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A Comparative Study on Benefits and Complications of Removal of Gallbladder with or without Retrieval Bags During Laparoscopic Cholecystectomy

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ABSTRACT

Laparoscopic cholecystectomy is one of the most commonly performed surgical procedures worldwide; however, specimen retrieval remains a critical step associated with potential complications such as surgical site infection, bile spillage, and port site hernia. The use of retrieval bags during gallbladder extraction is based on surgeon preference and resource availability. This study aimed to compare the benefits and complications of using retrieval bags versus direct extraction during laparoscopic cholecystectomy. A hospital-based prospective comparative study was conducted among 120 patients undergoing laparoscopic cholecystectomy. Participants were divided into two groups: retrieval bag used (n=60) and not used (n=60). Outcomes assessed included surgical site infection, postoperative pain and recovery parameters. The mean age of the patients was 44.0+/-13.0years, with a female predominance (4:1). Surgical site infection was observed in 3.3% of patients in the non-retrieval bag group, whereas no infections were reported in the retrieval bag group. Severe postoperative pain (VAS>/= 7) was reported in 10% of the retrieval bag group and 13% of the non-retrieval bag group. However, patients in the retrieval bag group required significantly higher doses of analgesics and experienced delayed return to normal activities. The use of retrieval bags was associated with reduced surgical site infection but increased postoperative pain and delayed recovery. Routine use of retrieval bag may not be necessary in all cases, and their use should be individualized based on intraoperative findings.

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KEYWORDS:

Laparoscopic cholecystectomy, retrieval bag, surgical site infection, gallbladder extraction, postoperative pain

INTRODUCTION

Cholelithiasis is a common cause of abdominal pain and contributes significantly to global morbidity and healthcare burden. The prevalence of gallstone disease is approximately 10% in Western populations and 4.87% in Nepal. Laparoscopic cholecystectomy has become the gold standard for the management of symptomatic cholelithiasis due to its advantages of reduced postoperative pain, faster recovery, and improved cosmesis.

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Despite its benefits, laparoscopic cholecystectomy is not without complications. Intraoperative challenges include bile spillage, gallbladder perforation, and difficulties during specimen extraction. These complications may lead to surgical site infections or intra-abdominal abscess formation. The use of retrieval bags during specimen extraction has been advocated to minimize contamination and prevent spillage. However, their use may increase operative time, cost, and postoperative discomfort. In many settings, including Bir Hospital, the decision to use a retrieval bag is based on surgeon preference. This study was conducted to compare the outcomes of laparoscopic cholecystectomy performed with and without the use of retrieval bags.

MATERIALS AND METHODS

A hospital-based prospective comparative study was conducted in the Department of Surgery, Bir Hospital, from April 2022 to October 2023. A total of 120 patients aged ≥18 years undergoing elective laparoscopic cholecystectomy were included. Patients with acute cholecystitis, empyema gallbladder, suspected malignancy, immunocompromised status, uncontrolled diabetes, recent ERCP, or those requiring conversion to open surgery were excluded.

Participants were divided into two groups using systematic random sampling: retrieval bag used (n=60) and not used (n=60). Retrieval bags were improvised from sterile, non-powdered surgical gloves.

All procedures were performed under general anesthesia by licensed surgeons. Standard preoperative investigations were conducted. Outcomes assessed included surgical site infection (as per CDC criteria), postoperative pain (VAS score), analgesic requirement, time to resume diet, and return to normal activities.

Data were collected using structured proformas and analyzed using SPSS. Fisher's exact test was used for statistical comparison, with $p<0.05$ considered significant.

RESULTS

A total of 120 patients were included, with a mean age of 44.0±13.0 years and a female predominance (80.8%). No significant differences were observed between groups regarding age, sex, duration of surgery, or comorbidities.

Surgical site infection occurred in 3.3% of patients in the non-retrieval bag group, while no cases were reported in the retrieval bag group. Retrieval bags were used in all cases with bile or stone spillage, showing a significant association ($p<0.05$).

Postoperative pain scores were comparable between groups; however, patients in the retrieval bag group required significantly higher doses of analgesics ($p=0.020$). Additionally, patients in this group demonstrated delayed return to normal activities.

