

Drainage versus no Drainage after Elective Laparoscopic Cholecystectomy

Sharma A, Gupta SN

Department of Surgery
Nepalgunj Medical College and Teaching Hospital
Kohalpur, Nepal.

Corresponding Author

Anup Sharma
Department of Surgery
Nepalgunj Medical College and Teaching Hospital
Kohalpur, Nepal.
E-mail: anup_sharma88@yahoo.com

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ABSTRACT

Background

Laparoscopic cholecystectomy is the gold standard for the surgical treatment of cholelithiasis. Routine drainage after elective LC is an issue of considerable debate.

Objective

To evaluate the advantages and disadvantages of drainage in patients undergoing Laparoscopic cholecystectomy.

Method

The study was conducted at the department of surgery in Nepalgunj Medical College and Teaching Hospital, Kohalpur between March 2013 and May 2014. During the period of study, sixty patients underwent laparoscopic cholecystectomy for symptomatic gall stone. Sixty patients were randomized before surgical procedure into two groups. Group A consisted 30 patients in whom a drain was placed in subhepatic space and group B consisted 30 patients without drain. Postoperative pain was assessed using a 10-point visual analog scale. The two groups were evaluated and compared regarding postoperative pain, the time needed for surgery, length of postoperative hospital stay and the incidence of postoperative complications.

Result

The mean operative time in group A was 6.16 minutes longer when compared with group B ($p > 0.05$). Although the postoperative mean pain score was same at 6 hours after surgery in both groups (7.53 vs 7.23), the postoperative pain was higher in the group A by more than two points on the average in VAS (visual analogue score) at 24 hours and 48 hours. The proportion of the patients staying in the hospital for more than two days was higher in group A, 14 (46.66%) and 8 (26.66%) in group B ($p < 0.05$). There was no statistical difference in the rate of wound infections, shoulder pain, nausea, vomiting, and respiratory infections between the two groups.

Conclusion

The routine drainage of gallbladder bed after elective laparoscopic cholecystectomy may not be justified and appears to cause more postoperative pain and more postoperative complications and prolongs the hospital stay.

KEY WORDS

Cholecystectomy, drain, hospital stay, laparoscopy, postoperative

INTRODUCTION

Cholelithiasis is among the most common gastrointestinal illness.¹ Among all the surgical diseases of gastrointestinal tract, cholecystectomy is the most commonly performed elective surgery worldwide. Cholecystectomy remains the treatment of choice for symptomatic gall stone despite the challenges of dissolution therapy and lithotripsy. The introduction of laparoscopic cholecystectomy (LC) as an alternative to the conventional removal of gall bladder by Philippe Mouret in 1987 has revolutionized this procedure.^{2,3}

Nevertheless, controversy regarding the routine use of drainage after elective LC still exists. Surgeons have routinely drained after LC because of fear of collection of bile or blood requiring open procedures. Another reason for draining is to allow CO₂ insufflated during laparoscopy to escape via the drain site leading to decreased shoulder pain.⁴

Therefore we conducted this study to assess the usefulness of drain in elective LC and whether not using a drain will lead to increased mortality and morbidity.

METHODS

The study was conducted at Nepalgunj Medical College and Teaching Hospital in the department of surgery between March 2013 and May 2014. During the period of study, sixty patients underwent LC for symptomatic gall stone. Patients with acute cholecystitis, cholangitis, pancreatitis and common bile duct stone were excluded. Patients were divided before surgical procedure into two groups. Group A consisted 30 patients in whom a drain was placed in subhepatic space and group B consisted 30 patients without drain.

All patients were confirmed to have symptomatic cholelithiasis after ultrasonography was performed. All patients were submitted to biochemical and hematological tests, chest X-ray, electrocardiogram. All the patients received one dose of 1 gm *ceftriaxone* during the induction of anesthesia. All patients were operated by the same surgical team. A drain tube made of polyethylene was placed at the end of the LC (in patients selected by draw) through the trocar (5 mm) at the anterior axillary line. The drain tube was in place for at least 48 hours. In all patients the drain was planned to remove at 48 hours unless any bile leak or bleeding is detected. The protocol of the postoperative analgesia was same for all the patients. On the day of operation all patients received 75 mg of diclofenac sodium intramuscularly eight hourly and from the next day oral combination of ibuprofen and paracetamol.

