

# Intraoperative Findings and Technique Modification in Acute Cholecystitis in Early and Delayed Groups of Laparoscopic Cholecystectomies: A Randomized Control Prospective Study

<sup>1</sup>Navendu Agarwal, <sup>2</sup>Brijesh K Sharma

## ABSTRACT

**Introduction:** Cholecystectomy is the most common surgery performed. The invention of laparoscopic cholecystectomy has made it extremely convenient and safe, but still the question of when to perform the surgery persists. This study attempts to compare the intraoperative findings of acute cholecystitis patients of the early and delayed group and its impact in surgery.

**Materials and methods:** Institutional-based prospective randomized control study was done on two groups of patients who were diagnosed and admitted to the General Surgery outpatient department (OPD) of Mahatma Gandhi Medical College and Hospital, Jaipur, Rajasthan, India from November 2015 to November 2017. The early group was operated within 7 days of the appearance of symptoms and the delayed group was operated after 6 weeks. Intraoperative findings and modification of technique were duly noted in both and analysis done by applying the chi-square test.

**Results:** Acute complications are found to be more in an early group like turbid bile or pus with distended gallbladder in the early group, but adhesions are much more in the delayed group. Technique modification is more required in early as compared with the delayed group.

**Conclusion:** An early cholecystectomy is a convenient option for a patient with a nonsignificant technique modification to manage the intraoperative complications.

**Keywords:** Adhesions, Delayed, Early, Laparoscopic cholecystectomy, Technique modifications.

**How to cite this article:** Agarwal N, Sharma BK. Intraoperative Findings and Technique Modification in Acute Cholecystitis in Early and Delayed Groups of Laparoscopic Cholecystectomies: A Randomized Control Prospective Study. *J Mahatma Gandhi Univ Med Sci Tech* 2017;2(3):114-117.

**Source of support:** Nil

**Conflict of interest:** None

<sup>1</sup>Postgraduate Resident, <sup>2</sup>Professor

<sup>1,2</sup>Department of General Surgery, Mahatma Gandhi Medical College and Hospital, Jaipur, Rajasthan, India

**Corresponding Author:** Brijesh K Sharma, Professor Department of General Surgery, Mahatma Gandhi Medical College and Hospital, Jaipur, Rajasthan, India, Phone: +919414076406, e-mail: brijeshsharma1952@gmail.com

## INTRODUCTION

In the West, 10 to 15% of adults are suffering from gallstone disease;<sup>1-5</sup> however, 1 to 4% become symptomatic per year.<sup>3,5</sup> In India, the disease prevalence is variable in different parts with almost 7 times in North India as compared with South India.<sup>6</sup> The invention of laparoscopic instruments, a new era in gallbladder surgery began in the year 1987. With the advantages associated with laparoscopic surgery, the method is now preferred and has become a standard procedure at the taluka level.<sup>3,7</sup> The timing of surgery is still a point of controversy. In general practice, it is seen that in the first 72 hours, the tissue planes are separable, and bleeding is less as compared with the later period. The main reason for conversion to open in early cholecystectomy is found to be the obscured view and dissection of Calot's triangle.<sup>8,9</sup> Also, there are practical difficulties of handling a distended edematous gallbladder and risk of spillage of turbid bile or pus. Moreover, in late cases, pericholecystic adhesions obscuring the dissection at Calot's triangle is the main reason for conversion.<sup>10</sup> By convention, surgery is carried out after 6 weeks in acute cholecystitis to allow recovery. This conventional method has disadvantages of patients suffering and loss of finance. This study aims to compare the intraoperative findings of early and delayed groups' laparoscopic cholecystectomy and the technique modification required to manage the cases appropriately.

## MATERIALS AND METHODS

This was a hospital-based prospective comparative randomized study carried out from November 2015 to November 2017 in the Department of General Surgery, Mahatma Gandhi Medical College and Hospital, Jaipur Rajasthan, India. Sixty patients with diagnosed acute cholecystitis who satisfied the inclusion and exclusion criteria were admitted through the OPD and Emergency Department. Due approval was taken from Institutional Ethical Committee before undertaking the study. The selected patients were then informed about the

procedure and written informed consent was taken. These patients were divided into two groups:

- 30 early laparoscopic cholecystectomy
- 30 delayed laparoscopic cholecystectomy

### Inclusion Criteria

Patients of acute cholecystitis were selected on following criteria<sup>11</sup>:

- Clinical criterion: Acute upper abdominal pain with tenderness under the right costal margin.
- Ultrasonographic (USG) criterion: The USG evidence of acute cholecystitis (thickened and edematous gallbladder wall, distended gallbladder, and pericholecystic fluid collection).

