



IS THERE ANY SIGNIFICANT POST OPERATIVE CHANGES IN LIVER FUNCTION TEST AFTER LAPAROSCOPIC VS OPEN CHOLECYSTECTOMY? A SINGLE INSTITUTION STUDY

General surgery

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ABSTRACT

Cholecystectomy is the surgical removal of the diseased gallbladder. Cholecystectomy is a common treatment of symptomatic gallstones and other gallbladder conditions. Cholecystectomy can be performed either laparoscopically, or by an open surgical technique. Pain and complications caused by gallstones are the most common reasons for removal of the gallbladder. Gallbladder can also be removed in order to treat biliary dyskinesia or gall bladder carcinoma. With recent advances in minimal access surgery, laparoscopic cholecystectomy is entering an era where it is considered an outpatient procedure. Elevated liver function test (LFT) are common soon after surgery. The elevation is usually transient and the LFT return to normal levels without any intervention. This study aims to evaluate the effect of laparoscopic and open cholecystectomy on liver functions of the patients compared to the preoperative status.

KEYWORDS

cholecystectomy, liver function test.

Material and methods

Study was conducted in a series of 100 cases of chronic calculus cholecystitis with or without choledocholithiasis from October 2018 – August 2020.

Inclusion criteria:

1. Patient presenting with signs & symptoms of acute / chronic cholecystitis
2. USG diagnosed cases of cholecystitis with/without calculi & Patient with jaundice.

Exclusion criteria:

1. Individuals in which pre existing disease states dominate or the presence of which may adversely affect the outcome have been excluded.
2. Medically unfit patients with co-morbid conditions.
3. Suspected cases of Carcinoma gall bladder.
4. Patients with any preoperative abnormal LFT or preoperative history of liver disease.

Result and analysis

Table 1 shows the distribution of study subjects in Laparoscopic Cholecystectomy group according to the change in liver function parameters. Serum bilirubin level at closure was normal in 62.8% patients. 23.5% patients had normal serum bilirubin levels and in 13.7% cases it was elevated. On the 1st postoperative day serum bilirubin level was normal in 78.4% patients while on 7th postoperative day all the patients (100%) showed normal serum bilirubin levels. Serum AST levels showed no change in 19.6% patients. In 15.7 patients the serum AST level was within the normal range and in maximum 64.7% cases it was elevated. On the 1st postoperative day we found no change in serum AST level in 15.7% patients. On 7th postoperative day all the patients (100%) showed normal serum AST level. Serum ALT level at closure was normal in 39.2% patients. In 7.9% patients the serum ALT level was within the normal range and in 52.9% cases it was elevated. On the 1st postoperative day no change in serum ALT level was seen in 29.4% patients. On 7th postoperative day all the patients (100%) showed normal serum ALT levels. No change in serum ALP in 88.4% patients was observed. 11.7% patients had normal serum alkaline phosphate levels and in 3.9% cases it was elevated. On the 1st postoperative day serum alkaline phosphate level were normal in 88.4% patients. On 7th postoperative day all the patients (100%) showed normal serum alkaline phosphate levels. Serum albumin level in all cases showed no changes.

Table 1. Analysis of data showing liver function test of Laparoscopic Cholecystectomy

Test	Preop level (within normal range)	At closure	First post op day	Seventh post op day (within normal range)
Bilirubin	27(100%)	21(77.8%)	3(11.1%)	3(11.1%)
AST	27(100%)	20(74.1%)	7(25.9%)	0
ALT	27(100%)	21(77.8%)	4(14.8%)	2(7.4%)

