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Research Article

**POST LAPAROSCOPIC CHOLECYSTECTOMY, TRANSIENT
DERANGEMENT OF LIVER ENZYMES**¹Muhammad Salman, ²Yamna Khalid, ³Dr Maham Habib¹Medical officer Rural Health Center 134 GB Tehsil Samundri District Faisalabad, ²WMO Rehman Medical Complex, Nishtar Road, Multan, ³FMH Shadman Lahore.**Article Received:** March 2019**Accepted:** April 2019**Published:** May 2019**Abstract:**

Aims: We intend to enquire the change in blood levels of aspartate aminotransferase (AST), gamma-glutamyl-transferase (GGT), alanine aminotransferase (ALT), lactate dehydrogenase (LDH) and alkaline phosphatase (ALP) in patients who underwent laparoscopic cholecystectomy (LC) and collate these alterations with those happening after open cholecystectomy (OC).

Methods: Out of total 194 patients studied in May 2016 to April 2017, 156 underwent laparoscopic cholecystectomy while 58 had undergone open cholecystectomy during the same period of time. OC patients were enrolled as control group. Lab investigations were done within 24 hours preoperatively and again after 24 hours postoperatively for biochemical evaluation.

Results: Statistical analysis brings to light a significant increase in the levels of ALT, GGT, AST, and LDH levels in the laparoscopic cholecystectomy group postoperatively. In comparison with the open cholecystectomy group, the variation between elevations of enzymes levels was also pronounced for LC group.

Conclusion: It is thus concluded that these elevations of levels of enzymes could mostly be associated to the damaging effects of the pneumoperitoneum on the blood flow of liver. Although these alterations are transient and do not seem to be clinically significant, attention should be given before planning to perform LC in patients with liver insufficiency.

Key words: Laparoscopic cholecystectomy – pneumoperitoneum - liver function tests.

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INTRODUCTION:

For about 25 years, laparoscopic cholecystectomy (LC) has supplanted open cholecystectomy (OC) in the treatment of symptomatic gallbladder ailments and has turned into the highest quality level treatment for cholelithiasis. As it increased overall ubiquity, it has turned out to be a most frequently performed operation in general surgery practice. Despite the fact that LC offered numerous points of interest over laparotomy, new concerns emerged with respect with the impacts of a pneumoperitoneum on the cardiovascular and respiratory system (1).

One of the significant hemodynamic changes is the transient decrease in hepatic blood stream brought about by a pneumoperitoneum (3,4,5,8). The pressure achieved in creating pneumoperitoneum and its length was appeared to impact the level of hepatic ischemia by causing heights in liver enzymes (4,7,8).

In this study we expected to research the changes in the serum levels of hepatic enzymes after LC performed under consistent intraperitoneal Pressure (14mmHg) and think about the distinctions in patients who had experienced OC.

METHODS:

Between May 2016 to April 2017, 136 patients with cholelithiasis underwent LC in Nishter Hospital Multan that were studied. Patients whose blood biochemistry for aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), lactate dehydrogenase (LDH) and gamma-glutamyltransferase (GGT) was obtained both preoperatively and post operatively after 24 hours. Patients having CBD stones, or elevated levels of liver enzymes before operation, or in whom complications like CBD injury or excessive bleeding from the liver bed was noted, were count out from the study. Patients with other co-morbidities such as hypertension, diabetes mellitus and/or positive serology for hepatitis B or hepatitis C viruses were also not included. Statistical analysis was done for 136 uncomplicated patients. 102 (75 %) of 136 patients were female and 34 (25%) were male. Mean age was 51.06 years.

Amid a similar time interim, 58 patients experienced OC in our hospital, mostly due to temporary technical issues at the laparoscopy theatre. 58 uncomplicated patients, whose enzyme levels both preoperatively and postoperatively were assessed and who were administered the similar anesthetic protocol as for patients experiencing LC were also included in the research as the control group. Of them, 46 (79.3%)

were female and 12 (20.6 %) were male with a median age of 53.16 years.

