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EFFECT OF DRAIN ON SHOULDER PAIN IN PATIENTS WITH LAP CHOLECYSTECTOMY IN NINEVEH

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ABSTRACT

Background: Laparoscopic cholecystectomy is a popular treatment for symptomatic cholecystitis, but post-procedure abdominal and shoulder pain can persist, affecting patient comfort and recovery. **Aim of the study:** To evaluate the effect of surgical drain in reducing shoulder pain after lab cholecystectomy among the patients in Nineveh governorate. **Patients and Methods:** A randomized controlled trial involving 157 patients aged 20-60 at Al-Salam Teaching Hospital assessed postoperative shoulder tip pain using a numeric verbal rating scale. Patients were divided into two groups, with drain surgery and without drain surgery. Postoperative shoulder tip pain was measured at 6, 12, 24, and 48 hours. Patients were interviewed postoperatively and pain severity was assessed using a numeric verbal rating scale (VRS). **Results:** The study found that 26.0% of patients with drains had PLSP, while 56.0% without a drain. Grades of PLSP were different between groups A and B. Age was lower in drain patients, but not significant. Gender distribution was similar between groups. Post-operative complications showed no significant differences between groups. However, patients in group A had higher proportions of infection and hospital stay compared to those in group B. No significant differences were found in post-operative complications. **Conclusion:** The performing of lap cholecystectomy with drain was obviously decreased the post-laparoscopic shoulder pain irrespective to age and gender.

KEYWORDS: Drain, lap cholecystectomy, Shoulder pain.

INTRODUCTION

The most common laparoscopic procedure performed globally, laparoscopic cholecystectomy (LC), is now the accepted standard of care for symptomatic calculous and acalculous cholecystitis.[1] A smaller wound, less respiratory problems following surgery, a quicker recovery period, and a shorter hospital stay are only a few benefits of LC.[2]

However, disturbing abdominal and shoulder pain can be observed after laparoscopic surgery. The elimination or reduction of this pain may increase patient comfort, promote a quick return to normal activity and reduce pulmonary and venous system problems.[3,4]

On the other hand, post-laparoscopic shoulder pain (PLSP), which has been documented to occur up to about 50% of the time after LC, is a commonly overlooked but not infrequent complaint.[5] This symptom not only increases pain and anxiety throughout the healing process, but it also lengthens hospital stays and may even lead to readmission.[6] Thus, it is crucial to investigate ways to lower PLSP following LC. Prior research indicates that PLSP can endure for up to seven days and occasionally longer than five weeks.[7] The pain in the shoulder is frequently significantly more severe than the pain in the internal organs and incision. The most significant finding was that 72% of patients used no opioids to treat their shoulder discomfort.[8] Additionally, it has been discovered that PLSP responds to treatment less well than visceral pain and incisions.[9] Continuous pain will not only make patients more uncomfortable if we do not provide effective treatment right away, but it may also raise the risk of various postoperative complications and delayed rehabilitation, both of which will drive up the expense of care dramatically.[10,11] Moreover, persistent discomfort will significantly lower patients' pleasure. These outcomes all run counter to the

initial goals of doing assisted surgery with laparoscopy. As a result, PLSP is becoming more widely acknowledged as a significant clinical issue.[11]

There are differing opinions on the use of drainage after laparoscopy (LC) to lessen pain.[12] The primary purpose of using a drain following a laparoscopic cholecystectomy is to avoid hematomas or bilomas. Randomised clinical trials have not demonstrated any benefit from a drain, according to the Cochrane Database Systemic Review.[13] In order to avoid abdominal collections following laparoscopic cholecystectomy, drains are utilized. Discharge of patients may be delayed and infectious problems may worsen if drains are used.[12,13] After an elective laparoscopic cholecystectomy, the installation of a sub-hepatic drain prolongs hospital stay, increases post-surgical pain, and does not stop intra-abdominal abscesses from occurring.[14] The use of a drain after an elective LC is not advised by European and Asian guidelines.[15,16] Regarding the use of drains in urgent, critical circumstances, there is disagreement, albeit.[17] Consequently, the surgeon's evaluation of the clinical scenario continues to guide the decision to employ a drain. The prognosis may be better if a drain is present in an infected abdominal area.[15] These days, laparoscopic surgeons practise a range of techniques, including normal drainage following laparoscopy, drainage in specific circumstances, and no drain at all.