		No change	Change (increase)		No change	Change (decrease)		
			Within normal range	More than normal range		Within normal range	More than normal range	
Bilirubin	51(100%)	32(62.8%)	12(23.5%)	7(13.7%)	40(78.4%)	8(15.7%)	3(5.9%)	51(100%)
AST	51(100%)	10(19.6%)	8(15.7%)	33(64.7%)	8(15.7%)	10(19.6%)	33(64.7%)	51(100%)
ALT	51(100%)	20(39.2%)	4(7.9%)	27(52.9%)	15(29.4%)	3(5.88%)	33(64.8%)	51(100%)
Alkaline phosphate	51(100%)	45(88.4%)	4(11.7%)	2(3.9%)	45(88.4%)	4(11.7%)	2(3.9%)	51(100%)
Albumin	51(100%)	51(100%)	0	0	51(100%)	0	0	51(100%)

Table 2 shows the distribution of study subjects in Minilap Cholecystectomy group according to the change in liver function parameters. Serum bilirubin level at closure was normal in 77.8% patients. 11.1% patients had normal serum bilirubin levels 11.1% cases had elevated levels. On the 1st postoperative day serum bilirubin level were normal in 77.8% patients while on 7th Post operative day all the patients (100%) had serum bilirubin levels. Serum AST level were normal in maximum 74.1% patients. In 25.9% patients the serum AST level was within the normal range. On the 1st postoperative day we found no change in serum AST level in 14.1% patients. On 7th postoperative day all the patients (100%) showed normal serum AST levels. In terms of serum ALT level on closure we observed no change in 77.8% patients. While in 14.8% patients the serum ALT level was within the normal range and in 7.4% cases it was elevated. On the 1st postoperative day we found no change in serum ALT level in 63% patients. However, on 7th postoperative day all the patients (100%) showed serum ALT level within normal range. Serum alkaline phosphate levels were normal during closure. On 1st postoperative day 92.6% patients had normal serum alkaline phosphate levels. On 7th postoperative day all the patients (100%) had normal serum alkaline phosphate levels. Serum albumin levels in all cases were normal.

Table no.2 Analysis of Data showing Liver Function test of Minilap Cholecystectomy

Test	Preop level (within normal range)	At closure		First post op day		Seventh post op day (within normal range)
		No change	Change (increase)	No change	Change (decrease)	
Bilirubin	27(100%)	21(77.8%)	3(11.1%)	3(11.1%)	21(77.8%)	6(22.2%)
AST	27(100%)	20(74.1%)	7(25.9%)	0	20(74.1%)	5(18.5%)
ALT	27(100%)	21(77.8%)	4(14.8%)	2(7.4%)	17(63%)	7(25.9%)

Alkaline phosphatase	27(100%)	27(100%)	0	0	25(92.6%)	2(7.4%)	0	27(100%)
Albumin	27(100%)	27(100%)	0	0	27(100%)	0	0	27(100%)

Table 3 shows the distribution of study subjects in Conventional Cholecystectomy group. Serum bilirubin levels were normal on closure in 81.8% patients. In 18.2% patients the serum bilirubin levels were normal. On the 1st postoperative day serum bilirubin level were normal in 90% patients while on 7th postoperative day all the patients (100%) showed normal serum bilirubin levels. Serum AST was normal. In 9.1% patients the serum AST level was normal and in 9.1% patients it was elevated. On the 1st postoperative day serum AST levels were normal in 63.6% patients. On 7th postoperative day all the patients (100%) showed normal serum AST levels. Serum ALT levels on closure were normal in 68.2% patients. In 22.7% patients the serum ALT level was normal and in 9.1% cases it was elevated. On the 1st Post operative day serum ALT level in 63.6% patients were normal. On 7th postoperative day all the patients (100%) showed serum ALT level within normal range. Serum albumin was normal.

