ORIGINAL ARTICLE

"Does Timing of Surgery Affect Outcome In Laparoscopic Cholecystectomy for Acute Cholecystitis?"

MUMTAZ AHMAD KHAN, RAKHSHANDA RASHID, SAMA MUKHTAR, NADEEM AHMAD
Department of Surgery, Pakistan Institute of Medical Sciences, Islamabad
Correspondence to: Mumtaz Ahmad Khan, Department of Surgery, Pakistan Institute of Medical Sciences, Islamabad, Ph: Cell +92 (0) 300 5 241 242, Office +92 (0) 51 926 0 115, Residence +92 (0) 51 9255 464, E-mail: mumtazpims@yahoo.com

ABSTRACT

Background: Gallstone disease is a common problem and many patients present with acute cholecystitis (AC). The policy of laparoscopic cholecystectomy (LC) in AC needs to be evaluated in our set up.
Objectives: To study the effect of timing of surgery on the outcome in laparoscopic cholecystectomy for acute cholecystitis.
Materials and Methods: All patients presenting with gallstone disease to our institution, from June 1, 2009 to May 31, 2010 underwent laparoscopic cholecystectomy on first available elective list, irrespective of duration of symptoms and data was analyzed.
Results: A total of 156 patients presented with gallstone disease. Mean age was 49.50 and male to female ratio of 1:5.5. AC was diagnosed in 49 (31.41%). Majority of patients (n-25, 51.02%) with AC presented in 4-7 days duration. Mean operating time was 54.08 minutes in chronic cholecystitis (CC), 55.83 minutes in LC performed with 72 hours of onset and 73.2 minutes in patients operated later for AC. Conversion rate to open cholecystectomy was 9.09% in LC for AC within 72 hours of onset, 66.66% if operated during 4-7 days duration. In Chronic cholecystitis conversion rate was 4.67% while the same was 4.28% in patients after six weeks after resolution of AC. Morbidity, complications, conversion rate and postoperative stay was significantly higher in male patients presenting during 4-7 days after the onset of AC.
Conclusion: LC is feasible and safe in AC, if performed early. It has similar morbidity and mortality pattern compared to patients undergoing LC for CC or patients who are operated six weeks after an acute attack of AC. However LC after 72 of onset of symptoms is associated with increased operating time, morbidity and complication rate.

Key Words: Acute cholecystitis, laparoscopic cholecystectomy, complications, Morbidity, Operating Time, Timing, safety, feasibility.

INTRODUCTION

Gallstone disease is a major health problem worldwide and approximately 10-15% of adults in USA have gallstones[1]. A similar incidence in India[2] and Pakistan is expected[3-4]. During the last two decades laparoscopic cholecystectomy (LC) has become the gold standard treatment of gallstone disease[5-6]. LC is minimally invasive procedure whereby the gallbladder is removed using laparoscopic technique causing less surgical trauma thereby resulting in reduced hospital stay and early resumption to normal activity[7]. Approximately 20-30% of all admissions in gallstone disease are due to acute cholecystitis. Traditionally acute cholecystitis was managed by conservative therapy followed by laparoscopic cholecystectomy after a period of at least 6 weeks[8]. This traditional view was challenged[9-11] and later randomized clinical trials suggested that urgent laparoscopic cholecystectomy is feasible and safe for the treatment of acute cholecystitis[1-14]. However this issue was again complicated when it was observed that LC has acceptable outcome if performed within 72 hours of onset of symptoms[15]. This 72 hours limitation is practically very difficult and patients usually present quite late with acute cholecystitis in our set up. Moreover, it is not practical to operate these patients on emergency list laparoscpically due to logistic reasons and they have to undergo surgery on first available elective list. Our policy is to operate all gallstone disease patients when admitted to a hospital irrespective of duration of symptoms. There was a need to study the impact of this policy on morbidity, operating time, conversion rate, complications, postoperative hospital stay and mortality.

