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General Surgery

LAPAROSCOPIC CHOLECYSTECTOMY: ALTERATIONS IN LIVER FUNCTION TESTS POST-OPERATIVELY

Dr Shweta Kumari Junior Resident, Department of Surgery, PMCH, Patna

Dr.(Prof) Vimal Mukesh Professor, Department of Surgery, PMCH, Patna

Dr. Md Sarfaraz Alam Assistant Professor, Department of Surgery, PMCH, Patna

Dr Md. Habibullah Ansari* Junior Resident, Department of Surgery, PMCH, Patna *Corresponding Author

ABSTRACT

Objective: This study was done to assess the alteration in liver function test following laparoscopic cholecystectomy post-operatively.

Material and Methods: A prospective study conducted on 182 patients reported in surgery OPD Patna Medical College and Hospital, Patna from July 2017 to June 2018 with cholelithiasis. All the patients underwent laproscopic cholecystectomy. Both pre-operative and post-operative liver function test was done.

Results: Out of 182 patients, 46 were male and 136 were female patients. The mean age was 32.3 years. The level of serum ALT and AST increased significantly within the first 24 hours following operation, AST showed mild increase in 36% of the cases while ALT increased in 12% of the cases. Total bilirubin and direct bilirubin showed a slight increase within the first 24 hours following operation in 2% of the patients. Alkaline phosphatase increased in 10% of the patients.

Conclusion: Laproscopic Cholecystectomy lead to transient but reversible significant hepatic enzymes alterations. These alterations are self limited and return to reference values within 7 days of operation. The cause of alteration might be liver tractions, electrocoagulation's and manipulation of duct.

KEYWORDS : laproscopic cholecystectomy, liver function test, enzymes

INTRODUCTION:

Laparoscopic cholecystectomy, a minimal-access approach surgery for the removal of the gallbladder, was first performed by Mouret in 1987.[1] Laparoscopic cholecystectomy offers many advantages that include a marked reduction in hospital stay and decreased cost. It has also been observed, from several studies involving over 4000 patients undergoing laparoscopic cholecystectomy, that the complication rate is less (about 4%) with the procedure; conversion to open laparotomy occurs in 5% of patients; the death rate is remarkably low (i.e., 0.1%); bile duct injuries are unusual (i.e., 0.2-0.5%). Because of these distinct advantages, the procedure has gained worldwide popularity and has now become one of the most common operations performed in general surgical practice.

Laparoscopic surgery is performed by the insufflation of gas into the peritoneal cavity. Carbon dioxide is the standard gas used, largely because it does not support combustion. After absorption from the peritoneum, it is readily excreted via the lungs.[2] Carbon dioxide is 20 times more soluble in serum than room air or oxygen and has been shown to be absorbed 32 times more quickly than room air when used for double-contrast barium enemas.[3] Pneumoperitoneum is likely to be smaller in volume and shorter in duration after laparoscopic cholecystectomy than after open laparotomy. During the most cases of the surgery, a pneumoperitoneum of 12-14 mm Hg CO2 is established.[4-6]

Although laparoscopic cholecystectomy offered many advantages over laparotomy, new concerns came-up regarding the effects of pneumoperitoneum on the cardiovascular and respiratory system. These changes are well tolerated even in older and more debilitated patients and except for a slight increase in the incidence of cardiac arrhythmias, no other significant cardiovascular complications occur.[7] One of the important hemodynamic changes is the transient reduction in hepatic blood flow caused by a pneumoperitoneum. The pressure of the created pneumoperitoneum and its duration was shown to influence the degree of hepatic ischemia. This results in elevations in liver enzymes alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase, gamma-glutamyl transferase (GGT), bilirubin, and international normalized ratio (INR). Although laparoscopic cholecystectomy is associated with transient elevation of liver enzymes, the disturbances after the procedure are self-limited and not associated with any morbidity in patients with normal liver function tests. This study has been undertaken to know the changes in LFTs after Laproscopic Cholecystectomy, the incidences of such change, there relation to age, sex, duration of surgery and to know the clinical significances of such disturbances.

MATERIALS AND METHODS:

All the patients admitted from surgery OPD in Patna Medical College and Hospital, Patna diagnosed to have cholelithiasis was included in the study. Any patient with pre-operative abnormality in liverenzymes, suspected chronic liver diseases, common bile duct pathology, conversion to open cholecystectomy, Hematological disorders was excluded.

Investigations were done to assess the fitness of patients for surgery. All patients were given pre-operative prophylaxis with Inj. Ceftriaxone 1gm IV, stat. Regional anesthesia was administered to patients and Laproscopic cholecystectomy was done.

Post-operatively, Inj. Diclofenac was given as analgesia for 48 hours. Post-operatively Inj. Ceftriaxone 1gm IV, BD and Inj. Metronidazole 100cc, TDS was given for 48 hours. The liver function tests were further done 24hour later, and in some patients, the liver function test was repeated to monitor liver function. Along with, adverse events were noted in all the patients. Finally, the duration of hospital stay was noted.

