



Study to Assess Post-Operative Outcome in Patients Undergoing Elective Laparoscopic Cholecystectomy with or Without Drain

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(Received: 16 September 2024

Revised: 11 October 2024

Accepted: 04 November 2024)

KEYWORDS

Laparoscopic cholecystectomy,
Drain,
Postoperative complications,
Pain management,
Hospital stay,
Surgical outcomes

ABSTRACT:

Introduction: Laparoscopic cholecystectomy is the gold standard for managing gallbladder pathologies due to its minimally invasive nature, which offers benefits such as reduced postoperative pain, smaller scars, shorter hospital stays, and quicker recovery. Despite these advantages, postoperative issues such as shoulder tip pain, nausea, and vomiting can occur. Traditionally, drains have been used to mitigate complications related to pneumoperitoneum and prevent fluid collections like bilomas or hematomas. However, recent studies suggest that drains may increase postoperative complications and prolong hospital stays, raising questions about their routine use. **Objective:** To evaluate the impact of drain placement versus no drain on postoperative outcomes in patients undergoing elective laparoscopic cholecystectomy. **Methods:** This was a prospective comparative study conducted at the Department of General Surgery, AVMCH, from September 2022 to June 2024, among 68 patients. Participants were divided into two groups—drain and no drain—based on their treatment protocol. Data were collected through detailed history-taking, clinical examinations, and relevant investigations. Postoperative outcomes such as pain, fever, nausea, vomiting, fluid collection, wound infections, and hospital stay were assessed. Statistical analysis was performed using SPSS v23.0 with significance set at $p < 0.05$. **Results:** The study found no significant differences in baseline characteristics or intraoperative variables between the groups. However, the drain group exhibited significantly ($p < 0.05$) higher postoperative pain scores, increased incidence of fever, nausea, vomiting, and wound infections, and a longer hospital stay compared to the no-drain group. **Conclusion:** Patients undergoing elective laparoscopic cholecystectomy without a drain experienced better postoperative outcomes, including reduced pain, fewer complications, and shorter hospital stays.

Introduction

Laparoscopic cholecystectomy is considered the gold standard for managing gallbladder pathologies.(1) This procedure is both safe and effective, offering numerous advantages, including reduced postoperative pain, minimal external scarring, shorter hospital stays, and a quicker return to daily activities.(2,3) However, the drawbacks include abdominal pain, shoulder tip pain, and postoperative nausea and vomiting. Therefore, the use of a drain is recommended, as pneumoperitoneum is believed to contribute to these symptoms. Additionally, drains help prevent complications such as biloma or hematoma.(4,5) Numerous previous studies have demonstrated the benefits of drain placement, though some studies suggest that drains may increase

postoperative complications, thereby prolonging hospital stays.(6,7) In contrast, drain placement has proven highly beneficial in complicated cases, contributing to improved postoperative outcomes. Therefore, it is essential to evaluate the advantages and disadvantages of drain placement in laparoscopic cholecystectomy.(8) Against this background, the aim of the present study was to assess the postoperative complications occurring in groups of drain placement and non-placement and find out if no placement of drain can be detrimental in postoperative care of lap cholecystectomy patients.

Materials and Methods

This prospective comparative study was conducted in the Department of General Surgery at AVMCH from



September 2022 to June 2024 and included 68 patients undergoing elective laparoscopic cholecystectomy. Patients were selected based on inclusion criteria (age over 18 years with gallbladder pathology) and exclusion criteria (bleeding disorders, need for common bile duct exploration, or immunocompromised status). Data collection involved comprehensive history-taking, clinical examination, relevant radiological and hematological investigations, and intraoperative findings, with follow-up to assess postoperative outcomes. Patients were divided into two groups: one with drain placement and one without, with all surgeries performed by the same surgeon. Postoperative variables such as complications, fever, nausea, vomiting, fluid collection, shoulder tip pain, wound infections, and hospital stay duration were evaluated. Convenience sampling was used, and data analysis was performed with SPSS v23.0, employing t-tests and chi-square tests for statistical significance ($p < 0.05$).

Results

In the present study, a total of 68 patients meeting the inclusion criteria were included. Patients were divided into two groups, with 34 in the drain group and 34 in the no-drain group. The mean age of the patients was comparable between the groups, with no significant differences observed.

There was a slight female predominance among the patients; however, distribution between the groups was comparable, with no significant difference noted. Similarly, there were no significant differences in mean weight and height between the groups. The prevalence of diabetes mellitus and hypertension was also comparable between the groups.

Postoperative pain scores were significantly higher in the drain group than in the no-drain group when assessed at various time intervals, from 24 hours to postoperative day 7 ($p < 0.05$). Additionally, there was a significantly higher incidence of postoperative fever, nausea, and vomiting in the drain group compared to the no-drain group ($p < 0.05$). The incidence of wound infection was also significantly higher in the drain group (29.4%) compared to the no-drain group (2.9%) by postoperative day 7 ($p < 0.05$).