AIM OF THE STUDY

To evaluate the effect of surgical drain in reducing shoulder pain after lab cholecystectomy among the patients in Nineveh governorate.

MATERIALS AND METHODS

A prospective single blind randomized controlled experiment was used to carry out the investigation. The study included patients between the ages of 20 and 60 who were admitted to the surgical wards of the Al-Salam Teaching Hospital in the Nineveh governorate for a laparoscopic cholecystectomy. One hundred out of the 157 patients who were admitted met the inclusion and exclusion criteria. These patients were randomly assigned to two groups: group A consisted of patients who underwent LC with a drain, while group B consisted of patients who left without a drain. Patients with a history of shoulder pain, upper laparotomy, other abdominal surgical procedures, or conversion to laparotomy, major complications, including biliary tract injury and massive bleeding, were excluded. Neither conversions to open surgery nor patient loss to follow-up occurred. Every patient who was enrolled gave their written informed permission. A same standardized anesthetic and postoperative analgesic regimen was administered to each subject. Shoulder tip discomfort following surgery was the outcome measure that was examined at 6, 12, 24, and 48 hours. Direct questioning and phone calls were used to gather information on convalescence in cases where the patient was released early.

The presence or absence of shoulder tip pain at 6, 12, 24, and 48 hours was the outcome measure that was investigated. The anesthetist conducted postoperative interviews with every patient who was enrolled. Patients were asked to rate the current intensity of PLSP while at rest in order to measure pain. The exact place and timing of PLSP onset were noted. Using a verbal rating scale (VRS) with numbers ranging from 0 (no pain) to 10 (worst possible agony), the degree of pain was evaluated. In this investigation, minor pain was defined as a VRS score between 0 and 3, moderate pain as between 4 and 6, and severe pain as between 7 and 10. For the analysis, each of these variables was employed.

Operative technique

Under general anesthesia, all patients had surgery using the fourport approach in a reverse Trendelenburg position with their right side up. The first trocar (5 mm) for the laparoscope was inserted at the umbilicus after the pneumoperitoneum was produced with a Veress needle at maximum flow rate up to 15 mm of Hg. The epigastric port is often created of 10 mm, and the gallbladder is subsequently removed via it. In order to do the remaining surgery, the intra-abdominal gas pressure in each arm was kept between 13 and 15 mmHg and between 10 and 12, respectively. Using the wall-mounted OT timers, the length of the procedure was meticulously documented. Ten millilitres of a 0.5% buprivacaine solution were injected into the port sites following the removal of the gallbladder. A silicone Jackson-Pratt drain was put through the lateralmost port and placed in the subhepatic space in patients who had acute cholecystitis, empyema, or gangrenous gallbladder disease. At the conclusion of the process, all leftover carbon dioxide was entirely removed in each example. A patient was considered to have arrived in the postoperative care ward at 0 hours after surgery. The durations during which shoulder pain was present were 6, 12, 24, and 48 hours, respectively. After giving the patients a thorough explanation, the visceral or local pain at the port sites was expressly requested and removed from the questionnaire. When a patient has been released from the hospital, questions about shoulder tip pain were asked over the phone.

Inclusion criteria

- Age group 18-75 years
- Symptomatic cholelithiasis
- Patients undergoing elective laparoscopic cholecystectomy

Exclusion Criteria

- Obstructive Jaundice
- Conversion to open surgery
- Intraoperative haemorrhage
- Intraoperative biliary tract injury
- Intraoperative cholangiogram required

- Performance of any additional procedure

Statistical analysis

All the data were summarized in excel sheet 2010 and the statistical analysis was done using SPSS 26. Chi square and Fissure Exact tests were used to find the statistical associations.