Patients of the early group were operated within 7 days of admission and the delayed group patients were operated after 6 weeks.

### Exclusion Criteria

- Patients unfit for laparoscopic surgery
- Patients with suspected common bile duct stones
- Patients above 80 years
- Patients having localized/generalized peritonitis
- Patients with previous upper abdominal surgery
- Patients with clinically palpable gallbladder
- Patients not willing to give consent for the study

Sixty diagnosed patients with acute cholecystitis who were fulfilling the inclusion and exclusion criteria were included in this study. A pro forma was made to note patient's particulars, including history, physical examination, treatment received, and operative findings along with the required operative technique.

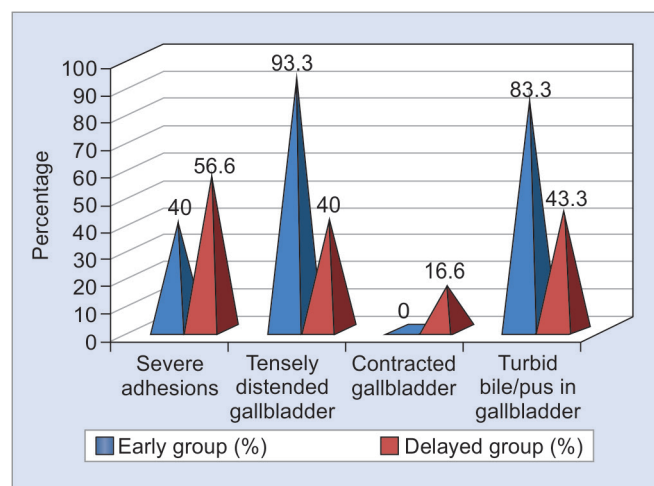
Preoperative assessment of the patient for fitness was done by evaluation of biochemical, hematological, serological tests, and preanesthetic check-up. The surgeries were performed by consultant surgeons after thorough investigation and preanesthetic check-up, under general anesthesia using endotracheal intubation by the anesthetist. Pneumoperitoneum was created by blind puncture with a Veress needle through the supraumbilical incision. Four laparoscopic ports were used. Gallbladder visualization and noting of points like adhesions, distension of gallbladder, fibrosis, or contraction of gallbladder were done in the pro forma. The note made of bile turbidity or the presence of pus in the gallbladder. Exposure of Calot's triangle and release of adhesions were done. The cystic pedicle was dissected to isolate the cystic duct and the cystic artery separately, and both were then clipped and divided. Intraoperative cholangiogram was not performed. The gallbladder was dissected off from its bed with a monopolar cautery hook. At the completion of the surgery, the gallbladder was extracted through the

epigastric incision. If necessary, the gallbladder was emptied through a laterally inserted Veress needle to allow better grasping. In some instances, enlargement of the epigastric port was also done to deliver the gallbladder safely. These technique modifications were noted in the pro forma. Hemostasis was achieved in gallbladder bed, and after a thorough saline lavage, a suction drain was placed, if clinically indicated and the incisions were closed.

When required, conversion to the open procedure was performed through a right subcostal incision.

## RESULTS

We can see clearly in Graph 1 representing the Table 1 that severe adhesions were found in 17 (56.6%) delayed group patients and 12 (40%) early group patients. Contracted gallbladder was found in 7 (16.6%) patients of the delayed group and none in the early group of patients, and this is found to be statistically significant. Tensely distended gallbladder was found in 93.3% (28 out of 30) patients of early group and 40% (12) in the delayed group, and this is also found to be statistically significant. Turbid bile/pus in the gallbladder was found in 25 out of 30 patients (83.3%) of the early group and 7 (16.6%) only in the delayed groups, and this is also found to be

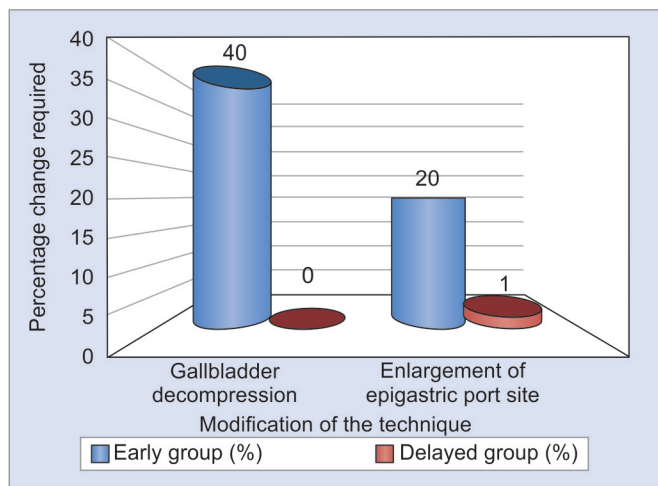


**Graph 1:** Distribution of intraoperative findings during cholecystectomy in patients of cholecystitis in early and delayed group

