

Postoperative Pain Management and Patient Satisfaction Following Laparoscopic Cholecystectomy: A Cross-Sectional Study in Basrah, Iraq

Mansoor Abdulrazzaq Mutar*, Aqeel Mousa Nassir and Ahmed Abdulhadi Abdulbaqi Safar

Al-fayhaa teaching hospital, Basrah, Iraq

***Corresponding author:**

Mansoor Abdulrazzaq Mutar,
Al-fayhaa teaching hospital, Basrah, Iraq

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1. Abstract

1.1. Background

Laparoscopic cholecystectomy, though minimally invasive, remains associated with significant postoperative pain that can impede recovery and affect patient satisfaction. Inadequate pain control may lead to delayed ambulation, prolonged hospital stay, and chronic postsurgical pain. Multimodal analgesia-including paracetamol, NSAIDs, opioids, and regional anesthesia-is widely recommended, yet satisfaction with pain control remains variable across populations.

1.2. Objective

To evaluate postoperative pain management strategies and analyze their association with pain intensity and patient satisfaction among patients undergoing laparoscopic cholecystectomy in a tertiary care center in Basrah, Iraq.

1.3. Methods

A descriptive cross-sectional study was conducted from June to December 2023 at a tertiary hospital in Basrah. A total of 375 adult patients who underwent elective laparoscopic cholecystectomy were enrolled using consecutive sampling. Pain intensity was assessed using the Visual Analog Scale (VAS) at 6, 12, and 24 hours postoperatively, while patient satisfaction with analgesia was measured on a 5-point Likert scale. Analgesic interventions were categorized as paracetamol, NSAIDs, opioids, or local anesthesia. Data were analyzed using SPSS version 27. Associations between analgesic type, pain scores, and satisfaction were examined using chi-square and t-tests, with a p-value <0.05 indicating statistical significance.

1.4. Results

Paracetamol was the most frequently used analgesic (35.4%), followed by NSAIDs (26.5%), opioids (22.7%), and local anesthesia

(15.3%). At 6 hours postoperatively, paracetamol was associated with significantly lower severe pain rates (29.2%) compared to other analgesics ($p = 0.032$). By 24 hours, severe pain was absent across all groups ($p = 0.475$). Satisfaction scores did not significantly differ among analgesic groups ($p = 0.3529$), although paracetamol and opioids showed the highest “very satisfied” responses (26.7% and 29.9%, respectively).

1.5. Conclusion

Early postoperative pain control was most favorable with paracetamol, aligning with opioid-sparing, multimodal analgesia principles. Despite similar satisfaction rates across groups, paracetamol and opioids yielded higher subjective satisfaction. These findings support incorporating standardized, patient-centered analgesic protocols to enhance early recovery and patient satisfaction after laparoscopic cholecystectomy.

2. Introduction

Cholecystectomy, especially the laparoscopic technique, is one of the most frequently performed abdominal surgeries worldwide due to its minimally invasive nature and quicker recovery time [1]. Despite being minimally invasive, laparoscopic cholecystectomy is still associated with considerable postoperative pain [2]. This pain can delay ambulation, prolong hospital stay, and reduce overall patient satisfaction [3]. If acute pain is not properly managed, it may transition into chronic postsurgical pain (CPSP), which can persist for months or even years [4]. In fact, recent studies have shown that approximately 29% of patients report persistent pain at 12 months post-cholecystectomy [5]. Effective postoperative pain management is thus critical to enhance recovery and improve quality of life [6]. Pharmacologic interventions such as non-steroidal anti-inflammatory drugs (NSAIDs), opioids, pregabalin, and intravenous ketamine are commonly used in multimodal strategies to reduce pain and opioid-related side effects [7]. Intravenous ketamine, for

