



COMPARATIVE STUDY OF LAPAROSCOPIC CHOLECYSTECTOMY VERSUS OPEN CHOLECYSTECTOMY IN A TEACHING HOSPITAL

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ABSTRACT The study was carried out to find out the average time, hospital stay, complications of Laparoscopic versus open Cholecystectomy in Dept. of Surgery, A.G.M.C & G.B.P. Hospital, Agartala. Design of the study was Prospective type of Observational Study. Patients with gall stones and gall bladder related diseases who were admitted in A.G.M.C & G.B.P. Hospital between September 2015 and August 2017 for cholecystectomy. The selection of procedure of open cholecystectomy or laparoscopic was decided depending upon the inclusion and exclusion criteria, exception when patient consent was not given for a particular procedure. Main outcome measured was Operating time, hospital stay, morbidity and mortality. Fifty (50) patients underwent laparoscopic cholecystectomy and 50 patients had open surgery. The demographic data and co-morbidities were comparable between the two groups. The average time taken in laparoscopic cholecystectomy was 52.50 minutes and in open cholecystectomy was around 82.50 minutes ($p < .05$). The post operative hospital stay was significantly shorter for patients undergoing laparoscopy ($p = .001$). There was, however no statistical significant difference in the mortality rate. There was no major bile duct injury for patients in either group. 4(four) cases were converted to open cholecystectomy because of obscured anatomy and adhesion. It was concluded that Laparoscopic cholecystectomy is a safe procedure in gall bladder diseases, resulting in less operating time, fewer complications and shorter hospital stay than open cholecystectomy.

KEYWORDS : Cholecystitis, Gall stone, cholelithiasis, cholecystectomy, Laparoscopy

Introduction:

Gallstones (GS) are a common occurrence in India. As many as 16% and 29% of women above the age of 40-49 years and 50-59 years respectively have incidence of gall stones. For every patient with symptomatic gallstone disease (GSD) there are many more with asymptomatic gallstones. Since ages, cholecystectomy has been the gold standard surgical treatment of cholelithiasis. With the advent of laparoscopic cholecystectomy the scenario of surgical management of cholelithiasis has changed drastically. It has opened new horizons in the management of gallstones. Theoretical benefits of laparoscopic approach include reduced hospitalization and cost, decreased pain, avoidance of large incision with improved cosmesis and reduced post-operative recovery time with an early return to work. Although it showed early promising results, recent trials show an increase in the incidence of operative complications, especially common bile duct injury. Expensive instruments, specialized training and long learning curve also limit the use of laparoscopy. This has led to a lot of soul searching and numerous attempts at comparing the merits and demerits of laparoscopic versus open cholecystectomy. Recent upsurge in practice of laparoscopic surgery and other form of minimal access surgery has ushered a new era of surgical treatment which is having profound effect on surgical management. Minimal access surgery has touched every field of surgical speciality. Until the end of 1980's, open cholecystectomy was the gold standard for treatment of stones in gall bladder. First Cholecystectomy was performed in 1882 by Karl Langenbuch.⁹ No other Surgical procedure has had a dramatic and pivotal impact on abdominal surgery as Laparoscopic cholecystectomy. Laparoscopic cholecystectomy has revolutionized the treatment of gall bladder disease and is now the gold standard for the treatment of gall stones and the commonest operation performed world wide. Limited numbers of studies have explored the difference of Laparoscopic Cholecystectomy and Open Cholecystectomy and the different causes of conversion, complications, hospital stay etc in our state. Hence the present study was designed to evaluate the different aspects of both the operations.