**Table 1:** Distribution of intraoperative findings during cholecystectomy in patients of cholecystitis in early and delayed groups

Operative findings	Early group (%)	Delayed group (%)	p-value
Severe adhesions	12 (40)	17 (56.6)	0.301 (NS)
Tensely distended gallbladder	28 (93.3)	12 (40)	<0.001 (S)
Contracted gallbladder	0 (0)	7 (16.6)	0.016 (S)
Turbid bile/pus in gallbladder	25 (83.3)	13 (43.3)	0.003 (S)

Chi-square test = 16.124 with 3 degrees of freedom; p-value = 0.001; S: Significant; NS: Not significant



**Graph 2:** Distribution of technique modification during cholecystectomy in patients of cholecystitis in early and delayed group

**Table 2:** Distribution of technique modification during cholecystectomy in patients of cholecystitis in early and delayed groups

Modification of the technique	Early group (%)	Delayed group (%)	Total (%)
Gallbladder decompression	12 (40)	0 (0)	12 (20)
Enlargement of epigastric port site	6 (20)	2 (6.6)	8 (13.3)

Chi-square test = 1.134 with 1 degree of freedom; p-value = 0.287 (nonsignificant)

statistically significant. These observations show that tensely distended gallbladder and thick bile/pus in the gallbladder are found to be more in the patients of the early group than in the delayed group of patients. Severe adhesions and contracted gallbladder are more common in the delayed group than in the early group of patients. These findings suggest that delayed group patients have chronic complications, and the early group has acute complications of cholecystitis which is comparatively easier to handle than the chronic ones.

Graph 2 representing the Table 2 shows the modification of laparoscopic technique during cholecystectomy when the need arises in both early and delayed groups of patients. Gallbladder decompression was needed in the 12 (40%) early group of patients, while none of the patients of the delayed group needed it. Enlargement of the epigastric port was done to extract gallbladder in 6 (20%) patients of the early group and only in 2 (6.6%) patients of the delayed group. These observations in this table tell that early cholecystectomy required more frequent modification of techniques compared with delayed laparoscopic cholecystectomy.

**DISCUSSION**

The high incidence of gallstone disease in North India makes laparoscopic cholecystectomy the most common

procedure in general surgery unit. It is an established gold standard operation due to its proven efficacy with both cosmetic and rapid recovery. Acute cholecystitis was once considered a contradiction to laparoscopic cholecystectomy. By current standards, laparoscopic cholecystectomy is accepted as a safe and feasible approach to acute cholecystitis in the hands of experienced surgeons. Performing laparoscopic cholecystectomy for acute cholecystitis is technically more demanding than in elective cases. Extensive inflammation causes an increase in bleeding and adhesions around the Calot’s triangle, obscuring the anatomy, making dissection difficult and hazardous. Conversion may be required if the anatomy cannot be defined, if the operation progresses poorly or if complications arise.

It can be seen from Table 1 in our study that four intraoperative findings considered were severe adhesions, tensely distended GB or contracted gallbladder, and the presence of turbid bile or pus. Severe adhesions were found in 40% in the early group and 56.6% in the delayed group; however, it was not statistically significant. Tensely distended gallbladder was found in 93.3% in the early group and 40% in the delayed group and was statistically significant. Contracted gallbladder was found in 16% cases in the delayed group only and was statistically significant. Turbid bile or PUS in gallbladder was found in 83.3% in the early group and 43.3% in the delayed group and was also found to be a statistically significant factor. Lo et al<sup>12</sup> demonstrated that turbid bile or pus was seen in 87% patients in the early group and 46% in the delayed group, similar to our study. Hence, it can be seen that early cases have more chances of turbid bile or pus. In a study by Riaz et al,<sup>13</sup> pus in gallbladder was found in 28.2% in the early group and 31.7% in the delayed group. Frozen calot’s was found in 10.25% in the early group and 7.3% in the delayed group.

In Table 2, it is shown that technique modification was needed when required in both early and delayed groups to complete the surgery. Gallbladder decompression was required in 40% cases in the early group only. Enlargement of the epigastric port was required in 20% cases in the early group and 6.6% cases in the delayed group. No extra port was required in any of our cases.