example, has been shown to effectively reduce pain intensity and opioid consumption [8]. Regional techniques like transversus abdominis plane block (TAPB) and intraperitoneal local anesthetic instillation (IPLA) are also effective, with evidence supporting reduced postoperative pain scores and improved patient satisfaction [9]. A randomized trial found that TAPB and local infiltration both significantly decreased Visual Analogue Scale (VAS) scores compared to controls [10]. Beyond pharmacologic and regional interventions, patient education plays a critical role in pain management [5]. Preoperative counseling and educational programs, especially using mobile smart learning technologies, have been shown to reduce anxiety and improve patient satisfaction with analgesia [4]. Patients who receive structured education on the use of patient-controlled analgesia (PCA) are more likely to report higher satisfaction levels and appropriate use of analgesics [11]. However, despite advancements in techniques and medications, a significant proportion of patients remain dissatisfied with their pain control after surgery [10]. This suggests a gap between clinical practices and patient expectations or perceptions of care [3]. Therefore, understanding both the effectiveness of pain management strategies and their impact on patient satisfaction is essential for optimizing postoperative care following cholecystectomy [3]. Evaluating current practices in real-world clinical settings can help identify gaps in care and guide improvements in perioperative pain protocols [10]. This study aims to assess postoperative pain management practices and analyze the level of patient satisfaction following cholecystectomy in a cross-sectional clinical setting.

3. Methods

This study followed a descriptive cross-sectional design and was conducted to explore current practices in postoperative pain management and assess patient satisfaction following laparoscopic cholecystectomy. The research was carried out at a tertiary care hospital in Basrah, Iraq, over a 2 years period from June 2023 to June 2025. The study population included adult patients who had undergone elective laparoscopic cholecystectomy and were admitted postoperatively within the hospital during the study window. A

consecutive sampling method was used to recruit eligible participants. Patients were included if they were 18 years or older, had undergone uncomplicated laparoscopic cholecystectomy, and were able to communicate and provide informed consent. Patients were excluded if they had a history of chronic pain conditions, psychiatric illness, previous abdominal surgeries, or intraoperative complications that required conversion to open surgery. Additionally, those who developed significant postoperative complications (e.g., sepsis, ICU admission) were not included. A total of 375 patients participated in the study who were admitted to Basrah Teaching hospital. Data were collected using a structured questionnaire developed by the research team based on existing literature and expert consultation. The questionnaire included three main sections: demographic and clinical information, details of pain management interventions used, and patient satisfaction ratings. Pain intensity was assessed using the Visual Analog Scale (VAS), while satisfaction with pain control was measured using a 5-point Likert scale ranging from “very dissatisfied” to “very satisfied.” Prior to data collection, the questionnaire was pilot-tested on a small sample of patients to ensure clarity and consistency. Face-to-face interviews were conducted by trained data collectors during the patients’ postoperative hospital stay, allowing for real-time data capture and minimizing recall bias. In addition to self-reported responses, medication records were reviewed to validate the type and timing of analgesia administered. The study protocol was reviewed and approved by the Basrah Health Directorate, ensuring adherence to local ethical standards for research involving human participants. Written informed consent was obtained from all patients after explaining the purpose and confidentiality of the study. All collected data were entered and analyzed using SPSS software (version 27). Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarize patient characteristics and outcomes. Associations between demographic variables, pain scores, and satisfaction levels were evaluated using chi-square tests for categorical variables and independent t-tests for continuous variables. A p-value less than 0.05 was considered statistically significant.

Table 1: Sociodemographic and Clinical Characteristics.

Variable		Frequency	(%) Percentage
(Age (years	Mean $\pm$ SD	11.1 $\pm$ 44.8	
Gender	Female	219	58.4
	Male	156	41.6
Marital Status	Divorced	42	11.2
	Married	221	58.9
	Single	74	19.7
	Widowed	38	10.1
Education Level	Primary	115	30.7
	Secondary	154	41.1
	Tertiary	106	28.3
Employment Status	Employed	180	48.0
	Retired	72	19.2
	Unemployed	123	32.8
Comorbidities	Both	35	9.3
	Diabetes	77	20.5
	Hypertension	79	21.1
	None	184	49.1
Type of Anesthesia	General	326	86.9
	Spinal	49	13.1
(Length of Hospital Stay (days	Mean $\pm$ SD	0.9 $\pm$ 2.5	

Table 2: Pain Management Strategies Used.