MATERIALS AND METHOD

This study was a prospective type of observational study included 100 patients with gall stones and gall bladder related disease who were admitted in Gen Surgery in A.G.M.C & G.B.P.Hospital between September 2015 and August 2017 for cholecystectomy. The selection of procedure of open cholecystectomy or laparoscopic was decided depending upon the inclusion and exclusion criteria, exception when patient consent was not given for a particular procedure. Information was collected from the patients after a written valid informed consent from them. The study was approved by Institutional Ethical

committee. Patients with chronic calculous cholecystitis, gall stones without pain abdomen and other disease of gall bladder including those with diabetes, hypertension etc., were included in the study. Patients written valid informed consent for the particular procedure was taken. Patients with Acute cholecystitis, Gall bladder cancer, Pregnancy, Heart disease, those who did not give consent for the study, Anaesthesia unfit patients were excluded. This study involved preoperative assessment, intra operative practice and post-operative management and follow up in O.P.D. All the patients were studied with reference to duration of surgery, drainage, post-operative analgesic, post operative stay, intra operative and post-operative complications. Patients were admitted 2 days prior to surgery in case of elective cholecystectomy from O.P.D after complete investigations performed required for general anaesthesia. Investigations performed in these patients included Haemogram, Blood sugar level, Urine examination, Liver function test, Blood urea and serum creatinine level, Chest x-ray, ECG and Ultrasonography of abdomen. After complete investigations and after satisfying the inclusion and exclusion criteria for the study, patients were subjected to either open or laparoscopic cholecystectomy depending on patient's choice or upon draw of lots in no choice patients. First dose of antibiotics administered to the patient just prior to incision, immediately after intubation. General anaesthesia was administered to all the patients. Foleys Catheterization was done in all patients. Post-operative management included nil by mouth till bowel sounds are heard. Intravenous fluids in the form of crystalloids, Broad spectrum antibiotics were given. Analgesics in the form of Injection Tramadol were given. Top up analgesia in the form of intramuscular diclofenac sodium injection was given, whenever it was required. Patient were discharged after start of oral diet and when ambulatory. Follow up in OPD to find out whether the operative wound is healthy or not and for stitch removal after 7 days. All laparoscopic cholecystectomy converted to open cholecystectomy were considered as difficult laparoscopic cholecystectomy for evaluation of data.

Inclusion criteria: (1) Patients having symptomatic gall stone disease. (2) Patients having other gall bladder cause. (3) Those who gave consent for the study. **Exclusion criteria:** (1) Patients who are not willing to participate in this study. (2) Patients having Acute Cholecystitis, C.B.D stone, Cardiovascular disease, C.O.P.D, Pancreatitis. (3) Patients considered unfit for Anaesthesia. (4) Pregnant patients. Data was recorded and collected in the schedule recording proforma before, during and after the operation and later on entered and analyzed with computer using SPSS version 15.0.

RESULTS

Operating Time:

Showing operating time in both the procedures:-(TABLE -1)

	n=100	Percentage
30 to 45 mins	3(3%)	3.0
45 to 60 mins	28(28%)	28.0
60 to 75 mins	37(37%)	37.0
> 75 mins to 120 mins	32(32%)	32.0
Total	100	100.0

Table shows that 37% of the patients had taken 60 to 75 minutes for operation, 32% had taken above 75 minutes, 28% had taken 45 to 60 minutes and only 3% had taken 30 to 45 minutes.

Conversion: Showing the different reasons for conversion :- (TABLE-2)

Reasons	n=100	Percentage
Obscured Anatomy	3(3%)	3.0
Adhesions	1(1%)	1.0
No Conversion	96(96%)	96.0
Total	100	100.0

Table shows that 4 patients in laparoscopic group had to be converted to open. 3 patients due to obscured anatomy of calot's triangle and 1 patient due to adhesions, remaining 46 patients needed no conversion in the laparoscopic group.

Complications: Showing post operative complications : (TABLE-3)

Complications	n=100	Percentage
Vomiting	2(2%)	2.0
Wound infection	6(6%)	6.0
Nil	92(92%)	92.0
Total	100	100.0

Table shows that 92% of the patients had no post operative complication, 6% of the patients had post operative wound infection and 2% of the patients had vomiting in the post operative period.

Showing type of operation done & time taken: (TABLE -4)

Type of operation done	Time of operation				n=100	Significance
	30 to 45 mins	45 to 60 mins	60 to 75 mins	> 75 mins to 120 mins		
O.C	0	2	19	29	50	p=.001
L.C	3	26	17	0	46	
L.C to O.C	0	0	1	3	4	
Total	3	28	37	32	100	

Table shows the significance between the type of operation done and the time taken to perform (p<.05). L.C had mean average time of 52.50 minutes and O.C had mean average time of 82 minutes.

