



A Prospective Study of Alteration in Liver Function Test after Laparoscopic Surgeries

Authors

Dr Krushnakumar G Virda¹, Dr Amul Bhedi²

^{1,2}M.S. (General Surgeon), Department of Surgery
Government Medical College Baroda, Vadodara, India

Corresponding Author

Krushnakumar G. Virda

Address: C/o Dr G.K.Virda, 55-Durveshnagar, "Parth-Krushna" OppSaryu App, Junagadh, Gujarat

Email: krushna.virda@gmail.com, Contact no.: 0991-9426622311

ABSTRACT

Background: Laparoscopy is gaining wide popularity among surgeons in India. There have been no studies in our setting to evaluate the potential deleterious effects of laparoscopic surgery on hepatic function. This study is intended to assess the prevalence, and clinical significance of unexplained disturbances in liver enzymes following laparoscopic surgeries.

Aim and Objectives: To evaluate the Alteration of Liver Function test in patients after Laparoscopic surgeries. And to Compare the Alteration of Liver Function test in Laparoscopic Surgeries with Open Surgeries

Methods: Study conducted with total 60 patients selected by convenient sampling method from those who underwent laparoscopic and open surgery in Medical College Baroda and Sir Sayajirao General Hospital, Vadodara in the period from January 2015 to November 2015. levels of Aspartate Aminotransferase (AST or SGOT), Alanine Aminotransferase (ALT or SGPT), Serum bilirubin and Serum Alkaline Phosphatase were measured preoperatively once and then postoperatively on Day 1, Day 2 and Day 7.

Results: Total 60 patients were studied. Mean difference in liver function test of Laparoscopic group was found between preoperative and postoperative day 1, No significant difference was found on postoperative day 2 and postoperative day 7. Mean difference [Elevation] shown as follow in preoperative and postoperative day 1 was Serum bilirubin: 0.85 mg/dL to 1.08 mg/dL, SGPT/ALT : 33.7 U/L to 50.96 U/L, SGOT/AST : 33.23 U/L to 50.66 U/L and Alkaline Phosphatase : 70.63 IU/L to 119.8 IU/L. Mean difference in liver function test of Open group was found between preoperative and postoperative day 1, No significant difference was found on postoperative day 2 and postoperative day 7. Mean difference [Small Degree of Elevation] shown as follow in preoperative and postoperative day 1 [except Serum Bilirubin] was Serum bilirubin: 0.84 mg/dL to 0.82 mg/dL, SGPT/ALT: 33.67 U/L to 35.10 U/L, SGOT/AST: 32.46 U/L to 35.76 U/L and Alkaline Phosphatase: 70.50 IU/L to 77.23 IU/L.

Conclusion: We observed that elevation in liver function test on postoperative day 1 came back to normal on postoperative day 7 in laparoscopic surgery group. And there was small degree of elevation but within normal range in liver function test in open surgery group which came back to normal on postoperative day 7.

Keywords: Laparoscopic Cholecystectomy, Postoperative Liver Function test.

INTRODUCTION

Minimally invasive surgery, especially laparoscopic surgery, describes an area of surgery that crosses all traditional disciplines and has changed the face of general surgery. The goal of laparoscopic surgery is to perform standard, classical open surgical procedures via the laparoscope to make the operative procedure more patient friendly. Laparoscopy provides access to the peritoneal cavity for diagnosis and also for many surgical interventions which was previously only possible by laparotomy.

The growth of this technique and its applications has developed exponentially, and it currently accounts for a large proportion of all surgical procedures. The main advantages of laparoscopic surgery include the reduction of tissue trauma due to small skin incisions and reduction in adhesion formation. The growing interest in laparoscopy is mostly attributable to cumulative evidence suggesting a reduction in patient morbidity, shortening in hospital stay, and early return to normal activity.

During the last decade many studies have disclosed ‘unexplained’ changes in postoperative liver function tests in patients undergoing laparoscopic procedures^{1,2}. These studies demonstrate that transient elevation of hepatic enzymes could occur after laparoscopic procedures. No causes for this elevation are documented so far. These changes might be attributed to hepatocellular dysfunction secondary to one or combination of CO₂ pneumoperitoneum, diathermy extruding liver, branch of the hepatic artery injured and general anesthesia³. CO₂ pneumoperitoneum might be one of the main reasons for the change of serum liver enzymes.

The transient elevation of hepatic enzymes showed no apparent clinical implication in most patients who received laparoscopic surgery according to follow-up observations and feedback from these patients. Nevertheless, these results indicate that, if the patient's preoperative liver function was very poor, laparoscopic surgery might not be the optimal choice for treating certain abdominal diseases.

PATIENTS AND METHODS

Prospective study was conducted to evaluate the effect of laparoscopic and open procedures on liver function. All the patients studied were selected for laparoscopic and open procedures after they underwent routine history taking, physical examination and investigations to exclude pre-existing liver diseases or generalized debility.

Total 60 patients included in the study were selected by convenient sampling method from those who underwent laparoscopic and open surgery in Medical College Baroda and Sir Sayajirao General Hospital, Vadodara. In this study 20 patients [33.33%] underwent laparoscopic cholecystectomy and 10 patients [16.66%] underwent laparoscopic appendectomy while 4 patients [6.66%] underwent open cholecystectomy and 26 patients [43.33%] underwent open appendectomy. The study was conducted over 11 months (January 2015 to November 2015). Data collection period will be approximately 9 months (February 2015 to October 2015).

STATISTICAL METHODS

Statistical analysis was done by Student Paired t test. The P value less than 0.05 was considered to be statistically significant.

RESULTS

This study was conducted on 60 patients admitted in general surgery wards of Sir Sayajirao General Hospital, Vadodara. During evaluation of effect of liver function test before and after 1st postoperative day, 2nd postoperative day and 7th postoperative day of patients who underwent laparoscopic and open surgery.

The data was analysed by using the students paired t test. The P value less than 0.05 was considered to be statistically significant. Result of this study were as follow.

