

Original Research Article

Cholelithiasis and laparoscopic cholecystectomy: identifying the appropriate time for operative intervention

Ravi Kotecha*, Vishwa Kotecha

General Surgery, Shubham Hospital, Phalodi, Jodhpur, India

Received: 27 July 2021

Revised: 13 August 2021

Accepted: 16 August 2021

*Correspondence:

Dr. Ravi Kotecha,

E-mail: dr.ravinkotecha@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Cholelithiasis is the most common among hepatobiliary disease and often requires surgical intervention. Laparoscopic cholecystectomy is the gold standard nowadays. This research paper was done to know appropriate time for laparoscopic cholecystectomy and how much improvement will we get after laparoscopic cholecystectomy.

Methods: In our prospective observational study, 118 patients of cholelithiasis, 59 with dyspepsia in one group and 59 without dyspepsia in another group were taken. Both groups patients were analysed with Buckley validated dyspeptic score before and after laparoscopic cholecystectomy till 6 months postoperatively for score improvement.

Results: In our study, we confirmed that there was improvement in Buckley validated dyspeptic score in both group of patients with dyspepsia and without dyspepsia 6 month after laparoscopic cholecystectomy but not complete improvement. Improvement in Buckley validated dyspeptic score 6 months after laparoscopic cholecystectomy was more in patients with less duration of symptoms and less frequency of episode preoperatively and in non-dyspeptic patients.

Conclusions: We could conclude that even earlier surgery after onset of symptoms didn't result in complete resolution of symptoms in both groups particularly in group B (patients with dyspepsia). We can say that whether it is dyspeptic or non-dyspeptic gallstone disease, it has benefit from laparoscopic cholecystectomy but we can also say that improvement achieved is not complete as after laparoscopic cholecystectomy there were still number of patients who had Buckley validated score more than 6 in both groups after 6 months of surgery.

Keywords: Cholelithiasis, Dyspepsia, Laparoscopic cholecystectomy, Buckley validated dyspeptic score

INTRODUCTION

Among the hepatobiliary diseases, cholelithiasis is the most common all over the world that often surgical intervention.¹

Clinical presentation of cholelithiasis is variable. Mostly it remains asymptomatic and if symptomatic then most commonly presented as colicky pain which is described as right sided hypochondriac and epigastric pain which often radiates to back and described as dull constant back

pain. Pain may be of moderate to severe in degree, lasts for minutes to hours, occurs most commonly at night waking up the patients.

Other symptoms are nausea, vomiting, food intolerance and dyspepsia. Dyspepsia, indigestion or upset stomach is a group of symptoms that includes upper abdominal fullness, heartburn, nausea, belching and upper abdominal pain. Functional dyspepsia is dyspepsia without organic cause that justifies the symptoms and is

about 15% in western countries. Dyspeptic symptoms may co-exist or may worsen after the attack.²⁻⁴

Nowadays laparoscopic cholecystectomy is the gold standard for cholelithiasis.⁵ Laparoscopic cholecystectomy offers greater advantages like less postoperative pain, less hospital stay, early ambulation and improved postoperative pulmonary function, early return to work also. This is followed by improvement of symptoms in 90% of patients. Still 20 to 30% patients have significant pain and around 57% of patients having dyspeptic symptoms after laparoscopic cholecystectomy. Therefore, there is on-going debate regarding effectiveness of laparoscopic cholecystectomy with regard to relieving dyspeptic and other symptoms. Despite this, the rate of laparoscopic cholecystectomy has been increasing since the evolution of laparoscopic techniques, suggesting that this may be over utilized.⁶

The present study was done to determine whether early laparoscopic cholecystectomy, in patients with uncomplicated gall stone disease and symptoms of dyspepsia will produce complete symptomatic resolution 6 months postoperatively and to determine appropriate timing of laparoscopic cholecystectomy to decrease failure rate. This was done by various comparison between 2 groups: group A cholelithiasis with dyspepsia and group B cholelithiasis without dyspepsia who underwent laparoscopic cholecystectomy.