MATERIALS AND METHODS

The study was carried out at the Hepatobiliary & Pancreatic (HBP) Surgery Unit at Pakistan Institute of Medical Sciences, Islamabad. It was a retrospective study after obtaining approval from the Hospital Research and Ethics Committee. We aimed to study the impact of the time elapsed from onset of symptoms to operation on the operating time, conversion rate, peri-operative morbidity and length of postoperative hospital stay. We had a policy to offer laparoscopic cholecystectomy to all with gallstone disease patients, irrespective of duration of symptoms. Between June 1, 2009 and May 31, 2010 all patients presenting with gallstone disease were included in the study. Only those patients who were rendered unfit to undergo surgery by other departments because of medical problems were excluded from the study.

Patients were divided into five groups on the basis of duration of symptoms before surgery (time from onset of symptom to operation time):

(1)- early group within 3 days, (2)- Intermediate groups between 4 to 7 days,(3)-Delayed group 1 - 6 weeks), (4)- elective group >6 weeks from the onset of symptoms of acute cholecystitis, (5) chronic cholecystitis with no previous history of acute cholecystitis. All data was stored in a prospective database. All data was entered into SPSS version 17 and analyzed. P value less than 0.05 was considered significant.

RESULTS

During the study period, 156 patients were admitted with the diagnosis of gallstone disease. The mean age was 49.50(Standard deviation 11.70) years, (range 17 to 90 years). Twenty four (15.4%) patients were male while 132 (84.6%) were females with a male to female ratio of 1:5.5. Acute cholecystitis was diagnosed in 49 (31.41%) patients. Majority of male population (n- 18,75% of male population) presented with acute cholecystitis. Distribution of patients in terms of duration of symptoms from onset of acute cholecystitis is shown in table 1. In females 31 patients (23.48% of female population) had acute cholecystitis.. Majority of patients with acute cholecystitis presented in 4-7 days duration (n-25, 16.02%).

Table 1: Number of patients in terms of duration of illness

Duration of Symptoms	Frequency	Percent	Cumulative Percent
<3days	12	7.9	7.9
4-7 days	20	13.2	21.2
>one week	11	7.3	28.5
>6 weeks	74	49.0	77.5
Chronic Cholecystitis	34	22.5	100.0
Total	151	100.0	

Table 2: Operating time in relation to duration of symptoms

Operating time in Relation to duration of Symptoms						
Duration of Symptoms	Mean (St. Error)	Median	Standard Deviation	Minimum	Maximum	Range
<3 Days	55.83 (3.80)	60	13.16	34	87	53
4-7Dyas	72(5.18)	76	25.90	34	130	96
1-6 weeks Week	66.54(9.26)	60	30.72	45	141	96
>6 weeks	52.56 (2.07)	45	17.84	34	18	94
Chronic Cholecystitis	54 (2.71)	52	15.8	34	107	73

Table 3: Incidence of complications in relation to duration of symptoms from onset to surgery

Duration of Symptoms	complications				
	minor bleed	intraoperative bile leak	post operative bile leak	CBD injury	Total
<3days	1	0	0	0	1
4-7 days	3	6	3	1	13
1-6 weeks	0	1	1	0	2
>6 weeks	0	3	1	0	4
Chronic Cholecystitis	3	0	2	0	5
Total	7	10	7	1	25

Table 4: Post-operative stay in relation to duration of symptoms at the time of presentation

Duration of Symptoms	Mean	Std. Deviation	Minimum	Maximum	Range	Grouped Median
<3days	1.5000	1.24316	1.00	5.00	4.00	1.3636
4-7 days	3.5200	5.91692	1.00	30.00	29.00	1.8667
1-6 weeks	1.0909	.30151	1.00	2.00	1.00	1.0909
>6 weeks	1.8243	3.63528	1.00	32.00	31.00	1.3333
Chronic Cholecystitis	1.3529	.84861	1.00	5.00	4.00	1.2258
Total	1.9167	3.53044	1.00	32.00	31.00	1.3383