Laparoscopic Cholecystectomy	20
Laparoscopic Appendicectomy	10
Open Cholecystectomy	4
Open Appendicectomy	26

Statistical Analysis

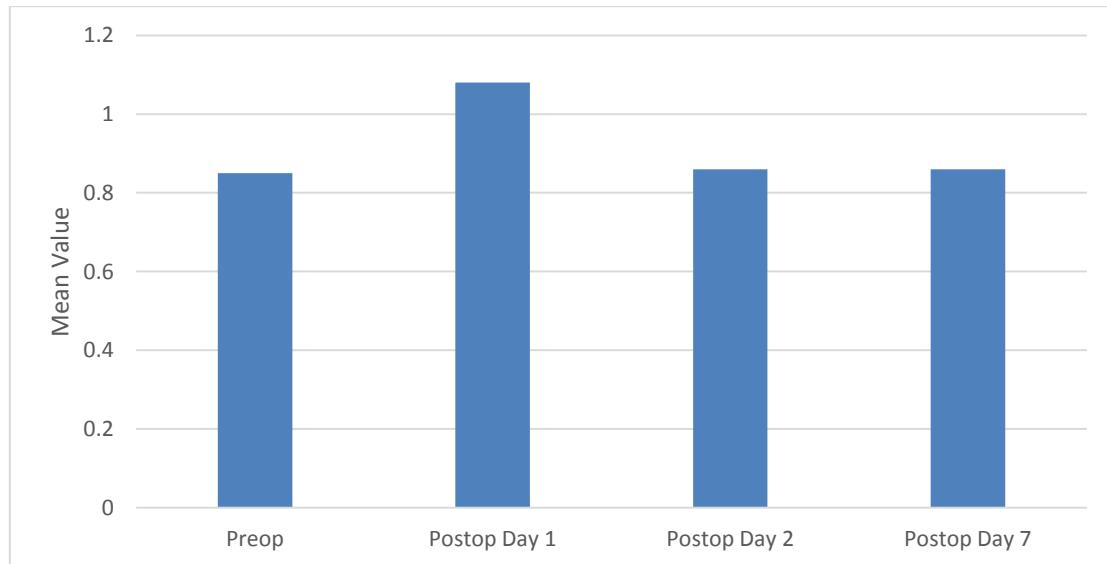
LAPAROSCOPIC SURGERY GROUP

SERUM BILIRUBIN LEVELS:

Comparison of Mean Serum Bilirubin preoperative and Postoperative day 1, day 2 and day 7 in Laparoscopic surgery group.

	N	Mean (mg/dL)	Std. Deviation	P value
PreOp	30	0.85	0.15	
Postop day 1	30	1.08	0.38	0.0061
Postop day 2	30	0.86	0.14	0.7850
Postop day 7	30	0.86	0.14	0.7590

COMPARISON OF MEAN SERUM BILIRUBIN VALUE IN PREOPERATIVE AND POSTOPERATIVE 1, 2 AND 7 IN LAPAROSCOPIC SURGERY GROUP



Above table shows serum Bilirubin level preoperatively was 0.85 ± 0.15 mg/dL and on postoperative day 1, 2 and 7 were 1.08 ± 0.38 mg/dL, 0.86 ± 0.14 mg/dL and 0.86 ± 0.14 mg/dL respectively. There was significant difference of serum Bilirubin level between preoperative and 1st postoperative day ($P = 0.0061$ i.e. <0.05). There was no significant difference between preoperative and 2nd postoperative day ($P = 0.7850$ i.e. >0.05) and no significant difference between preoperative and 7th postoperative day ($P = 0.7590$ i.e. >0.05).

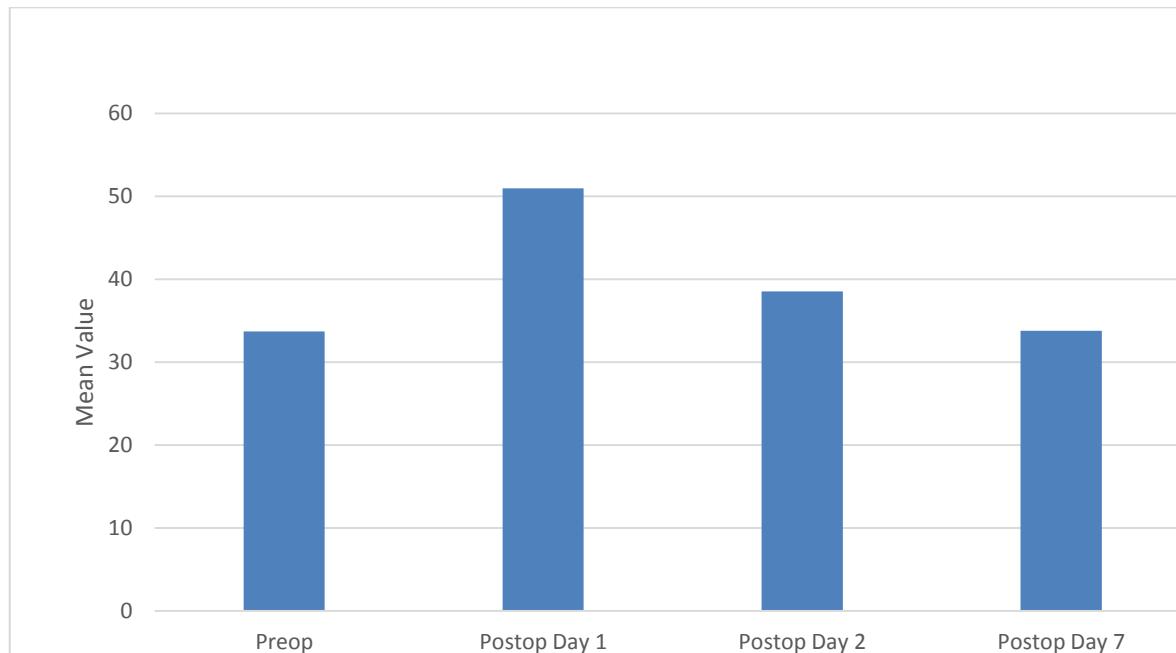
Thus it was suggestive of increase in serum bilirubin level in 24 hours postoperatively which came down to near preoperative value within 1 week postoperatively.