The following variables were evaluated and compared between the two groups: (a) operative time, (b) postoperative pain, (c) the length of postoperative hospital stay, (d) postoperative complications.

The pain was evaluated using visual analogue score (VAS). VAS is presented by a special designed ruler numerated from 0 to 10 cm. At the one end, "0" represents no pain; at the other end, "10" represents unbearable pain. The patients were asked to point out on the ruler the number they thought presented the power of their pain. The first recording of pain was six hours after surgery and the second recording in the morning, third in the evening of first postoperative day and lastly on the second postoperative day at the time of removal of the drain.

All data were analyzed using Statistical Package for Social Science (SPSS). Chi-square and t-tests were used to analyze data, as appropriate, and statistical significance was established at $p < 0.05$.

RESULTS

Both the groups (Group A with drain and group B without drain) included same number of patients, 30 in each group. Average age of the patients in group A was 36.25 years and 37.90 years in group B. Male to female ratio in group A was 1:3.5 and in group B 1:4 and the overall ratio was 1:3.7.

The mean operative time in group A was 54.82 minutes and in group B was 48.66 minutes. The mean operative time in group A was 6.16 minutes longer and the difference was statistically not significant ($p > 0.05$). Table 1 shows incidence of postoperative pain. At 6th postoperative hour 26 (86.66%) patients in group A and 24 (80%) patients in group B had pain. The mean score in VAS was almost equal in both the groups (7.53 vs. 7.23). The pain at this time was mostly felt at the epigastric port site. At 24th and 48th hour the pain was maximum at the drain site. Twenty seven (90%) patients in group A had pain at the drain site after 24th and the pain was persisting in 25 (83.33%) patients even at 48th hour after surgery. The pain was higher in group A by more than two points on the average in VAS at 24 and 48 hours and these differences were statistically significant ($p < 0.05$). Table 2 shows the VAS score of postoperative pain.

Table 1. Incidence of postoperative pain abdomen.

Time (Hrs)	Group A	Group B	P value
6	26 (86.66%)	24 (80%)	0.56
24	27 (90%)	19 (63.33%)	0.001
48	25 (83.33%)	11(36.66%)	0.003

Table 2. VAS score of pain.

Time (Hrs)	Group A		Group B		P value
	Mean	SD	Mean	SD	
6	7.53	±1.21	7.23	±1.11	0.147
24	5.58	±0.94	3.81	±1.02	0.001
48	5.41	±0.87	3.45	±0.86	0.005

SD: Standard Deviation

The proportion of the patients staying in the hospital for more than two days was higher in group A, 14(46.66%) and 8(26.66%) in group B ($p < 0.05$). In group A out of 14 patients, nine patients stayed for more than two days because the removal of drain was not possible at 48 hours due to persistent amount of drainage, however none of them had bile or blood. In these patients drain was removed on post operative day three and four. Table 3 shows the length of hospital stay and postoperative complications.

Table 3. Length of hospital stay and postoperative complications in two groups.

Outcome	Group A, n (%)	Group B, n (%)	P value
Hospital Stay >2 days	14 (46.66)	8 (26.66)	0.012
Nausea	21 (70)	9 (30)	0.19
Vomiting	12 (40)	7 (23.33)	0.33
Pain on Right Shoulder	3 (10)	4 (13.33)	0.15
Surgical Site Infection	1 (3.33)	0	0.71
Pneumonia	1 (3.33)	0	0.27

Postoperative complications were more frequently seen in Group A but the differences were statistically not significant. Pain in the right shoulder was more often observed in Group B. Nausea, vomiting was more common in Group A. Only one patient had superficial wound infection of the epigastric port and one had pneumonia in the postoperative period in Group A. In all patients with drainage, the drain content was serosanguinous and serous. There was no bile leak in group A. None of the patients in group A required re-drainage after the removal of drain. Patients in group B were assessed clinically as well as radiologically for the presence of collection. Ultrasound abdomen to assess the collection was advised only if suspected clinically by the presence of increased in severity or persistence of pain, prolonged ileus (> 48 hours), fever and abdominal signs of localized or generalized peritonitis. Five patients in group B had pain persisting for more than 48 hours hence ultrasound was done to look for collection which revealed minimal collection in gall bladder fossa not requiring any intervention. Their pain subsided gradually with symptomatic treatment.