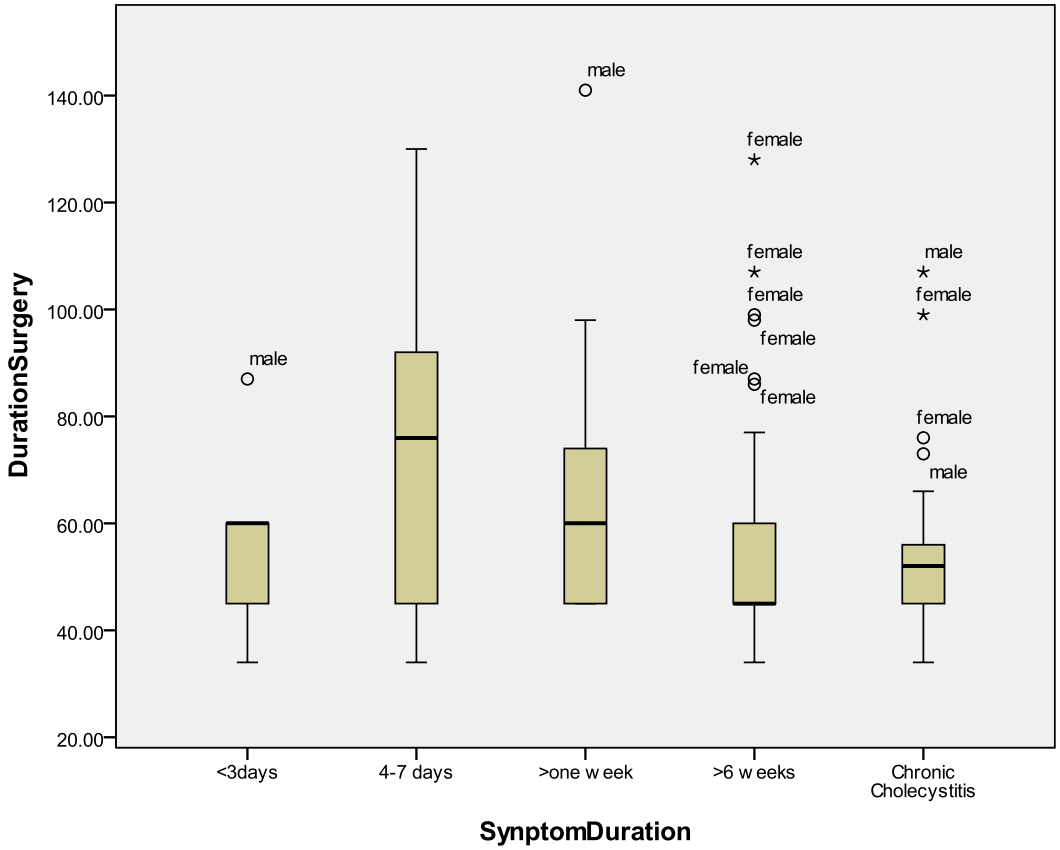

Figure 1 Mean operating time is greater in male patients operated 72 hours after the onset of acute cholecystitis.