LC was performed under general anesthesia with intravenous anesthesia induction followed by continuous inhalational anesthesia with help of mechanical ventilation. In spite of the fact that a similar class of agents was used for all patients, the dosages of the anesthetic medicines were individually titrated.

Laparoscopic operations were performed utilizing four trocars with the standard American procedure. 14mmHg of pneumoperitoneum was made and kept up by intraperitoneal carbon dioxide (CO₂) insufflations with programmed insufflators.

Mean operating time was 68±18 minutes for the LC patients, determined as the span between intubation and extubation. Mean span of the pneumoperitoneum was 51±13 minutes. OC was performed by the same operating team by giving right subcostal incision. Monopolar electrocautery was utilized in gallbladders dissection from their liver beds in both categories. preoperative arterial blood pressure, oxygen saturation and pulse rates of the patients were intently observed. No arterial blood pressure alterations were noted in either group. No other drug was regulated to the patients earlier or after the task with the exception of i.v. anti-biotic agents (ceftriaxone) and tramadol for postoperative pain management. All patients were given normal saline and dextrose water for the initial 12 hours. Blood tests were taken from vein in the antecubital region of every patient preoperatively as a piece of routine pre-op preparation and 24 hours postoperatively for correlation of the hepatic enzymes level alterations. Patients who experienced LC were discharged on first postoperative day after blood tests were taken and all patients were encouraged to return for follow up.

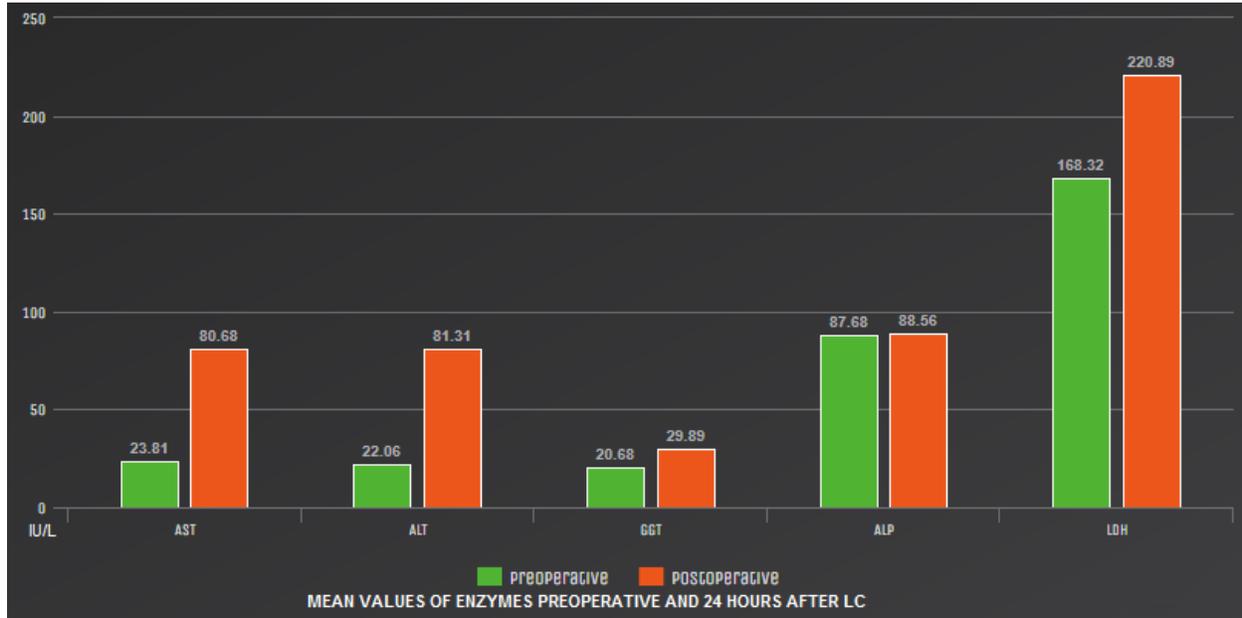
Biochemical investigations for enzymes were performed utilizing a similar analyzer. The accepted normal ranges for liver enzymes were; for AST 8-41 IU/L, for ALT 8-54 IU/L, for GGT 7-50 IU/L, for LDH 98-192 IU/L and for ALP 38-126 IU/L.