SGPT/ALT LEVELS

Comparison of Mean SGPT/ALT preoperative and Postoperative day 1, day 2 and day7 in Laparoscopic surgery group

	N	Mean (mg/dL)	Std. Deviation	P value
PreOp	30	33.70	4.28	
Postop day 1	30	50.96	16.07	<0.0001
Postop day 2	30	38.53	7.72	0.0014
Postop day 7	30	33.80	4.27	0.9257

COMPARISON OF MEAN SGPT/ALT VALUE IN PREOPERATIVE AND POSTOPERATIVE 1, 2 AND 7 IN LAPAROSCOPIC SURGERY GROUP



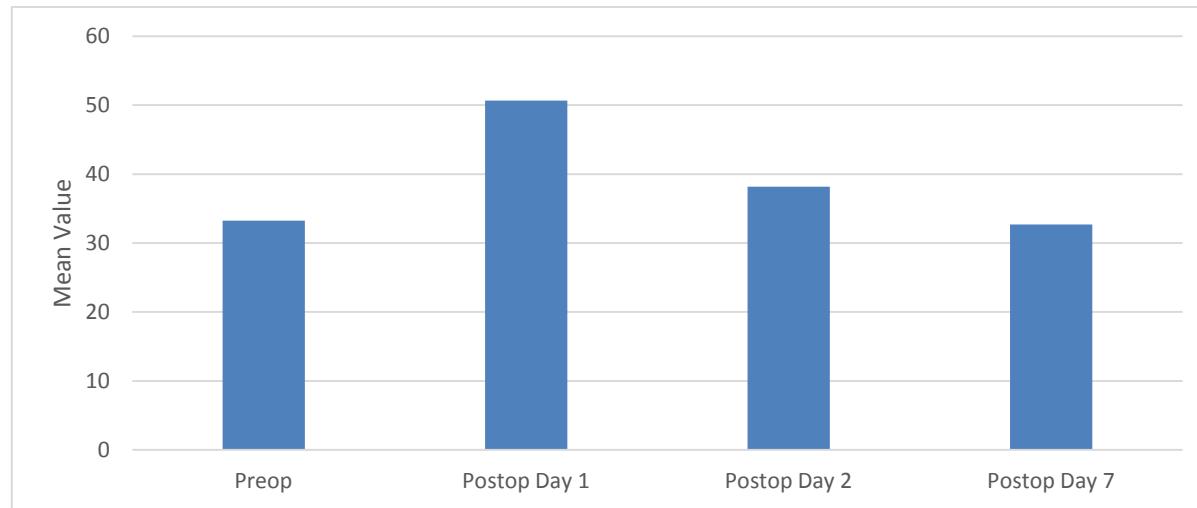
Above table shows ALT/SGPT level preoperatively was 33.70 ± 4.28 U/L and on postoperative day 1, 2 and 7 were 50.96 ± 16.07 U/L, 38.53 ± 7.72 U/L and 33.80 ± 4.27 U/L respectively. There was significant difference of ALT/SGPT level between preoperative and 1st postoperative day ($P = <0.0001$ i.e. <0.05). There was significant difference between preoperative and 2nd postoperative day ($P = 0.0014$ i.e. <0.05) but no significant difference between preoperative and 7th postoperative day ($P = 0.9257$ i.e. >0.05). Thus it was suggestive of increase in ALT/SGPT level in 24 to 48 hours postoperatively which came down to near preoperative value within 1 week postoperatively.

SGOT/AST LEVELS

Comparison of Mean SGOT/AST preoperative and Postoperative day 1, day 2 and day 7 in Laparoscopic surgery group.

	N	Mean (mg/dL)	Std. Deviation	P value
PreOp	30	33.23	3.79	
Postop day 1	30	50.66	13.28	<0.0001
Postop day 2	30	38.16	9.63	0.0130
Postop day 7	30	32.70	4.08	0.4939

COMPARISON OF MEAN SGOT/AST VALUE IN PREOPERATIVE AND POSTOPERATIVE 1, 2 AND 7 IN LAPAROSCOPIC SURGERY GROUP.



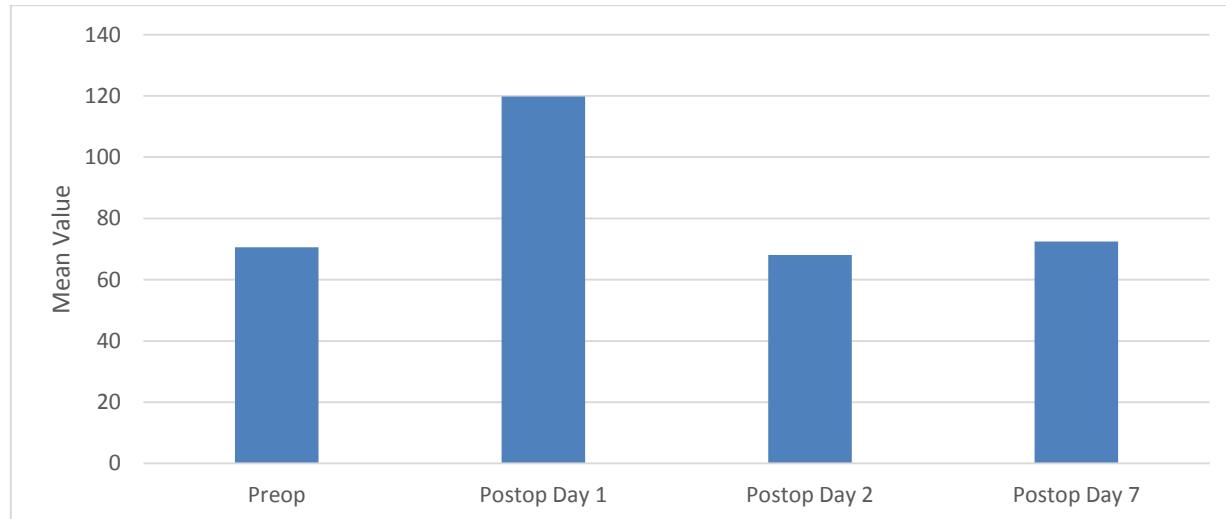
Above table shows AST/SGOT level preoperatively was 33.23 ± 3.79 U/L and on postoperative day 1, 2 and 7 were 50.66 ± 13.28 U/L, 38.16 ± 9.63 U/L and 32.70 ± 4.08 U/L respectively. There was significant difference of AST/SGOT level between preoperative and 1st postoperative day ($P = <0.0001$ i.e. <0.05). There was significant difference between preoperative and 2nd postoperative day ($P = 0.0130$ i.e. <0.05) but no significant difference between preoperative and 7th postoperative day ($P = 0.4939$ i.e. >0.05). Thus it was suggestive of increase in AST/SGOT level in 24 to 48 hours postoperatively which came down to near preoperative value within 1 week postoperatively.