However, an overall majority presented 6 weeks after a previous episode of acute cholecystitis. Mean operating time was 53.11 minute for patients with chronic cholecystitis and 66.36 minutes in acute cholecystitis. Intra-operative findings in relation to duration of symptoms from onset to operation is shown in table 3. Impact of duration of symptoms on operating time is shown in table 4. Figure 1 show that mean operating time is longer in male population with acute cholecystitis undergoing surgery 72 hours after the onset of symptoms. Conversion to open cholecystectomy (OC) was required in 20 patients (12.8%), because of difficulties encountered during surgery. Rate of conversion to OC was 5.88% (n-5) in chronic cholecystitis, 5.4% (n-4) in patients operated six weeks after onset of AC and 8.3% (n-1) in patients operated within 72 hours of onset, rising to 40%(n-10) in patients operated during 4-7 days duration after onset and 27.27%(n-3) if operated during 1-6 weeks duration. Reasons for conversion to OC were simple edematous gallbladder in 1(2.94%), contracted gallbladder in 2, empyema gallbladder in 3, perforation in one, adhesions to adjoining structures like omentum, stomach, duodenum and colon in 7 out of 16 and distorted anatomy at the Calot’s triangle in 3 patients. Influence of duration of symptoms on complication rate is shown in table 3. Post operative stay in relation to symptom duration is given in table 4. There was no mortality in either group of patients. CBD injury was observed in one patient who was male and underwent surgery after 72 hours of onset of symptoms.

DISCUSSION

Gallstone disease is a common problem and a significant proportion (up to 20%) of these patients present with acute cholecystitis (AC).[3, 4, 17, 18]. Traditionally, AC had been considered to be a contraindication to LC because of the technical difficulties, which might lead to higher complication rates; particularly major bile duct injuries. Traditional treatment of AC with conservative management followed six weeks later by laparoscopic cholecystectomy[8] has been challenged in favour of LC[9-19]. Though some were hesitant to adapt a policy of early LC in AC right from the beginning [8], with increasing experience, an increasing number of authors suggested that early approach is feasible, safe and reliable[20-24]. Some attempted to coin a term urgent laparoscopic cholecystectomy for acute cholecystitis during the index admission[13]. Hunter pointed out that during the last two decades, we have seen an increasing shift in the paradigm for surgery of the gallbladder. Most of the rules learnt over years during residency are being challenged and one of them is timing of surgery in AC. In Hunters view it should be taken when still hot[21]. However some were of the view that LC after 72 hours of onset is associated with increased morbidity [15, 25-28], so LC should be attempted with guard in patients presenting after a duration of more than 72 hours. This study aims to solve this dilemma in our set up.

In our study, mean age of patients presenting with gallstone disease is similar to age mentioned in national literature. However in international literature, an older age is mentioned both in eastern and western population[15, 19] . Similarly female preponderance is seen in our population [26, 27, 28], while in the rest of world an almost equal number of males and females have gallstone disease[15, 19]. Males are more likely to present with acute cholecystitis (75%, n-18) than females (23.48%, n-31). (P value 0.000). A similar observation was made by Wing Hong et al and [15]. It was observed by Wing Hong et al [15] and others[20] that LC during the first 72 hours is safe and feasible but only a minority presents during this golden period. The mean operating time in our study was influenced by two factors, namely male sex and AC presenting after 72 hours of onset. Operating time was significantly longer in AC compared to chronic cholecystitis with a difference of 13.4 minutes (p value .014). However mean operating time was longest in male patients presenting after 4 days (72.20 minutes, p-value 0.007). Mean operating time in patients presenting with AC during first 72 hours (55.83 minutes) was comparable to operating time in patients with chronic cholecystitis (54.08 minutes) or in those who were operated after six weeks of acute attack (52.56 minutes). It means that if operated during the first 72 hours, patients with acute cholecystitis are benefitted of early return to work, no break through attacks requiring admissions with morbidity and mortality profile similar to that of LC in CC. T S Mufti[29] has reported a longer operating time while H U Qureshi [30] has reported shorter operating time. It reflects that mean operating time is also influenced by the surgeon. Conversion rate in the present study was 30.61%, n-15 in AC and