Enzyme levels were measured as a mean ± SD for both categories and for both before and after surgery values. The Student t test was used to assess the difference between LC and OC groups and the paired samples test was used to analyze the notable daily enzyme changes in the patients of LC group.

RESULTS:

No postoperative morbidity or mortality happened in any of the patients contemplated. All patients were hemodynamically stable amid the operations and none of them required any other drug than the arranged sedative convention. In the LC gathering, AST, ALT, GGT and LDH expanded essentially 24 hours after the

operation (Fig.1). Likewise, postoperative means for AST and ALT were practically triple raised regarding the preoperative mean and AST, ALT and LDH levels achieved a mean value over the upper limit point 24 hours after operation. No significant change was seen in ALP levels postoperatively.



(Fig.1) Mean values of enzymes Preoperative and 24 hours after LC

Mean AST, ALT, GGT, LDH and ALP levels before and 24 hours after the operation in the OC class happened are appeared Table II. The expansion of mean enzymes levels did not even achieve two-crease. What's more, postoperative mean dimensions of contemplated enzymes stayed in normal limits. At the

point when the enzymes changes were contrasted and the OC gathering, increment in AST, ALT and LDH were critical for LC gathering ($p=0.0001$ for every liver enzyme). GGT increment was likewise huge on the edge ($p=0.041$). Be that as it may, the adjustment in ALP levels was irrelevant (Table II).

Enzyme	Laparoscopic cholecystectomy group		Open cholecystectomy group (n=26)		p value of difference
	Preoperative	Postoperative (after 24h)	Preoperative	Postoperative (after 24h)	
AST	23.81 ± 6.56	80.68 ± 27.14	27.84 ± 7.37	41.39 ± 13.97	0.0001
ALT	22.06 ± 8.64	81.31 ± 22.18	25.62 ± 9.08	33.53 ± 12.69	0.0001
GGT	20.68 ± 9.25	29.89 ± 18.68	21.25 ± 7.87	25.27 ± 9.35	0.041
LDH	168.50 ± 12.98	220.89 ± 50.90	149.40 ± 11.45	176.75 ± 20.24	0.0001
ALP	87.68 ± 16.10	88.56 ± 10.21	78.03 ± 16.97	78.64 ± 19.84	0.524

All raised enzyme levels were found to come back to their normal dimensions after the operation in the LC group as by the biochemical tests performed on their subsequent visits. Whenever addressed, none of the patients whined about anything justifying future assessment.

DISCUSSION:

When considered as incidental, rise of liver enzymes, for example, AST and ALT after uncomplicated laparoscopic cholecystectomy has turned into a notable finding. Despite the fact that the clinical significance of these enzyme rises has not been

illuminated, transient hepatic breakdown was suspected in past investigations (3,4,7,8).

Halevy et al recommended expanded intraperitoneal pressure, pressing the liver by cranial withdrawal of gallbladder amid LC, burning of the liver bed for hemostasis, control of outer bile conduits and impacts of general anesthesia as conceivable reasons for height of certain liver enzymes (6). Nonetheless, liver withdrawal for better presentation, control of biliary tract for recognizing conceivable basic conduit stones, electrocauterization of the liver bed were routinely performed in OC also. We looked at the enzyme adjustments in LC patients with those in the OC patients who were given a similar sedative agents and same anti-infectious agents to even out the conceivable impacts of these medications on hepatic capacity. The main recommended factor that may cause these adjustments in our investigation was the raised intraperitoneal pressure made amid LC.

