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Original Article

A Comparative Study Between Abdominal Drain in Laparoscopic Cholecystectomy and without Drain

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Abstract:

Background: *Prophylactic drains in abdominal surgery are widely used either to detect early complications, such as postoperative hemorrhage or leakage, or to remove collections that might be toxic, such as bile, and become infected.*

Objective: *To assess the effect of abdominal drain in laparoscopic cholecystectomy*

Patients and method: *A prospective study conducted in our hospital from the first of January 2020 to the end of December 2020 on 60 patients presented cholelithiasis, undergoing laparoscopic cholecystectomy with and without drain.*

Results: *Pain score in the current study, shows that in group A the mean pain score was (5.9±1.3) while it was (3.8± 1.7) in group B with highly significant difference found (p<0.001). Pain grade shows that mild pain was found in 6 patients in group A and 14 patients in group B, 13 patients with moderate-sever pain in group A and 7 patients in group B, with significant difference between the groups. The mean time of hospital stays of the patients in group A (drain) (31.9±3.6 hours) was significantly longer than time of hospital stay in group B (without drain) (18.2±3.5 hours) (p<0.001).*

Conclusion: *Laparoscopic cholecystectomy without routine drainage shows that: shorter hospital stays, less operative time, less operative complication.*

Keywords: *Laparoscopic cholecystectomy, abdominal drain, gallstone.*

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1. INTRODUCTION

Prophylactic drains in abdominal surgery are widely used either to detect early complications, such as postoperative hemorrhage or leakage, or to remove collections that might be toxic, such as bile, and become infected. However, evidence-based data do not support the use of prophylactic drainage in the majority of abdominal surgery procedures (1). Cholecystectomy is the second most common operation in gastrointestinal surgery after appendectomy. In the era of open cholecystectomy, a meta-analysis showed that drains increased morbidity without providing any additional benefit for patients.3 At present, laparoscopic cholecystectomy (LC) is the preferred method for either elective

cholecystectomy or emergent cholecystectomy (2,3). To perform an open cholecystectomy, the surgeon creates an incision about 4 to 6 inches long in the abdomen to remove the gallbladder. Patients usually receive general anesthesia. Recovery from open cholecystectomy may require some people to stay in the hospital for up to a week. Normal physical activity can usually be resumed after about a month (4). Gallstones are aggregation of hard substance that forms inside gallbladder when there is disequilibrium in the constitution of bile such as more cholesterol,(5) accumulated amount of pigment material and/or decreased amount of bile acid, gallstones may also result from dysfunction of gallbladder contraction (6). Risk factors for gallstones include female sex, increasing age, pregnancy, oral contraceptives, obesity, diabetes mellitus, ethnicity (Native North American), rapid weight loss (7). Gallstones blocking the flow of bile account for 90% of cases of cholecystitis (acute calculous cholecystitis). Blockage of bile flow leads to thickening and buildup of bile causing an enlarged, red, and tense gallbladder. The gallbladder is initially sterile but often becomes infected by bacteria, predominantly E. coli, Klebsiella, Streptococcus, and Clostridium species. Inflammation can spread to the outer covering of the gallbladder and surrounding structures such as the diaphragm, causing referred right shoulder pain (8). In acalculous cholecystitis, no stone is in the biliary ducts. It accounts for 5–10% of all cases of cholecystitis and is associated with high morbidity and mortality rates. Acalculous cholecystitis is typically seen in people who are hospitalized and critically ill (13). Males are more likely to develop acute cholecystitis following surgery in the absence of trauma. It is associated with many causes including vasculitis, chemotherapy, major trauma or burns (9,10). Drain has been widely used in many abdominal surgeries for therapeutic purposes such as the removal of infected debris or abscess, and supporting the healing of leakage or fistula. Although the usability of therapeutic drain is commonly accepted, the efficacy of prophylactic drain still has been debated. Most surgeons have inserted prophylactic drain with expectations that the drain would be helpful for early detection of postoperative bleeding or leakage, and also prevention of intra-abdominal abscess through removing debris or curd. However, there are only few evidence-based studies for the actual effectiveness of prophylactic drain and the objections against the routine use of drain have been raised (11). With the advent of LC, the use of drains may be justified because of the increased incidence of biliary injury and, consequently, bile leakage. The use of prophylactic

drainage in LC to avoid bile and blood collection requiring subsequent treatment is largely diffuse.

2. PATIENTS AND METHODS

A prospective study conducted in our hospital from the first of January 2020 to the end of December 2020 on 60 patients presented cholelithiasis, undergoing laparoscopic cholecystectomy with or without drain.

