

Safety and Efficacy of laparoscopic cholecystectomy in comparison to open cholecystectomy

¹Dr.SadiqHusainKachavi,²Dr.Sandeep Patil,³Dr.CG Sunil

^{1,3}Assistant Professor, SDM College of Medical Sciences and Hospital, SDM University, Dharwad, Karnataka, India

²Associate Professor, SDM College of Medical Sciences and Hospital, SDM University, Dharwad, Karnataka, India

Corresponding Author: Dr.CG Sunil

Abstract

The first open cholecystectomy was performed by Langenbuch in 1882 in Berlin. The first laparoscopic cholecystectomy was performed by Muhe in 1985. However the first laparoscopic cholecystectomy recorded in medical literature was performed in March 1987 by Mouret in Lyon, France. The technique was perfected a year later in March 1988 by Dubois in Paris. Preoperatively patient's history was assessed with special reference to pain, fever, nausea, vomiting, dyspepsia, jaundice, mass per abdomen, weight loss and decreased appetite. A careful emphasis was made to record the physical findings particularly icterus tenderness in right hypochondrium and gallbladder mass. Laboratory testing and USG of gallbladder and CBD was done. CBD stone was ruled out by USG. Mean patient satisfaction score is significantly less in Group OPEN with $P = 0.009$. Significant number of patients responded with good to excellent grading (80%) in LAP group when compared to those patients in group OPEN (44%). For statistical analysis purpose we combined excellent+good as above average, and average+poor as below average satisfaction. Significant numbers of patients are satisfied with laparoscopic surgery when compared with open surgery.

Keywords: Laparoscopic cholecystectomy, open cholecystectomy, CBD stone

Introduction

The modern era of laparoscopic surgery has evoked remarkable changes in approaches to surgical diseases. The trend toward minimal access surgery (MAS) has prompted general surgeons to scrutinize nearly all operations for possible conversion to laparoscopic techniques.

Gallstones are the most common biliary pathology. It is estimated that gallstones affect 10-15 percent of the population in the western societies^[1]. Surgery plays an important part in the treatment. In more than 90% of patients, cholecystectomy is curative, leaving them symptom free^[2]. Patients with symptomatic gallstones should be advised to have elective laparoscopic cholecystectomy^[3].

The first open cholecystectomy was performed by Langenbuch in 1882 in Berlin. The first laparoscopic cholecystectomy was performed by Muhe in 1985. However the first laparoscopic cholecystectomy recorded in medical literature was performed in March 1987 by Mouret in Lyon, France. The technique was perfected a year later in March 1988 by Dubois in Paris. Since its introduction in France, laparoscopic cholecystectomy has become the treatment of choice for symptomatic cholelithiasis.

The postulated advantages of laparoscopic cholecystectomy are the avoidance of large incision, shortened hospital stay and earlier return to work^[4]. Our purpose in this study is to compare results after cholecystectomy using a laparoscope to that using standard open technique, in an effort to determine if these proposed advantages could be achieved in practice.

Methodology

This was a prospective study conducted at Bangalore medical college, Bangalore from October 2013 to May 2015. This study consisted of 50 patients treated with cholecystectomy (25-open and 25-laparoscopic).

Inclusion criteria

All patients with acute cholecystitis, chronic cholecystitis, cholelithiasis, empyema, mucocele and gangrenous gallbladder.

Exclusion criteria

Patients with choledocholithiasis, carcinoma of gallbladder, perforated gallbladder were excluded from the study.

All the patients were admitted and a detailed history and clinical examination was carried out as per written proforma.

The choice of operation in each case is decided by:

Patient's choice by explaining both procedures.

The preference of the surgeon in each case.

Patients opting for laparoscopic cholecystectomy were explained the possibility of conversion to open cholecystectomy.

Preoperatively patient's history was assessed with special reference to pain, fever, nausea, vomiting, dyspepsia, jaundice, mass per abdomen, weight loss and decreased appetite. A careful emphasis was made to record the physical findings particularly icterus tenderness in right hypochondrium and gallbladder mass. Laboratory testing and USG of gallbladder and CBD was done. CBD stone was ruled out by USG.

A thorough preoperative anaesthetic evaluation was done and patient fitness for general anaesthesia assessed. A dose of antibiotics (usually a cephalosporin) was given 30 minutes before surgery. A nasogastric tube was inserted routinely.

Injectable antibiotics and analgesics were given for 2-3 days postoperatively. Then they were given orally for another 3 days. Patients were started orally between 24-48 hours post-surgery in most cases. Sutures were removed usually by the 10th day.

The patient was reviewed on the 7th day and 21st day after discharge. Follow up was done for a period of 6 months whenever possible.