Showing type of operation done & causes of conversion :- (TABLE -5)

Type of operation	Cause of conversion			n=100	Significance
	Obscured Anatomy	Adhesions	No Conversion		
O.C	0	0	50	50	p=.001
L.C	0	0	46	46	
L.C to O.C	3	1	0	4	
Total	3	1	96	100	

Table shows that the causes of conversion in the type of operations done was highly significant p value which is below <.05. 4 patients in the L.C group had to be converted into O.C due to obscured anatomy (3%) and adhesion (1%).

Showing type of operation done & hospital stay :- (TABLE-6)

Operation done	Hospital stay			n=100	Significance
	2 days	3 to 7 days	> 7 days to 10 days		
O.C	1	26	23	50	p=.001
L.C	37	9	0	46	
L.C to O.C	0	1	3	4	
Total	38	36	26	100	

Table shows that there is significance with the type of operation done and the hospital stay (p<.05). Mean average hospital stay in L.C patients was 2.5 days compared to 8.5 days in O.C group.

Comparison of conversion rates between various studies :- (TABLE-7)

Studies	Year	Conversion Rate(%)
Vecchio et al.	1998	2.2
Butt et al.	2006	4
Guraya et al.	2004	2.9
Southern Surgeons Club	1991	4.7
Lim et al.	2005	11.5
Mcgee et al.	1996	10
Our study	2017	8

Discussion:

In the history of surgery, very few operations have changed the thinking and operating habits of surgeons as quickly and on such broad scale as laparoscopic cholecystectomy. This technique of small incision for cholecystectomy has shown good result in terms of reducing pain and morbidity and paved the way for use of minimal access surgery. Laparoscopic cholecystectomy was first performed in Lyon, France in March 1987 by Philippe Mouret, a general surgeon, who already had vast experience in gynaecological surgery and consequently was knowledgeable in the use of laparoscope. The extent to which the surgical incision contributes to morbidity and mortality is well established. Sufficient time has elapsed since the first laparoscopic cholecystectomy was performed. Indeed explosive growth of minimally invasive surgery of which laparoscopic cholecystectomy is prototype mandates the need for comparisons with respect to morbidity and mortality. Most surgeons have passed through the learning curve phase of their experience and have now settled into established patterns of activity.

In the present study many of the patients having calculi cholecystitis were in the age group of 40 to 49yrs(32%) followed by 30 to 39yrs(28%) group. In our study the sex female had preponderance than male patient. 85% of the study subjects were female and 15% were male suffering from calculi cholecystitis. In our study it was found out that cholelithiasis was common amongst the housewife 69%, reduced physical activity heightens the risk of gallstone disease whereas increased physical activity helps in prevention of cholelithiasis. In our study mean operative time for laparoscopic cholecystectomy was 52.50 minutes which is considerably shorter than mean operating time in open cholecystectomy which was around 82.50 minutes, similar findings was found by KAH Talpur in Pakistan in the year 2011 where the mean operating time was 46.89 minutes in L.C group and 54.16 minutes in O.C group. Indications for analgesia in both procedures were different. Whereas in open cholecystectomy group this was due to wound pain, the patients in the laparoscopic group required post-operative analgesia for relief of shoulder tip pain secondary to diaphragmatic irritation due to CO2 pneumoperitoneum. In our study 44% patient's use of analgesics was within the first 48 hrs of operation in the L.C group and in 24% patient's analgesic were used even after 2 days in the O.C group.

Wound infection in open procedure is 3 times the laparoscopic procedures. In our study wound infection was found to be in 6% of patient's and all of them were in the O.C group which was almost similar to the previous studies. Post-operative hospital stay for open cholecystectomy is more than 3 days in most studies whereas it is 3 or less in cases of laparoscopic cholecystectomy patients. In our study also it was similar, the mean average hospital stay in L.C patients was 2.5 days compared to 8.5 days in O.C patients. For elderly patients, many of whom have limited cardiopulmonary reserves, laparoscopic surgery could increase the morbidity and mortality of surgery. Pressure effects of Carbon dioxide gas insufflated, may have effect on venous return, the heart rate and rhythm, basal lung expansion, carbon dioxide retention and acidosis.