Table no. 3 Analysis of Data showing Liver Function Test of conventional cholecystectomy

Test	Preop level (within normal range)	At closure			First post op day			Seventh post op day (within normal range)
		No change	Change (increase)	Change (decrease)	No change	Change (increase)	Change (decrease)	
Bilirubin	22(100%)	18(81.8%)	4(18.2%)	0	20(90%)	2(9.1%)	0	22(100%)
AST	22(100%)	18(81.8%)	2(9.1%)	2(9.1%)	14(63.6%)	5(22.7%)	3(13.7%)	22(100%)
ALT	22(100%)	15(68.2%)	5(22.7%)	2(9.1%)	14(63.6%)	2(9.1%)	6(27.3%)	22(100%)
Alkaline phosphatase	22(100%)	22(100%)	0	0	22(100%)	0	0	22(100%)
Albumin	22(100%)	22(100%)	0	0	22(100%)	0	0	22(100%)

Discussion

Cholecystectomy is a common treatment of symptomatic gallstones and other gallbladder conditions.[1] Cholecystectomy can be performed either laparoscopically, or by an open surgical technique.[2] Pain and complications caused by gallstones are the most common reasons for removal of the gallbladder.[3] Gallbladder can also be removed in order to treat biliary dyskinesia or gall bladder carcinoma.[4] There were 51 patients who underwent laparoscopic cholecystectomy and 49 patients underwent open cholecystectomy. They were randomly chosen. All laparoscopic cholecystectomies (LC) were done with four ports. Minilap cholecystectomy (MC) – incision length 4 – 6 cm (Loke M, 1995). Conventional cholecystectomy (CC) – incision length was more than 10 cm (Loke M, 1995). Serum bilirubin, AST and ALT levels were raised significantly in laparoscopic cholecystectomy in comparison to open cholecystectomy from preoperative normal level. Level of serum alkaline phosphatase elevation was relatively less. All the deranged parameters normalized within seven days after operation. Study conducted by Nasir Zaheer Ahmad (2015) [5] A total of 355 patients were retrospectively analyzed by examining the LFTs the day before, the day after, and 3 weeks after the surgery. Alterations in the serum AST, ALT, and GGT were seen on the first postoperative day. An overall disturbance in the LFTs was seen in more than two-thirds of the cases. Repeat LFTs performed after 3 weeks on follow-up were found to be within normal limits. Study was conducted by Datta Swapan Kumar et al (2016). [6] Level of serum alkaline phosphatase elevation was relatively less. All the deranged parameters normalized within seven days after operation. The increase of AST and ALT was statistically significant and correlated both to the level and duration of pneumoperitoneum (Morino M et al, 1998). [7] Study was done by Ranjan Gupta et al. LFT was obtained preoperatively and on postoperative Days 1 and 7. Liver enzyme activities were significantly elevated in the HPLC group compared with the LPLC group. A study conducted by Department of Surgery, Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Haryana, India; (2015) India. In LC patients, there were rise in the levels of serum bilirubin, AST and ALT after 24 hrs of surgery from the

pre operative value and then again fall was noted (near to normal value) after 72 hrs of surgery except in that of ALP. ALP levels showed slight fall after 24 hrs of surgery and then slight rise after 72 hrs which was within the normal limit. In OC patients, there were slight variations in the liver enzymes (which were within the normal range). Study conducted in King Abdullah University Hospital, Jordan University of Science & Technology (2020) there was no statistical difference between the preoperative and 1-day postoperative values for ALP, direct bilirubin and GGT. First post operative values for total bilirubin, ALT and AST were significantly higher than the preoperative values. All patients had normal values of LFTs after 1 week postoperatively.

Conclusion.

A significant unexplained disturbance in liver function occurs in laparoscopic cholecystectomy. Reason for this is the pneumoperitoneum related raised intra-abdominal pressure. Larger study group is necessary to obtain more statistically significant result. A comparative study using laparoscopy without gas would further be a pointer to pneumoperitoneum being the cause for alteration of liver function. The duration and level of intra-abdominal pressure are responsible for changes of hepatic function during laparoscopic procedures. Although no symptom appeared in patients with normal hepatic and renal function, low intra-abdominal pressure is recommended and insufflations time should be kept as short as possible in hepatic or renal compromised individual. The patients with severe hepatic or renal failure should not be subjected to prolonged laparoscopic procedures.

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