Objectives

Objectives of this study was to know the answers of following questions: does laparoscopic cholecystectomy achieve complete symptomatic relief in patients with gallstone and symptoms of dyspepsia?; was there any improvement in Buckley validated dyspeptic score 6 months after laparoscopic cholecystectomy? How much was the improvement overall? was there any difference in score improvement and satisfaction in both groups: A patients with gallstone with symptoms of dyspepsia and B the patients with gallstones without dyspepsia?; was there any relation between probability of complete resolution of symptoms after laparoscopic cholecystectomy and time interval between onset of symptoms and laparoscopic cholecystectomy in both groups?

METHODS

The present study was conducted in the department of general surgery, Subham hospital during the period of December 2016 to December 2018. Study subjects were taken from the cases of gall stone disease reported to our institute who fulfilled the inclusion criteria and who underwent laparoscopic cholecystectomy. It was a hospital based prospective observational study. To determine sample size, power analysis was done. To calculate sample size with an alpha error of 0.05 and a power of 90%, we would require a minimum of 59

subjects per group to detect a difference of 15% with respect to postoperative satisfaction in both groups.

2 groups were taken, group A included 59 patients with gallstone disease without dyspepsia and a matched group B which included 59 patients with gall stone disease and dyspepsia. Preoperative analysis was done for all the patients. and all were followed up to 6 months postoperative. Buckley validated dyspeptic score had been assessed pre and postoperative after 6 months and analysis was done regarding result of surgery. Initially data was collected on paper, then entered into computerized database. Then statistical analysis was done.

Paired student's t test was used for intragroup analysis. Independent samples t test was used to compare means for two groups. Pearson's Chi-square which was used to test the significance of the relative frequencies of observed events that was measured as categorical outcomes measured on Likert (ordinal) scales. It was based on the order in which the observations from two samples fall. A $p < 0.05$ was used to indicate a significant difference.

Inclusion criteria

Patients with age more than 18 years, patients with uncomplicated gall bladder stone disease and patients with acute cholecystitis were included in the study.

Exclusion criteria

Patients with complicated gallstone disease defined by previous common bile duct stones (choledocholithiasis), obstructive jaundice, cholangitis, gallstone induced pancreatitis, cholecysto-enteric fistula, gall bladder neoplasm, previous biliary/pancreatic surgery, open cholecystectomy and previous gastric surgery were excluded from the study.

RESULTS

Preoperative assessment was done in all the patients. Total 17.8% patients had palpable gall bladder on clinical examination, out of which 13.6% patients in group A and 22% patients in group B had palpable gall bladder. 16.9% patients in group A and 27.1% patients in group B means total 22% patients had fever in our study.

Table 1 shows that with increase in duration of symptoms, patients develop more dyspeptic symptoms. Mean duration for group A 11.76 ± 12.45 months and was 30.02 ± 16.96 months for group B.

Table 2 shows preoperative Buckley validated dyspeptic score analysis in both groups which shows that mean score was more in group B and it was significant as p value was less than 0.001. Table 2 shows that group A has mean total Buckley validated dyspeptic score less

than 16 in all patients while in group B, score was more than or equal to 16. Among these, 71.1% had score between 16-20, 27.1% patients had score between 20-25 and 1.7% patient had score more than 25 in our study.

Table 3 shows postoperative Buckley validated dyspeptic score analysis in both groups. Table 3 shows that all patients had improvement in total Buckley validated dyspeptic score and all had score less than 16, among them 48 (40.7%) out of 118 patients had score between 0-6, 32 (54.2%) patients in group A and 16 (27.1%) patients in group B with mean value for group A 5.42 ± 1.61 and for group B 6.97 ± 2.20 and p value for this was less than 0.001 which was significant.

Table 4 shows distribution of cases according to satisfaction level. Though it was subjective, among 118 patients, 90.7% patients were satisfied or very much satisfied while 9.3% patients had no satisfaction after laparoscopic cholecystectomy. Among them, in group A

86.4% patients had satisfaction or very much satisfaction while only 13.6% had no satisfaction after laparoscopic cholecystectomy. While in group B, 5.1% patients had no satisfaction after laparoscopic cholecystectomy. Here p value was 0.008 that was significant.

Tables 5 and 6 shows statistical analysis of relation between timing of surgery and patient improvement in terms of pre and postoperative dyspeptic score and patient satisfaction in group A and group B respectively.

Table 7 shows distribution of cases and statistical analysis in improvement of total Buckley validated dyspeptic score in group A preoperatively to postoperatively. Preoperatively 59 patients had score between 6-16 with mean score 11.46 ± 1.90 ; postoperatively score was improved with 32 (54.2%) patients having score between 0-6 and 27 (45.8%) patient having score between 6-16 with mean score of 5.42 ± 1.61 and p value was less than 0.001 which was significant.

