, from 05-12-2024 to 05-05-2025. Ethical approval was obtained from the hospital.

There were 97 participants, with 47 allocated to each group; the sample was determined using the World Health Organization calculator. This calculation was based on an assumed statistical power of 80%, a significance level of 5%, and anticipated discharge rates of 86% for the mini laparotomy group and 64% for the classical group, as derived from a previous study.¹⁰ Consecutive non-probability sampling was employed to enroll patients. We selected patients of either gender aged between 20 and 60 years with a confirmed Diagnosis of symptomatic gallstones. Patients with a history of chronic diseases, those presenting with active cholecystitis jaundice or complicated cholelithiasis, patients with diabetes mellitus or other comorbidities known to affect pain perception, patients who were HBsAg or Anti-HCV positive, pregnant patients, and those in whom an intraperitoneal drain was placed, as this could contribute to additional pain.

Upon admission, patients gave their consent. A pre-operative workup was conducted for each patient, which included a detailed history, clinical examination, and routine baseline investigations such as routine blood count, prothrombin time, activated partial

thromboplastin time, renal function tests, blood grouping, cross-match, urinalysis, blood urea and sugar levels, along with an electrocardiogram, chest X-ray, and serum electrolytes. Participants were then allocated into one of two groups using a blocked randomization technique. Group A underwent mini laparotomy cholecystectomy through a right transverse subcostal incision measuring 3 to 5 centimeters, while Group B underwent classical cholecystectomy via an 8 to 12-centimeter incision. In both groups, the anterior rectus sheath was divided in the line of the incision. In the classical group, the rectus muscle was divided along the line of incision. The recti were retracted medially and laterally, after which the posterior sheath was divided vertically to enter the peritoneal cavity in both groups. A single experienced surgeon, a Fellow of the College of Physicians and Surgeons of Pakistan, performed all surgical procedures.

In the postoperative period, all patients were regularly interviewed and monitored. The hospital stay duration was recorded for each patient. Discharge criteria were assessed for all patients, requiring that patients be tolerating oral intake, have passed stools, exhibit no respiratory problems, have a clean wound, need no further analgesia, and be completely mobile. Fulfillment of all these parameters was necessary for a patient to be considered ready for discharge. All collected data, including demographic details and outcome measures, were recorded in a proforma.

SPSS 20 was used for analyzing the acquired data. We used mean and standard deviation for age and weight. Gender, education level,

residence, and discharge criteria were presented using frequency and percentages. The chi-square test was used to assess discharge criteria between the two groups, with $P \leq 0.05$ considered significant.

RESULTS

In this study, we enrolled 94 patients, divided into two cohorts of 47 each. The group undergoing mini laparotomy (Group A) had a mean age of 41.30 ± 13.29 years, while the classical laparotomy group (Group B) had a mean age of 46.09 ± 12.52 years. A significant female majority was observed in both cohorts, with 41 females (87.2%) in the mini laparotomy group and 42 (89.4%) in the classical group (Table 1). A notable difference was observed in the postoperative recovery period. The hospital stay was notably shorter for patients who received a mini-laparotomy, averaging 1.91 ± 0.69 days, compared with 2.45 ± 0.88 days for those who underwent the classical procedure.

Most importantly the attainment of standardized discharge criteria which included tolerating oral intake, normal bowel function, absence of respiratory issues, a clean wound, no further need for analgesia and full mobility was potentially higher in the mini laparotomy group, thirty-nine patients (83.0%) in this group met all criteria for discharge compared to 29 patients (61.7%) in the classical laparotomy group ($P = 0.02$) (Table 2). Stratifications are shown in Table 3.

Table 1: Demographics

Demographics		Groups			
		Group A (Mini laparotomy)		Group B (Classical laparotomy)	
		n	%	n	%
Gender	Male	6	12.8%	5	10.6%
	Female	41	87.2%	42	89.4%
Education level	Primary or less	17	36.2%	20	42.6%
	Middle	18	38.3%	17	36.2%
	Matric & above	12	25.5%	10	21.3%
Residence	Urban	31	66.0%	27	57.4%
	Rural	16	34.0%	20	42.6%

Table 2: Comparison of discharge criteria between groups

		Group A (Mini laparotomy)		Group B (Classical laparotomy)		P value
		Count	Column N %	Count	Column N %	
Discharge criteria met	Yes	39	83.0%	29	61.7%	0.02
	No	8	17.0%	18	38.3%	

Table 3: Stratification of discharge criteria in both groups with demographics

				Groups				P value
				Group A (Mini laparotomy)		Group B (Classical laparotomy)		
				n	%	n	%	
Gender	Male	Discharge criteria met	Yes	5	83.3%	3	60.0%	0.38
			No	1	16.7%	2	40.0%	
	Female	Discharge criteria met	Yes	34	82.9%	26	61.9%	0.03
			No	7	17.1%	16	38.1%	
Education level	Primary or less	Discharge criteria met	Yes	14	82.4%	12	60.0%	0.13
			No	3	17.6%	8	40.0%	
	Middle	Discharge criteria met	Yes	14	77.8%	13	76.5%	0.92
			No	4	22.2%	4	23.5%	
	Matric & above	Discharge criteria met	Yes	11	91.7%	4	40.0%	0.01
			No	1	8.3%	6	60.0%	
Residence	Urban	Discharge criteria met	Yes	24	77.4%	18	66.7%	0.36
			No	7	22.6%	9	33.3%	
	Rural	Discharge criteria met	Yes	15	93.8%	11	55.0%	0.01
			No	1	6.2%	9	45.0%	
	20 to 35	Discharge criteria met	Yes	13	81.2%	7	70.0%	0.50