ALKALINE PHOSPHATASE LEVELS:

Comparison of Mean Alkaline phosphatase preoperative and Postoperative day 1, day 2 and day 7 in Laparoscopic surgery group.

	N	Mean (mg/dL)	Std. Deviation	P value
PreOp	30	70.63	16.25	
Postop day 1	30	119.80	27.48	<0.0001
Postop day 2	30	68.03	15.07	0.5411
Postop day 7	30	72.50	18.79	0.7159

COMPARISON OF MEAN S.ALKALINE PHOSPHATASE VALUE IN PREOPERATIVE AND POSTOPERATIVE 1, 2 AND 7 IN LAPAROSCOPIC SURGERY GROUP



Above table shows Alkaline Phosphatase level preoperatively was 70.63 ± 16.25 IU/L and on postoperative day 1, 2 and 7 were 119.80 ± 27.48 IU/L, 68.03 ± 15.07 IU/L and 72.50 ± 18.79 IU/L respectively. There was significant difference of Alkaline Phosphatase level between preoperative and 1st postoperative day ($P = <0.0001$ i.e. <0.05). There was no significant difference between preoperative and 2nd postoperative day ($P = 0.5411$ i.e. >0.05) and no significant difference between preoperative and 7th postoperative day ($P = 0.7159$ i.e. >0.05).

Thus it was suggestive of increase in Alkaline Phosphatase level in 24 hours postoperatively which came down to near preoperative value within 1 week postoperatively.

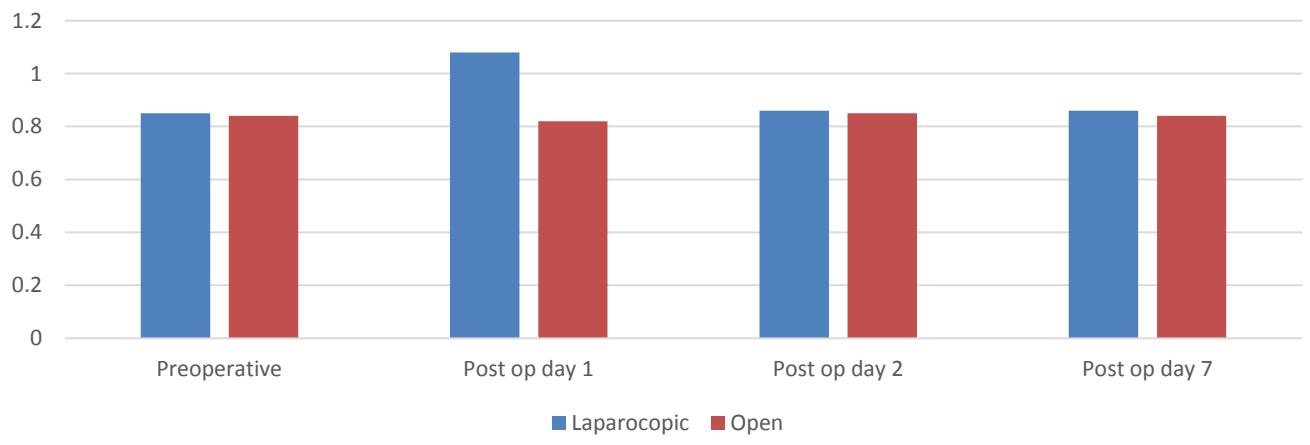
COMPARISON OF LAPAROSCOPIC AND OPEN SURGICAL GROUP

SERUM BILIRUBIN LEVELS:

Comparison of Mean Serum Bilirubin preoperative and Postoperative 1, 2 and 7 in Laparoscopic and Open surgical group.

	Laparoscopic surgery group	Open surgery group	P value
Preoperative	0.85	0.84	0.7510
Post op day 1	1.08	0.82	0.0007
Post op day 2	0.86	0.85	0.7295
Post op day 7	0.86	0.84	0.6014

Comparison of Mean Serum Bilirubin preoperative and Postoperative 1, 2 and 7 in Laparoscopic and Open surgical group.