Table 1: Distribution of cases according to timing of surgery (months) from onset of first symptom in both groups.

Timing of surgery (in months) from onset of first symptom	Groups				Total	
	Group A		Group B			
	No. of patients	%	No. of patients	%	No. of patients	%
≤10	33	55.9	4	6.8	37	31.4
11-20	17	28.8	14	23.7	31	26.3
21-30	3	5.1	20	33.9	23	19.5
31-40	3	5.1	7	11.9	10	8.5
41-50	2	3.4	9	15.3	11	9.3
51-60	1	1.7	3	5.1	4	3.4
>60	0	-	2	3.4	2	1.7
Total	59		59		118	
Mean	11.76		30.02			
SD	12.45		16.96			
t	6.664					
P	<0.001					

Table 2: Distribution of cases according to total preoperative Buckley validated dyspeptic score in both groups.

Preoperative total score	Groups				Total	
	Group A		Group B			
	No. of patients	%	No. of patients	%	No. of patients	%
0-6	0	-	0	-	0	-
>6-16	59	100	0	0	59	50
>16-20	0	-	42	71.1	42	35.5
>20-25	0	-	16	27.1	16	13.6
>25	0	-	1	1.7	1	0.8
Total	59		59		118	
Mean	11.46		19.61			
SD	1.90		2.17			
t	21.707					
P	<0.001					

Table 3: Distribution of cases according to total postoperative Buckley validated dyspeptic score (after 6 months) in both groups.

Postoperative total score	Groups				Total	
	Group A		Group B			
	No. of patients	%	No. of patients	%	No. of patients	%
0-6	32	54.2	16	27.1	48	40.7
>6-16	27	45.8	43	72.9	70	59.3
>16-20	0	-	0	-	0	-
>20-25	0	-	0	-	0	-
>25	0	-	0	-	0	-
Total	59		59		118	
Mean	5.42		6.97			
SD	1.61		2.20			
t	4.339					
P	<0.001					

Table 4: Distribution of cases according to satisfaction level in both groups.

Satisfaction	Groups				Total	
	Group A		Group B			
	No. of patients	%	No. of patients	%	No. of patients	%
No	8	13.6	3	5.1	11	9.3
OK	16	27.1	32	54.2	48	40.7
Yes	35	59.3	24	40.7	59	50.0
Total	59		59		118	
χ^2	9.657					
P	0.008					

Table 5: Statistical analysis of relation between timing of surgery (months) and patient improvement in group A.

Timing of surgery	No.	%	Preoperative score	Postoperative score	Satisfaction					
					Yes		Ok		No	
					No.	%	No.	%	No.	%
<10	33	55.9	11.3	5.54	19	57.57	6	18.18	8	24.24
11-20	17	28.8	11.76	5.05	11	64.7	6	35.29	0	0
21-30	3	5.08	11	5	2	66.66	1	33.33	0	0
31-40	3	5.08	12.33	6	2	66.66	1	33.33	0	0
41-50	2	3.38	11	5.5	1	50	1	50	0	0
51-60	1	1.69	10	7	0	0	0	0	1	100
>60	0	0	0	0	0	0	0	0	0	0
Total	59				33		15		9	
Mean			11.43	5.41						
SD			1.01	1.02						
t			33.44							
P			<0.001							

Table 6: Statistical analysis of relation between timing of surgery (months) and patient improvement in group B.

Timing of surgery	No.	%	Preoperative score	Postoperative score	Satisfaction					
					Yes		Ok		No	
					No.	%	No.	%	No.	%
<10	4	6.8	18.75	8.5	0	0	4	100	0	0
11-20	14	23.7	19.35	6.78	5	35.7	6	42.85	3	21.42
21-30	20	33.9	20.05	6.73	8	40	12	60	0	0
31-40	8	11.9	18.5	5.5	5	62.5	3	37.5	0	0

Continued.

