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The Efficiency of the Prophylactic Sub-Hepatic Drain in a Straightforward Laparoscopic Cholecystectom

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ABSTRACT

Background and Objective: Several studies show that prophylactic drains in simple laparoscopic cholecystectomy are unnecessary and even harmful. Considering that the drainage of the gallbladder bed after laparoscopic cholecystectomy can be free of complications, the aim of this study is to compare the effectiveness of prophylactic drainage in patients undergoing laparoscopic cholecystectomy and the effectiveness of subhepatic drain.

Methods: This prospective study was conducted in Al-Imamain Alkadhumian medical city during the period from first of January 2019 to the end of December 2020. During the study period, 61 adult patients undergoing elective cholecystectomy participated after written consent was taken from them. 31 of them received subhepatic drain and 30 patients did not. The level of pain and complications was compared in the two groups.

Findings: In the group that had a drain, the average pain scale was 16.5±0.9 degrees, and hospitalization after surgery was 2.1±0.6 days. They had subhepatic collection of 29.4±4.8 ml and 19.4% of patients had complications. However, people without drains had an average pain score of 2.3±1.1, hospitalization days of 0.633±0.61, subhepatic collection of 20.6±4.08 ml, and 33.3% of patients had complications. There was a positive and direct relationship between postoperative pain scale and drainage ($p<0.05$). In addition, the subhepatic collection of the first group was significantly different from the subhepatic collection of the second group ($p<0.05$). However, no statistically significant relationship was found between age and drain.

Conclusion: Based on the results of this study, routine drainage tube placement during laparoscopic cholecystectomy increases post-operative discomfort, hospital stay, and sub hepatic collection without reducing complications from operation.

Keywords: *Cholecystectomy, Laparoscopy, Gallstones, Preventive Surgical Procedures, Hepatic Veins, Subhepatic Drain.*

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Introduction

One of the most popular elective abdominal procedures is cholecystectomy. Carl Langenbuch conducted the first successful cholecystectomy in 1882, and it became the accepted standard of care for calculus gallbladder illnesses for more than 100 years (1). Gallstone illnesses are now treated with laparoscopic cholecystectomy (LC), which gradually gained popularity around the globe and has since taken the place of the traditional open procedure (2). With the greatest of intentions, various surgical drains have been used in various procedures for years (3). Whether they succeed in their intended function after years of surgery is often up for discussion. While there is less data to support the usage and advantages of different forms of surgical drainage, most surgeons continue to employ their standard procedure. The care of surgical patients should be improved, and surgeons should be able to base their practice on solid scientific concepts rather than just "doing what I usually do," with stronger evidence. The lack of conclusive data has made it difficult to resolve several contentious problems with the use of surgical drainage (4).

In surgical practice, surgical drains are often employed, particularly during large procedures. In general, the goal is to decompress or drain either air or fluid from the surgical region. While laparoscopic cholecystectomy is less intrusive, surgery may cause significant, even life-threatening complications (5). Laparoscopic cholecystectomy causes shoulder tip discomfort, back pain, and nausea/vomiting, unlike laparotomy. Laparoscopic cholecystectomy is routinely drained to avoid complications. Because of the fear of collecting bile or blood requiring open procedures, surgeons routinely drain after laparoscopic cholecystectomy. This allows carbon dioxide insufflated during laparoscopy to escape via the drain site, reducing shoulder pain that sometimes requires local anesthetic bupivacaine instillation at the right side of the abdomen. Drains may aggravate infective problems and postpone discharge (6, 7).

We introduce prophylactic drainage following elective cholecystectomy even though no RCT supports it. In noncomplicated elective laparoscopic cholecystectomy, current studies suggest little benefit. Surgically inserted drains increase the risk of intraabdominal and wound complications, abdominal discomfort, impaired pulmonary function, and hospital stay. All RCTs failed to reduce postoperative complications. As with open cholecystectomy, laparoscopic drains may increase morbidity, expense, and time (8, 9). The main contribution of study is to determine the effectiveness of using prophylactic drain in patients subjected to elective non-complicated laparoscopic cholecystectomy.

Methods

This prospective study was conducted at Al-Imamain Alkadhumian medical city during the period from the 1st of January 2019 to the 31st of December 2020, and sixty-one adult patients were posted for laparoscopic cholecystectomy for symptomatic gall stone diseases. Detailed history and thorough clinical examination were considered. Laboratory tests and ultrasound examination were done for each patient to conform the diagnosis. Patients with coexistence of other intra-abdominal pathology, suspicion of gall bladder carcinoma, CBD stone and Mirizzi's syndrome have been excluded. For 31 patients, sub hepatic tube drain was inserted and for other 30 patients, no tube drain was inserted. Each patient was analyzed with respect to post-operative pain intensity by numerical rating scale, sub-hepatic collection, hospital stay and complications by close follow up throughout the period of hospitalization and after discharge till drain and stitches removed up to day 10 after the operation. With the aid of the statistical application SPSS V24, the acquired data were examined (10, 11). The significance of associations between related categorical variables was determined using the chi-square test, whilst the significance of variations between the means of related numerical variables was determined using an independent two sample t test.