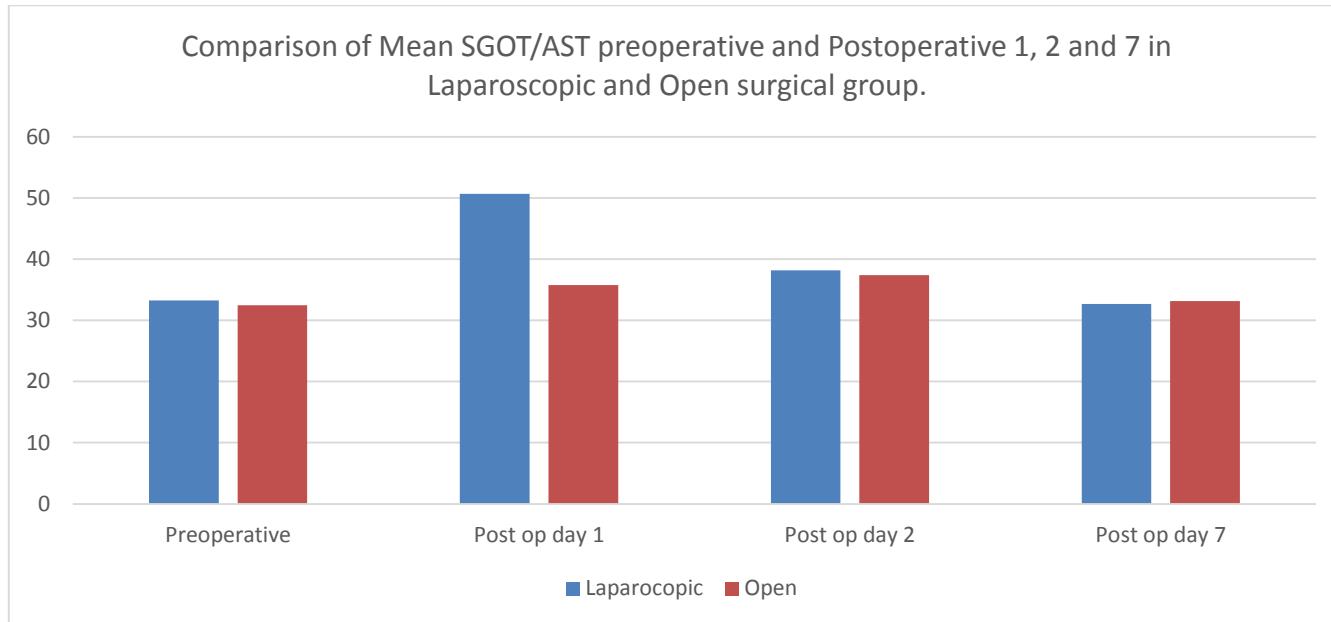


Above table shows Serum Bilirubin level comparison between laparoscopic and open surgical group preoperatively was 0.85 mg/dL and 0.85 mg/dL, postoperative day 1 was 1.08 mg/dL and 0.82 mg/dL, postoperative day 2 was 0.86 mg/dL and 0.85 mg/dL and postoperative day 7 was 0.86 mg/dL and 0.84 mg/dL. There was significant difference between preoperative and postoperative day 1 ($P = 0.0007$ i.e. <0.05). While there was no significant difference in preoperative ($P = 0.7510$ i.e. >0.05), postoperative day 2 ($P = 0.7295$ i.e. >0.05) and postoperative day 7 ($P = 0.6014$ i.e. >0.05).

SGOT/AST LEVELS:

Comparison of Mean SGOT/AST preoperative and Postoperative 1, 2 and 7 in Laparoscopic and Open surgical group

	Laparoscopic surgery group	Open surgery group	P value
Preoperative	33.23	32.46	0.4408
Post op day 1	50.66	35.76	<0.0001
Post op day 2	38.16	37.40	0.7262
Post op day 7	32.70	33.13	0.6776

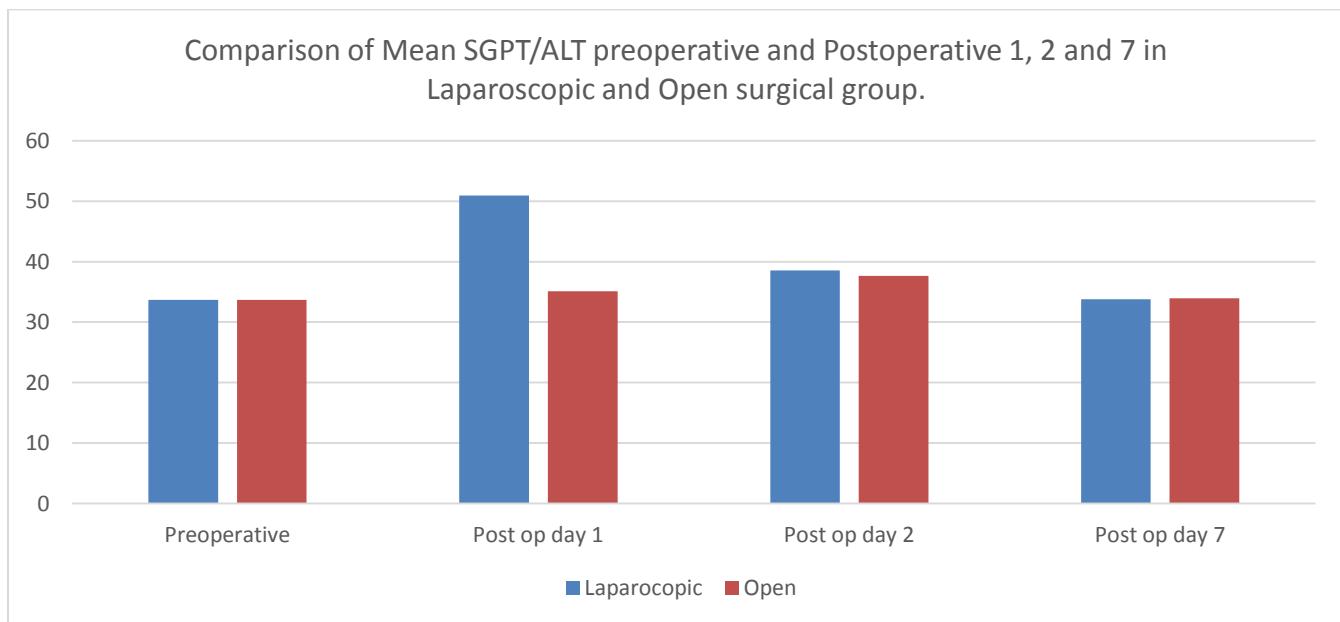


Above table shows SGOT/AST level comparison between laparoscopic and open surgical group preoperatively was 33.23 U/L and 32.46 U/L, postoperative day 1 was 50.66 U/L and 35.76 U/L, postoperative day 2 was 38.16 U/L and 37.40 U/L and postoperative day 7 was 32.70 U/L and 33.13 U/L. There was significant difference between preoperative and postoperative day 1 ($P = <0.0001$ i.e. <0.05). While there was no significant difference in preoperative ($P = 0.4408$ i.e. >0.05), postoperative day 2 ($P = 0.7262$ i.e. >0.05) and postoperative day 7 ($P = 0.6776$ i.e. >0.05).