Patients were assigned into two groups with a 30 patients in each, namely, group A and B. In group A laparoscopic cholecystectomy with drain while in group B without drain

All participants were subjected to the following: Clinical examination, routine laboratory investigations, abdominal ultrasonography and pre-operative fitness.

Inclusion criteria:

1. Age between 18 and 70 years .
2. Patients presented with symptomatic cholelithiasis.
3. Those who undergoing elective laparoscopic cholecystectomy.

Exclusion criteria:

Patients were excluded if they had one or more of the following

1. Acute cholecystitis.
2. Obstructive jaundice
3. Those who were converted to open surgery.
4. Intraoperative complications: hemorrhage, biliary tract injury, cholangiogram.
5. Patient who refused to do laparoscopic cholecystectomy.
6. If there is a need for additional surgical procedures.

Post-operative care:

- Abdominal U/S was done only for to patients suspected to have collection (if they have persistent shoulder pain, fever, elevated leucocytic count or persistent vomiting).

- Parenteral antibiotics were given with induction and for the first two days post-operatively.

Procedures:

Laparoscopic cholecystectomy was done by using the standard 4 port technique in all patients. two opening was located in the midline the umbilical and one opening located at

below the xiphoid 1 cm each, and two in the lateral, one located below the costal margin and one in right lumbar region 5mm each. The patients were divided into two groups: in group A the drain was not placed, while in group B, a drain of size 18 Fr was placed through lateral 5 mm trocar. The practice in most of the institutions is to place a suction drain and remove it on next morning but in the current study the drain was gravitational, that is no suction was applied, and attached to a drain bag. When placed, the drain tube was removed 48 hours postoperatively, unless ongoing leak of blood or serum of more than 30 ml/day, or bile of any amount was observed. The patients, in whom the drain was not kept, when suspected of having any leakage, underwent sonography to detect fluid collection in peritoneal cavity. Pain assessment was done by verbal categorical rating scale. The effects of omitting the drain in respect of hospital stay, morbidity, and mortality were observed.

Statistical analysis:

After the data were entered in a table developed by the researchers, the analysis was done by using the SPSS program, version 23 and for qualitative variables, we used frequencies and percentages, and for the quantitative variables, we used measures of central tendency and dispersion (standard deviation). For the inferential statistics the tests were used of chi-square test (with a significance of $P \leq 0.05$).

3. RESULTS

Wound infection was found in 3 patients in group A and 1 patient in group B, fever was found in 2 patients in group A and 1 patient in group B, Nausea and vomiting was found in 2 patients in group A and 4 patients in group B, Bile leakage in 2 patients in group A and 1 in group B, perihepatic collection in 1 patient in group A and 2 in group B, and acute pancreatitis found in 1 patient in group A only. All of these findings are demonstrated in (**Table 1**).

Regarding to the pain score in the current study, in group A the mean pain score was (5.9±1.3) while it was (3.8± 1.7) in group B with highly significant difference found ($p<0.001$). Pain grade shows that mild pain was found in 6 patients in group A and 14 patients in group B, 13 patients with moderate-sever pain in group A and 7 patients in group B, with significant difference between the groups, as shown in (**Table 2**). The mean time of operation in group A (drain) (62.3±10.9 minutes) was significantly longer than time of operation in group B (without drain) (51.8± 13.4 minutes) ($p=0.001$). The mean time of hospital stays of the patients in group A (drain) (31.9±3.6 hours) was significantly longer

than time of hospital stay in group B (without drain) (18.2±3.5 hours) (p<0.001). As shown in (**Table 3**).

Table 1. Post-operative complications

Complications	Group A (drain) N=11		Group B (without) N=9		P. value
	No.	%	No.	%	
Wound infection	3	27.2	1	11.1	0.300 Ns
Fever	2	18.2	1	11.1	0.500 Ns
Nausea and vomiting	2	18.2	4	44.5	0.400 Ns
Bile leakage	2	18.2	1	11.1	0.500 Ns
Perihepatic collection	1	9.1	2	22.2	0.500 Ns
Acute pancreatitis	1	9.1	0	0.0	0.300 Ns

Ns: not significant

Table 2. Pain score (visual analogue scale)

Variable		Group A (drain) N=30	Group B (without) N=30	P. value
Pain score (VAS)		5.9±1.3	3.8± 1.7	<0.001 S
Pain grade	Mild pain	6	14	0.02 S
	Moderate- severe pain	13	7	