Results:

Table 1: Comparison of intra-operative complications in two groups of patients studied

Intra-operative complications	Group Lap (n=25)		Group Open(n=25)	
	No	%	No	%
Nil	23	92.0	24	96.0
Present	2	8.0	1	4.0
1. Major bleeding requiring conversion to open cholecystectomy.	0	0.0	0	0.0
2. Minor bleeding not requiring conversion to open cholecystectomy.	1	4.0	0	0.0
3. Bile duct injury.	0	0.0	0	0.0
4. Gall stone spillage.	1	4.0	1	4.0
5. Visceral injuries.	0	0.0	0	0.0

Rate of intra-operative complications is similar in both groups with $p > 0.999$.

Table 2: Comparison of post-operative complications in two groups of patients studied

Post-operative Complications	Group Lap (n=25)		Group Open (n=25)	
	No	%	No	%
Nil	23	92.0	20	80.0
Present	2	8.0	5	20.0
Chest infection	1	4.0	3	12.0
Wound infection	1	4.0	2	8.0
Total	25	100	25	100

Post-operative complications are statistically more associated with Group open with $P=0.417$.

Table 3: Comparison of post-operative pain in two groups of patients studied

Pain	Group Lap		Group Open	
	No	%	No	%
Mild	15	60.0	2	4.0
Moderate	9	36.0	13	52.0
Severe	1	4.0	10	44.0
Total	25	100.0	25	100.0

More than 90% of the patients in open cholecystectomy group had moderate to severe pain, where as most of the patients $>90\%$ in the laparoscopic cholecystectomy had mild to moderate pain.

Table 4: Comparison of post-operative mobilization in two groups of patients studied

Post-operative mobilization (hrs)	Group Lap		Group Open	
	No	%	No	%
<24	21	84.0	2	8.0
25-36	2	8.0	5	20.0
37-48	1	4.0	15	60.0
>48	1	4.0	3	12.0
Total	25	100.0	25	100.0
Mean \pm SD	26.72 \pm 6.78		42 \pm 8.12	

Post-operative mobilization is significantly earlier in Group LAP with $P < 0.001^{**}$

Table 5: Comparison of post-operative oral feeds in two groups of patients studied

Post-operative oral feeds (hrs)	Group Lap		Group Open	
	No	%	No	%
12.00	8	32.0	0	0.0
18.00	11	44.0	5	20.0
24.00	4	16.0	12	48.0
36.00	2	8.0	8	32.0
Total	25	100.0	25	100.0
Mean \pm SD	18.48 \pm 6.69		26.64 \pm 6.95	

Duration to mean post-operative oral feeds is significantly less in Group LAP when compared to group Open Resumption of oral intake was significantly earlier in group Lap (18.48 hrs) when compared to group Open (26.64hrs).

Table 6: Comparison of duration of stay in two groups of patients studied

Duration of stay(days)	Group Lap		Group Open	
	No	%	No	%
1-2	20	80.0	1	4.0
3-7	3	12.0	21	84.0
>7	2	8.0	3	12.0
Total	25	100.0	25	100.0
Mean \pm SD	2.56 \pm 1.89		5.2 \pm 1.89	

Duration of hospital stay is significantly less in Group LAP compared to Group open with $P < 0.001^{**}$.

The total duration of hospital stay was shorter in group LAP (mean 2.56 \pm 1.89 days) compared to patients in group OPEN (mean 5.2 \pm 1.89).

Table 7: Comparison of Return to work in days in two groups of patients studied.

Return to work (days)	Group Lap		Group Open	
	No	%	No	%
1-7	19	76.0	1	4.0
8-14	4	16.0	13	52.0
>14	2	8.0	11	44.0
Total	25	100.0	25	100.0
Mean \pm SD	7.68 \pm 2.59		12.76 \pm 3.77	

Mean return to work is significantly earlier in Group LAP with $P = < 0.001^{**}$.

Patients in the Lap group returned to work earlier (7.68 days) when compared to Open group (12.76 days).

Table 8: Comparison of patient satisfaction in two groups of patients studied

Patient satisfaction	Group LAP		Group OPEN	
	No	%	No	%
Excellent	8	32.0	1	4.0
Good	12	48.0	10	40.0
Average	4	16.0	11	44.0
Poor	1	4.0	3	12.0
Total	25	100.0	25	100.0

Mean patient satisfaction score is significantly less in Group OPEN with $P = 0.009$.

Significant number of patients responded with good to excellent grading (80%) in LAP group when compared to those patients in group OPEN (44%) For statistical analysis purpose we combined excellent+ good as above average and average+poor as below average satisfaction. Significant numbers of patients are satisfied with laparoscopic surgery when compared with open surgery.

Discussion

The overall rates of complications were more in the open group. The most common complications found were wound and chest infection (seen almost exclusively in open group). These findings can be explained on the basis of a large subcostal incision used in the open group.