SGPT/ALT LEVELS:

Comparison of Mean SGPT/ALT preoperative and Postoperative 1, 2 and 7 in Laparoscopic and Open surgical group.

	Laparoscopic surgery group	Open surgery group	P value
Preoperative	33.70	33.67	0.9764
Post op day 1	50.96	35.10	<0.0001
Post op day 2	38.53	37.67	0.6950
Post op day 7	33.80	33.97	0.8861

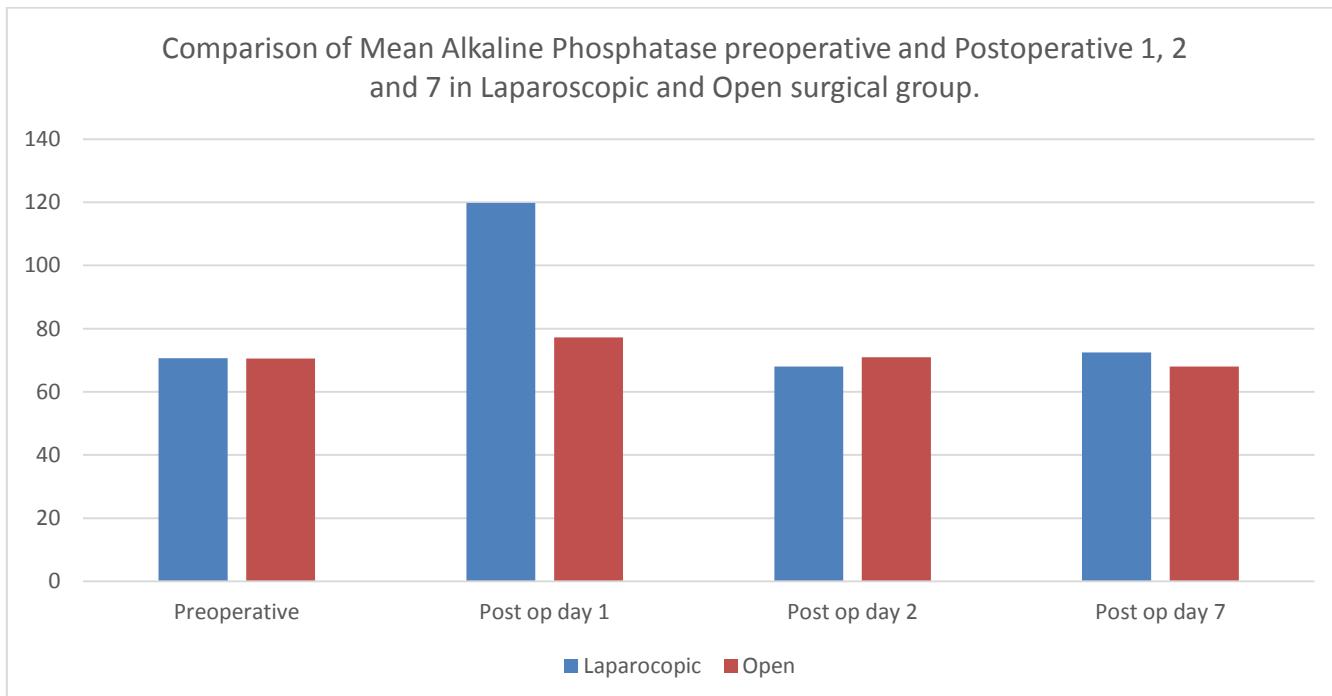


Above table shows SGPT/ALT level comparison between laparoscopic and open surgical group preoperatively was 33.70 U/L and 33.67 U/L, postoperative day 1 was 50.96 U/L and 35.10 U/L, postoperative day 2 was 38.53 U/L and 37.67 U/L and postoperative day 7 was 33.80 U/L and 33.97 U/L. There was significant difference between preoperative and postoperative day 1 ($P = <0.0001$ i.e. <0.05). While there was no significant difference in preoperative ($P = 0.9764$ i.e. >0.05), postoperative day 2 ($P = 0.6950$ i.e. >0.05) and postoperative day 7 ($P = 0.8861$ i.e. >0.05).

ALKALINE PHOSPHATASE LEVELS:

Comparison of Mean Alkaline Phosphatase preoperative and Postoperative 1, 2 and 7 in Laparoscopic and Open surgical group.

	Laparoscopic surgery group	Open surgery group	P value
Preoperative	70.63	70.50	0.9752
Post op day 1	119.80	77.23	<0.0001
Post op day 2	68.03	70.96	0.4407
Post op day 7	72.50	68.00	0.3079



Above table shows Alkaline phosphatase level comparison between laparoscopic and open surgical group preoperatively was 70.63 IU/L and 70.50 IU/L, postoperative day 1 was 119.80 IU/L and 77.23 IU/L, postoperative day 2 was 68.03 IU/L and 70.96 IU/L and postoperative day 7 was 72.50 IU/L and 68.00 IU/L. There was significant difference between preoperative and postoperative day 1 ($P = <0.0001$ i.e. <0.05). While there was no significant difference in preoperative ($P = 0.9752$ i.e. >0.05), postoperative day 2 ($P = 0.4407$ i.e. >0.05) and postoperative day 7 ($P = 0.3079$ i.e. >0.05).

DISCUSSION

Laparoscopic procedures has rapidly emerged as an established method for treatment of many common surgical diseases. The growing interest in laparoscopy is mostly attributable to cumulative evidence suggesting a reduction in patient morbidity, shortening of hospital stay and early return to normal activity. During the last decade many studies have disclosed unexplained changes in postoperative liver function in patients undergoing laparoscopic procedures CO_2 pneumoperitoneum might be one of the main reasons for

the change of serum liver enzymes, as this is the only main difference laparoscopic surgeries had when compared with open surgeries. There have been no studies in our setting in India to evaluate the potential deleterious effects of laparoscopic surgery on hepatic function. This study was therefore intended to assess the presence of clinical significance of unexplained disturbances in liver enzymes following laparoscopic surgeries.