S: significant

Table 3. Operative time and hospital stays (hours) in the studied groups

Variable	Group A (drain) N=30	Group B (without) N=30	P. value
Time of operation (min.)	62.3±10.9	51.8± 13.4	0.001 S
Hospital stays (hours)	31.9±3.6	18.2±3.5	< 0.001 S

S: significant

4. DISCUSSION

Numerous studies have shown that several abdominal surgical procedures can be safely performed without drainage, drainage does not prevent complications; otherwise, increase the tube-related complications such as fever, wound infection, wound hernia, or discomfort to patients (12). The main reason to use prophylactic drainage in LC is to reduce complications such as intra-abdominal collections that require treatment and to detect bile leak, thereby decreasing the overall mortality and morbidity rates (13). Despite being a less invasive technique, some patients complain of postoperative shoulder pain, nausea, and

vomiting. Some publications recommend the use of a short-term drain postoperatively based on the theory that high-pressure CO2 insufflation during the operation and the accumulation of gas in the right subphrenic area leads to these complaints. Moreover, its used in case of operative complications (Bleeding, bile leak, etc….) (14). In the current study wound infection was more common in drain group than that in without drain group, which is in agreement with Qiu J et al, study that revealed wound infection was more common significantly in drain group than that without drain (12). In particular, the wound infection rate was lower in the no drain group. Port-site infection is a minor complication that affects 1.1% to 7.9% of patients after LC. (15, 16) which is concordant with El-Labban G et al, which found that wound infection was happened in (18.75%) of the patients in drain group while (5%) of patients in group without drain with statistically significant difference found between both groups (17). While in Playforth M et al, study they found that wound infection with no significant difference between the groups (18). In the current study, nausea and vomiting found in 2 patients in group A and 4 patients in group B with no significant difference. Which is in agreement with Gurusamy K et al. (19), and Satinský I et al. (20) studies revealed no significant differences in post operative nausea and vomiting between both groups in the studies. Feo C et al mentioned that postoperative nausea and vomiting have been reported with an incidence of 53% to 72% after LC. (21). Picchio M, et al in his meta-analysis study confirms the relevant presence of both vomiting and nausea after LC without any significant difference between the drain and no drain groups (22). Regarding the operative time in the present study, the mean time of operation in group A (drain) was significantly longer than time of operation in group B (without drain). This is same that found by Picchio M et al, in his randomized multicenter study found that the time needed for drain group was 67.1 (62.8–71.3) minutes and for those without drain was 60.7 (55.5–65.9) with highly significant difference (22). Moreover, it is in agreement with Egyptian study carried by Samer A et al, stated that significant increase in operative time in drain group than another group (23). While in El-Labban G et al, study instead of longer time of operation in drain group but no significant difference found (17). In the current study mean time of hospital stays of the patients in group A (drain) (31.9±3.6 hours) was significantly longer than time of hospital stay in group B (without drain), this is same that found by Qiu J, et al that revealed significant increase in time for hospital stay in drain group than that for no drain group (24). Regarding to the pain score in the current study, the

mean pain score in group A was higher than in group B with significant difference found ($p<0.001$). Pain grade shows that mild pain was found in 6 patients in group A and 14 patients in group B, 13 patients with moderate-sever pain in group A and 7 patients in group B, with significant difference between the groups. In a study carried by Hawasli A, they revealed that there is a minor difference between both groups of laparoscopic cholecystectomies (drain group and without drain group) regarding postoperative pain wither it is abdominal or shoulder pain but with statistically differences between the groups (25). Moreover, it is in agreement with Uchiyama K et al, mentioned that there is significant increase in the mean of VAS scores in drain group than that in without drain group after 24 and 48 h post operatively especially in females (26). In Sharma A et al, study used VAS to assess the severity of postoperative pain and found that the proportion of the patients having pain for 24 and 48 hours was more in those having drain. At 6th postoperative hour the severity of the pain was almost equal in both groups and maximum at the right upper abdomen, mainly at the epigastric port site. This could be because the gall bladder was extracted through the epigastric port which needs to be dilated or even further incised to retrieve the gall bladder (27).

5. CONCLUSION

Laparoscopic cholecystectomy without routine drainage shows that: shorter hospital stays, less operative time, less operative complication.

Ethical Issues:

All ethical issues were approved by the authors from the Iraqi Ministry of Health. Verbal and signed informed consents were obtained from all patients who included in the study during their first visit.

Conflict of interest: None

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