

Laparoscopic Cholecystectomy with and without Drainage - A Comparative Clinical Study

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ABSTRACT

Introduction: In India gallstones are most common and costly digestive disease and are a major cause of hospitalization. Laparoscopic Cholecystectomy (LC) has received nearly universal acceptance and is currently considered the criterion standard for the treatment of symptomatic cholelithiasis. Drains are placed to reduce complications after LC but on the other hand it has been found to increase infective complications and delay discharge. So the present study was conducted with the aim of assessing the effect of drain use and no drain use in patients undergoing elective laparoscopic cholecystectomy.

Material and methods: The study included 60 patients selected by convenience sampling technique, Who underwent four port laparoscopic cholecystectomy. These were randomly divided into two groups: drain was placed in even group and no drain was put in odd group. All Patients were assessed on following parameters postoperatively including abdominal pain (Visual Analogue Scale), Shoulder pain, Drain site infection, Wound infection, Fever, Duration of post-operative hospital stay, Nausea, Vomiting, Haemorrhage.

Results: Both the groups were homogenous in terms of age and gender ($p>0.05$). Postoperative stay and rate of wound infection was higher in drain group as compared to no drain group ($p<0.05$). There is no difference in terms of nausea and vomiting among two groups. Haemorrhage was absent in all the cases in both drain group and no drain group. However a total of 6 (20.00%) patients in drain group developed drain site infection and majority i.e. 28 (93.33%) of patients complained of pain on drain removal.

Conclusion : So it is concluded that use of drain in case of elective laparoscopic cholecystectomy does not provide any benefit infact it increases the chances of wound infection as well as there is an increase in postoperative hospital stay. So use of drain is not recommended as a routine practice after laparoscopic cholecystectomy.

Keywords: Laparoscopic Cholecystectomy, Cholelithiasis, Drains,

INTRODUCTION

The gallbladder is a pear-shaped reservoir of bile situated on the inferior surface of the liver, partially covered by peritoneum.¹ Gall bladder, by virtue of its anatomical position at the gateway to the hilum of the liver and by virtue of its embryological development including its numerous variations, is the commonest component of gastrointestinal system after the appendix requiring surgical intervention. Gallstone disease, one of the commonest biliary tract disorders known since ages requires surgical intervention for total cure. In India gallstones are most common and costly digestive disease and are a major cause of hospitalization.²⁻⁴ Conventional cholecystectomy have enjoyed unchallenged supremacy as treatment of choice for cholelithiasis for more than 100 years but its preference in the surgical fraternity is slowly and steadily decreasing after the

invention of minimally invasive surgery like mini-cholecystectomy and laparoscopic cholecystectomy.^{5,6} Dr. Med Erich Mühe of Böblingen, Germany, performed the first laparoscopic cholecystectomy (LC) on September 12, 1985. A National Institutes of Health (NIH) consensus statement in 1992 stated that LC provides a safe and effective treatment for most patients with symptomatic gallstones and has become the treatment of choice for many patients. LC has received nearly universal acceptance and is currently considered the criterion standard for the treatment of symptomatic cholelithiasis.⁷ Infact laparoscopic cholecystectomy has revolutionised the treatment of gallstone disease, being the most remarkable surgical innovations of 20th century. It has become gold standard for the treatment of cholelithiasis.^{8,9} It is the commonest laparoscopic operation performed worldwide and is the second most commonly performed operation in GI surgery after appendectomy.¹⁰ Laparoscopic cholecystectomy provides a safe and effective treatment for patients with gallstones as it reduces postoperative pain with almost inadvisable scar, short hospital stay and earlier return to work.¹¹ As all other surgical interventions laparoscopic cholecystectomy is also associated with number of complications, which may range from mild to serious and even life threatening at times. Shoulder tip pain, back pain, and nausea/vomiting, absent in the conventional laparotomy, are the common complaints in laparoscopic cholecystectomy. To prevent such complications routine drainage was adopted in laparoscopic cholecystectomy¹² Surgeons have routinely drained after laparoscopic cholecystectomy because of the fear of collection of bile or blood requiring open procedures. Another reason for draining is to allow Carbon dioxide insufflated during laparoscopy to escape via the drain site, thereby decreasing the shoulder pain. On the other hand, drain use may increase infective complications and delay discharge. A higher proportion of patients with nausea and vomiting has also been noted. Studies have shown higher wound infection rate and longer hospital stay in the drain group.¹²

Therefore, controversy has surrounded this practice in elective conventional Cholecystectomies. The recent Cochrane Database Systematic Review shows that traditionally, drains were used for the early detection of bile leaks and any unsuspected hemorrhage and to evacuate abdominal fluid collections without the need for more invasive procedures. At present, the rate of