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This study and its protocol were approved by the authority of the health institution at Al Kadhymia Teaching hospital (Code: KTH., EC: 1-4-2021, 124). Also, we used the American Psychological Association's ethical issues. The involved applicants (or their relatives) provided a written informed agreement. The whole research was done based on the Helsinki Declaration.

Results

Demographic characteristic of patients: Drain was inserted for 31 patients (50.8%), while not for 30 (49.2%) patients, figure1.

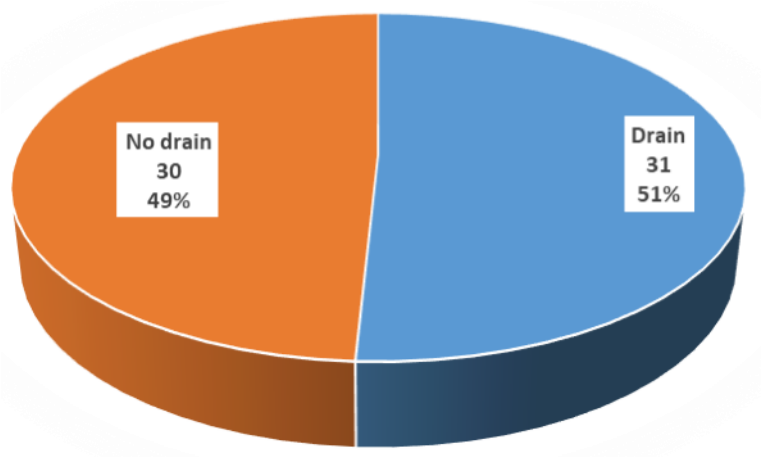


Figure 1. Distribution of studied cases according to group (drain vs no drain)

As shown in table 1, the mean age of all studied cases was 40.13±11.41 years, 31.1% of cases were males and 68.9% were females. The mean pain score of all studied cases was 3.79±1.77, sub-hepatic collection was 25.13±6.3ml and post-operative hospital stay was 1.39±099 days. Complications had been developed by 26.2% of all studied cases.

Table 1. Distribution of studied cases according to essential characteristics

	Mean±SD or Number(%)
Age	40.13±11.41
Gender	
Male	19(31.1)
Female	42(68.9)
Pain score	3.79±1.77
24 hrs. sub hepatic collection (ml)	25.13±6.3
Post-op hospital stay (day)	1.39±099
Complication	
Complication	16(26.2)
No complication	45(73.8)

Post-operative pain scale and Post-operative sub hepatic collection: As shown in table 2 using independent 2 samples t-test, differences between means of variables age, post-operative pain scale and Post-operative sub hepatic collection were presented. We chose the same age groups in both drain and no

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drain patients, so no significant difference was noticed between mean age according to type of study (p=0.627). It was shown that the mean of pain scale after 8 hours was significantly higher among drain group (p=0.001). Table 2 shows that the mean sub-hepatic collection was significantly higher among drain group (p=0.001). The subhepatic collection was measured by U/S 24 hrs. post operation.

Table 2 differences between means of age using independent 2 samples t-test

Variable	N	Mean	Std. Deviation	p-value
Age				
Drain	31	40.8387	12.07503	0.627
No drain	30	39.4000	10.84245	
Pain scale				
Drain	31	5.1613	0.96943	0.001
No drain	30	2.3667	1.18855	
Sub hepatic Collection				
Drain	31	29.4839	4.85023	0.001
No drain	30	20.6333	4.08938	

Hospital stay: In Table 3, it is obvious that the mean time for post-operative hospital stay was significantly higher among drain group (p=0.001).

Table 3. Differences between means of post-operative hospital stay using independent 2 samples t-test

	N	Mean (day)	Std. Deviation	p-value
Post-op hospital stay				
Drain	31	2.1290	0.67042	0.001
No drain	30	0.6333	0.61495	

Post-operative complications: Table 4 shows that there was no significant association between using drain of study and development of complications (p=0.215). The complications include biloma, drain site infection, nausea and vomiting.

