Comparative Audit of Laparoscopic Cholecystectomy: A Local Experience

ABSTRACT

Objective: To determine the efficacy of laparoscopic cholecystectomy in our settings, the main complications associated with it, the reasons for conversion to open cholecystectomy and the duration of hospital stay, in a Comparative Audit between Group A and Group B, each comprising 1000 patients,
Design: Descriptive study.
Place and Duration of Study: Surgical Department, Rawalpindi Medical College and the author’s Surgical Clinics from January 1998 to December 2112.
Materials and Methods: One thousand patients undergoing laparoscopic cholecystectomy, were included in each group. The initial 1000 cases operated between January 1997 to December 2007, were included in Group A whereas subsequent 1000 patients operated between January 2008 to December 2012, were included in B group. The important variables included demographic data, intra operative time and findings, causes of conversion to open cholecystectomy and reasons for it, post operative hospital stay, morbidity and mortality associated with the procedure.
Results: There were 833 females and 117 males with mean age 45±11 years in A Group whereas there were 840 females and 160 males in B Group with mean age 44+10,(p>.05) In Group A, 66.6% patients had chronic cholecystitis with cholelithiasis and were admitted through Out Patient Department whereas 33.4% were admitted through Accident and Emergency Department with acute cholecystitis while in Group B it was 69% and 31% respectively,(p>.05) Abdominal ultrasound showed multiple calculi in 745 (74.5%) patients and 255 (25.5%) patients had single calculus preoperatively in Group A whereas it was 79% and 21% in Group B,(p>.05) Empyema was found in 136(13.6%) cases in Group A versus 185 (18.5%) in Group B,(p>.05) whereas adhesions were present in 403(40.3%) patients in Group A against 380 (38%) in Group B. In Group A conversion rate was 4.8% versus 1.5% in Group B. Frequency of CBD injury was 1.4% in Group A which reduced to only .3% in Group B. Mean operating time was 40 minutes and 20 minutes in Group A and Group B respectively. 72.9.% of the patients were discharged within 24 hrs of operation in Group A versus 86.2% in Group B. In Group A, there was no mortality while morbidity was 6% but in Group B, the mortality was 0.5% and morbidity of 4%.
Conclusion: Laparoscopic Cholecystectomy in our set up have shown marked improvement in results in last 17 years despite all constraints.
Key words: Laparoscopic Cholecystectomy, calculous Cholecystitis.

Introduction

It is estimated that in United States of America about one million patients have gallstones. Gallstones are the most common cause of hospitalization and the most costly digestive tract disease, with an annual estimated overall cost of more than five billion US dollars. The standard treatment for symptomatic gall stones was open operation through abdominal incisions to remove the gall bladder till late 80s. Open cholecystectomy needs a five day hospital stay and a 3-6 weeks period of convalescence. Today more than 83.3% of cholecystectomies are carried out laparoscopically. Studies have shown that LC reduces hospitalization and promotes earlier recovery and return to normal activity and is not associated with post-operative immuno-suppression, with a more positive post-operative morbidity profile.
compared to open surgery.\textsuperscript{4, 5} LC is associated with low incidence of complications though incidence of bile duct injuries is increased compared with Open Cholecystectomy which can be controlled by better training and introduction of better optics.\textsuperscript{6} Considering all the facts mentioned so far, we can safely say that laparoscopic cholecystectomy (LC) is the Gold Standard Procedure for symptomatic gall stone disease.\textsuperscript{7}

In order to prove this fact we collected the data of 2000 cases of LC and conducted a comparative audit of first 1000 (Group A) cases with subsequent 1000 cases (Group B). The purpose of conducting this study was to compare the effectiveness of laparoscopic cholecystectomy (in terms of safety, operating time and hospital stay), the frequency of conversion to open cholecystectomy and the reasons behind it, the frequency of common bile duct injury during laparoscopic surgery and to find out the factors responsible for post-operative morbidity between Group A and Group B.

**Materials and Methods**

In Group A, a prospective cohort of 1000 patients undergoing laparoscopic cholecystectomy between January 1997 to December 2007 at Rawalpindi Medical College and the author’s surgical clinics were included in Group A whereas in Group B, 1000 patients were included who underwent procedure between January 2008 to December 2012. They were selected through non probability purposive sampling and were admitted through Out Patients Department and Accident and Emergency Department for elective laparoscopic cholecystectomy. Patients with clinical diagnosis of acute and chronic cholecystitis underwent a detailed pre operative workup including history, physical examination, laboratory investigations, abdominal ultrasound and pre anesthetic evaluation.