Discussion

Laparoscopic cholecystectomy is a commonly performed surgical procedure for the management of symptomatic gallbladder disease, appreciated for its minimally invasive technique and generally favourable

outcomes.(9) However, the necessity and advantages of using drains postoperatively continue to be a subject of debate among surgeons. Drains are traditionally used to prevent fluid accumulation and reduce the risk of complications such as bile leaks and infections, yet their routine use has been questioned due to potential drawbacks, including increased pain, extended hospital stays, and a higher incidence of complications, such as wound infections.(10) The study included 68 patients, evenly divided between the drain and no-drain groups. Both groups were well-matched regarding age, sex distribution, physical characteristics (weight and height), and the prevalence of comorbid conditions, such as diabetes mellitus and hypertension. Furthermore, no significant differences were observed in baseline blood parameters or surgical duration between the groups.(11)

Similar to present study, there was no significant difference in the mean age between the groups in a study by Bawahab et al., with female preponderance. However, the distribution of gender between the groups were not statistically significant.(12) Another study by Shams et al. documented with similar age and gender distribution between the groups. The majority of patients were female and age group of 31 to 50 years of age.(13) The patients in the drain group experienced significantly higher postoperative pain scores at various intervals from 24 hours up to postoperative day 7 compared to those in the no-drain group. In concordance to present study, Antoniou et al. found significantly elevated pain scores in the drainage group at both 6-12 hours and 12-24 hours post-surgery.(14) In line with the present study, Qiu et al. found that there was a significant difference ($p < 0.05$) in the drainage group's early VAS score. On the other hand, patient satisfaction with the cosmetic result, late VAS scores, and postoperative haematological test results did not show any significant variations between the two groups. In summary, considering that patients with acute calculous cholecystitis following laparoscopic cholecystectomy experience identical drain-related problems to those in the non-drainage group, regular drainage may not be warranted.(15)

In the study by Picchio et al., no notable differences were observed in visual analogue scale scores for abdominal and shoulder pain, use of parenteral ketorolac, nausea, and vomiting between the two groups.(16) Another study by Alrekabi et al., documented no substantial variations in nausea and vomiting between the two groups across different postoperative periods. However, notable distinctions emerge in hospital stays, as well as postoperative abdominal and shoulder tip pain, with the



group using a drain experiencing more significant occurrences than the group without a drain. Consequently, refraining from using drains in uncomplicated laparoscopic cholecystectomy cases appears beneficial in reducing postoperative complications and morbidity.(17) Similar to the present study, Qiu et al. documented the overall complication rate to be 12.5%, with no statistically significant difference observed between those with or without drainage.(15) The no-drain group in the research by Cirocchi et al. showed reduced incidence of abdominal collections that needed to be drained after surgery and postoperative wound infections. Nevertheless, when randomised controlled trials (RCTs) were sub grouped, this relevance was shown only for wound infections.(18)

The duration of hospital stay was significantly shorter for patients in the no-drain group. This reduced hospital stay not only reflects better postoperative recovery but also implies potential cost savings and reduced burden on healthcare resources. In concordance to present study Bswahab et al., documented significant shorter hospital stay among the no drain group compared to the patients in drain group.(12) Similar to the present study, Qiu et al. documented that resumption of normal activities occurred notably faster, and the postoperative hospital stay was marginally shorter in the non-drainage group.(15) In the no-drain group, both hospital length of stay and operative time were significantly shorter; however, this finding was within the context of notable heterogeneity in study by Cirocchi et al.

Overall, the available data suggests that acute cholecystitis does not warrant routine drain placement after laparoscopic cholecystectomy.(18) The conclusion drawn by Shams et al. said that there is no necessity for routine placement of a sub hepatic drain after laparoscopic cholecystectomy in uncomplicated cases.(13) Bawahab et al., concluded that there was no additional advantage in prophylactic drain insertion following cholecystectomy for acute calculous cholecystitis, whether the cases were complicated or non-complicated.(12) The present study indicates that patients undergoing elective laparoscopic cholecystectomy without the use of a drain generally experience better postoperative outcomes, characterised by less pain, fewer complications, and shorter hospital stays.(19) These findings support the recommendation for the selective or limited use of drains in laparoscopic cholecystectomy, emphasising patient safety and quality of care.(20) Future research with larger sample sizes and long-term follow-up is warranted to further validate

these results and potentially refine surgical guidelines for the benefit of patients undergoing this common procedure.

Conclusion

The study provides compelling evidence that patients undergoing elective laparoscopic cholecystectomy without a drain generally experience improved postoperative outcomes. These benefits include significantly lower pain scores, reduced incidence of complications such as fever, nausea, vomiting, and wound infections, as well as shorter hospital stays compared to patients with a drain. These findings underscore the potential advantages of selective or minimal drain usage in laparoscopic cholecystectomy, emphasizing patient safety and optimizing quality of care. Nonetheless, further research involving larger sample sizes and extended follow-up periods is essential to validate these results and refine surgical guidelines, ultimately enhancing outcomes for patients undergoing this common procedure.