4.67 %(n-5) in chronic cholecystitis. Conversion rate in early and elective group is comparable to the conversion rate in LC for CC.However rate conversion to OC is significantly high in intermediate and delayed group. Conversion to OC has been primarily because of dense adhesions of gallbladder to adjoining structures making progress difficult or almost impossible(n-10) or difficulty in displaying anatomy at the Calot's triangle n-3. A similar observation has been mentioned by Lo CM et al[12] ,Wing Hong et al[15] , and Simonopolos et al[27]. However others have mentioned smaller conversion rates[9, 11, 12, 19]. But on looking closely at the study designs we see that either they have not stratified patients into groups on the basis of duration of illness or they have excluded some patients from study on the basis of raised billirubin or mass formation in gall bladder. Some studies however addressed the issue of duration of symptoms and came up with different results [18,20]. Sharma et al [20] has observed no statistical difference in the conversion rate on the basis of duration of symptoms. George et al[18] has observed slightly higher conversion rate in patients presenting after 72 hours with no statistical significance. Gender has an influence on conversion rate as 80% males (n-8) required conversion to OC as compared to conversion to OC rate of 29.16% (n-7) in females. A similar observation has been mentioned by Bickel A et al [25] and Zeisman A et al [26]. Highest number of complications (52%) and significantly higher post op stay of 3.52 days was seen in patients operated during 4-7 days of onset of AC, while complication rate was minimum with post operative hospital stay of almost around 1.5 days in patients operated within 72 hours period after onset of symptoms. This profile is even slightly better than the index population of LC in CC which is gold standard

CONCLUSIONS

Patients in our set up present late in the course of acute cholecystitis and duration from onset to operation is usually more than 72 hours. LC is safe and feasible with acceptable morbidity and mortality if performed early in the course of disease (within 72 hours of onset). Male patients and patients operated after 72 hours of onset have a higher complication rate requiring caution in the decision of surgery. Threshold for conversion to OC in these patients should be low and it should not be considered as failure.

REFERENCES

1. Mittal B, Mittal R J Postgrad Med 2002; 48:149-52.
2. 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 1989; 30:201-5.
3. Jawaid M, Masood Z, Iqbal SA, Sultan T. The pattern of diseases in a Surgical Unit at tertiary care public hospital at Karachi. Pak J Med Sci 2004;20(4):311–4.
4. Channa NA, Soomro AM, Ghangro AB. Cholecystectomy is becoming an increasingly common operation in Hyderabad and adjoining areas The Journal of the Pakistan Medical Association Volume 32, Number 2, Jul - Dec 2007
5. Soper NJ, Stockmann PT, Dunnegan DL, Ashley SW. Laparoscopic cholecystectomy. The new 'gold standard'? Arch Surg. 1992 Aug;127(8):917-21;
6. A H Sain. Laparoscopic cholecystectomy is the current "gold standard" for the treatment of gallstone disease. Ann Surg. 1996 November; 224(5): 689–690.
7. Bhopal FG, Rai MA, Iqbal MA. A comparative study of morbidity in laparoscopic and open cholecystectomy. J Surg Pak. 1998;3(3):2–7.
8. Cuschieri A. Approach to the treatment of acute cholecystitis: open surgical, laparoscopic or endoscopic? Endoscopy. 1993;25:397–8.
9. Wilson RG, Macintyre IM, Nixon SJ, Saunders JH, Varma JS, King PM. Laparoscopic cholecystectomy as a safe and effective treatment for severe acute cholecystitis.BMJ. 1992 Aug 15;305(6850):394-6.
10. Calero GP, Ruiz TJ, Sanjuanbenito DA, Calero AA, Díez TM, Latorre FR, Housari MG, Martínez ME, Fresneda MV. Acute cholecystitis: is it still justified to delay surgery? Cir Esp. 2010 Aug;88(2):92-6. Epub 2010 Jun 18.
11. Wang YC, Yang HR, Chung PK, Jeng LB, Chen RJ. Urgent laparoscopic cholecystectomy in the management of acute cholecystitis: timing does not influence conversion rate. Surg Endosc. 2006 May;20(5):806-8. Epub 2006 Mar 16.
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):461-7.