Knowing the fact that normal portal venous pressure is between 7-10mmHg and about 50% of the hepatic blood stream originates from the portal venous framework, 14mmHg of pneumoperitoneum made with CO₂ is expressed to be the real reason for transient hepatic ischemia amid LC (2,4,9,10,12). Jakimowicz et al demonstrated that 14mmHg of intraperitoneal pressure decreased the gateway blood stream by 53% utilizing the Doppler procedure (9). Richter et al, in a trial rodent model, showed that pneumoperitoneum under 12-15mmHg of pressure diminishes typical hepatic blood stream and causes diverse degrees of ischemia in liver tissue (12). Hasukic et al, in their randomized investigation contrasting the impacts of low and high weight pneumoperitoneum on liver capacities, expressed that AST and ALT heights were fundamentally higher in patients operated under high intraabdominal pressure (14mmHg) by pneumoperitoneum than those under low weight (7mmHg) (4). In an investigation looking at hepatic enzyme modifications in LC, gasless LC and LC under low pressure (beneath 10mmHg) pneumoperitoneum, Giraudo et al found huge enzyme level ascents after LC that are not seen after gasless or low pressure LC, underlining the outright impact of intraperitoneal pressure any doubt on hepatic perfusion by methods for enzyme level changes (7). Morino et al researched the term of pneumoperitoneum at consistent pressure and found that when the span of activity surpasses an hour, rises in AST and ALT levels become increasingly huge (8).

Studies comparing the enzyme change between LC a non-cholecystectomy laparoscopic operations were also directed to analyze impacts of a pneumoperitoneum on these progressions all the more precisely, barring the other possible factors, for example, liver tissue trauma and biliary tract controls that may meddle with results. The equivalent noteworthy enzyme level rises were additionally watched in laparoscopic colectomy patients recommending that a pneumoperitoneum assumes the key factor in transient hepatic ischemia causing enzyme rises (8,10).

Preoperative and postoperative dimensions of AST, ALT, GGT, ALP, LDH, PT and total bilirubin have been examined in different investigations to decide the physiological premise of hepatic breakdown (2-7,13). Anyway critical heights after LC contrasted and OC have been characterized for just AST and ALT levels. Time controlled examinations have demonstrated that these enzyme increase keep going for around 3 days postoperatively and the essential among LC and OC values blur away following 2 days (4,8,10).

We researched the adjustments in AST, ALT, GGT, LDH and ALP levels previously and 24 hours after the operations in LC patients and contrasted this change and the OC patients who were anesthetized with a similar convention. AST, ALT, GGT and LDH levels were raised altogether 24 hours after LC. In LC patients, postoperative mean estimations of AST, ALT and LDH surpassed the furthest reaches of typical extents. Nonetheless, postoperative enzyme levels were inside the typical ranges in patients who experienced OC. At the point when contrasted and the OC patients the ascent in AST, ALT, GGT and LDH levels were as yet critical for the LC group. Notwithstanding AST and ALT, we found that GGT and LDH were additionally impacted after LC. LDH heights may be because of high intraperitoneal pressure making comparable impacts on intestines by diminishing the mesenteric venous stream causing passive venous blockage. Nonetheless, elevation in LDH levels needs further examination utilizing target screening tests before assuming such a conclusion.

Nevertheless, in otherwise healthy patients, these hepatic enzyme modifications saw after LC have not been appeared to be clinically significant (2,3,8,). We likewise did not encounter any issues or entanglements at control visits to warrant further examination in LC performed patients having enzyme elevation postoperatively. Despite the fact that laparoscopic cholecystectomy is considered as a high hazard system

in patients with decompensated cirrhosis (Child-Pugh class C), it isn't certain whether the expanded morbidity in these patients is a consequence of a pneumoperitoneum (12).

CONCLUSION:

To finish up, our present investigation showed that AST, ALT, GGT and LDH increase could happen after LC. Indeed, even three-fold increments could be noted in AST and ALT levels. At the point when investigated together with the information gathered from past studies, these progressions might be credited to the decrease of portal venous stream under high pressure of a pneumoperitoneum. There has been no verification to express that these enzyme changes are mirroring a genuine hepatic or other organ ischemia in generally solid patients, however specialists ought to be careful before planning to perform LC in patients with known hepatic inadequacy. LC performed under a low weight pneumoperitoneum or gasless LC utilizing stomach divider retractors may be practical in these patient populaces.

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