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How to cite this article: Mandeep Singh, Karnail Singh, Inderjit Singh Chawla. Laparoscopic cholecystectomy with and without drainage - a comparative clinical study. International Journal of Contemporary Medical Research 2017;4 (1):117-120.

biliary complications after LC is 0.4 % (range, 0.1–0.9 %). Postoperative hemorrhagic complications are very rare which further limit the use of drains. The absence of subhepatic fluid collections after cholecystectomy is strongly associated with an uncomplicated postoperative recovery. The efficacy of drains to evacuate subhepatic collections may justify their use to prevent postoperative complications.¹³ However, experimental studies showed that, when a drain is inserted in the peritoneal cavity that contains no fluids, it is quickly surrounded by omentum and completely occluded within 48 hours. Drains are supposed to be much more efficient in draining bile than other types of intra-abdominal collections. Port-site infection is a minor complication that affects 1.1–7.9 % of patients after LC. The use of drains seems to improve the incidence of this complication, possibly related to the presence of a foreign body.

Thus as compared to open cholecystectomy, the usefulness of drains in laparoscopic cholecystectomy is not clear, and in many instances prophylactic drains are useless or may even add to the morbidity or cost of a procedure.^{14,15} However the data related to effectiveness of drain use is still limited. This serves as a basis to undertake present study to compare the effect of drain use on outcome of laparoscopic cholecystectomy.

A prospective study of 60 cases undergoing Laparoscopic cholecystectomy with and without drainage was undertaken in order to study

1. The length of hospital stay and
2. The incidence of post-operative morbidity in terms of complications for evaluation of merits and demerits of drainage over non-drainage techniques.

MATERIAL AND METHODS

The study was conducted in Department of General Surgery, Govt. Rajindra Hospital/ Govt. Medical College Patiala, Punjab on Sixty patients of gall Bladder disease admitted for laparoscopic cholecystectomy. Study was approved by ethical committee of the institution. After obtaining Writtten informed, the patients were divided into two groups- Group A and Group B on random basis

Group A: (n= 30) Sub-hepatic space was drained by a suction drain which was brought out through mid axillary port (even group)

Group B: (n= 30) Non-drainage of Sub-hepatic space (odd group)

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

Operative procedure and outcome measures:

Plan of thesis was approved from institutional ethical committee. Written informed consent was obtained in all the cases. Haemogram, urine analysis, liver-function tests, pre-operative

chest x-ray, ECG and ultra sonography of intra and extrahepatic biliary tract was be done in all cases. All patients were subjected to Laparoscopic cholecystectomy. General anaesthesia was utilized. Laparoscopic cholecystectomy was performed using four port technique. In 30 patients in odd group non-drainage of sub-hepatic space was used, in the even group sub-hepatic space was drained by a suction drain which was brought out through mid axillary port. Sociodemographic data of the patient including age, sex, any past history of illness if present and investigations including USG findings were recorded in proforma developed by researcher. All the patients in both experimental and control group were evaluated for 9 outcome measures postoperatively including Abdominal pain (Visual Analogue Scale), Shoulder pain, Drain site infection, Wound infection, Fever, Duration of post-operative hospital stay, Nausea, Vomiting, Haemorrhage. Postoperative pain was assessed at 0 day, 1st day, 2nd day, 3rd day after operation by using Visual Analogue scale. On day 0, all patients were administered analgesics after 1hr of extubation than at 6hrs and then after 8 hrs. On day 1, 2 and 3 all the patients were given analgesics as required after assessing pain. The wound infection was recorded by examination of wound daily for any discharge and/or redness. All patients were given respiratory physiotherapy, and were made ambulatory in the post-operative period as early as possible.

STATISTICAL ANALYSIS

The data was analysed using appropriate statistical methods including descriptive and inferential statistics including chi-square and student's t-test.

RESULTS

Present study revealed that maximum no. i.e. 9 (30.00%) of patients in no drain group belonged to age group of 31-40 years followed by 8 (26.67%) patients in 20-30 years, whereas least no. of subjects i.e. 3 (10.00%) belonged to 61-70 years. In drain group maximum no. of patients i.e. 8 (26.67%) belonged to 31-40 years and least no. i.e. 4 (13.33%) of subjects belonged to 61-70 years age group. Both the groups were homogenous in terms of age distribution ($p = 0.9841$). As per gender distribution majority of the study subjects in both no drain group and drain group were females i.e 26 (86.7%) and 29 (96.7%) respectively. Both the groups were homogenous in terms of gender distribution ($p = 0.161$). Mean hospital stay (in days) was significantly higher in case of no drain group (4.63 ± 2.41) as compared to drain group (8.63 ± 4.06) with $p=0.00002$. Rate of wound infection was significantly higher with drain use as compared to no drains because more number of patients in drain group i.e. 7 (23.33%) developed wound infection as compared to patients in no- drain group i.e. 1 (3.33%) with $p=0.0226$. There is no difference in terms of nausea and vomiting among two groups. Haemorrhage was absent in all the cases in both drain group and no drain group. Insertion of drain added to discomfort of the patients as a total of 6 (20.00%) patients in drain group developed drain site infection and majority i.e. 28 (93.33%) of patients complained of pain on drain removal. There was no statistically significant difference in abdominal pain as assessed by Visual Analogue Scale in both drain and no drain group at 0, 1st and 2nd postoperative day. There is no significant effect of drain use on shoulder pain.