Variable	Category	Frequency	Percentage (%)
Analgesic Type	Local Anesthesia	52	15.3
	NSAIDs	90	26.5
	Opioids	77	22.7
	Paracetamol	120	35.4
	Local Anesthesia		

Table 3: Pain Intensity by Analgesic Type.

Time	Pain Level	Paracetamol	NSAIDs	Opioids	Local Anesthesia	p-value
6 hours	Mild (0–3)	9 (7.5%)	0 (0.0%)	2 (2.6%)	0 (0.0%)	0.032
	Moderate (4–6)	76 (63.3%)	56 (62.2%)	45 (58.4%)	31 (59.6%)	
	Severe (7–10)	35 (29.2%)	34 (37.8%)	30 (39.0%)	21 (40.4%)	
12 hours	Mild (0–3)	33 (27.5%)	22 (24.4%)	21 (27.3%)	16 (30.8%)	0.168
	Moderate (4–6)	80 (66.7%)	58 (64.4%)	52 (67.5%)	27 (51.9%)	
	Severe (7–10)	7 (5.8%)	10 (11.1%)	4 (5.2%)	9 (17.3%)	
24 hours	Mild (0–3)	76 (63.3%)	54 (60.0%)	54 (70.1%)	32 (61.5%)	0.475
	Moderate (4–6)	44 (36.7%)	36 (40.0%)	23 (29.9%)	20 (38.5%)	
	Severe (7–10)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	

Table 4: Patient Satisfaction by Analgesic Type.

Satisfaction	Local Anesthesia	NSAIDs	Opioids	Paracetamol
Dissatisfied	1 (1.9%)	13 (14.4%)	10 (13.0%)	19 (15.8%)
Neutral	15 (28.8%)	16 (17.8%)	19 (24.7%)	26 (21.7%)
Satisfied	19 (36.5%)	37 (41.1%)	20 (26.0%)	36 (30.0%)
Very dissatisfied	3 (5.8%)	6 (6.7%)	5 (6.5%)	7 (5.8%)
Very satisfied	14 (26.9%)	18 (20.0%)	23 (29.9%)	32 (26.7%)
p-value	0.3529			

4. Results

The sample comprised 375 patients with a mean age of 44.8 years (SD ± 11.1), indicating a predominantly middle-aged population. Females represented a slight majority (58.4%), and the majority of participants were married (58.9%), with secondary education being the most common level (41.1%). Employment status showed that nearly half were employed (48.0%), while a significant proportion were unemployed (32.8%). Notably, 49.1% reported no comorbidities, suggesting a relatively healthy surgical cohort, though hypertension (21.1%) and diabetes (20.5%) were still prominent. The overwhelming use of general anesthesia (86.9%) reflects standard practice in laparoscopic procedures. The average hospital stay of 2.5 days underscores the minimally invasive nature and expected short recovery period of laparoscopic cholecystectomy. Among the analgesics employed, paracetamol was the most frequently administered (35.4%), followed by NSAIDs (26.5%) and opioids (22.7%), with local anesthesia utilized in only 15.3% of cases. This distribution suggests a preference for non-opioid pharmacologic strategies, aligning with enhanced recovery protocols aimed at minimizing opioid use. Pain scores varied significantly at 6 hours postoperatively ($p = 0.032$), with paracetamol recipients reporting the highest proportion of mild pain (7.5%) and the lowest proportion of severe pain (29.2%). In contrast, local anesthesia and opi-

oid groups exhibited higher rates of severe pain at this timepoint. However, at 12 and 24 hours post-surgery, pain levels showed no significant differences among analgesic types ($p = 0.168$ and 0.475 , respectively), and by 24 hours, severe pain had resolved completely in all groups. Patient satisfaction scores were not significantly different across analgesic types ($p = 0.3529$), although subtle variations were noted. Paracetamol and opioids elicited the highest proportions of “very satisfied” responses (26.7% and 29.9%, respectively), while local anesthesia had a relatively lower dissatisfaction rate (1.9%). NSAIDs showed a moderately favorable satisfaction profile. These findings imply that while early pain relief (as noted in Table 5) may influence satisfaction, other factors such as side effects, expectations, and provider-patient communication likely contribute to overall satisfaction. Discussion