Funding: Nil

Conflict of interest: Nil

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Table 1: Comparison of the mean parameters between the groups

	Drain		No Drain		p-value
	Mean	SD	Mean	SD	
Age (in years)	39.6	14.6	37.9	10.0	0.51
Weight (in kgs)	71.6	8.7	67.7	7.8	0.058
Height (in cm)	164.0	8.8	160.9	8.7	0.654
Hemoglobin	12.9	2.4	12.3	2.3	0.343
RBS	112.8	23.4	102.2	14.0	0.2
Blood Urea	21.4	3.2	19.5	2.2	0.32
Serum Creatinine	0.9	0.2	0.9	0.3	0.88
Duration of surgery (in mins)	127.9	10.9	120.1	9.3	0.52



Duration of hospital stay	8.3	1.0	5.6	.5	0.01*
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Table 2: Distribution of variables between the groups

		Drain		No Drain		Chi-square (p-value)
		Count	N %	Count	N %	
Gender	Female	16	47.1%	22	64.7%	2.14 (0.14)
	Male	18	52.9%	12	35.3%	
Residency	Rural	13	38.2%	12	35.3%	0.06 (0.801)
	Urban	21	61.8%	22	64.7%	
Diabetes mellitus	Absent	16	47.1%	26	76.5%	6.22 (0.52)
	Present	18	52.9%	8	23.5%	
Hypertension	Absent	21	61.8%	30	88.2%	6.35 (0.12)
	Present	13	38.2%	4	11.8%	
Intraoperative complications	Absent	28	82.4%	31	91.2%	1.15 (0.28)
	Present	6	17.6%	3	8.8%	

Table 3: Comparison of the post-operative pain score between the groups

Postoperative Pain Score	Drain		No Drain		p-value
	Mean	SD	Mean	SD	
6 hours	1.0	0.0	1.0	0.0	-
24 hours	5.9	1.3	4.4	1.0	0.521
48 hours	5.1	0.7	3.6	0.7	0.01*
72 hours	3.8	0.8	2.6	0.8	0.01*
POD 1	3.9	1.1	3.8	1.2	0.01*
POD 2	3.0	0.8	2.0	0.0	0.01*
POD 4	2.5	0.6	2.3	0.4	0.01*
POD 7	2.2	0.5	1.4	0.5	0.01*

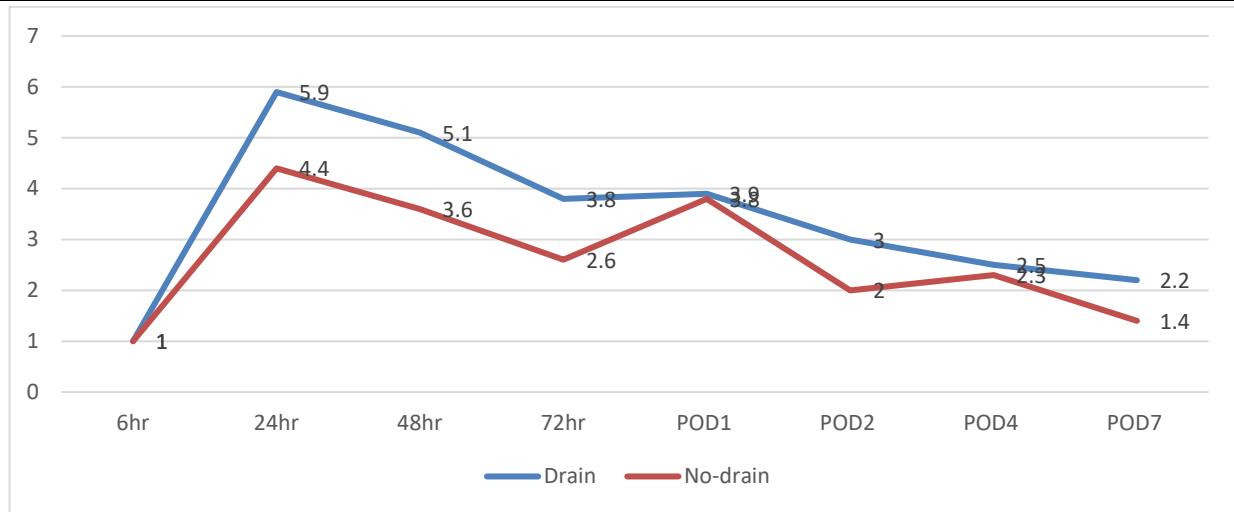


Figure 1: Comparison of the postoperative pain score between the groups

Table 4: Comparison of presence of fever, nausea and vomiting between the groups

Postoperative period		Drain		No Drain		Chi-square (p-value)
		Count	%	Count	%	
Fever	Absent	14	41.2	30	88.2	16.48 (0.01)*
	Present	20	58.8	4	11.8	
Nausea	Absent	19	55.9	28	82.4	5.58 (0.01)*
	Present	15	44.1	6	17.6	
Vomiting	Absent	23	67.6	34	100.0	13.12 (0.01)*
	Present	11	32.4	0	0.0	
Wound infection on POD 7	Absent	24	70.6	33	97.1	8.78 (0.01)*
	Present	10	29.4	1	2.9	