Table 4. Association between tube drain and complications

	Complication Number(%)	No complication Number(%)	p-value
Drain	6(19.4)	25(80.6)	0.215
No drain	10(33.3)	20(66.7)	0.215

The drain group: 2 cases developed biloma and they were managed successfully by inserting drain under U/S guide and their condition was settled. 2 cases were having Mirizzi syndrome, in spite of using drain for 5 days, they developed biloma after 10 days and need drainage again, and one case presented as acute abdomen and reopened again bile peritonitis was found, washing was done and drain was put and the condition was settled after 1 week. One case was presented after 10 days with drain site wound infection. The no drain group: 4 cases of no drain group were presented 3 days after operation with nausea and

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vomiting, 6 cases were presented with intra-abdominal collection (biloma) after the 7th day post operatively and U/S guided drainage was done and their condition improved.

Discussion

Anxiety of the patient and postoperative pain perception are both variables that prolong healing after surgery and cause discomfort. Similar to another study by Harilingam et al., which discovered that 48% of drain groups had VAS median grades of G4 and the no drain groups had VAS median grades of G2 (48%), the mean pain scale in the current study was higher in drain groups, with a mean pain scale of 5.1 as opposed to no drain groups, which had a mean pain scale of 2.3 (12, 13). Antoniou et al. characterized the drain fever condition after cholecystectomy in 1962 for the first time (14, 15). If a drain is kept in place for more than two days, fever and right upper abdomen discomfort may occur in this scenario. In 23% of the group with drains and 4% in the group without drains, the discomfort and fever spontaneously subsided after 1-3 days (16, 17). This discrepancy may be explained by the drain's foreign response effect (18, 19), the drain's link to the outside world (20) and the pain it causes in patients, which prevents them from coughing effectively and leads to atelectasis (21).

The mean subhepatic collection measured by ultrasonography on day one in our research's drain group patients was 29.3 ml, compared to 20.6 ml in the group without a drain. This difference between the two study groups was statistically significant. The greater fluid collection in the drain group is explained by the tissue's perception of the drain as a foreign object within the abdomen. The average sub-hepatic collection in the study of Picchio et al. was 30±5 ml in both groups (22). In a research by Picchio et al., the mean subhepatic collection in the drain group was 3.13±3.6 ml, compared to 2.85±3.6 ml in the non-drain group (22). In the current study, the mean hospital stay for patients with drains was (2.1±0.67) days, while it was (0.6±0.614) days for patients without drains, with a p-value of 0.005. This is comparable to the study of Omar et al., which found that patients with drains had a hospital stay of (4.8±2.8) days and patients without drains had a hospital stay of (2.5±2.2) days. According to a study (23), the postoperative hospital stay was lengthier in the drain group than it was in the group without drains. According to the study by Gurer, hospital stays ranged between (2.9±1.9) and (4±2.9) days for groups with drain and those without it. The lengthier hospital stay in the drain group is caused by the patient's inability to be sent home owing to higher pain and discomfort (19).

In reality, the possibility of biliary leakage or bleeding, which may cause peritonitis, is the main reason to place a drain following cholecystectomy. This is a viable choice when there is an abnormal biliary tract, when cystic canal clips are not applied properly, or when the dissection is too challenging and results in bleeding. With a p value of 0.216, our research revealed no statistically significant link between employing a drain and the emergence of problems. Biloma, an infection at the drain site, nausea, and vomiting are some of the side effects. Several patients developed intraabdominal collection because the drain was withdrawn considerably sooner than the development of collection or obstruction of the drain. After three days, two instances in the drain group had tube obstruction, which led to the development of bilomas. Both cases were treated by inserting drains under U/S guides, and their conditions were resolved. One instance came with an acute abdomen and required a repeat laparoscopy when bile peritonitis was discovered. Washing was done, drain was placed, and the condition was resolved after one week in two cases with Mirizzi syndrome despite utilizing the drain for seven days. After ten days, one patient with an infection at the drain site wound appeared. In contrast, 6 instances of intra-abdominal collection (biloma) manifested with nausea and vomiting 3 days following surgery in 4 cases of the no drain group. U/S guided drainage was performed in these cases, and the patients' conditions improved. Hence, the findings of our research agree with those of

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Gurer et al. (19). According to a study, there is no connection between having a drain following a laparoscopic cholecystectomy and having a post-operative biloma (19). In light of this, we discovered that the practice of prophylactic drainage following laparoscopic cholecystectomy in non-complicated cases increases patients' pain, decreases comfort postoperatively, delays their recovery and discharge, and is ineffective in preventing and detecting postoperative bile collection.

Patients who had laparoscopic cholecystectomy with tube drain experienced higher postoperative discomfort. In patients having laparoscopic cholecystectomy with tube drain, we have seen a prolonged hospital stay. We discovered that, as evaluated by U/S, the subhepatic collection for 24 hours is higher in drain patients. The post-operative problems between the drain and non-drain groups did not vary significantly.

Conflict of interest: The authors declare there is no conflict of interest.

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