RESULTS:

We studied 182 patients who underwent laparoscopic chole cystectomy from July 2017 to June 2018. Out of 182 patients, 46 were male and 136 were female patients. The mean age was 32.3 years.

SL. NO	PARAMETERS	PRE-OPERATIVE VALUES	POST-OPERATIVE VALUES	DIFFERENCE
1	TOTAL BILIRUBIN	0.6 mg/dl	0.9 mg/dl	0.3
2	ALT	16 U/L	34 U/L	18
3	AST	46 U/L	54 U/L	8
4	GGT	25 U/L	41 U/L	16
5	PROTIEN	7.1 g/dl	7.2 g/dl	0.1
6	ALK. PHOSPHATASE	170	172	2

Bilirubin (total) pre-operative was 0.6 mg/dl, increased 24 h after surgery to 0.90 mg/dl. GGT increased from 25 U/l to 41 U/l. AST and ALT was found to be significantly elevated from 46 U/l to 54 U/l and from 16 U/l to 34 U/l, respectively. Alkaline phosphatase and protein did not show any elevation, the pre-operative values were 170 U/l and after 24 h was 172 U/l. and 7.1g/dl to 7.2g/dl respectively.

DISCUSSION:

Laparoscopic cholecystectomy, a minimal-access approach surgery, offers many advantages that include a markedly reduction in hospital stay and decreased cost. For over 25 years, laparoscopic cholecystectomy has replaced Open Cholecystectomy in the management of benign gallbladder diseases and has become the gold standard for symptomatic cholelithiasis. It is also the procedure of choice for most patients referred for elective cholecystectomy. As with any surgical procedure, it is not 100% safe and free from complications. Retained stones and duct injuries are among the serious complications related to this procedure. Duct injuries are not easy to recognize during surgery and are usually detected postoperatively.[8]

Although laparoscopic cholecystectomy offered many advantages over laparotomy, new concerns arose regarding the effects of a pneumoperitoneum on the cardiovascular and respiratory system. These changes are well tolerated even in older and more debilitated patients and except for a slight increase in the incidence of cardiac arrhythmias, no other significant cardiovascular complications occur.

One of the important hemodynamic changes is the transient reduction in hepatic blood flow caused by the pneumoperitoneum. The pressure of a created pneumoperitoneum and its duration was shown to influence the degree of hepatic ischemia. This results in changes in liver enzymes ALT, AST, alkaline phosphatase, GGT, Bilirubin, and protein levels. Apart from the general assessment of liver function, LFTs are generally used postoperatively as an indicator of duct obstructions and iatrogenic injuries. The sensitivity of liver function tests in predicting biliary obstruction has been shown to be high.

An elevation of the liver enzymes is not always suggestive of retained stones. In earlier studies, a change in liver function tests of up to 70% has been reported with no adverse clinical outcome.[9]

Early elevation of LFTs soon after surgery should not cause major concern as they usually return to normal without intervention. In the case of laparoscopic cholecystectomy, close monitoring by performing serial biochemical analyses can be done when there is increased suspicion of an iatrogenic duct injury or slipped stone as indicated by elevated levels of alkaline phosphatase and bilirubin.[10]

In our study, the level of change of AST, ALT, and GGT was high. There were moderate changes in the postoperative Bilirubin levels, and the level of ALP and protein remained almost unchanged.

Although laparoscopic cholecystectomy is associated with transient elevation of liver enzymes, the disturbances after laparoscopic cholecystectomy are self-limited and not associated with any morbidity in patients with a normal liver function[11]. The derangement of the liver functions had no adverse clinical event. All the values were found to have returned to normal at the follow-up after 3 weeks.

CONCLUSION:

Liver function tests include AST, ALT, GGT, ALP, Bilirubin and protein. Raised values of AST, ALT, and GGT represent hepatocellular dysfunction. Any rise in the values of ALP and Bilirubin suggests obstructions to the flow of bile and may have clinical manifestations, warranting more investigations before a surgery. Surgical manipulations, diathermy, patient position, arterial injury and CO_2 pneumoperitoneum are the contributory factors for liver enzymes changes following Laproscopic cholecystectomy. These changes return to normal in 3-4 days after procedure and they have no clinical consequences in patients with normal hepatic function but they may still cause worry to the surgeon regarding the integrity of biliary tree. There has been no proof to state that these enzyme changes are reflecting a true hepatic or other organ ischemia in otherwise healthy patients since all patients recovered without any sequlae within 5 days. However, surgeons should be cautious before planning to perform laparoscopic cholecystectomy in patients with known hepatic insufficiency. Laparoscopic cholecystectomy performed under a low-pressure pneumoperitoneum or gasless laparoscopic cholecystectomy using abdominal wall retractors might be feasible in these patient populations.

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