This study’s population had a mean age of 44.8 years, predominantly comprising middle-aged adults, which is consistent with global and regional data showing cholecystectomy is most commonly performed in this age group due to the peak incidence of gallstone disease in the fourth and fifth decades of life [12]. A female predominance (58.4%) was observed, reflecting established epidemiological patterns linked to hormonal risk factors for cholelithiasis [13]. Marital and educational profiles of the participants were broadly representative of the general Iraqi population,

with similar distributions reported in a recent study conducted in Sulaimaniyah [14]. Comorbidity data revealed that nearly half of the patients (49.1%) had no underlying conditions, though hypertension and diabetes were still notable at 21.1% and 20.5%, respectively—figures that reflect the rising burden of chronic diseases in Middle Eastern surgical populations [15]. General anesthesia was the dominant method (86.9%), consistent with current surgical standards for laparoscopic procedures globally [12]. The mean hospital stay of 2.5 days aligns with data from international cohorts supporting the minimally invasive nature of laparoscopic cholecystectomy and its association with early discharge [16]. The current study found that paracetamol was the most frequently used analgesic (35.4%), followed by NSAIDs (26.5%), opioids (22.7%), and local anesthesia (15.3%). This distribution reflects a preference for non-opioid analgesics in line with enhanced recovery after surgery (ERAS) principles, which emphasize minimizing opioid use due to potential side effects such as nausea, respiratory depression, and delayed recovery. These findings are consistent with the 2024 PROSPECT systematic review, which recommended the routine use of paracetamol and NSAIDs preoperatively or intraoperatively, reserving opioids for rescue analgesia only, and encouraging regional techniques such as TAP blocks and local infiltration as adjuncts to systemic analgesia [1]. Similar trends are evident in regional studies. A 2021 study from Egypt evaluating postoperative pain control after laparoscopic cholecystectomy found that rectus sheath block and intraperitoneal instillation with local anesthetics both significantly improved pain control, yet opioids remained in limited use, reinforcing a multimodal analgesia approach [8]. Moreover, a recent Mexican study evaluating modified TAP blocks confirmed significantly lower postoperative pain scores and opioid consumption in the intervention group, echoing the effectiveness of regional anesthesia as part of ERAS protocols in middle-income countries Castillo-Dávila et al., 2024. Thus, the pattern of analgesic use in our sample appears aligned with global and regional evidence promoting a multimodal, opioid-sparing approach [17]. Pain scores in this study varied significantly by analgesic type at 6 hours postoperatively ($p = 0.032$), with paracetamol users reporting the highest proportion of mild pain (7.5%) and the lowest proportion of severe pain (29.2%), compared to other groups. These findings are consistent with recent multimodal analgesia guidelines recommending paracetamol as a foundational agent for postoperative pain control due to its favorable safety and tolerability profile, particularly when combined with other non-opioid agents [1]. In contrast, patients who received opioids or local anesthesia had notably higher rates of severe pain at this early time point. While opioids are traditionally used for more severe postoperative pain, their effectiveness as standalone agents in laparoscopic procedures is increasingly questioned due to rapid offset and adverse effects [18]. By 12 and 24 hours post-surgery, pain levels showed no significant differences across all analgesic groups ($p = 0.168$ and 0.475 , respectively), with severe pain entirely resolved by 24 hours. Regional data also reflect similar trends; a 2021 study from Egypt noted that while intraperitoneal bupivacaine and TAP block had better pain control in the early hours, their benefit diminished

by 24 hours [8]. These results emphasize the importance of early postoperative analgesia but suggest that long-term pain relief is comparable regardless of initial analgesic choice in laparoscopic procedures.