The presence of such a large incision and the associated pain inhibits respiratory movements, thereby leading to atelectasis and pulmonary infection.

The large wound hematoma associated with a large incision can act as a nidus for infection

thereby leading to wound infection and its associated complications like delayed wound healing, wound dehiscence, incisional hernia etc. There was no mortality in this study.

Patients undergoing laparoscopic cholecystectomy had less pain (mild to moderate) when compared to those undergoing open cholecystectomy (moderate to severe). In a similar study conducted by Hieronymus PJD *et al.* [5] similar findings were seen.

This can be attributed to the fact that laparoscopic cholecystectomy uses smaller skin incisions and less dissection of muscles and fascia that is associated with a lesser degree of local inflammatory response and consequently less pain and less requirement of analgesics.

Most of the patients in the laparoscopic group were able to take orally within the first 12-24 hours where as the oral intake of most patients in the open group was possible only after 24-36 hours.

This difference is due to the fact that in laparoscopic cholecystectomy bowel handling is minimum, hence the associated post op paralytic ileus lasts for a shorter period leading to early return of bowel motility. This early resumption of enteral feeding also prevents gut colonization by pathogenic bacteria and also gives a sense of well-being to the patient.

The period of hospital stay was taken from day of surgery to discharge the total period of hospital stay in our study was around 2-3 days for the lap group and around 5-6 days in the open group.

Early discharge from the hospital has a positive influence on the patient as it decreases the convalescence period and also promotes early return to work and also prevents nosocomial infections. Early discharge also decreases hospital costs.

Studies by Jeffrey S Barkun^[6], Ahmed Assalea^[7] and Tuula Kiviluoto *et al.* [8] also showed a much shorter stay in both groups a postoperative hospital stay of 1.8 days (which is similar to that seen in our study) & 3-5 days in the open group which is slightly lesser than our study.

The mean time for return to normal work after surgery was 8 days in the laparoscopic group and 13 days in the open group. Since most of our patients were from the low socioeconomic group, this early return to work decreases the financial burden associated with a major surgery on the patients' and their families.

Patients in the LAP group were much more pleased with the outcome of their surgery in terms of early oral feeds, early mobilization, early return to work, less pain and better cosmesis. Most of the patients gave excellent to good rating when compared to open group who gave good to average rating.

Conclusion

- Laparoscopic cholecystectomy was safe with less postoperative morbidity associated with faster patient recovery and satisfaction as documented by less postoperative pain, earlier resumption of oral feeds, earlier full mobilization and discharge home, as well as early return to work.
- In conclusion, the study supports the view that laparoscopic cholecystectomy is safer and efficacious and offers definitive advantages over open cholecystectomy and should be an available option for all patients requiring elective cholecystectomy.

References

1. Norman S William, Christopher JK, Bulstrode P. Ronan O'Connell. Bailey and Love's Short Practice of Surgery, 26th ed, CRC Press, 2013, 1106.
2. Courtney M Townsend, Daniel Beauchamp R, Mark Evers B, Kenneth L Mattox. Sabiston Textbook of Surgery, Elsevier, 19th ed., 2013, 14-87.
3. Charles Brunicaardi F, Dana K Andersen, Timothy R Billiaret al. Schwartz's Principles of Surgery, 10th ed., 2015, 13-20.
4. Margaret Farquharson, Brendon Moron. Fraquharson's Textbook of operative surgery, 9th ed, Hodder Arnold, 2005, 329.

5. Hieronymos PJD, Stevens, Marjan Van De Berg, Coert H Russeler, Jack CJ Wereidsma. Clinical and financial aspects of cholecystectomy: Laparoscopic versus open technique, *World J Surg.* 1997;21:91-97.
6. Jeffrey S Barkun, Alan N Barkun, Jonathan Meakins. Laparoscopic versus open cholecystectomy: The Canadian Experience. *Am J Surg.* 1993 April;165:455-458.
7. Dr. Aarushi Kataria, Dr. Naveen Nandal and Dr. Ritika Malik, Shahnaz Husain -A Successful Indian Woman Entrepreneur, *International Journal of Disaster Recovery and Business Continuity* Vol.11, No. 2, (2020), pp. 88–93
8. Kumar, S. (2020). Relevance of Buddhist Philosophy in Modern Management Theory. *Psychology and Education*, Vol. 58, no.2, pp. 2104–2111.
9. Ahmad Assalia, Mosh E Schein, Doron Kopelman, Moshe Hashmonai. Mini cholecystectomy versus conventional cholecystectomy: A prospective randomized trial-implications in laparoscopic era. *World J Surg.* 1993;17:755-759.
10. Tuula Kiviluoto, Jukka Siren, Pekka Luukkonen, Eero Kivilaakso. Randomized trial of laparoscopic versus open cholecystectomy for acute and gangrenous cholecystitis. *Lancet.* 1998;351:321-323.