Timing of	No.	%	Preoperative	Postoperative	Satisfaction					
41-50	9	15.3	20	7.6	4	44.44	5	55.55	0	0
51-60	3	5.1	21.3	9	2	66.66	1	33	0	0
>60	2	3.4	16.5	7	0	0	2	100	0	0
Total	59				24		33		3	
Mean			19.86	6.6						
SD			2.13	2.18						
t			33.44							
P			<0.001							

Table 7: Distribution of cases according to total preoperative and postoperative Buckley validated dyspeptic score in group A.

Total score	Preoperative		Postoperative		Total	
	No. of patients	%	No. of patients	%	No. of patients	%
0-6	0	-	32	54.2	32	27.11
>6-16	59	100	27	45.8	86	72.88
>16-20	0	-	0	-	0	-
>20-25	0	-	0	-	0	-
>25	0	-	0	-	0	-
Total	59		59		0	-
Mean	11.46		5.42		118	
SD	1.90		1.61			
t	22.883					
P	<0.001					

Table 8: Distribution of cases according to total preoperative and postoperative Buckley validated dyspeptic score in group B.

Total score	Preoperative		Postoperative		Total	
	No.	%	No.	%	No.	%
0-6	0	-	16	27.1	16	13.6
>6-16	0	-	43	72.9	43	36.4
>16-20	42	71.2	0	-	42	35.6
>20-25	16	27.1	0	-	16	13.6
>25	1	1.7	0	-	1	0.8
Total	59		59		118	
Mean	19.61		6.97			
SD	2.17		2.20			
t	34.429					
P	<0.001					

Table 8 shows distribution of cases and statistical analysis in improvement of total Buckley validated dyspeptic score in group B preoperatively to postoperatively. Preoperatively 42 (71.2%) patients had score between 16-20, 16 (27.1%) patients had score between 20-25 and 1 (1.7%) patient had score more than 25 with mean score of 19.61 ± 2.17 , post-operatively score was improved with 16 (27.1%) patients having score between 0-6 and 43 (72.9%) patient having score between 6-16 with mean score of 6.97 ± 2.20 and p value was less than 0.001 which was significant.

DISCUSSION

Luman et al who found that most of the patients who had persistent symptoms after surgery had symptoms of less than 6 months duration.⁷

When we analyzed time interval between onset of symptoms and surgery, we found that in group A around 56% (33) patients were having time interval less than 10 months, among them 25 patients (75.75%) were satisfied or very much satisfied with average preoperative score of 11.3 to 5.54 postoperative score. 17 patients (28%) had

time interval of 11-20 months, among them all were satisfied or very much satisfied with preoperative average score of 11.76 to post-operative score of 5.05. There were 3 patients in whom time interval was 21-30 months had average preoperative score of 11 to postoperative score of 5, among them 2 were very much satisfied while 1 was satisfied. Same when time interval was between 31-40 months, there were 3 patients among which 2 (66.66%) were very satisfied and 1 (33.33%) was satisfied after laparoscopic cholecystectomy.

In group B, there were 4 (6.8%) patients in whom time interval was less than 10 months, among them all had satisfaction level ok, with preoperatively average score of 18.75 to 8.50 postoperatively. There were 14 (23.7%) patients who had time interval of 11-20 months had improvement in dyspeptic score from 19.69 preoperatively to 6.79 after cholecystectomy with 11 (73.85%) patients very much satisfied to satisfied and 3 patients not satisfied after laparoscopic cholecystectomy. There were 7 (11.9%) patients having time interval of 31-40 months and all were satisfied with average score 18.43 preoperatively to 5.29 postoperatively.

So we could conclude that even earlier surgery after onset of symptoms didn't result in complete resolution of symptoms in both groups particularly in group B. Our findings were also consistent with Lublin et al who found that longer duration of pain experienced preoperatively was predictive of persistent pain after surgery.⁵

Bulent et al found that laparoscopic cholecystectomy improved the quality of life significantly in both groups, though gallstone disease in both groups was not equally distressing.⁸ Gallstone patients with lower gastrointestinal quality of life index scores were more likely to benefit from laparoscopic cholecystectomy. In our study we found the same thing as in group A, we had 59 (100%) patients with Buckley validated dyspeptic score between 6-16 with mean score of 11.46 ± 1.90 , while in group B, there were 42 (71.2%), 16 (27.1%) and 1 (1.7%) patients with score between 16-20, 20-25 and >25 respectively with mean score 19.61 ± 2.17 .