RESULTS

The comparison between the studies groups regarding the presence of PLSP was demonstrated in table (1) which revealed that the 26.0% of patients with drain and 56.0% of patients without drain were presented with PLSP; the difference was statistically significant at p=0.002.

Table 1: The comparison between the studies groups regarding the presence of PLSP.

PLSP	Group A (with drain) (n=50)		Group B (without drain) (n=50)		p-value*
	No.	%	No.	%	
Yes	13	26.0	28	56.0	**0.002**
No	37	74.0	22	44.0	

**Chi square test has been used*

The grades of PLSP among the group A were distributed as mild in 6 patients, moderate in 5 patients, and severe in only 2 patient while among the group B, the distribution was 13, 10, and 5 patients as mild, moderate, and severe respectively. The difference was statistically not significant as shown in table (2).

Table 2: The grades of PLSP among the studied groups.

Grades of PLSP	PLSP				p-value*
	Group A (with drain) (n=13)		Group B (without drain) (n=28)		
	No.	%	No.	%	
Mild	6	46.2	13	46.4	0.975
Moderate	5	38.5	10	35.7	
Severe	2	15.3	5	17.9	

**Chi square test has been used*

Comparison of age between the studied groups was demonstrated in table (3) and revealed that the mean age among the drain group was lower than that among the no drain group but the statistical association was not significant.

Table 3: Comparison of age between the studied groups.

Age	PLSP				p-value*
	Group A (with drain) (n=13)		Group B (without drain) (n=28)		
	Mean	SD	Mean	SD	
	35.9	2.1	36.2	1.6	0.616
**Chi square test has been used*					

The assessment of the gender distribution across the studied groups was demonstrated in table (4). It elicited that 38.5% of group A were males and 61.5% were females in comparing to 57.1% and 42.9% of group B were males and females respectively with no significant statistical difference.

Table (4): Comparison of gender between the studied groups.

Gender	PLSP				p-value*
	Group A (with drain) (n=13)		Group B (without drain) (n=28)		
	No.	%	No.	%	
Male	5	38.5	16	57.1	0.265
Female	8	61.5	12	42.9	
**Chi square test has been used*					

The post-operative complications between the studied groups were demonstrated in table (5) which revealed that the nausea and vomiting, hemorrhage, and abdominal pain showed no statistically significant differences. Regarding the infection and hospital stay, the patients within group A had significantly higher proportions in comparing to those within group B at p00.023 and p=0.002 respectively.

Table 5: Comparison of Complications Between The Studied Groups.

Complications	PLSP				p-value*
	Group A (with drain) (n=13)		Group B (without drain) (n=28)		
	No.	%	No.	%	
Nausea and vomiting	4	30.8	3	10.7	0.181
Hemorrhage	1	7.7	2	7.1	1.000
Abdominal pain	2	15.4	4	14.3	1.000
Infection	5	38.5	2	7.1	**0.023**
Hospital stay time >2 days	6	46.2	1	3.6	**0.002**

**Fisher Exact test has been used*

DISCUSSION

A number of studies have surprisingly revealed that patients who have a drain have lower PLSP following a laparoscopic procedure. This suggests that carbon dioxide (CO2) exhaling through the drain site may lessen the irritating effects of leftover gas in the peritoneal cavity.[18,19] Other research, however, has shown contradictory findings, demonstrating that a drain has no impact on the occurrence of PLSP following LC.[20] Therefore, the question of whether drains have any effect in lowering PLSP following LC is still open.