In present study 60 patients who constituted the study population, 30 were male patients and 30 were female. All the patients were between 7 and 80 years of age. Majority of the patients were between 20 - 40 years age group (i.e. 28 patients).

Patients who underwent various types of laparoscopic & open surgeries [Cholecystectomy or Appendicectomy] were included in the study. 30 patients were operated for acute or subacute appendicitis. They all underwent either laparoscopic or open appendicectomy. Rest 30 patients were operated for cholelithiasis. They all underwent either laparoscopic or open cholecystectomy.

In all patients the levels of serum bilirubin, serum AST, serum ALT and serum Alkaline phosphatase was checked preoperatively once and post operatively on day 1, day 2 and day 7.

Comparison of Mean ALT/SGPT level of various studies for laparoscopic surgery group.

	Pre op	Postop day 1	Postop day 7
Halvey A et al ²	13.70 ± 4.80	30.00 ± 46.50	-
Tan et al ³	23.30 ± 11.60	38.80 ± 15.20	25.10 ± 14.30
Güven and Oral et al ⁶	21.55 ± 8.92	60.30 ± 32.17	-
Ahmad NZ et al ⁷	28.03 ± 14.37	67.10 ± 66.33	-
Our Study	33.70 ± 4.28	50.96 ± 16.07	33.80 ± 4.27

Halvey A et al ² stated that the mean level of serum ALT/SGPT preoperatively was 13.70 ± 4.80 U/L and postoperatively day 1 was 30.00 ± 46.50 U/L with p value of <0.005 i.e. <0.05 . So author found statistical significant difference.

Tan A et al ³ stated that the mean level of serum ALT/SGPT preoperatively was 23.30 ± 11.60 U/L and postoperatively day 1 was 38.80 ± 15.20 U/L with p value of <0.05 . So author found statistical significant difference.

Güven and Oral et al ⁶ stated that the mean level of serum ALT/SGPT preoperatively was 21.55 ± 8.92 U/L and postoperatively day 1 was 60.30 ± 32.17 U/L with p value of <0.0001 i.e. <0.05 . So author found statistical significant difference.

Ahmad NZ et al ⁷ stated that the mean level of serum ALT/SGPT preoperatively was 28.03 ± 14.37 U/L and postoperatively day 1 was 67.10 ± 66.33 U/L with p value of <0.05 . So author found statistical significant difference.

In present study there was a significant rise in the serum ALT/SGPT levels in the immediate postoperative period when compared to the preoperative values with p value <0.0001 i.e. <0.05 , which came down to near preoperative values with in a weeks' time in our study also having mean level of serum ALT/SGPT preoperatively was 33.70 ± 4.28 U/L. postoperatively day 1, day 2 and day 7 the levels were 50.96 ± 16.07 U/L, 38.53 ± 7.72 U/L and 33.80 ± 4.27 U/L respectively.

Comparison of Mean AST/SGOT level of various studies for laparoscopic surgery group.

	Pre op	Postop day 1	Postop day 7
Halvey A et al ²	17.30 ± 4.0	30.90 ± 50.80	-
Tan et al ³	28.40 ± 20.2	41.50 ± 24.70	29.10 ± 18.70
Güven and Oral et al ⁶	22.76 ± 6.44	61.72 ± 28.13	-
Ahmad NZ et al ⁷	25.39 ± 9.68	58.41 ± 54.04	-
Our Study	33.23 ± 3.79	50.66 ± 13.28	32.70 ± 4.08

Halvey A et al ² stated that the mean level of serum AST/SGOT preoperatively was 17.30 ± 4.0 U/L and postoperatively day 1 was 30.90 ± 50.80 U/L with p value of <0.05 . So author found statistical significant difference.

Tan A et al ³ stated that the mean level of serum AST/SGOT preoperatively was 28.40 ± 20.2 U/L and postoperatively day 1 was 41.50 ± 24.70 U/L with p value of <0.05 . So author found statistical significant difference.

Güven and Oral et al ⁶ stated that the mean level of serum AST/SGOT preoperatively was 22.76 ± 6.44 U/L and postoperatively day 1 was 61.72 ± 28.13 U/L with p value of <0.0001 i.e. <0.05 . So author found statistical significant difference.

Ahmad NZ et al ⁷ stated that the mean level of serum AST/SGOT preoperatively was 25.39 ± 9.68 U/L and postoperatively day 1 was 58.41 ± 54.04 U/L with p value of <0.05 . So author found statistical significant difference.

In present study there was a significant rise in the serum AST/SGOT levels in the immediate postoperative period when compared to the preoperative values with p value of <0.0001 i.e. <0.05 , which came down to near preoperative values with in a weeks' time in our study also having mean level of serum AST/SGOT preoperatively was 33.23 ± 3.79 U/L, postoperatively day 1, day 2 and day 7 the levels were 50.66 ± 13.28 U/L, 38.16 ± 9.63 U/L and 32.70 ± 4.08 U/L respectively.

Comparison of Mean Alkaline Phosphatase level of various studies for laparoscopic surgery group.

	Pre op	Postop day 1	Postop day 7
Halvey A et al ²	105.14 ± 33	111.11 ± 40	-
Güven and Oral et al ⁶	66.42 ± 19.40	68.37 ± 18.28	-
Ahmad NZ et al ⁷	83.93 ± 23.90	82.19 ± 33.87	-
Our Study	70.63 ± 16.25	119.80 ± 27.48	72.50 ± 18.79

Halvey A et al ² stated that the mean level of Alkaline phosphatase preoperatively was 105.14 ± 33 IU/L and postoperatively day 1 was 111.11 ± 40 IU/L with p value of <0.05 . So author found statistical significant difference.

Güven and Oral et al ⁶ stated that the mean level of alkaline phosphatase preoperatively was 66.42 ± 19.40 IU/L and postoperatively day 1 was 68.37 ± 18.28 IU/L with p value of 0.131 i.e. >0.05 . So author found statistical no significant difference.

