ORIGINAL RESEARCH ARTICLE

A Study to Assess the Significance of Lft Changes in Hepatic Function due to Co2 Pneumoperitoneum following Laparoscopic Cholecystectomy: A Pilot Study

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ABSTRACT

Introduction: Laparoscopic surgery is always considered as better than classical open one because of small incisions pain and complications like haemorrhage are reduced and time required for recovery is short. The current study was undertaken to assess the significance of LFT changes in hepatic function due to CO2 pneumoperitoneum following laparoscopic cholecystectomy.

Material and Methods: A detailed work up of all the patients enrolled in the study i.e detailed history, a thorough Clinical Examination was performed, followed by routine investigations. The liver function tests were repeated thrice, i.e 24 & 72 hours after surgery and on follow up (10th postoperative day) to monitor liver function. All the results were analyzed by SPSS software version 16.0. Chi- square test and paired t test 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 evaluated a total of 10 subjects, out of which 2 subjects were of less than 40 years of age while the remaining 8 were more than 40 years of age. Out of 10, 3 subjects were males while remaining 7 were females. Non- significant results were obtained while comparing the LFTs in between males and females at different preoperative and postoperative time intervals. While comparing the overall change in the mean LFTs in between subjects of less than 40 years and more than 40 years of age, no significant difference was observed.

Conclusion: The study concluded that there were non- significant results were obtained while comparing the LFTs in between males and females at different preoperative and postoperative time intervals. While comparing the overall change in the mean LFTs in between subjects of less than 40 years and more than 40 years of age, no significant difference was observed.

Keywords: Hepatic, Laparoscopic Cholecystectomy, LFT.

INTRODUCTION

Laparoscopic cholecystectomy is widely used for treatment of benign gallbladder diseases. Today more than 90% of cholecystectomies are performed laparoscopically.[1-3] Laparoscopic cholecystectomy (LC) has become the standard treatment of symptomatic gallstones, and currently, it is one of the most commonly performed minimally invasive surgical procedures. The laparoscopic approach is beneficial to patients in terms of a shorter hospital stay, less postoperative pain, an early return to work, and better cosmetic scars. However, this procedure was found to impair hepatic function, at least temporarily, in previously healthy patients.[4]However the operation time may be prolonged and the pneumoperitoneum produces elevated intraabdominal pressure with continuous compression of intra-abdominal organs, which potentially influences hepatic microcirculatory perfusion.[5-7] New concerns arose regarding the effects of pneumoperitoneum on the cardiovascular and respiratory systems.[8] Moreover, the observation of hemodynamic and metabolic impairment related to Carbon dioxide (CO2) pneumoperitoneum and postoperative mesenteric ischemia reports following laparoscopic procedures have raised concern about the local and systemic effects of increased intraabdominal pressure during laparoscopic procedures.[9]The current study was undertaken using various LFTs, to further explore the significance of LFT changes in hepatic function due to CO2 pneumoperitoneum following laparoscopic cholecystectomy.

MATERIAL AND METHODS

The present Prospective Observational Cohort study was conducted among 100 patients undergoing laparoscopic cholecystectomy in the department of general surgery of GGS medical college & hospital, Faridkot. Ethical approval was taken from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. Patients undergoing laparoscopic cholecystectomy, Patients above 18 years of age, Have symptomatic gallstones were included in the study. Any patient with pre-operative abnormality in liver enzymes, Patients with Suspected chronic liver diseases, Patients with

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Common bile duct pathology, Patients with Conversion to open cholecystectomy, Patients with Hematological Disorders and Patients with Intra – Operative Complication – CBD (common bile duct) injury, jaundice, cholangitis, Patients on hepatotoxic drugs, Patients who had undergone ERCP (endoscopic retrograde cholangiopancreatography) or stenting within 1 week before laparoscopic cholecystectomy were excluded from the study. A detailed work up of all the patients enrolled in the study i.e detailed history, a thorough Clinical Examination was performed, followed by routine investigations including CBC (complete blood count), FBS (fasting blood sugar)/RBS (random blood sugar), PTI (prothrombin time index)/INR (international normalized ratio), RFTs (renal function tests), LFTs (liver function tests), Urine Routine, Serum Electrolytes, Viral Markers, Chest X Ray, Ultrasound Abdomen. After that all patients got their pre-anaesthetic check-up and underwent laparoscopic cholecystectomy under constant intraperitoneal pressure (12mm Hg) subsequently. The liver function tests were repeated thrice, i.e 24 & 72 hours after surgery and on follow up (10th postoperative day) to monitor liver function. Adverse events were observed in all patients in the postoperative period.