We did not enroll the patients for elective laparoscopic cholecystectomy who had previous upper abdominal operations, immunosuppressed or receiving radiotherapy. Patients with evidence of common bile duct pathology on clinical, biochemical or ultrasonological basis, having bleeding disorders or intra hepatic gallbladder were also excluded from our study. Patients with deranged liver function tests were treated first on medical basis and then underwent laparoscopic cholecystectomy.

Pre operative, intra operative and post operative variables were collected and analyzed. Pre operative variables included age, gender, mode of admission, diagnosis, hemoglobin, total leukocyte count and ultrasound findings with emphasis on the number of calculi. Operative variables included operating room (OR) time, status of gall bladder, presence of adhesions, perforation of gallbladder with spillage of stones, common bile duct injury, conversion to open cholecystectomy and the reasons behind it. Post operative variables included death of patient, morbidity (wound infection, post operative shoulder pain, port site hernia, surgical emphysema and missed stones), length of hospital stay (LOH) and the need for re intervention. All data entered in S.P.S.S and P-value determined, P-value < 0.05 is considered to be significant.

**Results**

In Group A, 883 (88.3%) were females and 117 (11.7%) males with female to male ratio of 7.5:1. The mean age of study participants was 45.04 years (range, 20-70) whereas in Group B, 840(84%) were females and 160(16%) males with female to male ratio of 5.3:1 with a mean age of 44+_10 years (range17-80 year). Both groups were similar (p >.05) in terms of preoperative variables. (Table I)

**Table I: Pre Operative Variables(n=2000)**

<table>
<thead>
<tr>
<th>Group</th>
<th>Males</th>
<th>Females</th>
<th>Admitted via OPD</th>
<th>Admitted via A&amp;E</th>
<th>Chronic cholecystitis</th>
<th>Acute cholecystitis</th>
<th>Normal leukocyte count</th>
<th>Raised leukocyte count</th>
<th>USG(single calculus)</th>
<th>USG(multiple calculi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>117</td>
<td>883</td>
<td>666</td>
<td>334</td>
<td>666</td>
<td>334</td>
<td>630 (63%)</td>
<td>370 (37%)</td>
<td>225 (22.5%)</td>
<td>745 (74.5%)</td>
</tr>
<tr>
<td>Group B</td>
<td>160</td>
<td>840</td>
<td>690</td>
<td>310</td>
<td>690</td>
<td>310</td>
<td>669 (66.9%)</td>
<td>331 (33.1%)</td>
<td>210 (21%)</td>
<td>790 (79%)</td>
</tr>
</tbody>
</table>

The mean operating time in Group A was 40 minutes whereas it was 20 minutes in Group B, mainly attributed to adoption of Clipless Laparoscopic Cholecystectomy, resulting shorter duration of surgery. The operating room duration, the status of gallbladder, presence of adhesions and perforation of gallbladder with spillage of stones are summarized in table II. We had to convert 53
cases (5.3%) to open cholecystectomy in Group A, due to dense adhesions in 32(3.2%) cases, bleeding obscuring the view in 5 (0.5%), and duodenal injury in 1 (0.1%) case. We had to convert 1 case (0.1%) just at the start of the surgery due to port site injury. However in Group B, conversion rate fell to 1.5% only.

<table>
<thead>
<tr>
<th>Table II: Intra Operative Variables</th>
<th>Group A(n=1000)</th>
<th>Group B(n=1000)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal gallbladder</td>
<td>367(36.7%)</td>
<td>14(14.1%)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Moderately distended gallbladder</td>
<td>145(14.5%)</td>
<td>42(42.2%)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Severely distended gallbladder</td>
<td>203(20.3%)</td>
<td>20(12%)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Shrunken gallbladder</td>
<td>80(8%)</td>
<td>4(6.4%)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Mucocele gallbladder</td>
<td>125(12.5%)</td>
<td>75(17.5%)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Empyema gallbladder</td>
<td>136(13.6%)</td>
<td>85(18.5%)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Adhesions</td>
<td>403(40.3%)</td>
<td>80(38%)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Perforation with stone spillage</td>
<td>49(4.9%)</td>
<td>5(3.5%)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>CBD injury</td>
<td>14(1.4%)</td>
<td>4(3.3%)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Conversion to open cholecystectomy</td>
<td>53(5.3%)</td>
<td>5(1.5%)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>OR time of less than 30 min</td>
<td>313(31.3%)</td>
<td>78(77.8%)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>OR time between 30 &amp; 60 min</td>
<td>589(58.9%)</td>
<td>10(21%)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>OR time more than 60 min</td>
<td>98(9.8%)</td>
<td>2(1.2%)</td>
<td>&lt;.05</td>
</tr>
</tbody>
</table>

In Group A, 92.8% patients got discharged within 48 hours while in Group B, 91% patients were discharged within 48 hours. It was due to fact that increasing number of patient with empyema and mucocoele were operated by laparoscopic approach( 15.5% vs 36%) as well as patients with Chronic Liver Disease who need surgical intervention, resulted in prolonged postoperative stay. This is despite of fact that Group B also included day care laparoscopic cholecystectomy procedures. In Group A, mortality was nil and morbidity was 6% while in Group B, mortality was .5% and morbidity was 4%. High mortality was again related to CLD cases operated in Group B. The length of hospital stay (LOH), causes of morbidity and frequency of missed stones is presented in table III.

