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ORIGINAL RESEARCH

A comparative study to determine pre operative LFT versus post operative LFT in Laparoscopy cholecy stectomy patients

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ABSTRACT

Introduction: Laparoscopic cholecystectomy (LC) continues to be the gold standard treatment for symptomatic cholelithiasis. Liver function tests (LFTs) include alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), and bilirubin. The aim of present study is to compare the post operative LFT with pre-operative values in patients undergoing laparoscopic cholecystectomy.

Material & methods: The prospective observational study was conducted among 90 patients at department of general surgery for duration one year. Patients were included and excluded on the basis of inclusion & exclusion criteria.The data was analyzed using a paired t-test. For the purpose of comparing categorical variables, the chi-square test was used. Statistical significance was defined as a p value less than 0.05.

Results: Maximum patients were in the age group of 40-49 years (27.7%).Female (80%) patients were more in number as compared to male (20%). Mean value of bilirubin preoperatively was 0.86 mg/dl while post operatively was 0.66 mg/dl. Aspartate transaminase (AST) value was 35.4 U/l pre operatively and 50.2U/l postoperatively. Mean preoperative and postoperative alanine transaminase (ALT) levels were 37.1 U/l & 51.4 U/l respectively. Mean albumin was 4.5g/dl pre operatively and 3.4g/dl postoperatively. Results were statistically significant.

Conclusion: Early post-operative transient elevation of hepatic transaminases after laparoscopic cholecystectomy is not associated with any adverse clinical outcome.

Keywords: hepatic dysfunction, liver function test, laparoscopic cholecystectomy, preoperative, postoperative

INTRODUCTION

The understanding of the challenges and potential consequences related to the laparoscopic cholecystectomy has expanded since its inception in 1987. The success of this procedure relies on the modernization of technical abilities, which enables the overcoming of challenges and the early discovery of issues, as well as their timely management. While the laparoscopic technique has essentially supplanted open cholecystectomy, it is important to note that the laparoscopic treatment carries a higher risk of iatrogenic duct damage.[1] The incidence and kind of biliary injuries that occur during laparoscopic cholecystectomy exhibit variability, and it is of utmost importance to promptly diagnose and manage these injuries in order to ensure the patient's well-being.[2] Biochemical testing of liver enzymes is a prevalent clinical procedure for evaluating biliary injuries, alongside other evaluation approaches. The sensitivity of liver function tests (LFTs) in the detection of blockages in bile flow has been determined to exceed 90%.[3] The clinician must always be concerned about any increase in the levels and should conduct further investigation to ascertain the underlying condition. AST and ALT are commonly regarded as indicators of hepatocellular functionality. Elevated levels of alkaline phosphatase (ALP) have been observed in cases with biliary duct system obstruction. Concurrently, bilirubin levels may rise as a result of either hemolysis or obstruction in the bile flow. Elevated levels of serum transaminases may also indicate the presence of common bile duct (CBD) stones.[4] The elevation of intra-peritoneal pressure that occurs during laparoscopic cholecystectomy has been shown to reduce the flow of blood through the portal vein. This is anticipated to have an impact on the results of liver function tests (LFTs) immediately following the surgery. Surgeons may have legitimate worries about the potential impact on the integrity of the biliary tract.[5,6] Hence the aim of present study is to compare the post operative LFT with pre-operative values in patients undergoing laparoscopic cholecystectomy.

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MATERIAL & METHODS

The prospective observational study was conducted at department of general surgery for duration one year. Ethical permission was obtained from institutional ethical committee before commencement of study. A total of 90 patients were selected after taking written informed consent. Patients admitted to hospital for laparoscopic cholecystectomy with age above 20 years were included in the study and patients less than 20 years of age, grossly abnormal pre-operative LFT, patients with major medical comorbidities like cardio-respiratory compromise or hepatic dysfunction, patients who had either frozen calot's triangle or lot of adhesions between gall bladder and surrounding structures, resulting in prolongation of intraoperative time beyond one hour were excluded from the study. All study participants were admitted for laparoscopic cholecystectomy following a thorough pre-anesthesia evaluation and clearance process. A pre-operative liver function test (LFT) was conducted on the day of admission. The following day after hospitalization, participants underwent a routine 4-port laparoscopic cholecystectomy procedure. Liver function tests (LFTs) were conducted at two time points: 24 hours post-surgery and during a follow-up appointment two weeks later. The collected data was put into a spreadsheet, exported to the data editor of SPSS version 25.0 (SPSS Inc., Chicago, Illinois, USA), and finally summarized. Categorical variables were summed up as frequencies and percentages, whereas continuous variables were expressed as mean (standard deviation). Student's independent t-test was used for data intergroup analysis. The data was analyzed using a paired t-test. For the purpose of comparing categorical variables, the chi-square test was used. Statistical significance was defined as a p value less than 0.05

RESULTS

Out of total 90 patients the maximum patients were in the age group of 40-49 years (27.7%) followed by 30-39 years (22.2%), 50-59 years (20%), 20-29 years (15.5%) and greater than 60 years (14.6%). Female (80%) patients were more in number as compared to male (20%) as shown in table 1.

