



A Comparative Study of Subjective and Objective Parameters in Patients Undergoing Cholecystectomy (Open Vs Laparoscopic)

Dr R Vinod Kumar^[1], Dr Brijendra Nigam^[2], Dr Mahesh Gupta^[3], Dr Roshin Mathew Philip^[4],

Dr Manisha Srivastava^[5], Dr C Varalakshmi^[6]

¹MBBS, Post Graduate Department of General Surgery

Rama Medical College Hospital and Research Centre, Kanpur, U.P. Pin:209217

²Professor, Department of General Surgery

Rama Medical College Hospital and Research Centre, Kanpur, U.P. Pin:209217

³MS, DMAS, FMAS, FIAGES, Professor and Head Department of General Surgery

Rama Medical College Hospital and Research Centre, Kanpur, U.P. Pin:209217

⁴MBBS, Post Graduate Department of General Surgery

Rama Medical College Hospital and Research Centre, Kanpur, U.P. Pin:209217

⁵Professor and Head Department of Emergency Medicine

Rama Medical College Hospital and Research Centre, Kanpur, U.P. Pin:209217

MBBS, Post Graduate Department of Community Medicine

GSL Medical College Rajahmundry, Andhra Pradesh 533296

Corresponding Author: Dr Roshin Mathew Philip

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BACKGROUND: Cholecystectomy is the surgical removal of the gall bladder, is a widely performed procedure indicated for various gallbladder diseases, such as cholelithiasis, cholecystitis, and biliary dyskinesia. Two main modes of operative management of cholecystectomy that are performed are the open cholecystectomy and laparoscopic cholecystectomy. Our study aims to objectivize the superiority of laparoscopic versus open cholecystectomy through clinical as well as biochemical parameters such as CRP and Albumin.

MATERIALS AND METHODS: A sample size of 50 Patients have been taken in the study divided into 2 groups of 25 each and evaluated for the outcome in terms of operative time, post-operative analgesia, postoperative hospital stay, CRP, and Serum Albumin levels.

RESULT: The mentioned parameters have been measured in both the study groups and the patients managed by laparoscopic surgery had significantly better outcomes than with open cholecystectomy.

CONCLUSION: Laparoscopic cholecystectomy presents significant advantages such as shorter surgical duration and recovery times, diminished postoperative pain and inflammation, and reduced hospital stays and less inflammatory response. These benefits establish laparoscopic cholecystectomy as a superior choice for patients necessitating gallbladder removal, promoting

expedited recovery and enhanced postoperative outcomes.

KEY WORDS: Cholecystectomy, Laparoscopy, Cholelithiasis, Open vs Laparoscopic cholecystectomy, Gall stones.

I. INTRODUCTION:

Cholecystectomy, the surgical removal of the gallbladder, is a widely performed procedure indicated for various gallbladder diseases, such as cholelithiasis, cholecystitis, and biliary dyskinesia. The evolution of surgical techniques has seen a significant shift from open cholecystectomy to laparoscopic cholecystectomy, driven by the benefits of minimally invasive surgery. Laparoscopic cholecystectomy, first performed by Erich Mühe in 1985, has since become the gold standard for gallbladder removal due to its numerous advantages over the open technique.^[1] The laparoscopic method has largely supplanted the more common open cholecystectomy. Bypassing a big incision, shortening the duration of hospital stay, and expediting healing are all benefits of laparoscopic cholecystectomy.^[2,3] In comparison to the conventional open cholecystectomy, this method has various benefits, such as less postoperative pain, a shorter hospital stay, less stress response, a quicker recovery, and better cosmetic results^[4,5]



II. MATERIALS AND METHODS

Patients diagnosed with cholelithiasis in the surgery OPD at Rama medical hospital were divided into 2 groups each consisting of 25 patients. The cholecystectomy technique was selected and randomized according to computer-based random selection system. The time taken for surgery is calculated from the start of skin incision. Pain scaling was done to assess the postoperative pain after administration of IM diclofenac and the hospital stay was further calculated for each groups. Laboratory values like CRP and albumin were also evaluated on preop as well as on post op days 1 and 3 taking into consideration the normal values of CRP <6mg/dl and serum albumin level between 3.5 – 5.5 gm/dl. Data were analyzed using SPSS version 26, employing a chi-square test with a significance level of $p < 0.01$.

