

## ORIGINAL ARTICLE

## Incidence of Alteration in Liver Functional Tests in Patients Undergoing Laparoscopic Cholecystectomy

Mohit Mohindra<sup>1</sup>, Mansimrat P. Singh<sup>2</sup>, Devika Arora<sup>3</sup><sup>1</sup>Senior Resident, Department of General surgery, Dayanand Medical College & Hospital, Ludhiana, Punjab<sup>2</sup>MBBS, MS, FNB (Minimal Access Surgery), FMAS, FIAGES, PD Hinduja Hospital, Mumbai, Maharashtra<sup>3</sup>Senior Resident, Department of Anaesthesia, ESIC Hospital, Ludhiana, Punjab, India**ABSTRACT**

**Background:** Laparoscopic cholecystectomy (LC) is one of the commonly employed surgical procedures these days. It is indicated for the treatment of cholecystitis (acute/chronic), symptomatic cholelithiasis, biliary dyskinesia, acalculous cholecystitis, gallstone pancreatitis, and gallbladder masses/polyps. Studies from the past literature have shown significant alterations in the liver functional tests (LFT) in patients undergoing LC. Hence; we planned the present study to evaluate effect of carbon dioxide pneumoperitoneum (CDP) on liver functions following LC. We also aim to analyse the overall incidence of these alterations in same patients. **Materials & methods:** The present study included evaluation of alterations in LFT in patient undergoing LC. A total of 200 subjects were included in the present study. All the patients underwent LC for the treatment of gall stones. In all the patients, pre-operative assessment of LFT was done which included evaluation of SGOT (aspartate aminotransferase), SGPT (alanine aminotransferase), total bilirubin (TB), direct bilirubin (DB) and alkaline phosphatase (ALP). All the values were evaluated post-operatively also after twenty four time. LC was carried out in all these patients using standard procedure as described previously in the literature. Comparative evaluation of all the parameters was done in relation to LFTs at pre-operative and post-operative time. All the results were analysed by SPSS software. **Results:** In the present study, we included a total of 200 subjects, out of which 154 were females and 46 were males. Significant results were obtained while comparing the mean SGOT, SGPT, TB and DB levels in patients undergoing LC at pre-operative and post-operative time. However, while comparing the mean AP values, non-significant results were obtained. The overall increase in the mean SGOT, SGPT, TB and DB values was seen in 95 %, 93 %, 73 % and 70% subjects respectively. **Conclusion:** Alteration in hepatic profile does occur in patients undergoing LC. Proper assessment of safety measures of LC procedure should be taken in patients with hepatic disorders.

**Key words:** Laparoscopic cholecystectomy, Liver functional tests

Corresponding author: Dr. Mohit Mohindra, Senior Resident, Department of General surgery, Dayanand Medical College & Hospital, Ludhiana, Punjab, India

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**INTRODUCTION**

During the past decade laparoscopic cholecystectomy (LC) has become the procedure of choice in the surgical treatment of symptomatic biliary lithiasis. The operation is not completely risk-free, some incidents and complications being more frequent than with open cholecystectomy (OC).<sup>1-3</sup> LC is indicated for the treatment of cholecystitis (acute/chronic), symptomatic cholelithiasis, biliary dyskinesia, acalculous cholecystitis, gallstone pancreatitis, and gallbladder masses/polyps.<sup>4</sup> The aetiology of gallbladder disease is basically associated with a poorly functioning gallbladder and superconcentrated bile. Normally, the gallbladder empties its contents in response to physiologic changes associated with digestion (cholecystokinin, vagal input

from antral distension, migrating myoelectric complex).<sup>5-8</sup> Studies from the past literature have shown significant alterations in the liver functional tests (LFT) in patients undergoing LC.<sup>9,10</sup>

Hence; we planned the present study to evaluate effect of carbon dioxide pneumoperitoneum (CDP) on liver functions following LC. We also aim to analyse the overall incidence of these alterations in same patients.

**MATERIALS & METHODS**

The present study was planned in the surgical wing of the private hospital and included evaluation of alterations in LFT in patient undergoing LC. Written consent was obtained from all the subjects before the starting of the study. A total of 200 subjects were included in the present

study. The mean age of the subjects was 48.5 years. Out of 200, 154 were females while 46 were males. All the patients underwent LC for the treatment of gall stones. Complete detailed clinical examination of the patients was done before the starting of the study. Exclusion criteria for the present study included:

- Patients with history of any systemic illness,
- Patients with any known drug allergy,
- Patients suffering from with any form of hepatic pathology,
- Patients less than 18 years of age

In all the patients, pre-operative assessment of LFT was done which included evaluation of SGOT (aspartate aminotransferase), SGPT (alanine aminotransferase), total bilirubin (TB), direct bilirubin (DB) and alkaline phosphatase (ALP). All the values were evaluated post-operatively also after twenty four time. LC was carried out in all these patients using standard procedure as described previously in the literature.<sup>11</sup> Following the LC procedure, the histopathology reports were evaluated. Comparative evaluation of all the parameters was done in relation to LFTs at pre-operative and post-operative time. All the results were analysed by SPSS software. Chi-square test, student t test and One Way ANOVA were used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