CONCLUSION :

Worldwide many case series have been published regarding comparison between laparoscopic cholecystectomy and open cholecystectomy and results are in favour of laparoscopic cholecystectomy. Finally it may be concluded from the study that : Laparoscopic cholecystectomy is a better procedure than open cholecystectomy from the study results. Complications, duration of

operation, hospital stay, use of drain and analgesics were much lesser; with early return to work compared to open cholecystectomy. However open cholecystectomy is preferable for Surgeons in training and in cases of complicated cholecystectomy.

REFERENCES

1. Khuroo MS, Mahajan R, Zargar SA, Javid G, Sapru S. Prevalence of biliary tract disease in India: a sonographic study in adult population in Kashmir. *Gut* 30:1989; 201-05.
2. Ellis H, John Stough Bobbs: father of gall bladder surgery. *Br J Hosp Med (Lond)*. 2009; 70: 650.
3. Traverso LW, Carl Langenbuch and the first cholecystectomy. *American journal of surgery*. 1976; 81-2.
4. Paulino-Netto A. A review of 391 selected open cholecystectomies for comparison with laparoscopic cholecystectomy. *Am J Surg*. 1993;166: 71-3.
5. Cheslyn-Curtis S, Russell RC. New trends in gallstone management. *Br J Surg*. 1991; 78: 143-49.
6. Villanova N, Bazzoli F, Taroni F, Frabboni R, Mazzella G, et al. Gallstone recurrence after successful oral bile acid treatment. A 12-year follow-up study and evaluation of long-term post dissolution treatment. *Gastroenterology*. 1989; 97: 726-31.
7. Della Bianca P, Bonvin B. Lithotripsy of biliary calculi by shock waves. Current possibilities and perspectives. *Helv Chir Acta*. 1990; 56: 913-16.
8. Fromm H. Gallstone dissolution therapy with ursodiol. Patient selection. *Dig Dis Sci*. 1989; 34: 36S-38S.
9. Stochman PT, Dunnegan DL, Ashley SW. Laparoscopic cholecystectomy: The New gold standard *Arch Surg*. 1992 Aug; 127(8):917-21.
10. Ji W, Li LT, Li JS. Role of Laparoscopic subtotal Cholecystectomy in the treatment of complicated cholecystitis. *Hepatobiliary Pancreat Dis Int*. 2006 Nov; 5(4):584-89.
11. Cuschieri A. Laparoscopic Cholecystectomy. *J. R. Coll. Surg Edinb*. 1999 June; 44:187-92.
12. Lan CM, Murray FE, Cusher A. Increased cholecystectomy rate after the introduction of Laparoscopic Cholecystectomy in Scotland. *Gut*. 1996 Feb; 38(2):282-84.
13. Wayand WU, Gatter T. Lap Chole: The Austrian experience. *J R Coll Surg Edinb*. 1993; 38(3):152-154
14. New Era of Surgery History of Laparoscopy: The Indian Scenario Current Minimal Access Procedure Future. Available on <http://surgerytimes.com/history/modern.html>. Accessed on 01/09/2017.
15. Tripura Population Sex Ratio in Tripura Literacy rate data. Available on <http://www.census2011.co.in/census/state/tripura.html>. Accessed on 01/09/2017.
16. Gupta V, Chowdri N, Hamed N, Naggesh S. Lap vs Open Cholecystectomy: A Prospective Study of 800 Patients. Available on <http://www.surgerytimes.com/history/modern.html>. Accessed on 01/09/2017.
17. Kaushik R, Sharma R, Batra R, Yadav TD, Attri K, Kaushik SP. Laproscopic Cholecystectomy: An Indian Experience of 1233 cases. *J Laparcent dos Adv Surg Tech A*. 2002 Feb; 12(1):21-5. Pubmed.