There were no deaths and reoperations were also not needed. After discharge, all patients returned for follow up on the 7th and on the 60th postoperative day. No hernia at the drain site was noted.

DISCUSSION

Laparoscopic surgery is valuable to the surgeon because, in comparison to conventional surgery, it allows the surgeon to perform operations more precisely and more anatomically, minimizes damage to the surgical bed, and therefore minimizes the need for drainage of the gallbladder bed. Laparoscopic surgery also allows the surgeon to use the cautery with more precision and reliability. In LC,

magnification of the bile ducts and duct of Luschka allows safer ligature during surgery.²

The routine placement of drain becomes a part of operation for a long period of time. However, controversies have surrounded this practice in elective conventional cholecystectomies, with most surgeons departing from this approach. Surgeons have routinely drained after LC because of a fear of collection of bile and blood requiring open procedures.² Another reason for drainage is to allow CO₂ insufflated during laparoscopy to escape via the drain site, thereby decreasing the shoulder pain.^{2,5} This is not always true, however, as was shown by Truedson in their prospective studies.⁶ Similarly, in a review of 1546 cases of cholecystectomy, only 0.26% of the patients were reoperated because of collection of bile.⁷ Likewise, in another review of 1277 patients, only 16 patients had to be reoperated because of bile peritonitis and notably all 16 patients had drains.⁸ Further, in a review of 8423 cases there was a subhepatic collection or abscess in 0%-7% in the patients with drains, and only 0%-4% in patients without a drain.⁹ In our study non had complications like bile leak or subhepatic abscess requiring reoperation. The drain failed to prevent this complication and a second operation needed to drain the fluid collection adequately shown in the literature, the clinically significant leak of bile is a result of inappropriate surgical technique and not the inevitable result of surgery that follows a big series of operated patients or lack of drain use.^{7,8,10-12} If a drain is used, it should be removed soon, as suggested by some surgeons, within 24-48 hours postoperative.^{2,9,13}

In this study we 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. Uchiyama et al. found that the mean VAS scores were significantly greater in drain group at 24 and 48 hours.¹⁴ Tzovaras et al. suggested that the routine use of drain in elective LC has nothing to offer and it is associated with increased pain.¹⁵

Hospital stay in drain group (Group A) ranged from 1-5 days while it ranged from 1-3 days in patients with no drain. That showed significant differences. Gurusamy et al. and Satinsky et al. have also reported significant differences with longer hospital stay in patients with drain.^{16,17}

Our study did not show statistical differences in terms of postoperative complications like surgical site infection, respiratory complications or postoperative nausea and vomiting, when two groups were compared which is in accordance with the observations of Gurusamy et al., however many studies have revealed that the use of drain is associated with increased morbidity.^{16,18}

Drains can also lead to a series of complications described in literature such as migration of the drain, breaking of the drain, fever because of the drain, and perforation of the intestine.¹⁹ However, the issue is not whether the use of the drain in LC is superior to the avoidance of drain, but whether the patient is in obvious hazard if a drain is not used. In elective LC, drain should not be used because it is of no benefit and it may become even dangerous.^{6,8,10,18} Further, the clinically significant bile leak is very rare and it cannot be prevented by the use of a drain.^{9,11,15}

Being a comparative but non-randomized is the main limitations of our study. We did not include the patients with clinical or sonological features of acute cholecystitis. These limitations may potentially bias our results. This potential bias would have been in favor of drain insertion, as drains are usually inserted in cases when complications are expected, but our study included patients with complicated and/or difficult cholecystectomies where no

drains were inserted and no postoperative complications were reported.

CONCLUSION

Our results indicate that routine drainage of gallbladder bed after elective LC may not be justified. Drainage causes more postoperative pain, prolongs the operative time, persistent drainage and hospital stay. However in selected patients with potential bile leak e.g imperfect closure of cystic duct, bile staining of liver bed suggesting the possibility of missed accessory duct, difficult cholecystectomy due to inflamed gallbladder and/or adhesions, drainage may be justified. At the same time drainage shouldn't be done only for the false sense of security as it can neither prevent postoperative biliary peritonitis nor bleed, unless great care is taken during surgery.

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