**RESULTS**

In the present study, we included a total of 200 subjects, out of which 154 were females and 46 were males. The mean SGOT level at the pre-operative and post-operative time was found to be 24.20 and 78.25 U/L respectively. The mean SGPT level in patients at the pre-operative and post-operative time was found to be 28.39 and 80.15 U/L respectively. Mean total bilirubin at pre-operative and post-operative time were found to be 0.85 and 1.58 mg/dL respectively. Significant results were obtained while comparing the mean SGOT, SGPT, TB and DB levels in patients undergoing LC at pre-operative and post-operative time. However, while comparing the mean AP values, non- significant results were obtained. The overall increase in the mean SGOT and SGPT values was seen in 95 % and 93 % subjects respectively. However; increase in the mean TB and DB was seen in 73% and 70% of the subjects respectively. Increase in the mean AP values was seen in 18 percent of the subjects. While dividing the patients on the basis of age, we observed that mean change in the SGOT and SGPT values was more in subjects of less than 40 years of age. Mean alteration of AP, TB and DB was more in subjects of more than 40 years of age. However, these alterations in between the groups divided on the basis of age were too small to be correlated statistically.

**DISCUSSION**

In the present study, we observed non- significant difference in the mean alteration of pre-operative and post-operative AP values. However; we observed significant different in the mean pre-operative and post-operative SGOT, SGPT, DB and TB values (**Table 1**). Our results were in correlation with result of previous authors who also observed similar findings in their studies.<sup>12</sup> Kaldor A et al determined if routine postoperative LFTs predict complications. One hundred ninety-nine consecutive patients undergoing laparoscopic cholecystectomy were included in the analysis. Nine (4.5%) patients had postoperative complications: eight with retained common bile duct stones and one with a cystic duct stump leak. All were diagnosed with postoperative endoscopic retrograde cholangiopancreatography. Only four of the nine patients had hyperbilirubinemia. Overall, 39 patients had postcholecystectomy hyperbilirubinemia, with four (10%) patients having complications. For the entire study population, there was no difference between pre- and postoperative total bilirubin and aspartate aminotransferase levels. There was a statistically significant difference in pre- and postoperative alanine aminotransferase and alkaline phosphatase. Postoperative elevations in liver function tests are frequently seen after laparoscopic cholecystectomy. These elevations do not predict postoperative complications. LFTs should be obtained only when clinically indicated.<sup>13</sup> Omari A et al measured the serum levels of eight parameters of liver function both before and 24 hours after surgery in 142 consecutive patients who underwent LC, 23 patients who underwent open cholecystectomy (OC), and in 25 patients who underwent a conventional hernial repair. The same anesthetic protocol was applied to all patients in the various groups and in the case of LC; the intra-abdominal pressure was maintained at 12 mmHg of CO<sub>2</sub>. Twenty-four (24) hours after surgery, there was a statistically significant change of all the eight parameters studied, except alkaline phosphatase in patients who underwent LC, whereas there were only 3 patients from the OC group who had changes of alanine aminotransferase and aspartate aminotransferase and 2 patients who had raised levels of direct bilirubin, and no changes were observed among those who had conventional hernial repair. They found that 83% of the patients showed more than a 100% increase in at least one parameter, 43% showed an increase in two or more parameters, and 23% showed an increase in three or more parameters. They also observed a significant drop of total proteins and albumin levels in all patients who had LC.<sup>12</sup>

**Table 1:** Comparison of pre-operative and post-operative LFT values in patients undergoing LC

Parameter	Pre-operative	Post-operative 24 hours	p- value
SGOT (U/L)	24.20	78.25	0.02*
SGPT(U/L)	28.39	80.15	0.03*
TB(mg/dL)	0.85	1.58	0.02*
DB (mg/dL)	0.35	0.52	0.01*
AP	69.25	62.82	0.92

\*: Significant

The overall increase in the mean SGOT, SGPT, TB, DB and AP values was seen in 95 %, 93 %, 73 %, 70% and 18% subjects respectively. Al-Luwaizia KR et al evaluated the effect of pneumoperitoneum in LC on liver enzymes and serum bilirubin in comparison with open cholecystectomy (OC). A prospective case control study involved 74 patients treated by LC, and, 30 patients treated by OC as a control group. Blood samples were taken 24 hours preoperatively and 24 hours after operation for biochemical tests. There were significant increases in serum bilirubin, Aspartate aminotransferase (AST), alanine aminotransferase (ALT), and Lactate dehydrogenase (LDH) levels in LC group postoperatively when compared with the OC group, while there were no significant changes in serum alkaline phosphatase (ALP). It has been concluded that, serum bilirubin and liver enzymes elevation could be attributed to the negative effects of the pneumoperitoneum on the hepatic blood flow.<sup>14</sup>Rao PR et al collected blood samples were collected from 60 inpatients, undergoing various laparoscopic procedures, preoperatively once and post operatively on days 1 and 3. They were tested for liver function by assessing levels of serum bilirubin, serum alanine amino transferase (ALT), serum aspartateaminotransferase (AST) and serum alkaline phosphatase (ALP). The level of serum AST, ALT, bilirubin and alkaline phosphatase increased significantly during the immediate post-operative period. Doubling of pre-op values of AST was seen in 28.3% and of ALT was seen in 25%. By the 3rd post-operative day, levels of AST, ALT, bilirubin and alkaline phosphatase returned to near pre-operative values. Therefore, transient elevation of hepatic enzymes occurred after all types of laparoscopic procedures. This transient rise showed no apparent clinical implication in most patients.<sup>15</sup>

**CONCLUSION**

From the above results the authors conclude that alteration in hepatic profile do occur in patients undergoing LC. However; occurrence of these alteration might be a transient phenomenon.

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