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Original Research Article

Two eras of laparoscopic cholecystectomy: an experience of 3000 cases

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ABSTRACT

Background: Laparoscopic cholecystectomy (LC) a minimal invasive procedure is regarded as gold standard for gallstone disease for many years. With increase learning curve of surgeons, the incidence of complications of this procedure decreases significantly. The purpose of study was to compare the experiences of Laparoscopic cholecystectomy performed.
Methods: It was a retrospective cohort study conducted in Surgical Department, Rawalpindi Medical College and author's surgical clinic. From 1st January 1998 to 31st December 2014. Total 3000 patients of Laparoscopic cholecystectomy were divided into 2 groups. First 1500 cases (operated between January 1998 to December 2007) in Group A and next 1500 cases (operated between January 2008 to December 2014) in Group B. Preoperative diagnosis, intraoperative findings and injuries especially incidence of CBD injuries with post-operative complications and their management were evaluated.
Results: Out of 3000 cases 2585 (86.1%) were females and 415 (13.8%) were males. Total 18 (0.6%) cases had CBD injury during LC. 17 cases were in group A which decreased significantly to 1 case in Group B. Mean operative time was 30 minutes. Wound infection remained the most common postoperative complication.
Conclusions: In our setup, the burden of laparoscopic cholecystectomy for symptomatic gallstones have increased with very low incidence of complications.

Keywords: Common bile duct injury, Complications, LC

INTRODUCTION

Cholelithiasis is the commonest surgical pathology of biliary tract known for many years and requires surgical approach for complete cure.[1] Cholelithiasis is very common surgical disease in UK general population ranging from 4 to 45% which varies with age and gender.[2,3] In America 10-15% adult population has gall bladder stones.[4] In India the reported incidence is in 6% of population.[5] The unchallenged supremacy of open cholecystectomy which was present for very long time is slowly and steadily decreasing after the invention of minimally invasive surgery like mini-cholecystectomy in 1983 and laparoscopic cholecystectomy (LC) in 1985/1987.[6,7] In fact it is the most eminent surgical shoot of this century which has revolutionized the treatment of cholelithiasis. It has now become the ideal for the treatment of cholelithiasis as it proffers a shorter hospital stay due to smaller wounds and reduced postoperative pain.[8-10]

Despite being the undisputed procedure of choice by general, laparoscopic and hepatobiliary surgeons there exist a steep learning curve before getting a complete command on this procedure. It requires a lot of experience and costly equipment is required for learning the art of this procedure especially in developing world.[11] Here we share the experience of this minimal invasive procedure performed in our setup over a period of seventeen years.

METHODS

After approval by institutional review board (Registration number: RMC/PR-108/Sep-2016) the study was started. Total 3000 patients of laparoscopic cholecystectomy were divided into 2 groups. First 1500 cases operated between January 1998 to December 2007 in group A and next 1500 cases operated between January 2008 to December 2014 in group B. Patients of any age and gender with clinical diagnosis of acute and chronic cholecystitis were included in study whereas exclusion criteria include patients who were Immunosuppressed, receiving radiotherapy, patients with evidence of CBD pathology on clinical, biochemical, ultrasonological or MRCP basis and patients with bleeding disorders.

Standard four port technique was used. If there was leaking of bile in the peritoneal cavity, it was sucked up and peritoneal cavity lavage with normal saline was done at end of procedure.

Similarly, in case of spillage of stones, smaller stones were sucked with help of normal saline using 10 mm sucker whereas large stones were individually picked up and removed one by one or a basket made up of surgical glove was used. In all cases, a drain was placed.

Port site wounds were approximated with silk. If rectus sheath defect was enlarged to >10 mm for gall bladder removal it was also repaired.

All findings were noted on predesigned Performa and data was entered and analyzed by IBM ® SPSS® version 22.0. In addition to descriptive statistics, Pearson's Chi square test was applied at 5% level of significance. Relative risks along with 95% confidence intervals were also calculated for each complication and outcome of procedure for each period.

RESULTS

Out of 3000 cases 2585 (86.1%) were females and 415 (13.8%) were males. Table 1 shows age and gender distribution and mode of admission of patients in two groups and both study groups were homogenous based on these baseline characteristics. As regards the intraoperative findings, an abnormal gall bladder was 1.29 times more likely to be found in group A (95% CI = 1.16 to 1.43) as compared to group B, the difference being highly statistically significant. The intraoperative findings of the gall bladders are displayed in Table 2, showing the highly statistically significant differences for mucocele and empyema in both study groups.