In Group A, 14 out of 1000 patients (1.4%) had common bile duct injury of which 09 were diagnosed intraoperatively while in 5 cases it was detected in the post operative period and needed re-intervention. In patients diagnosed intraoperatively,CBD repaired using T-tube however patients who were diagnosed postoperatively, initial drainage followed by choledochojejunostomy was done. In Group B, only 3 patients(0.3%) had common bile duct injury. All patients were diagnosed intraoperatively and CBD was repaired using T-tube.

**Discussion**

Laparoscopic cholecystectomy(LC) is gaining popularity day by day and has become treatment of choice for symptomatic gallstones. The benefits of LC like shorter postoperative hospital stay, more rapid overall recovery time and better cosmesis have been well established and documented. Our surgical audit also confirms ease, efficacy and safety of this procedure showing marked improvement in results in Group B.

In both groups, age range was comparable to the data published in literature. In Group A, 88.3% patients were female whereas 11.7% were male with female to male ratio of 7.1 : 1 higher than reported in literature, while in Group B, a ratio of 5.3:1 is comparable to literature. In Group A, we admitted 66.6% patients via Out Patient department and 33.4% through Accident & Emergency whereas in Group B, ratio was 69% vs 31% respectively while a
study done in South Australia shows 83.1% admissions through Out Patient Department and 16.8% through Accident & Emergency. An important aspect of any study on laparoscopic cholecystectomy is conversion rate to open cholecystectomy. In Group A, it was 5.3% which decreased to 1.5% only in Group B, showing improvement in surgical skills despite the fact that more patients suffering from mucocoele, empyema and chronic liver disease were included in Group B. Various studies quoted conversion rates of 5.3%, 7.4%, 7.9%. An important benefit of LC is short post operative operating time can be attributed to technique of Clip less laparoscopic cholecystectomy is gall bladder perforation, converting it into a lengthy procedure as it becomes important to retrieve all stones followed by irrigation to clear the spilled bile, so as to decrease the chances of abscess formation. In Group A, a frequency of gall bladder perforation with bile spillage was 4.9% which reduced to 3.5% in Group B whereas in literature, it is reported to be 1.5% & 17%. Critics always point out long operating time as a drawback of LC but despite initial lengthy procedures in stage of learning curve, our average operating time in Group A was only 40 minutes with 31.3% cases were completed within 30 minutes. In Group B, it reduced to 20 minutes with 77.8% cases completed within 30 minutes, much shorter operating time as compared to the time published in literature. Drastic reduction in operating time can be attributed to technique of Clip less Laparoscopic Cholecystectomy adopted in Group B in cases presenting with cystic duct diameter of 5mm or less. An important benefit of LC is short post operative hospital stay and early return to work. In Group A, post operative hospital stay had a range of 6 hours to 7 days with 72.9% of patients being discharged within 24 hours whereas in Group B, had a similar range but 86.2% patients were discharged within 24 hours comparable to the earlier conducted studies. Earlier discharges were possible due to introduction of Day Care Laparoscopic Cholecystectomy in Group B. The post operative morbidity in Group A was 6% and Mortality nil. In Group B, it was 4% and mortality of 0.5%, mainly attributed to patients presented with advanced Chronic Liver Disease having symptomatic gallstones. Morbidity rate of 5%, 5.4% and 6.4% is reported by various authors in literature. Mortality rate ranging from 0.08% to 1% has been reported in literature. Among the post operative complications, the incidence of wound infection was only 2.8% in Group A while Group B, it reduced to 2.2%. Various studies reported an incidence of 7% and 4%. Port site hernia was noted in only 0.2% cases in Group A reduced to 0.1% in Group B, though one study has documented a rate of 0.5% and another study has reported an incidence of 0.7%. In Group A, surgical emphysema was noted in 0.2% patients. No such case reported in Group B which is less as compared to one of the published studies.

Conclusion

Our Comparative audit of 2000 cases of laparoscopic cholecystectomy clearly indicates that there is marked improvement in terms of effectiveness, operative time, hospital stay and morbidity over last sixteen years. So laparoscopic cholecystectomy, can be considered as gold standard in our set up for symptomatic gallstones.

References