DISCUSSION

Laparoscopic cholecystectomy is the gold standard for the treatment of cholelithiasis. When compared to open surgery it offers various benefits like faster recovery, shorter hospital stay, and better postoperative outcome and fewer complication. Routine drainage was a part of cholecystectomy procedure for a long period of time. However many studies have reported no practical benefit of inserting drains after laparoscopic cholecystectomy. But still there is no clear cut practice regarding this. So the present randomized controlled study was conducted on a total of 60 patients with two groups. Findings of the present study demonstrated that there was a statistically significant ($p=0.00002$) difference among no drain group and drain group in terms of duration of hospital stay as it was more in case of no drain group (mean \pm s.d.=4.63 \pm 2.41) as compared to drain group (mean \pm s.d.=8.63 \pm 4.06). Similar findings are also been reported by Nagpal A et al (2011)¹⁶ as mean Hospital stay was higher in drain group as compared to no- drain group. Similar studies were also conducted by Koichi Ishikawa et al (2010)¹⁷, Rathi P.K et al (2009)¹⁸, where it is found that drain use prolongs the hospital stay. Gouda El-labban (2008)¹¹ also reported that hospital stay was longer in the drain group than in group without drain and it is appearing that the use of drain delays hospital discharge.

Present study reported a significant difference ($p=0.0226$) in rate of wound infection with drain use as compared to no drains because more number of patients in drain group i.e. 7 (23.33%) developed wound infection as compared to 1 (3.33%) patients in no- drain group. Similar findings are also reported by Abid Halim (2011)¹⁹ that due to more chances of infection it is advised not to place drain in Laparoscopic Cholecystectomy. Gurusamy et al (2007)¹² also reported that concluded that wound infection tended to be higher in those with a drain.

Another major finding of the study was that incidence of nausea and vomiting was slightly higher among patients in drain group as compared patients in no drain group. But these differences were not statistically significant. ($p=0.1903$, 0.3894 respectively). Similar findings are reported by Picchio M (2012)²⁰, Hawasli A et al (1994)²¹ which stated that there was no statistically significant difference among the incidence of nausea and vomiting in postoperative period with drain use and no use. Moreover in present study there was no statistically significant difference among patients in no drain group and drain group in terms of fever during postoperative period.

In present study other postoperative complication was hemorrhage was absent in all the cases in both drain group and no drain group. Small sample size could be a reason for not observing this complication. On other hand Picchio M et al (2012)²⁰ reported two (1.9 %) significant hemorrhagic events postoperatively. But in case of patients where drain was inserted a total of 6 (20.00%) patients developed drain site infection and majority i.e. 28 (93.33%) of patients complained of pain on drain removal. Other studies by Rathi P.K. et al (2009)¹⁸ also reported that it is observed that routine placement of drain after laparoscopic cholecystectomy not only prolongs the post-operative hospital stay; it also leads to drain site pain / discomfort.

Another major finding of the study is that there was no statistically significant difference in abdominal pain as assessed

by Visual Analogue Scale in both drain and no drain group at 0 postoperative day ($p=0.08$) and postoperative day 1 ($p=0.1325$) and postoperative day 2 ($p=0.7795$). None of the patients in either group complained of pain on third postoperative day. Similar findings are also been reported by Kemal Arslan et al (2011)²² that there was no difference in pain between groups the 2nd, 8th, or 18th hour evaluations. Gouda El-labban, (2008)¹¹ also reported the similar findings that there was no statistically significant difference in postoperative pain.

Present study also reveals that there is no significant effect of drain use on shoulder pain. These findings are supported by other studies conducted Gurusamy et al (2007)¹² and Picchio M et al (2012)²⁰ which reported that there was no statistically significant difference in occurrence of shoulder tip pain with drain use.

CONCLUSION

So it is concluded that there is no practical benefit of postoperative drain insertion in case of patients with laparoscopic cholecystectomy. It offers no benefit in terms of postoperative abdominal pain reduction, shoulder pain reduction, nausea, vomiting and fever in postoperative period. On the other hand it prolongs the hospital stay can also increases the chances of wound infection. In addition it adds to pain and discomfort on the drain site. So drain use is not recommended as a routine practice in laparoscopic cholecystectomy.

