

Alterations In Gamma Glutamyl Transferase In Laparoscopic Cholecystectomy

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ABSTRACT

Aims and Objective: The aim of present study was to study and compare alterations in liver function tests and gamma glutamyl transferase in laparoscopic cholecystectomy.

Material and Method: It is a prospective study conducted in the department of General Surgery at Maharishi Markandeshwar Medical College and Hospital Kumarhatti, Solan from April 2021 to April 2022 and included 50 cases diagnosed with cholelithiasis. LFTs and GGT was done 24 hour before, 24 and 72 hours after the laparoscopic cholecystectomy. An informed and valid consent from the patients were taken to include in the present study. The data collected was analysed by students paired t-test.

Results: In this study we found laparoscopic cholecystectomy is the preferred treatment for cholelithiasis. However, due to pneumoperitoneum created during surgery can cause decrease blood flow to liver transiently, that leads to alteration of liver function tests. S. Bilirubin, SGOT, SGPT, GGT are deranged significantly after laparoscopy cholecystectomy but ALP is or not be raised significantly after 24 hours of surgery. These raised values decrease after 72 hours of surgery but not significantly. Mean age of our patients was 44.68 12.328 years. The incidence of cholelithiasis is more in females than males.

Keywords: LFTs, S. Bilirubin, SGOT, SGPT, GGT, ALP

Introduction

Cholelithiasis problematic worldwide and it remains a common cause of surgical intervention, contributing considerably to health care costs. Its prevalence however, varies widely amid different populations. Among American adults the occurrence of cholelithiasis is about 10%, while in Western Europe the prevalence ranges from 5.9% to 21.9% ^[1]. Prevalence rates of 3.2% to 15.6% have been described from Asia ^[2]. Prevalence of cholelithiasis in India is more in females (n = 38) than men (n = 15) ^[3, 4]. The prevalence is more common in Northern Indians than Southern Indians followed by Maharashtra particularly from coastal region ^[5]. The standard treatment for management of symptomatic

cholelithiasis is laparoscopic cholecystectomy (LC). Halevy was the first to study the changes in liver function tests (lfts) after LC, who concluded that an increase of about 70% lfts without any clinical outcomes. The reason for these changes assumed were carbon dioxide pneumo-peritoneum and increased intra-abdominal pressure^[6]. Pneumo-peritoneum created is the main cause of reduction of blood flow to the liver. Pneumo-peritoneum pressure and its time altered the level of hepatic ischemia^[20]. This leads to increase in liver function tests (LFTs): serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT), serum alkaline phosphatase, gamma glutamyl transferase (GGT), serum bilirubin. Laparoscopic cholecystectomy causes elevation of liver function tests which are self-limited and without any morbidity in the patients^[10, 16].

1. **Aim:** The aim of the study was to study and compare the alterations in liver function tests and gamma glutamyl transferase in laparoscopic cholecystectomy alongwith safety of the procedure.
2. **Methods:** Prospective study from June 2021 to June 2022 conducted in department of General surgery in Maharashi Markandeshwar Medical College and Hospital, Kumarhatti, Solan, India. Total 79 patients were enrolled in the study. Out of 79 patients, 29 patients were excluded due to deranged LFTs, 50 patients were included in the study group. The study conducted after approval and clearance from the ethical committee of the institute. Written and informed consent has been taken.

Inclusion Criteria: Patients diagnosed with Cholelithiasis underwent laparoscopic cholecystectomy.

Exclusion Criteria

Patient presented with acute Cholecystitis, Had pre-operative abnormality in liver enzymes, Completion of cholecystectomy was done by open method, Patients were unwilling for laparoscopic cholecystectomy. Changes in Liver Function Tests (SGOT, SGPT, ALP, S. Bilirubin) and GGT were noted by comparing values 24 hours before, 24 and 72 hours after surgery. The data collected was compared and analysed with student paired t- test. P value less than 0.05 is considered significant.

Results

Total 50 patients were selected for the study after meeting exclusion and inclusion criteria. Age of patients was ranged from 16 years to 69 years. Mean age was 44.68years and standard deviation was 12.328. Out of 50 patients 38 were females and 12 were males. So female were 76% and male were 24%. P value is less than 0.00001 which shows that our study population has significantly more female as compared to male. The values of S. Bilirubin, SGOT, SGPT, GGT raised significantly after 24hours of surgery (p vale <0.05), there is no statistically difference between the value of ALP before and after 24 hours of surgery(p value >0.05).

The values of LFTs decrease after 72hours of surgery as compared to 24hours after surgery, but these decrease is not statistically significant(p value >0.05). This shows the transient increase in LFTs more significant immediately after 24hours of surgery which start returning to normal after 72hours but not completely which means it need more time to return to normal.

This alterations of LFTs were not associated with any clinical outcomes.

Table 1: Pre-operative values before 24 hour

Parameter	Bilirubin	SGOT	SGPT	ALP	GGT
Mean value	0.556	23.000	30.500	95.420	29.840
Std. deviation	0.210	5.824	7.768	20.427	15.384
Range	0.700	21.000	30.000	92.000	72.000
Min. value	0.200	14.000	10.000	59.000	10.000
Max. value	0.900	35.000	40.000	151.000	82.000

Table 2: Post-operative value after 24 hour

Parameter	Bilirubin	SGOT	SGPT	ALP	GGT
Mean	0.807	34.520	44.420	94.760	36.320
Std. Deviation	0.311	11.937	14.310	16.391	16.186
Range	1.330	50.000	68.000	75.000	70.000
Minimum	0.300	15.000	25.000	65.000	14.000
Maximum	1.630	65.000	93.000	140.000	84.000