Age groups (Years)	36 to 50	Discharge criteria met	No	3	18.8%	3	30.0%	0.59
			Yes	11	73.3%	11	64.7%	
	> 50	Discharge criteria met	No	4	26.7%	6	35.3%	0.03
			Yes	10	90.9%	7	50.0%	
Weight (Kg)	70 to 85	Discharge criteria met	No	1	9.1%	7	50.0%	0.03
			Yes	25	80.6%	13	54.2%	
	> 85	Discharge criteria met	No	6	19.4%	11	45.8%	0.19
			Yes	14	87.5%	16	69.6%	
			No	2	12.5%	7	30.4%	

DISCUSSION

The demographic profile of our present study, characterized by a mean age in the early forties and a significant female predominance of over 87% in both groups, aligns consistently with the epidemiological understanding of gallstone disease. This gender distribution is consistently reported in the literature and is mirrored in the study by Saeed et al., in which 90% of 100 patients were female (11). studied by Muhammad et al. and Handaya et al., where females constituted 84.5% and 68.2% of the participants, respectively (9,12). The slightly older mean age in our classical laparotomy group (46.09 years) compared to the mini-laparotomy group (41.30 years) introduces an interesting variable. However, the clinical significance of this difference may be limited. The comparable average weight between our two groups suggests a similar baseline physical status which is a crucial factor, given that a higher Body Mass Index has been identified as a significant predictor for conversion from mini-laparotomy to open surgery as reported by Handaya et al. and several other studies which documented that obesity is the leading factor of conversion to open cholecystectomy (12, 15).

The most compelling finding from our investigation is the shorter postoperative hospital stay and the higher rate of achieving standardized discharge criteria in the mini-laparotomy group. Our patients undergoing mini-laparotomy had an average hospitalization of 1.91 days, with 83.0% meeting all discharge criteria, compared to 2.45 days and only 61.7% in the classical group. This finding resonates strongly with the existing literature on minimally invasive open techniques. The study by Muhammad et al in Sudan reported an even shorter mean postoperative stay of 1.3 days for their mini-cholecystectomy patients, further validating the potential for quick recovery with this approach (9). Similarly, the feasibility study by Saeed et al. reported an average postoperative hospital stay of two days (11). Keus et al. also found that cholecystectomy with smaller incisions results in faster recovery and a shorter hospital stay (16).

The rationale for this quicker recovery in MC is well explained in the study by Singla et al., which directly compared muscle-splitting versus muscle-dividing incisions.¹⁰ Their work demonstrated that the muscle-splitting approach, a technique often employed in mini-laparotomy, led to significantly less postoperative pain, evidenced by lower pain scores and reduced analgesic requirements. Their patients in the muscle-splitting group walked significantly farther on the first postoperative day and were discharged earlier. This phenomenon was attributed to reduced tissue trauma, preserved muscle innervation and vascularization, and less postoperative pain, all of which directly facilitate early ambulation and recovery (10). This is consistent with the findings of Muhammad et al., who reported a mean of 3.4 doses of postoperative analgesia, indicating a manageable pain profile that supports early mobilization (9).

Furthermore, the safety profile of the mini-laparotomy technique is well-documented across these studies. Our study, along with that of Saeed et al., reported no mortality and no bile duct injuries.¹¹ Muhammad and Idris reported a low overall complication rate of 3.9% primarily minor bleeding and bile leaks, which were managed conservatively (9). Handaya et al. also reported no complications or mortalities in their cohort, reinforcing that the procedure can be performed safely with appropriate patient selection and surgical

expertise (12). The high patient satisfaction reported by Handaya et al. regarding cosmetic outcome and recovery period, coupled with the cost-effectiveness highlighted by Muhammad et al., makes this technique feasible and useful, especially in resource-constrained environments where laparoscopic equipment may be prohibitively expensive.

CONCLUSION

From our study, we conclude that mini-laparotomy cholecystectomy demonstrated significantly better short-term outcomes, including discharge criteria and hospital stay, compared with classical laparotomy.

DECLARATIONS

Data Availability Statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department Concerned. (IRB-Prime- 2022-502)

Consent for publication

Approved

Funding

Not applicable

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

ZUNAIRA AHMAD (Trainee Medical Officer)

Data collection, Data analysis, Manuscript drafting, Review of manuscript, and Final approval of manuscript.

MUZAFARUDDIN SADIQ (Professor)

Study Design, Review of Literature.

Supervision, Conception of the Study, and Final approval of the manuscript.

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