Table 1: Distribution according to age and gender (n=3000).

		Group A (n=1500)	Group B (n=1500)	Total (n=3000)	p-values
Gender	Females	1301 (86.7%)	1284 (85.0%)	2585 (86.1%)	0.36
	Males	199 (13.3%)	216 (14.4%)	415 (13.8 %)	
	F:M ratio	6.5:1	6:1		
Age	Minimum age	20 years	15 years	15 years	
	Maximum age	70 years	80 years	80 years	
	Mean±Standard deviation	(45.06±10 year)	(44.90±11 year)	(44.66±10 year)	
Mode of admission	OPD; chronic cholecystitis	1040 (69.3%)	1003 (66.8%)	2043 (68.1%)	0.14
	A and E; acute cholecystitis	460 (31.7%)	497 (33.1%)	957 (31.9%)	

Table 2: Intraoperative findings (n=3000).

Condition of GB		Group A (n=1500)	Group B (n=1500)	Total (n=3000)	p-values
Normal		574 (38.2%)	443 (29.5%)	1017 (33.9%)	0.00*
Distended	Moderately	216 (14.4%)	252 (16.8%)	944 (31.46%)	0.58
	Severely	263 (17.5%)	213 (14.4%)		
Shrunken		112 (7.4%)	101 (6.7%)	213 (7.1%)	0.43
Mucocele		182 (12.1%)	248 (16.5%)	430 (14.3%)	0.00*
Empyema		153 (10.2%)	243 (16.2%)	396 (13.2%)	0.00*

*Highly statistically significant association

All operative injuries and conversion to open cholecystectomy were observed to be lesser in later era as compared to earlier one as exhibited in Table 3. The risks of conversion to open cholecystectomy and CBD injury were observed to be 3 and 17 times more respectively, in group A as compared to group B with a highly statistically significant difference. In the present study, 18 out of 3000 patients (0.6%) had CBD injury. 17 cases were in group A which decreased significantly to 1 case in Group B. The cause of injury to CBD in 17 (94.4%) cases was lack of identification of anatomy whereas in 01 (5.6%) case it was due to Harmonic scalpel. Out of total 18 patients 15 (83.3%) were cases of chronic cholecystitis while three (16.7%) were cases of acute

cholecystitis. Most of the surgeries (65.96% of all 3000) were done in less than 30 minutes and majority of those with lesser duration belonged to group B with a highly statistically significant difference (0.00) (Figure 1). Wound infection and shoulder pain remained the most common postoperative complication and both complications occurred higher in patients of group A as compared to group B (Table 4).

Table 3: Operative injuries and conversion to open cholecystectomy (n=3000).

	Group A (n=1500)	Group B (n=1500)	Total (n=3000)	RR (95% CI)	p-value
Conversion to open Cholecystectomy	57 (3.8%)	16 (1.06%)	73 (2.4%)	3.56 (2.05-6.17)	0.00*
CBD Injury	17 (1.4%)	01 (0.06%)	18 (0.6%)	17.00 (2.26-127.08)	0.00*
Dense adhesions	33 (2.2%)	14 (0.93%)	47 (1.5%)	0.75 (0.48-1.17)	0.20
Bleeding obscuring view	05 (0.5%)	01 (0.06%)	06 (0.2%)	5 (0.58-42.47)	0.14
Port-site hernia	01 (0.1%)	00 (0%)	01 (0.03%)	3.0 (0.12-73.58)	0.50
Duodenal injury	01 (0.1%)	00 (0%)	01 (0.03%)	3.0 (0.12-73.58)	0.50