REFERENCES

1. Danny A Sherwinter "Laparoscopic Cholecystectomy" assessed at <https://profreg.medscape.com/px/getpracticeprofile>
2. Wani NA, Khan ZA.Experience with biliary tract surgery. Ind J Surg. 1995;62:181-186.
3. Hussain A, Ahmed N, Zarger HU.Gall Stones: A chemical study in Kashmir.Ind J Surg. 1984;156-160.
4. William TL. Clinical manifestations and impact of gallstone disease.Am J Surg. 1993;165:405-408.
5. Goco IR, Luciola G, Chamber RN. Mini-cholecystectomy and operative cholangiography: A means of cost containment. Am Surg. 1983;49:143-5.
6. Mouret P. From the first laparoscopic cholecystectomy to the frontier of laparoscopic surgery; the future prospective. Dig Surg. 1991;8:124-25.
7. Sherwint Danny A, Kurt E Roberts. Laparoscopic Cholecystectomy. Assessed at <http://emedicine.medscape.com/article/1582292-overview#a30>
8. Bruce DS, Stephen BE. Laparoscopic cholecystectomy: Treatment of choice for symptomatic cholelithiasis. Ann Surg. 1991;213:665-77.
9. Soper NJ, Stockmann PT. Laparoscopic cholecystectomy: The new gold standard. Arch Surg. 1992;127:917-23.
10. Mufti TS, Ahmad S, Naveed D, Akbar M, Zafar A. Laparoscopic cholecystectomy: An early experience at Ayub Teaching Hospital Abbottabad. J Ayub Med Coll Abbottabad. 2007;19:42-44.
11. Gouda El-labban, Emad Hokkam, Mohamed El-labban, Ali Saber, Khaled Heissam, Soliman El-Kammash. Laparoscopic elective cholecystectomy with and without drain: A controlled randomised trial. J Minim Access Surg. 2012;8:90-92.
12. Gurusamy KS, Samraj K, Mullerat P, Davidson BR. Routine abdominal drainage for uncomplicated laparoscopic

- cholecystectomy. Cochrane Database of Systematic Reviews 2007, Issue 4. Art. No.: CD006004.
13. Chiche L, Letoublon C (2010). Traitment des complications de la chole'cystectomie. In: EMC, Techniques chirurgicales - Appareil digestif, pp. 40–960. Elsevier Masson SAS, Paris
 14. Uchiyama K, Tani M, Kawai M, Terasawa H, Hama T, Yamaue H. Clinical significance of drainage tube insertion in laparoscopic cholecystectomy: a prospective randomized controlled trial. *J Hepatobiliary Pancreat Surg*. 2007;14: 551-56.
 15. Petrowsky H, Demartines N, Rousson V, Clavien PA. Evidence-based Value of Prophylactic Drainage: Discussion. *Annals of Surgery*. 2004;240.
 16. Nagpal A., Goyal S., Abbey L, Singh A. Drainage in cholecystectomy : Required or not? A Comparative Randomized Study in Northern Indian Subjects" *World Journal of Laparoscopic Surgery*. 2012;5:63-66.
 17. Ishikawa K, Matsumata T, Kishihara F, Fukuyama Y, Masuda H, Kitano S. Laparoscopic cholecystectomy with and without abdominal prophylactic drainage. *Digestive Endoscopy*. 2011;23:153–156.
 18. Rathi PK, Abdul Razaque Shaikh, Nandlal Kella, Rasool Bux Behan "Laparoscopic Cholecystectomy without the use of Drain in Selected Cases JLUMHS. 2011;10:23-26.
 19. Halim A, Ahmad I, Iqbal J, Khan Z. Role of drain in laparoscopic cholecystectomy" *J. Med. Sci. (Peshawar, Print)*. 2011;19: 49-53.
 20. Picchio M, De Angelis F, Zazza S, Di Filippo A, Mancini R, Pattaro G, Stipa F, Adisa AO, Marino G, Spaziani E. Drain after elective laparoscopic cholecystectomy. A randomized multicentre controlled trial. *Surg Endosc*. 2012;26:2817-22.
 21. Hawasli A, Brown E. The effect of drains in laparoscopic cholecystectomy" *J Laparoendosc Surg*. 1994;4:393-8.
 22. Kemal Arslan, Bülent Erenoğlu, Arif Atay, Hande Köksal, Osman. Effect of drain localization on postoperative pain in laparoscopic cholecystectomy: Prospective, Randomized and controlled study. *Eur J Surg Sci*. 2012;3:86-91.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 17-12-2016; **Published online:** 29-01-2017