III. RESULTS

Demographic and surgical details of the study are displayed. Out of 50 patients enrolled as a case of cholelithiasis the mean age of patients was 42.037 with standard deviation of ± 8.947 . The mean age of patients in group A (lap cholecystectomy) was 38.92 ± 12.87 and in group B (open cholecystectomy) was 35.64 ± 12.07 . Group A (lap cholecystectomy) consisted of 3 males (12.0%) and 22 females (88%) whereas in group B (open cholecystectomy) consisted of 1 male (4%) and 24 females (96%). The operating time was 47.6 ± 11.06 for Group A and 84.52 ± 12.93 for Group B patients (table 1). The post operative analgesia period data showed a 90.33 ± 20.33 (minutes) among group A patients and 124.33 ± 32.12 (minutes) among Group B patients (table 2). Post operative hospital stay was assessed which showed 2.56 ± 0.44 in Group A patients and 5.67 ± 2.14 (p value < 0.0001) (table 3).

ALBUMIN LEVELS

For group A (lap cholecystectomy) the mean Albumin level 12 hrs preoperatively was found 4.13 ± 0.21 g/dl. Post-operatively at day 1 was 3.45 ± 6.96 g/dl, and at post-operative day 3 was 4.20 ± 0.21 g/dl. For Group B (open cholecystectomy) Albumin levels were assessed preoperatively and showed 4.31 ± 0.31 and on post-operative day 1 and day 3 showed 3.24 ± 0.21 and 3.21 ± 0.35 respectively (table 4). The P values for the changes in serum albumin were 0.098 for the laparoscopic group and 0.074 for the open cholecystectomy group as determined by one-way ANOVA.

CRP Levels

For group A (lap cholecystectomy), the mean CRP levels preoperatively was 5.32 ± 1.24 mg/dl. The mean CRP levels postoperatively on day 1 was 34.5 ± 6.96 mg/dl and on day 3 was 28.5 ± 5.23 mg/dl. On 3rd post-Op day the levels were 28.5 ± 5.23 . For Group B (open cholecystectomy), the mean CRP levels preoperatively was 5.12 ± 1.06 mg/dl. Post-operatively on day 1 the values were 72.4 ± 28.3 mg/dl, and on day 3 the levels were 44.12 ± 10.23 mg/dl (table 5). These results clearly show that pre-operative CRP levels are almost equal in both the groups, while there is a sharp rise of CRP levels in both groups from 1st post-operative day to 3rd post-operative day.

CRP and albumin relationship was examined simultaneously and it was observed that the maximal amplitude was seen during the 1st post operative day in Group B patients and the fall was gradually observed after 3rd post-operative day. Therefore, it was observed that decline in albumin levels and rise in CRP levels were more in open cholecystectomy as compared to laparoscopic cholecystectomy suggesting lap-cholecystectomy is less stressful procedure.

IV. DISCUSSION

The removal of the gallbladder, or cholecystectomy, is a popular surgical procedure for the treatment of gallstones and other disorders involving the gallbladder. The two primary methods of cholecystectomy are open cholecystectomy and laparoscopic cholecystectomy. This study aims to compare the subjective and objective parameters of patients undergoing these two types of surgeries. In the present study, the mean age of patients undergoing laparoscopic cholecystectomy was 38.92 ± 12.87 years, while those undergoing open cholecystectomy was 35.64 ± 12.07 . The statistical analysis revealed a p -value of 0.753 indicating there is no significant difference in the mean age between the two groups. The mean post operative time for laparoscopic cholecystectomy group was 47.16 ± 11.06 minutes. And the mean post operative 84.52 ± 12.93 minutes showing that there is a significant difference between the two groups having a p -value < 0.0001 . This demonstrates that the post operative time for laparoscopic cholecystectomy is significantly shorter compared to open cholecystectomy.