18. Shah T, Shah P, Parmar H, Vaidya Y, Jadeja J, Patel D. Prospective Single Centre Study of 100 Patients undergoing Laparoscopic Cholecystectomy- Changing Trends. *NHL Journal of Medical Sciences*. 2013 Jan; (2):1.
19. Laparoscopic and Open Cholecystectomy Seem Equivalent Considering Complication and Operative time, but Laparoscopic Cholecystectomy is Associated With Quicker Recovery. Available on <http://www.cochrane.org/cd00623/liver-laparoscopic-and-open-cholecystectomy-seem-equivalent-considering-complication-and-operative-time>. Accessed on 01/09/2017.
20. Stephen RB, Attwood SEA, Hill ADK, Mealy K. *Annals of the Royal College of Surgeons of England*. 1992; 474:397-00.
21. Awadi ES, Nakeeb EL, Yousef T, Fikry A, Ahmed TM, Abd EL, Ghazy H et al. Laparoscopic versus Open Cholecystectomy in Cirrhotic patients: prospective randomised study. *International Journal of Surgery*. 2009; (7):66-9. ELSEVIER.
22. Gangan, Duca S, Bala D, Hajjar N, Cota A R. Acute Cholecystitis. *Laparoscopic Cholecystectomy versus Open Cholecystectomy 2004*. Available on: <http://www.tmj.ro/article.php?rt=34426474424480#abstract>. Accessed on 2/9/2017.
23. Kiviluoto T, Seim J, Luukkonen P, Kivilokso E. Images in Randomized Trial of Laparoscopic vs Open Cholecystectomy for Acute and Gangrenous Cholecystitis. *The Lancet*. Available on [http://dx.doi.org/10.1016/S0140-6736\(97\)08447-x](http://dx.doi.org/10.1016/S0140-6736(97)08447-x). Accessed on 2/9/2017.
24. Eldar S, Sabo E, Nash E, Abrahamson J, Matter I. Laproscopic versus Open Cholecystectomy in Acute Cholecystitis. *Surg Laprosc Endosc*. 1996 Oct; 7(5):407-14.
25. Supre N, Bapat VN, Pandhya SV, Dalvi N. Laparoscopic versus Mini-lap Cholecystectomy for gall stone disease. *Indian J Gastroenterol*. 1996; 15(3):94-6.
26. Saeed T, Zarim M, Aurangzeb M, Wazir M, Muqeem R. *Pakistan Journal of Surgery*. 2007; 23(2):96-9.
27. Sakpal VS, Bindra SS, Chamberlain S. Laparoscopic Cholecystectomy Conversion Rates Two Decades Later. *JLS*. 2001 Oct-Dec; 4(4):476-83.
28. Das N, Deb Barma A, Deb Barma G. Laproscopic Cholecystectomy- An Evaluation in Teaching Hospital. *International Journal of Recent Trends in Science and Technology*. 2014; ISSN 2277-282 E-ISSN 2249-809(10):3,456-57.
29. Bingener Casey J, Richards ML, Strodel WE, Schweringer WH, Sirinek KR. Reasons for Conversion from Laparoscopic to Open Cholecystectomy: A 10 year Review. *J Gastrointest Surg*. 2002 Nov-Dec; 6(6):800-5.
30. Memon MR, Muhammad G, Arshad S, Jat AM, Bozdar AG. Study of Open Cholecystectomy Conversion in Laparoscopic Cholecystectomy. *Gomal Journal of Medical Sciences*. 2011 Jan-Jun; (9):1.
31. Wu XD, Tian X, Lian MM, Wu L, Zhao S, Zhao L. Meta Analysis Comparing Early Versus Delayed Cholecystectomy Laparoscopic Cholecystectomy for Acute Cholecystitis. *BJS*. 2015; 102:1302-13.
32. Pukar MM, Shah JV, Mewada SG. Analytic Study of Laparoscopic Cholecystectomy. *International Journal of Anatomy, Radiology and Surgery*. 2015 Jan; 4 (1):1-5.
33. Urooz R, Khan S, Oonwala ZG. An audit of Laparoscopic Cholecystectomy: A Revisit. *Ann Hamdumi*. 2010; 1(1):9-11.
34. Dziri C, Samaail I, Osmani SB. Laparoscopic Cholecystectomy decreases extra surgical site morbidity compared with Open Cholecystectomy: A Propensity Matched Analysis. *La Tunisie Medicale*. 2015; 93(8):500-06.