*Highly statistically significant association

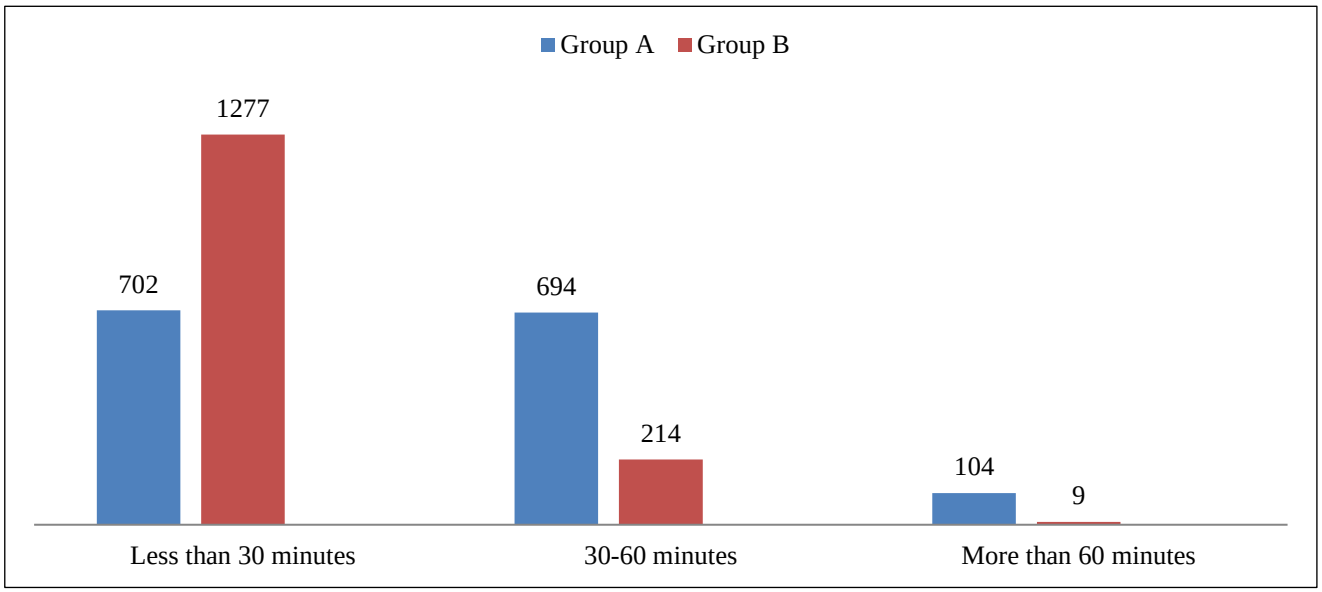

Figure 1: Operative timing of both groups.

Table 4: Post-operative complications in two groups.

	Group A (n=1500)	Group B (n=1500)	TOTAL (n=3000)	RR (95% CI)	P-value
Wound infection	39(2.6%)	16 (1.06%)	55 (1.83%)	2.43 (1.36-4.34)	0.00*
Shoulder pain	36 (2.4%)	12 (0.8%)	48 (1.6%)	3.00 (1.56-5.74)	0.00*
Surgical emphysema	01 (0.06%)	0 (0%)	01 (0.03%)	3.00 (0.21-73.58)	0.50
Port-site hernia	03 (0.2%)	05 (0.33%)	01 (0.26%)	0.60 (0.14-2.50)	0.48

*Highly statistically significant association

The postoperative course was smooth with most of patients 2502 (83.4%) remained in hospital within 24 hours. Whereas 290 (9.6%) stayed till 48 hours, 191 (6.3%) till 72 hours and only 17 (0.5%) stayed longer

than 72 hours and longest duration of stay in hospital was observed to be 168 hours in one patient. The duration of stay in hospital was significantly lesser in group B as compared to group A. (p value= 0.00). The comparison is given in Figure 2.