During postoperative follow up, we found improvement in score in both groups. In group A there were 32 (54.2%) and 27 (45.8%) patients with postoperative score between 0-6 and 6-16 respectively with mean score 5.42 ± 1.61 . In group B there were 16 (27.1%) and 43 (72.9%) patients with score between 0-6 and 6-16 with mean score 6.97 ± 2.20 . Here also p value was less than 0.001 which was significant.

Same results were compared preoperatively to postoperatively also where we found that p value was less than 0.001 therefore, it was significant. This was also supported by result in study done by Sakorafas et al.⁹ So from results of our study, we can say that whether it was dyspeptic or non-dyspeptic gallstone disease, it had benefit from laparoscopic cholecystectomy but we can

also say that improvement achieved was not complete as after laparoscopic cholecystectomy there were still number of patients who had Buckley validated score more than 6 in both groups after 6 months of surgery. Complete achievement was more in group A (54.2% patients achieved score between 0-6) compared to group B (only 27.1% patients achieved score between 0-6). So, proposed mechanism for dyspepsia are visceral hypersensitivity and possibly altered gastric motility.¹⁰ Therefore, laparoscopic cholecystectomy would have minimal effect on these symptoms.

Limitations

The limitations were budgetary constraints, time constraints, small sample size, reliability of data (particularly postoperative score), study done in only one institute and difficulty in convincing respondents to aware about research.

CONCLUSION

The following conclusions were drawn from clinical examinations and other findings and other imaging reports on 118 patients who underwent laparoscopic cholecystectomy and after 6 months again they were evaluated for improvement in Buckley validated dyspeptic score. There is improvement in Buckley validated dyspeptic score in both group of patients with dyspepsia and without dyspepsia 6 month after laparoscopic cholecystectomy but not complete improvement. Improvement in Buckley validated dyspeptic score 6 months after laparoscopic cholecystectomy is more in patients with less duration of symptoms and less frequency of episode preoperatively and in non-dyspeptic patients.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Unisa S, Jagannath P, Dhir V, Khandelwal C, Sarangi L, Roy TK. Population-based study to estimate prevalence and determine risk factors of gallbladder diseases in the rural Gangetic basin of North India. *HPB (Oxford)*. 2011;13(2):117-25.
2. Njeze GE. Gall stones. *Niger J Surg*. 2013;19(2):49-55.
3. Williams NS, Christopher JK, Bulstrode P, O'Connell R. Baily and Love's Short Practice of Surgery. 26th ed. Florida: CRC Press; 2013: 1107.
4. Saad RJ, Chey WD. Current and emerging therapies for functional dyspepsia. *Aliment Pharmacol Ther*. 2006;24(3):475-92.
5. Lublin M, Crawford DL, Hiatt JR, Phillips EH. Symptoms before and after laparoscopic

- cholecystectomy for gallstones. *Am Surg.* 2004;70(10):863-6.
6. Malik AH, Wani RA, Bari S Manhas A. Persistence of Symptoms after Laparoscopic cholecystectomy. *J Minim Invasive Surg. Sci.* 2016 February ; 5(1): e 31791.
 7. Luman W, Adams WH, Nixon SN, McIntyre IM, Hamer-Hodges D, Wilson G, et al. Incidence of persistent symptoms after laparoscopic cholecystectomy: a prospective study. *Gut.* 1996;39(96):863-6.
 8. Menten BB, Akin M, Irkorucu O, Tatliciolu E, Ferahkoe Z, Yildirim A, et al. Gastrointestinal quality of life in patients with symptomatic or asymptomatic cholelithiasis before and after laparoscopic cholecystectomy. *Surg Endoscop.* 2001;15(11):1267-72.
 9. Sakorafas GH, Milingos D, Peros G. Asymptomatic cholelithiasis: is cholecystectomy really needed? A critical reappraisal 15 years after the introduction of laparoscopic cholecystectomy. *Dig Dis Sci.* 2007;52:1313-25.
 10. Quartero AO, deWit NJ, Lodder AC, Numans ME, Smout AJ, Hoes AW. Disturbed solid phase gastric emptying in functional dyspepsia : A meta-analysis. *Dig Dis Sci.* 1998;43(9):2028-33.

Cite this article as: Kotecha R, Kotecha V. Cholelithiasis and laparoscopic cholecystectomy: identifying the appropriate time for operative intervention. *Int Surg J* 2021;8:2600-6.