Ahmad NZ et al⁷ stated that the mean level of alkaline phosphatase preoperatively was 83.93 ± 23.90 IU/L and postoperatively day 1 was 82.19 ± 33.87 IU/L with p value of 0.241 i.e. >0.05 . So author found statistical no significant difference.

In present study there was a significant rise in the alkaline phosphatase levels in the immediate postoperative period when compared to the preoperative values with p value of <0.0001 i.e. <0.05 , which came down to near preoperative values with in a weeks' time in our study also having mean level of alkaline phosphatase preoperatively was 70.63 ± 16.25 IU/L postoperatively day 1, day 2 and day 7 the levels were 119.80 ± 27.48 IU/L, 68.03 ± 15.07 IU/L and 72.50 ± 18.79 IU/L respectively.

In present study laparoscopic surgery group in details, the mean level of S.bilirubin preoperatively was 0.85 ± 0.15 mg/dL. Postoperatively on day 1, day 2 and day 7 the levels were 1.08 ± 0.38 mg/dL, 0.86 ± 0.14 mg/dL and 0.86 ± 0.14 mg/dL respectively. Thus it was found that there was a significant rise in the serum bilirubin levels in the immediate postoperative period with p value of 0.0061 i.e. <0.05 which came down to near preoperative values within 1 week postoperatively.

Comparison of Mean ALT/SGPT level of various studies for open surgery group.

	Pre op	Postop day 1
Tan A et al 3	21.80 ± 16.70	28.2 ± 13.70
Our Study	33.67 ± 4.39	35.10 ± 5.20

For open surgical group Tan A et al³ stated that the mean level of ALT/SGPT preoperatively was 21.80 ± 16.7 U/L and postoperatively day 1 was 28.2 ± 13.7 U/L with p value of >0.05 . So author found no statistical significant difference and small degree of increase in ALT/SGPT level postoperatively.

In present study there was a small degree of increase in the ALT/SGPT as preoperatively was 33.67 ± 4.39 U/L and postoperatively day 1 was 35.10 ± 5.20 U/L in the postoperative period when compared to the preoperative values with p value of 0.2515 i.e. >0.05 . But the increase was in normal range.

Comparison of Mean AST/SGOT level of various studies for open surgery group.

	Pre op	Postop day 1
Tan A et al 3	25.20 ± 17.60	31.80 ± 22.10
Our Study	32.46 ± 3.85	35.76 ± 4.32

For open surgical group Tan A et al³ stated that the mean level of serum AST/SGOT preoperatively was 25.20 ± 17.60 U/L and postoperatively day 1 was 31.80 ± 22.10 U/L with p value of <0.05 . So author found statistical significant difference and small degree of increase in AST/SGOT level postoperatively.

In present study there was a small degree of increase in the AST/SGOT as preoperatively was 32.46 ± 3.85 U/L and postoperatively day 1 was 35.76 ± 4.32 U/L in the postoperative period when compared to the preoperative values with p value of 0.0044 i.e. <0.05 . But the increase was in normal range.

In present study Open surgery group found no rise in serum bilirubin levels in postoperative day 1, day 2 and day 7 either it was cholecystectomy or appendicectomy. As Serum Bilirubin level preoperatively was 0.84 ± 0.15 mg/dL and on postoperative day 1, 2 and 7 were 0.82 ± 0.08 mg/dL, 0.85 ± 0.15 mg/dL and 0.84 ± 0.15 mg/dL respectively.

In present study Open surgical group, Alkaline phosphatase was 70.50 ± 16.79 IU/L and on postoperative day 1, 2 and 7 were 77.23 ± 9.29 IU/L, 70.96 ± 14.18 IU/L and 68.00 ± 14.85 IU/L respectively. There was small degree of increase in level of Serum Alkaline Phosphatase in open surgical group postoperatively day 1 and day 2 but within normal range. Which was similar to preoperative at postoperative day 7.

Comparing laparoscopic surgery with open surgery we found significant rise in serum Bilirubin, SGPT/ALT, SGOT/AST, Alkaline Phosphatase on postoperative day 1. For serum Bilirubin it was 0.85 mg/dL to 1.08 mg/dL and 0.84 mg/dL to 0.82 mg/dL in laparoscopic and open surgical group. For SGOT/AST it was 33.23 U/L to 50.66 U/L and 32.46 U/L to 35.76 U/L in laparoscopic and open surgical group. For SGPT/ALT it was 33.70 U/L to 50.96 U/L and 33.67 U/L to 35.10 U/L in laparoscopic and open surgical group. For Alkaline Phosphatase it was 70.63 IU/L to 119.80 IU/L and 70.50 IU/L to 77.23 IU/L in laparoscopic and open surgical group.

There was significant rise in liver function test in postoperative day 1 in laparoscopic surgery group. While in open surgery group there was small degree of rise but in normal range in liver function test on postoperative day 1. This rise postoperatively returned back to normal as preoperative level by postoperative day 7.

The transient postoperative increases in the serum bilirubin and liver enzyme levels were seen in the study population irrespective of the type of laparoscopic surgery they underwent. In all the patients where there was a transient rise in the enzyme levels, the values returned to near preoperative concentrations within one week after surgery. None of the patients presented with clinical hepatic dysfunction after the surgery according to follow up observations and feedback from these patients.

CONCLUSION

We observed that elevation in liver function test on postoperative day 1 came back to normal on postoperative day 7 in laparoscopic surgery group. And there was small degree of elevation but within normal range in liver function test in open surgery group which came back to normal on postoperative day 7. These transient changes might be attributed to hepatocellular dysfunction secondary to one or combination of CO₂ pneumoperitoneum, diathermy on liver and general anaesthesia3.

Based on our findings and other similar studies in the past, CO₂ pneumoperitoneum might be one of the main reasons for this change.

The transient elevation of liver enzymes showed no apparent clinical implication in most patients who received laparoscopic surgery3.

These results however indicate that if the preoperative liver function was very poor, laparoscopic surgery might not be the optimal choice for treating certain abdominal diseases.

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