According to the current study, 28 individuals acquired PLSP without a drain technique, while 13 patients developed PLSP with one. Yang *et al.'s* study[21], which found that the unadjusted incidence of PLSP in the group with a drain was considerably lower than in the group without a drain (28.8% vs. 38.1%; P = 0.039), also showed similar findings. Throughout the first postoperative day, the cumulative incidence of PLSP in the drain group was lower than that of the non-drain group (by log rank test, P = 0.035). It was found to be significantly lower, especially at the 12th and 24th postoperative hours (18.3% vs. 27.6%; P = 0.022) and 28.8% vs. 38.1% (p = 0.039). Additionally, a smaller randomized research discovered that in patients who had a suction drain following LC, the incidence and severity of PLSP was decreased.[22] Patients who had a drain 6, 12, 24, and 48 hours after LC had less severe shoulder pain, according to another recent randomized trial.[23] Our findings consistently shown that, in the initial stages of recovery following LC, a drain greatly decreased the incidence and pain score of PLSP. Most importantly, our findings and those of the previously stated studies indicate that releasing CO2 through the drain site was significantly linked to decreased PLSP[24], indicating a close connection between PLSP and discomfort from inflated gas during laparoscopy.

Average age of the patients in present study was 35.9 years among the drain group and 36.2 years among the no drain group, this result was parallel to that of Nagpal *et al.*, study[25], in which the patients' age was 36.25 years in drain group and 37.90 years in no drain group. While in Riad *et al.*, study[26], the mean age for the study group is 56.8±8.6 for the drain group and 58.8 ±7.9 for no drain group.

The male to female ratio in the drain group was 1:1.6, while it was 1.3:1 in the no drain group. However, the current study did not find any statistically significant differences between the genders in developing PLSP. The majority of patients in the drain groups and no drain group in the Hokkam *et al.* study[27] were female (male/female ratios: 24/56 and 20/60, respectively), but there was no statistically significant difference. The male to female ratio in both study groups was 1:3.5 and 1:4 in earlier investigations by Uchiyama *et al.*[28] and Tzovaras *et al.*[29]

Regarding the hospital stay, the current study showed that 6 patients in drain group and only one patient in no drain group stayed more than 2 days in hospital with statistically significant difference. Gurusamy *et al.*,[30] and Satinsky with his associates[31] and Hokkam *et al.*,[27] have also reported significant differences with longer hospital stay in drained patients.

Of the complications reported in this study, only one—infection—was found to be significantly correlated with the use of a drain. This finding aligns with a study by Gurusamy *et al.*[30] in which wound infection occurred in 15 patients in the drain group (18.75%) compared to 4 patients in the no drain group (5%), and that difference was statistically significant. All of the cases in this study responded well to oral antibiotics. Nonetheless, Hawasli and Brown[32] as well as Playforth and his group[33] said that their experiments revealed no appreciable variations with regard to wound infection. The group without a drain had a decreased rate of wound infection, specifically. A mild consequence following LC that affects 1.1% to 7.9% of patients is port-site infection.[34,35] This problem appears to be less common when drains are used, which may be because of the foreign body.[30] Reducing the drain's permanency following surgery is a useful strategy to lower the rate of wound infections.[36] Also, in Riad *et al.*, study[26], the wound infection, fever, bile leakage occur with high rate among the drain group, however there were no statistically significant differences between the studied groups. Post-operative prolonged shoulder pain occur in one case in the no drain group. After LC, the incidence of postoperative nausea and vomiting has been observed to range from 53% to 72%. With no discernible difference between the drain and no drain groups, our meta-analysis validates the meaningful presence of nausea and vomiting following LC.[37] According to Hokkam *et al.*[27], there were no appreciable variations in the two groups' post-operative pain scores at 24, 48 hours, and one week. According to Tzovaras *et al.*[29], routine drain usage during elective laparoscopic cholecystectomy has little benefit and is linked to discomfort. Recent research has demonstrated a link between the use of surgical drain and an increased risk of infection and post-operative abdominal pain.[17, 38] When doing laparoscopic surgery, the main purpose of the drain is to keep an eye on the accumulation of blood or bile. There is strong evidence to suggest that the purpose of surgical drains is to release trapped gas during laparoscopy.[39]

CONCLUSION

The performing of lap cholecystectomy with drain was obviously decreased the post-laparoscopic shoulder pain irrespective to age and gender.

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