Table 3: Post operative test after 72 hours

	Bilirubin	SGOT	SGPT	ALP	GGT
Mean	0.698	28.840	39.240	91.920	32.860
Std. Deviation	0.275	8.044	12.178	16.754	15.186
Range	1.200	36.000	66.000	93.000	68.000
Minimum	0.200	16.000	22.000	42.000	14.000
Maximum	1.400	52.000	88.000	135.000	82.000

Table 4: Comparison of LFTs 24 hour before and after surgery

Parameter	Pre-operative before 24hrs	Post-operative after 24hrs	t	P
s. Bilirubin	Mean – 0.556±0.210	Mean – 0.807±0.311	-13.213	< .001
Sgot	Mean – 23.00±5.824	Mean – 34.520±11.937	-10.474	< .0001
Sgpt	Mean - 30.50±7.768	Mean - 44.42±14.310-	6.064	< .0001
GGT	Mean – 29.84±15.384	Mean – 36.320±16.186	2.55	0 .01
Alp Mean - 5.42±20.427	-	Mean – 94.76±16.391	0.118	0.907

Table 5: Comparison of values 24 hour after surgery with 72 hour after surgery

Parameter Post-operative after 24hrs	Post-operative after 72hrs	-t	t
s. Bilirubin Mean –0.807±0.311	Mean – 0.698±0.275	-1.8	0.061
Sgot Mean - 34.52±11.937	Mean – 28.84±8.044	-2.752	0.06
Sgpt Mean – 44.42±14.310	- Mean – 39.24±12.178	-1.9	0.0541
Ggt Mean –36.32±16.18	- Mean - 32.86±15.18	-1.0544	0.27
Alp Mean – 94.76±16.391	- Mean - 91.92±16.754	-0.858	0.391

Discussion

In our study, we found there is a significant increase in LFTs except ALP in laparoscopic cholecystectomy after 24 hours of surgery. The transient rise of LFTs and GGT is due to pneumo peritoneum created during surgery. These raised values start decreasing after 72 hours of surgery but after 72 hours the decrease is insignificant. Bilirubin level is 0.556±0.210 24 hours before surgery which increased to 0.807±0.311 24 hours after surgery. Almost similar results were found in studies conducted by Singal R *et al.*, in their study mean

bilirubin level is 0.53 ± 0.1 24 hours before surgery which increased to 1.93 ± 0.7 24 hours after surgery.^[15] Ahmad NZ. *et al.*, Mean bilirubin level is 10.34 ± 5.88 $\mu\text{mol/l}$ 24 hours before surgery which increased to 16.44 ± 10.45 $\mu\text{mol/l}$ 24 hours after surgery^[17].

We found that mean SGOT level is 23.00 ± 5.824 24 hour before surgery which increased to 34.52 ± 11.937 24 hour after surgery. Almost similar results were seen in a study conducted by Halevy A *et al* they showed that man SGOT level is 17.3 ± 4 24 hour before surgery which increased to 30.9 ± 5.0 24 hour after surgery^[6]. Similarly, Maleknia SA *et al* also found almost similar results they found mean AST level is 22.6 ± 7.724 hour before surgery which increased to 42.7 ± 3.2 24 hour after surgery.

Mean SGPT level is 30.50 ± 07.76824 hour before surgery which increased to 44.42 ± 14.3124 hour after surgery. Almost similar results were proved in study conducted by Guven HE *et al.*, he showed that mean ALT level is 21.55 ± 8.9 24 hour before surgery which increased to 60.30 ± 32.17 24 hour after surgery^[16]. Results of their study was also statistically significant. One other study done by Maleknia SA *et al.*, showed similar results they showed that mean ALT level is 24 ± 8.7 24 hour before surgery which increased to 39.5 ± 6.524 hour after surgery. The results of their study were also statistically significant^[21].

GGT level is 29.84 ± 15.38424 hours before surgery which increased to 36.32 ± 16.18624 hours after surgery. Almost similar results were seen in studies conducted by Guven HE *et al.*, they showed that mean GGT level is 20.71 ± 10.224 hours before surgery which increased to 30.99 ± 20.7124 hours after surgery^[16]. Ahmad NZ. *et al.*, found mean GGT level is 43.26 ± 43.39 24 hours before surgery which increased to 71.17 ± 93.2824 hours after surgery^[17].

ALP level is 95.42 ± 20.427 24 hours before surgery which changed to 94.76 ± 16.39124 hours after surgery. Even Omari A *et al.*, did not show any significant increase in ALP^[18]. No elevation of serum ALP was noted in study conducted by Bendet N *et al.*,^[19].

We have clearly seen decreasing trends of liver function test after 72 hours of surgery. The values rise post-operative after 24 hour of surgery. But these values start decreasing after 72 hours of surgery which means that the liver function derangement is due to laparoscopic procedure and these changes are temporary. Alteration in liver function test are also seen in biliary injuries, choledocholithiasis, liver injuries during operation. But values of ALP, GGT, SGOT, SGPT and BILIRUBIN will not return to normal if these injuries (biliary injuries, choledocholithiasis, liver injuries) happen during surgery. These values (ALP, GGT, SGOT, SGPT and BILIRUBIN) will not return to normal if there is injury during operation. A study conducted by Ahmad NZ also shown similar results they showed that liver function test return to normal after 3 weeks. They showed that liver function test values return to normal without any active intervention^[17]. Similarly Tan M *et al.*, showed that liver function test returns to normal value after 7 days^[20].

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Conclusion

There is significant alterations of liver function tests and GGT after laparoscopic cholecystectomy. The alterations are more significant immediately after 24 hours of surgery but these values start decreasing after 72 hours. Their transient alterations are not associated

with any clinical outcomes and hospital stay also.

Our study showed that these values decrease after 72 hours but not significantly. Further studies are needed to find exactly when these values will come to normal.

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