Kolla et al<sup>14</sup> in their prospective study depicted various technique modifications, such as gallbladder decompression in 80% cases in early and in 5% cases in the delayed group. Enlargement of the epigastric port was done in 5% cases in each group, and use of the fifth port was done in 10% cases in the early group. Use of retrieval bag was done in 35% cases in the early group. Similarly, Lo et al<sup>12</sup> reported that decompression was required in 82.22 and 41.46% cases respectively. Use of the fifth port was done 17.7% in the early group. Port

enlargement was done in 71.11% cases in the early group and 46.34% cases in the delayed group. It is precisely seen that technique modification is required more in the early group. Decompression facilitates easy dissection of the gallbladder, enlargement of port helps in easy delivery, use of the fifth port can be done to retract peritoneum which helps to clear the field, and so on. Hence, technique modification was more in the early group, but overall, the difference was nonsignificant.

## CONCLUSION

Our study shows that though the rate of intraoperative complications in early cholecystectomy appears more and can make the dissection difficult, technique modification and operability do not pose a significant difficulty. Hence, early laparoscopic cholecystectomy can be approached as a safe option for surgery and prevent patient readmission for the same.

## SUMMARY

The present study was a prospective comparative randomized study and included 60 patients of acute calculous cholecystitis divided into early and delayed groups according to the timing of surgery. Adverse intraoperative findings, such as gallbladder distension and turbid bile/pus were more in the early group and contracted fibrosed gallbladder was seen more in the delayed group. However, the difference in the modification of technique was nonsignificant in both groups, making early cholecystectomy an equally viable option for the surgeon compared with delayed surgery.

## ACKNOWLEDGMENTS

The guidance and support of all teachers, seniors, and colleagues are acknowledged without whom this study would not have been completed.

## REFERENCES

1. Janzon L, Aspelin P, Eriksson S, Hildell J, Trelle E, Ostberg H. Ultrasonographic screening for gallstone disease in middle-aged women. Detection rate, symptoms, and biochemical features. *Scand J Gastroenterol* 1985 Aug;20(6):706-710.
2. Jorgensen T, Teglbjerg JS, Wille-Jorgensen P, Bille T, Thorvaldsen P. Persisting pain after cholecystectomy. A prospective investigation. *Scand J Gastroenterol* 1991 Jan;26(1):124-128.
3. NIH Consensus Statement. Gallstones and laparoscopic cholecystectomy. Bethesda (MD): NIH; 1992. [cited 2006 Aug 10]. Available from: <http://consensus.nih.gov/1992/1992GallstonesLaparoscopy090html.htm>.
4. Muhrbeck O, Sahlin S, Ahlberg J. Rise and fall in the number of cholecystectomies: Stockholm 1932-1993. *Eur J Surg* 1996 Apr;162(3):199-204.
5. Halldestam I, Enell EL, Kullman E, Borch K. Development of symptoms and complications in individuals with asymptomatic gallstones. *Br J Surg* 2004 Jun;91(6):734-738.
6. Sharma, AK. Gallstone disease more prevalent North India. 2017. [cited 2017 Nov 25]. Available from: <https://www.linkedin.com/pulse/gallstone-disease-more-prevalent-north-india-sharma-avsm>.
7. Bakken IJ, Skjeldestad FE, Mjåland O, Johnson E. Cholecystectomy in Norway 1990-2002. *Tidsskr Nor Laegeforen* 2004 Sep;124(18):2376-2378.
8. Cheema S, Brannigan AE, Johnson S, Delaney PV, Grace PA. Timing of laparoscopic cholecystectomy in acute cholecystitis. *Ir J Med Sci* 2003 Jul;172(3):128-131.
9. Livingston EH, Rege RV. A nationwide study of conversion from laparoscopic to open cholecystectomy. *Am J Surg* 2004 Sep;188(3):205-211.
10. Peng WK, Sheikh Z, Nixon SJ, Paterson-Brown S. Role of laparoscopic cholecystectomy in the early management of acute gallbladder disease. *Br J Surg* 2005 May;92(5):586-591.
11. Williams, NS.; Bulstrode, CJ.; O'Connell, PR.; editors. *Bailey & Love's short practice of surgery*. 26th ed. Boca Raton (FL): CRC Press; 2013.
12. Lo CM, Liu CL, Fan ST, Lai EC, Wong J. Prospective randomized study of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. *Ann Surg* 1998 Apr;227(4):461-467.
13. Riaz M, Bhasin SK, Hussain T, Parvez M. Early vs late laparoscopic cholecystectomy and effect of time on clinical severity, pathology, and surgical outcome in patients of acute cholecystitis a prospective study. *J Evol Med Dent Sci* 2015 Nov;4(92):15786-15790.
14. Kolla SB, Aggarwal S, Kumar A, Kumar R, Chumber S, Parshad R, Seenu V. Early versus delayed laparoscopic cholecystectomy for acute cholecystitis: a prospective randomized trial. *Surg Endosc* 2004 Sep;18(9):1323-1327.