No significant differences were observed in time to resume diet or overall postoperative complications between the groups.

DISCUSSION

This study demonstrates that the use of retrieval bags during laparoscopic cholecystectomy is associated with a reduced rate of surgical site infections but may lead to increased postoperative pain and delayed recovery.

The female predominance and mean age observed in this study are consistent with the known epidemiology of gallstone disease. Retrieval bags were preferentially used in cases with bile or stone spillage, which may have influenced the observed reduction in infection rates.

Although retrieval bags minimize contamination, their use may prolong operative time and contribute to increased pain, possibly due to extension of fascial incisions or additional manipulation during specimen extraction.

Pain assessment based on analgesic requirement suggests that patients in the retrieval bag group experienced greater discomfort despite similar VAS scores. This discrepancy highlights the subjective nature of pain assessment.

The findings suggest that routine use of retrieval bags may not be necessary in all cases and should be reserved for selected situations such as bile spillage or suspected infection.

TABLES

Table I: Background Characteristics of Patients by Use of Retrieval Bag

Table 1: Background Characteristics of Laparoscopic Cholecystectomy Patients, by Use/Nonuse of Retrieval Bag, Bir Hospital, Kathmandu

	Bag Used		Bag Not Used		Both Groups		Fishers Exact Value	P-value
	%	N	%	N	%	N		
Age								
18-35	45.5	15	54.5	18	27.5	33	1.29	0.736
36-45	48.4	15	51.6	16	25.8	31		
46-55	48.3	14	51.7	15	24.2	29		
>55	59.3	16	40.7	11	22.5	27		
Mean ± SD	46 ±14		44 ± 13		45 ± 13			
Sex								
Male	43.5	10	56.5	13	19.2	23	0.48	0.643
Female	51.5	50	48.5	47	80.8	97		
Duration of Surgery								
<60 minutes	53.8	42	46.2	36	65.0	78	1.32	0.339
>60 minutes	42.9	18	57.1	24	35.0	42		

Medical Problems								
None	51.3	58	48.7	55	94.2	113	1.37	0.439
Diabetes	28.6	2	71.4	5	5.8	7		
Total	50.0	60	50.0	60	100.0	120		

Table II: Procedure-Related and Postoperative Findings

Table 2: Procedure Related and Postoperative Findings in Laparoscopic Cholecystectomy Patients, by Use/Nonuse of Retrieval Bag, Bir Hospital, Kathmandu

Intraoperative Findings	Bag Used		Bag Not Used		Both Groups		Fishers Exact Value	P-value
	%	N	%	N	%	N		
Adhesion								
Absent	53.3	49	46.7	43	76.7	92	1.68	0.280
Present	39.3	11	60.7	17	23.3	28		
Bile Spillage								
No	46.4	52	53.6	60	93.3	112	8.57	0.006
Yes	100.0	8	0.0	0	6.7	8		
Stone Spillage								
No	49.2	58	50.8	60	98.3	118	2.03	0.496
Yes	100.0	2	0.0	0	1.7	2		
Pain within 24 hours								
3-4 score	53.6	15	46.4	13	23.3	28	0.79	0.759
5-6 score	51.6	33	48.4	31	53.3	64		
7-8 score	42.9	12	57.1	16	23.3	28		
Injection Dose								
1-2 dose	42.3	22	57.7	30	43.3	52	7.83	0.020
3 dose	46.9	23	53.1	26	40.8	49		
4-5 dose	78.9	15	21.1	4	15.8	19		
Normal Diet								
2-3 days	54.2	26	45.8	22	40.0	48	0.80	0.70
4-5 days	49.0	25	51.0	26	42.5	51		
6 or more days	42.9	9	57.1	12	17.5	21		
Normal Activity								
5-9 days	45.9	17	54.1	20	30.8	37	4.03	0.137
10-12 days	42.6	20	57.4	27	39.2	47		
13-15 days	63.9	23	36.1	13	30.0	36		
Post-operative Complications[†]								
None	51.3	59	48.7	56	95.8	115	1.88	0.364
Yes	20.0	1	80.0	4	4.2	5		
Total	50.0	60	50.0	60	100.0	120		

[†]includes Superficial SSI and persistent vomiting

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