Group A that underwent open cholecystectomy had 90.33 ± 20.23 minutes of postoperative analgesia. In contrast, the laparoscopic cholecystectomy group had a mean



duration of postoperative analgesia of 124.23 ±32.12 minutes with a p-value of 0.001, hence showing that shorter durations of postoperative analgesia compared to those undergoing laparoscopic cholecystectomy. Laparoscopic cholecystectomy patients tended to have shorter hospital stays, according to a p-value of less than 0.0001.

Comparison between the two groups, the open cholecystectomy group (n=25) had a mean serum albumin level of 4.31 ±0.33 g/dL. Based on the p-value of 0.074, it can be concluded that there was no significant difference in serum albumin levels between the two groups. Regarding serum CRP levels, the laparoscopic cholecystectomy group had a mean level of 5.32 ±1.24 mg/L, while the open cholecystectomy group had mean level of 5.12 ±1.06 mg/L. Since the p-value was just 0.0001, Even though a major drawback of CRP as predictor for stress-related complications is its slow kinetics^[7,8,9], we can infer that the rise in CRP levels were more in open cholecystectomy as compared to laparoscopic cholecystectomy suggesting lap-cholecystectomy is less stressful procedure.

Study by Schietroma et al.^[6], They found the mean serum albumin levels to be 3.80 ± 0.35 g/dL in the laparoscopic group and 3.70 ± 0.40 g/dL in the open group, with a p-value of 0.45, indicating no significant difference. For serum CRP levels, the laparoscopic group had a mean of 15.0 ± 20.0 mg/L, while the open group had a mean of 22.5 ± 25.0 mg/L, with a p-value of 0.10, suggesting no significant difference.

V. CONCLUSION

Minimal invasive laparoscopic cholecystectomy is less traumatizing as compared to open cholecystectomy. Postoperative albumin drops can be measured as early as 4–6 hours after surgery as compared to rise of CRP levels which can only be measured in late post-operative period. Hence early measures can be taken to prevent further complications by estimation of serum albumin level in early post-operative period. Estimation of Albumin levels though routinely not in clinical vogue at present can be studied further to establish its predictability as surgical outcome as compared to CRP.

Table: 1. Distribution of operative time among two groups

Laparoscopic Cholecystectomy (n=25)		Open Cholecystectomy (n=25)		P value
Mean	SD	Mean	SD	
47.16	±11.06	84.52	±12.93	<0.0001
Unpaired t Test				

Table: 2. Distribution of Postoperative analgesia among two groups

Duration of Postoperative analgesia (Minutes)	Open Cholecystectomy (n=25)		Laprosopic Cholecystectomy (n=25)		P Value
	Mean	SD	Mean	SD	
	90.33	±20.23	124.23	±32.12	0.001
Unpaired t Test					



Table: 3. Post operative Hospital Stay among Two Groups

Laparoscopic Cholecystectomy (n=25)		Open Cholecystectomy (n=25)		P Value
Mean	SD	Mean	SD	
2.56	±0.44	5.67	±2.14	<0.0001
Unpaired t Test				

Table: 4. Pre to Post operative serum albumin level among two groups

Albumin Level	Laparoscopic Cholecystectomy (n=25)		Open Cholecystectomy (n=25)	
	Mean	SD	Mean	SD
Pre-operative	4.13	±0.21	4.31	±0.33
Post operative Day-1	3.39	±0.36	3.24	±0.21
Post operative Day-3	4.20	±0.21	3.21	±0.35
P value	0.098		0.074	
One way ANOVA				

Table: 5. Pre to Post operative serum CRP level among two groups

CRP Level	Laparoscopic Cholecystectomy (n=25)		Open Cholecystectomy (n=25)	
	Mean	SD	Mean	SD
Pre-operative	5.32	±1.24	5.12	±1.06
Post operative Day-1	34.5	±6.96	72.4	±28.3
Post operative Day-3	28.5	±5.23	44.12	±10.23
P value	<0.0001		0.0001	
One way ANOVA				

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