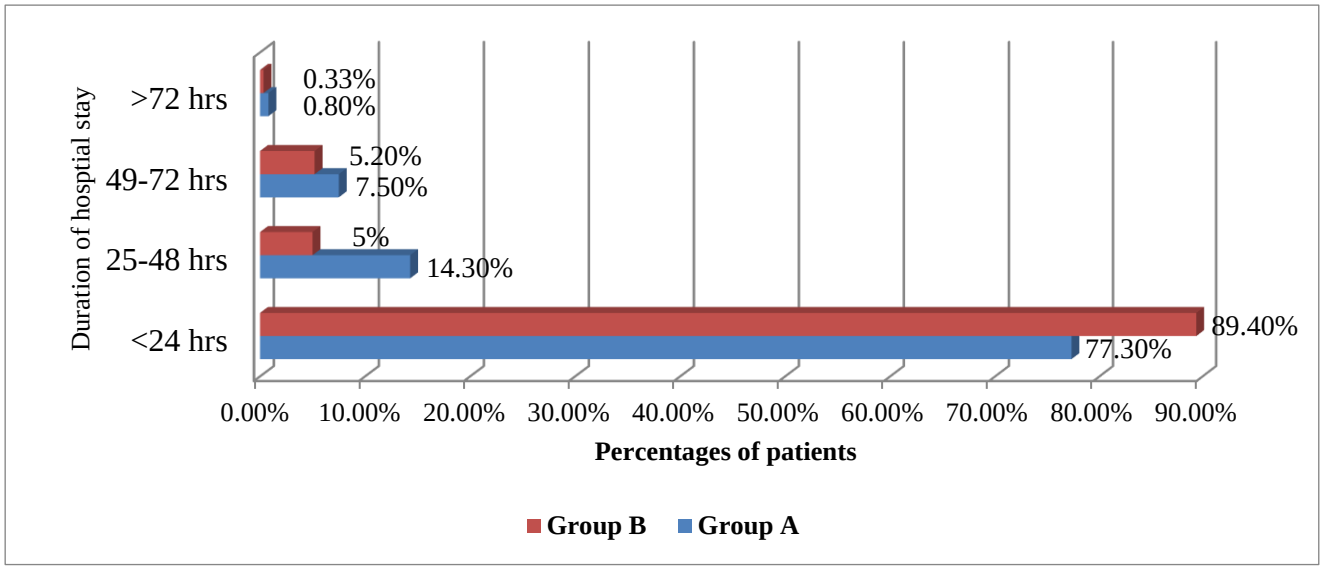

Figure 2: Comparison of duration of stay in hospital postoperatively in both study groups.

DISCUSSION

Minimal invasive i.e. laparoscopic cholecystectomy has already institute itself as gold standard for treatment of gall stone disease. It causes less surgical trauma, less pain, and save the hospital cost as majority of cases are performed as day surgery and it also help in early resumption of work.[12]

In the present study, most of the patients were middle age females with mean age of 44 years. It was in comparison to another national study by Ali et al, in which mean age was 42 years.[13] But reviewing other series mean age in our study was slightly higher.[14,15]

While most of the patients presented to us as cases of chronic cholecystitis with cholelithiasis i.e. 68.1%, about 31.9% presented as acute calculus cholecystitis. In series of 9542 LC by Duca et al, the incidence of chronic calculus cholecystitis was 71.07%.[16]

Reviewing the intraoperative findings of GB, most of the GBs had stones with normal to minimal inflammation this is due to frequent use of antibiotics in our setup. The other extreme of unmonitored use of antibiotics was mucocele GB which was found in 14.33% patients. This finding was in contrast to study done in Romania in which only 3.88% cases of mucocele GB were reported.[16]

Regarding the intraoperative complications, the rate of complications significantly decreased with surgeon's experience and the learning curve. A significant decrease in complications was observed after first one thousand cholecystectomies. With experience, there is better understanding of operative anatomy as well as instrument handling in difficult cases. As in many other centers the most serious complication encountered was common bile duct (CBD) injury i.e. 18 (0.6%) cases. In a national survey of Italy 56,591 Laparoscopic Cholecystectomies done in 187 centers and the overall incidence of CBD injury was 0.42%.[17] Duca, in his series reported only 0.1% incidence of CBD injury.[16]

From the early days of LC, a higher incidence of injuries has been related to the surgeon's learning curve, it was found that the incidence increases significantly with decreasing volume of LCs performed.[17] In the present study 83.3% cases of CBD injuries were diagnosed intra operatively in contrast to only 46% cases in an Italian study of 187 centers.[17] The most common method employed in the present study for repair of injured CBD was repair of CBD over T tube (76.5%) as recommended.[18]

Sometimes during laparoscopic surgery conversion to open surgery helps a lot and acts as only bailout procedure in difficult and complicated situations. The conversion rate in our series was 2.4% majority of this was attributed to CBD injury and dense adhesions. This was in contrast to other studies in which higher rates of conversion were seen 2.8%, 4.2% and 6.38%.[13,19,20] Tosun et al, formulated a useful scoring system from preoperative ultrasonography in predicting the conversion rates from laparoscopic to open cholecystectomy.[21]

One of the major means of predicting the surgeon's expertise in LC is the operative timings. In the present study, 66% of patients were operated in less than 30 minutes. While reviewing the first 1500 cases only 46.8% of cases were operated in less than 30 minutes but in next 1500 this proportion increased up to 85% of cases. In study by Ali et al, initially for first six months mean operating time in an uneventful procedure was approximately 90 minutes which was gradually reduced to 25-40 minutes by trained surgeons and 65 minutes by learners.[13] So the learning curve had a significant impact on operative timings as well.

Our incidence of wound infection was 1.83% which is lower than what reported in other studies 0.5-7%.[22,23]

The burden of laparoscopic cholecystectomies in our setup is increasing day by day and we are trying to improve our expertise in order to further decrease the rate of complications.

CONCLUSION

Considering the Laparoscopic cholecystectomy as a gold standard surgical intervention for gall stones it is performed in almost all the tertiary care setups around the globe. But it still requires lot of experience to become a master in this technique and to avoid complication related to this procedure.

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