Table : 1 Baseline characteristics of patients

Baseline characteristics		Frequency (percentage)
Age (in years)	20-29	14 (15.5)
	30-39	20(22.2)
	40-49	25 (27.7)
	50-59	18 (20)
	≥60	13 (14.6)
Gender	Male	18 (20)
	Female	72 (80)

Mean value of bilirubin preoperatively was 0.86 mg/dl while post operatively was 0.66 mg/dl. Aspartate transaminase (AST) value was 35.4 U/l pre operatively and 50.2U/l postoperatively. Mean preoperative and postoperative alanine transaminase (ALT) levels were 37.1 U/l & 51.4 U/l repectively. ALP value was 127 U/l preoperatively and 125 U/l postoperatively. Mean albumin was 4.5g/dl pre operatively and 3.4g/dl postoperatively. All the results were significant except for ALP.

Table: 2 Pre operative and post operative liver function test

Liver function test	Pre operative	Post operative	P value
Bilirubin	0.86±0.59	0.66±0.46	0.013
AST	35.4±16.3	50.2±17.3	0.001
ALT	37.1±24.6	51.4±22.1	0.001
ALP	127±50.3	125±33.1	0.561
ALB	4.5±0.24	3.4±0.28	0.001

DISCUSSION

The preferred method of symptomatic gallstone treatment is laparoscopic cholecystectomy. Like any surgical operation, it is not completely risk-free and complication-free. Serious side effects of this procedure include retained stones and duct damage. Duct injuries are typically discovered after surgery since they are difficult to spot during surgery.[7] LFTs are typically employed postoperatively as an indicator of duct blockages and iatrogenic damage in

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addition to the usual assessment of liver function. It has been demonstrated that liver function tests are highly sensitive in predicting biliary blockage. Large concentrations of this enzyme in particular elevate the probability of CBD stones due to the established predictive usefulness of ALP.[8] The presence of retained stones is not necessarily indicated by an increase in liver enzymes. Prior studies have noted changes in liver function tests of up to 70% without any negative clinical consequences.[9] This spike is thought to be caused by the procedure's elevated pneumo peritone um pressure, which results in hepatic dysfunction. The detrimental effects of pneumoperitoneum pressure on heart function have also been demonstrated by several research.[10,11] They have shown that during laparoscopic cholecystectomy, cardiac output and stroke volume decrease. The similar idea has also been used to explain decreases in gastrointestinal and hepatic perfusion.[12,5] In our study we took 100 patients who were admitted to surgery department for laparoscopic cholecystectomy. Liver function test were done pre operatively and postoperatively to determine the change. Our research confirmed that women are 3–4 times more likely than men to have cholelithiasis. Gallstone risk in females is increased by the estrogenic action, which supersaturates the bile with cholesterol. After laparoscopic cholecystectomy, we found statistically significant elevations in the liver enzymes AST and ALT in our study. Halevy et al were the first to document the finding of postoperative rise in liver enzymes following laparoscopic cholecystectomy in the literature. They showed an increase of up to 80% from the baseline level of LFTs, without poor clinical result.[9] Morino et al also investigated the effects of pneumoperitoneum on liver function tests following laparoscopic procedures, and they found a correlation between the severity of the alteration and the level and duration of pneumoperitoneum.[13] Hepatocellular damage, which is primarily brought on by the decrease in hepatic blood flow brought on by an increase in intra-abdominal pressure, is thought to be the probable reason of the postoperative elevation of both ALT and AST.[14-17] Pneumoperitoneum reduces portal venous input, which results in hypoperfusion of the liver and insufficient oxygenation, both of which cause hepatocellular damage.[18] Additionally, the use of carbon dioxide to create pneumoperitoneum has a vasoconstrictive impact that may lower visceral blood flow.[19] Additionally, anaesthetic techniques and medications like halothane and nitrous oxide can cause toxic liver injury.[20,21] Our study has some limitations, including a smaller sample size, which could prevent the use of final results over a significantly larger patient group, on which our study was conducted. Considering the small sample size of patients and the exclusion of patients who have liver disease, as these patients severely impacted by the post-operative deterioration of Laparoscopic cholecystectomy followed with LFT.

CONCLUSION

Our current investigation found no link between early post-operative temporary rise of hepatic transaminases and any negative clinical outcome following laparoscopic cholecystectomy. At the 2-week follow-up, it has most patients recovered to pre-operative values.

After a laparoscopic cholecystectomy, it is not advised to routinely have a post-operative LFT unless it is necessary. To support our finding, define the ideal intra-peritoneal pressures for a safe laparoscopic cholecystectomy, and assess whether utilizing laparoscopy in patients with substantial hepatic dysfunction is feasible, additional research with bigger sample sizes are needed.

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