13. Bhattacharya D, Senapati PS, Hurle R, Ammori BJ .Urgent versus interval laparoscopic cholecystectomy for acute cholecystitis: a comparative study. J Hepatobiliary Pancreat Surg. 2002; 9(5):538-42.
14. Lai PB, Kwong KH, Leung KL, Kwok SP, Chan AC, Chung SC, Lau WY. Randomized trial of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. Br J Surg 1998; 85: 764-767
15. Wing Hong Li, colin Wai Ho Chu, Moon Tang Cheung: Factors for conversion in laparoscopic cholecystectomy for acute cholecystitis: Is timing important?, Surgical Practice Vol 13 Issue 2 42-47 May 2009.
16. 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; 18: 1323-1327
17. Sharp KW. Acute cholecystitis. Surg Clin North Am 1998; 68: 269-279
18. George T, Dimitris Z, Paraskevi L, Theodoros T, George P, Constantine H, George T, Dimitris Z, Paraskevi L, Theodoros T, Constantine H. Timing of laparoscopic cholecystectomy for acute cholecystitis: A prospective non randomized study. World J Gastroenterol 2006 September 14; 12(34): 5528-5531
19. Khan MN, Nordon I, Ghauri ASK, Ranaboldo C, Carty N. Urgent cholecystectomy for acute cholecystitis in a district general hospital – is it feasible?Ann R Coll Surg 30 Engl 2009; 91: 30–34
20. Sharma SK1, Thapa PB2, Maharjan DK3, Dhakal A4, Baral N4 Influence of duration of symptoms over perioperative outcomes during emergency laparoscopic cholecystectomy Kathmandu University Medical Journal (2009), Vol. 7, No. 2, Issue 26, 120-124
21. J G Hunter Acute cholecystitis revisited: get it while it's hot. Ann Surg. 1998 April; 227(4): 468–469.
22. Yuksel O, Salman B, Yilmaz U, Akyureb N, Tatlicioglu E. Timing of laparoscopic cholecystectomy for subacute calculus cholecystitis: early or interval- a prospective study. J Hepatobiliary Pancreatic Surgery (2006) 13:421-424
23. Papi C, Catarci M, Ambrosio D, Gili L, Koch M, Grassi GB, et al. Timing of cholecystectomy for acute calculous cholecystitis: a meta-analysis. Am J Gastro 2004; 99(1):147–55.
24. Soffer D, Blackbourne LH, Schulman CI, Goldman M, Habib F, Benjamin R , Lynn M, Lopez PP, Cohn SM, McKenney MG. Is there an optimal time for laparoscopic cholecystectomy in acute cholecystitis? Surg Endosc (2007) 21: 805–809
25. Bickel A, Rappaport A, Kaneivski V, Vaksman I, Haj M, Geron N, Eitan A, Laparoscopci managemne of acute cholecystitis: Prognostic factors for success. Surg Endosc. 1996 Nov;10(11):1045-9.
26. Zisman A , Gold Deutch R, Zisman Eetal. Is gender a risk factor for conversion of laparoscopic cholecystectomy to open cholecystectomy? Surgical Endoscopy 1996;10:892-4
27. Simopouos C, Botaitis S, Poychronidis A, Tripsianis G, Karayiannakis AJ,. Risk factors for conversion for laparoscopic cholecystectomy to open cholecystectomy. Surgical Ensoscopy2005 19:7, 905-9.
28. Lo CM, Liu CL, Fan ST, Lai EC, Wong J, Prospective randomized study of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. Annals of surgery 1998 7:4 461-7
29. Mufti T S, Ahmad S, Naveed D, Akbar M, Zafar A. Laparoscopci cholecystectomy: An early experience at Ayub Teaching Hopsital Abbottabad. J Ayub Med Coll Abbottabad 2007;19(4) 42-44
30. Qureshi H U, Jan Q A, Muqim RU, Alam M, Khalil A R. Laparoscopic cholecystectomy-local experience. J. Med. Sci. (Peshawar, Print) January 2010, Vol. 18, No. 1 15