Although there was no statistically significant difference in satisfaction between analgesic groups ($p = 0.3529$), patients receiving paracetamol (26.7%) and opioids (29.9%) reported the highest rates of being “very satisfied.” This trend aligns with findings from global studies indicating that paracetamol is well-tolerated and often preferred by patients due to fewer side effects, even if its analgesic strength is moderate [1]. On the other hand, opioids, while effective for pain control, may reduce satisfaction due to common adverse effects like nausea, constipation, and sedation [6]. NSAIDs and local anesthesia showed moderate satisfaction levels, with local techniques such as TAP block possibly underused or underappreciated in routine settings despite evidence of effectiveness. Regionally, a study in Basrah, Iraq found that bupivacaine infiltration significantly improved satisfaction scores when combined with oral analgesia, confirming the benefit of local anesthesia in Middle Eastern practice [14]. Likewise, Başkent (2023) reported improved satisfaction using port-site local anesthetic application in Turkish patients undergoing cholecystectomy [19]. These findings, along with ours, suggest that analgesic efficacy alone does not determine satisfaction — patient education, expectations, and the presence or absence of side effects are equally critical. Incorporating patient-preference models and proactive communication strategies has been shown to enhance satisfaction outcomes, as highlighted by recent work from Korea using preoperative pain education interventions [5]. Pain intensity across different time points postoperatively (6h, 12h, 24h) varied significantly based on the type of analgesia used. At 6 hours, patients receiving paracetamol and NSAIDs reported a higher proportion of mild pain, while opioid and local anesthesia recipients exhibited relatively higher severe pain rates. These findings appear to contradict traditional expectations, as local anesthesia (e.g., TAP block, intraperitoneal bupivacaine) is typically associated with superior early pain control. However, the effectiveness of local anesthesia largely depends on proper technique and dosing, which may not have been consistently applied in all patients. A randomized controlled trial by Elsaedi et al. (2020) demonstrated that the combined use of port-site and intraperitoneal local anesthetic injection significantly reduced postoperative pain scores and improved early recovery outcomes in patients undergoing gynecologic laparoscopic surgery, compared to placebo. This supports the utility of properly administered local anesthetic techniques in enhancing postoperative pain control and accelerating functional recovery [20]. Similarly, Başkent (2023) reported improved early pain control with regional blocks when applied preoperatively in Turkish laparoscopic cholecystectomy patients [19]. By 12 and 24 hours, pain levels converged across all analgesic groups, and severe pain was completely absent by 24 hours. This pattern is consistent with literature showing that the analgesic benefits of local techniques tend to taper after 6–12 hours, and systemic analgesia particularly when adjusted postoperatively can effectively manage residual pain. 2024 randomized

controlled trial by Sayed Mohamed et al. compared subcutaneous local anesthetic infiltration at port sites with transversus abdominis plane (TAP) blocks in patients undergoing laparoscopic cholecystectomy. The study concluded that TAP blocks provided significantly superior pain control and reduced fentanyl consumption in the first 24 hours postoperatively, highlighting their effectiveness over port-site infiltration [21]. In the Middle East, Metwally et al. (2021) similarly found no statistically significant difference in pain scores beyond 12 hours between patients managed with intraperitoneal bupivacaine versus IV NSAIDs [8]. Collectively, these results support a multimodal pain management strategy in which early interventions such as local anesthesia are complemented by scheduled non-opioid analgesics to maintain adequate pain control throughout the recovery period.

5. Conclusion

This study demonstrates that while various analgesic techniques offer differing levels of early postoperative pain control, paracetamol and local anesthesia were associated with better patient satisfaction and lower pain intensity at early time points. Despite no significant differences in satisfaction across groups, these findings support the use of multimodal, opioid-sparing pain management strategies in laparoscopic cholecystectomy. Standardizing analgesic protocols and incorporating patient-centered approaches may further enhance recovery and satisfaction.

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