In the liver function tests, following parameters were specifically studied-

- ALT (alanine transaminase)
- AST (aspartate transaminase)
- ALP (alkaline phosphatase)
- Bilirubin (direct)
- Bilirubin (total)

To study the association of alterations in liver function tests under study following laparoscopic cholecystectomy, with age, the patients were sorted into two age groups

- < 40 yrs
- >40 yrs.

Age group (years)	Frequency	Percent
Less than 40	2	20.0
More than 40	8	80.0
Total	10	100.0

Table-1: Distribution of subjects according to age group

Gender	Frequency	Percent
Male	3	30
Female	7	70
Total	10	100.0

Table-2: Distribution of subjects according to gender

Similarly the association of these alterations in liver function tests with gender was studied by sorting male and female patients in two separate groups. On discharge all patients were asked to follow up in surgery OPD on 10th postoperative day and the liver function tests with parameters included in the study were repeated as mentioned earlier. All the results were analyzed by SPSS software version 16.0. Chi- square test and paired t test 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 evaluated a total of 10 subjects, out of which 2 subjects were of less than 40 years of age while the remaining 8 were more than 40 years of age.

Out of 10, 3 subjects were males while remaining 7 were females.

Mean AST, ALT, Total bilirubin, direct bilirubin and alkaline phosphatase pre-operative values were found to be 26.22 IU/L, 27.21IU/L, 0.75 mg/dL, 0.22 mg/dL and 77.33 IU/L respectively. Mean AST, ALT, Total bilirubin, Direct bilirubin and Alkaline phosphatase after 24 hours post-operatively were found to be 70.41 IU/L, 72.14 IU/L, 1.40 mg/dL, 0.42 mg/dL and 76.63 IU/L respectively. Mean AST, ALT, Total bilirubin, Direct bilirubin and Alkaline phosphatase pre-operative values were found to be 27.31 IU/L, 29.49 IU/L, 0.77 mg/dL, 0.21 mg/dL and 76.91 IU/L respectively. Mean AST, ALT, Total bilirubin, Direct bilirubin and Alkaline phosphatase pre-operative values were found to be 26.53 IU/L, 28.15 IU/L, 0.76 mg/dL, 0.21 mg/dL and 76.83 IU/L respectively.

Non- significant results were obtained while comparing the LFTs in between males and females at different preoperative and postoperative time intervals.

While comparing the overall change in the mean LFTs in between subjects of less than 40 years and more than 40 years of age, no significant difference was observed.

DISCUSSION

Presently laparoscopic cholecystectomy (LC) is considered as the gold standard procedure for removal of diseased gallbladder and one of the commonest surgeries performed globally; it is performed by insufflating abdominal cavity with CO2 to get good lookout of the surgical field. Generally an IAP of 10-15mmHg is maintained for laparoscopic cholecystectomy. This increased intra-abdominal pressure is considered to be the main factor leading to the impairment of pulmonary, cardiovascular, metabolic, neurologic, renal and hepatic functions depending on intraperitoneal pressure grade and ischemia. This resulting hepatic ischemia leads to

Parameter	Mean ±SD pre-operatively	Mean ±SD after 24 hours post-operatively	after 72 hours post-operatively	at post-operative 10th day
AST	26.22±9.04	70.41±14.94	27.31±8.78	26.53±9.33
ALT	27.21±7.89	72.14±13.57	29.40±7.78	28.15±7.54
Total Bilirubin	0.75±0.09	1.40±0.39	0.77±0.072	0.76±0.07
Direct Bilirubin	0.22±0.05	0.42±0.12	0.21±0.03	0.21±0.03
Alkaline Phosphatase	77.33±13.94	76.63±13.96	76.91±13.46	76.83±13.35

Table-3: Mean and SD of LFT parameters

Parameter		Gender		P- value
		Male	Females	
Preoperative	AST	24.21	27.89	0.225
	ALT	27.27	27.25	0.748
	TB	0.82	0.78	0.337
	DB	0.24	0.23	0.533
	ALP	64.56	67.34	0.538
Postoperative 24 hours	AST	68.78	71.63	1.004
	ALT	75.23	72.74	0.062
	TB	1.56	1.50	0.903
	DB	0.42	0.43	0.908
	ALP	72.53	71.12	0.767
Postoperative 72 hours	AST	25.16	28.38	0.214
	ALT	28.42	29.17	0.952
	TB	0.79	0.79	0.833
	DB	0.24	0.24	0.630
	ALP	65.79	73.11	0.591
Postoperative 10th day	AST	24.27	28.22	0.143
	ALT	28.40	28.09	0.728
	TB	0.79	0.78	0.884
	DB	0.24	0.2k4	0.610
	ALP	66.11	68.72	0.521

Table-4: Comparison of LFTs in between males and females at various time intervals

Parameter		Age group		P- value
		Less than 40	More than 40	
Preoperative	AST	18.73	28.15	0.000
	ALT	24.34	27.15	0.035
	TB	0.71	0.78	0.001
	DB	0.2635	0.2024	0.000
	ALP	79.25	76.25	0.413
Postoperative 24 hours	AST	65.22	71.80	0.031
	ALT	70.65	73.52	0.064
	TB	1.53	1.34	0.140
	DB	0.39	0.42	0.101
	ALP	78.49	75.35	0.569
Postoperative 72 hours	AST	20.18	29.16	0.000
	ALT	27.42	29.94	0.063
	TB	0.74	0.78	0.016
	DB	0.24	0.24	0.194
	ALP	78.93	76.48	0.523
Postoperative 10th day	AST	18.24	28.28	0.000
	ALT	26.84	28.44	0.563
	TB	0.76	0.79	0.105
	DB	0.24	0.22	0.155
	ALP	77.82	76.64	0.733

Table-5: Comparison of LFTs in between patients of less than 40 years and more than 40 years of age at various time intervals

elevation of liver enzymes level: alanine aminotransferase, aspartate aminotransferase, alkaline phosphatase and gamma glutamyl transferase. The raised intra peritoneal pressure leads to the compression of intra abdominal organs, potentially affecting the hepatic microcirculation leading to hepatocellular dysfunction.[10]

In the present study, we evaluated a total of 10 subjects, out of which 2 subjects were of less than 40 years of age while the remaining 8 were more than 40 years of age. Out of 10, 3 subjects were males while remaining 7 were females. Mean AST, ALT, Total bilirubin, direct bilirubin and alkaline phosphatase pre-operative values were found to be 26.22 IU/L, 27.21IU/L, 0.75 mg/dL, 0.22 mg/dL and 77.33 IU/L respectively. Mean AST, ALT, Total bilirubin, Direct bilirubin and Alkaline phosphatase after 24 hours post-operatively were found to be 70.41 IU/L, 72.14 IU/L,

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The mean age of subjects observed in our study was in concordance with the mean age of subjects in the study conducted by Omari A et al (45.2 years).[4]

Ahmad NZ (2011) also reported similar alterations in the serum AST and ALT levels on the first postoperative day, in patients undergoing LC.[11]

The results obtained by Omari A et al who also didn't report any significant alterations in the mean ALP levels post-operatively in patients undergoing LC.[4]

Hagras MMAE and Mohindra M also showed an increase in ALP values in 6% and 18% of patients undergoing LC.[12,13]

The results obtained by Mohindra M et al who reported a rise in TB and DB in 73% and70% of the patients undergoing LC.[13]

CONCLUSION

The study concluded that there were non- significant results were obtained while comparing the LFTs in between males and females at different preoperative and postoperative time intervals. While comparing the overall change in the mean LFTs in between subjects of less than 40 years and more than 40 years of age, no significant difference was observed.

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