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CLINICOPATHOLOGICAL STUDY OF A CRITICAL EVALUATION ON LIVER FUNCTIONS IN POSTCHOLECYSTECTOMY CASES

General Surgery

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ABSTRACT

Introduction: Gallstones [cholelithiasis] are the most common biliary pathology. It is estimated that gallstones affect 10-15% of the population in Western societies. They are asymptomatic in majority of cases (780). In the UK, the prevalence of gallstones at the time of death is estimated to be 17% and may be increasing. Approximately 1-2% of asymptomatic patients will develop symptoms requiring surgery per year, making cholecystectomy one of the most common operations performed by general surgeon.

Aims and objectives: To investigate the clinico-pathological analysis of calculous cholecystitis in relation to liver function tests in all pre-operative and post operative cases. Patients are required to undergo liver function test prior to and after their line of management in order to facilitate the investigation. Patients with cholelithiasis as the main cause must undergo a cholecystectomy either open or laparoscopic. Comparative evaluations of derangement of hepatic parameters in the preoperative period of patient undergoing different forms of gallbladder operations (conventional or laparoscopic cholecystectomy).

Materials and methods: The study was conducted in a series of 60 cases of chronic calculus cholecystitis. Patients were selected from surgical outpatient Department of Darbhanga Medical College and Hospital. Laheriasarai. The tenure of study was from April 2019 to December 2020.

Result: The above study also showed 82% increase in ALT level. In our study ALT was increased in 60 % patients (6% within normal range and 54% more than the normal range) at deflation and 70% patients (4% within normal range and 66% more than the normal range) on the second postoperative day in LC. In MC and CC it was about 16-32% and 32-40% respectively during the same period.

Conclusion: Ultrasonography was the mainstay in confirmatory diagnosis of gall bladder pathologies and the findings correlated well with clinical findings in almost all the cases. It not only revealed the evidence of gall stones in gall bladder with signs of acute or chronic cholecystitis but also other changes in the common bile duct, liver, pancreas and so on.

KEYWORDS

laparoscopic cholecystectomy

INTRODUCTION

Gallstones [cholelithiasis] are the most common biliary pathology. It is estimated that gallstones affect 10-15% of the population in Western societies. They are asymptomatic in majority of cases (780). In the UK, the prevalence of gallstones at the time of death is estimated to be 17% and may be increasing. Approximately 1-2% of asymptomatic patients will develop symptoms requiring surgery per year, making cholecystectomy one of the most common operations performed by general surgeon. Gallstones are quite common in the general populations and women are affected more often in the ratio of 4:1. It is more common in fat, fertile females in their forties. The composition of gallstones varies considerably but the major components are cholesterol, bile pigments and calcium. Gallstones also include iron, carbohydrates, phosphorous, proteins, cellular debris, mucous and carbohydrates.

Cholecystitis is defined as either an acute or a chronic inflammation of the gall bladder.

The main cause involves cholelithiasis and blockage of the cystic duct due to gall bladder stone migration. This leads to inspissations of bile, bile stasis and secondary infection by gut organisms, predominantly E. coli, S. typhi and Bacteroides species.

During investigation of a case of cholecystitis, it is often found that there is significant alteration of liver functions which produces symptomatic and sometimes asymptomatic biochemical changes. It is also a fact that in post cholecystectomy patients, liver functions are regained which can be estimated by examination of liver function tests. Symptomatically the patient is also relieved of many complaints experienced before operation. The incidences of complications owing to gall bladder stones are also reduced.

For the last 150 years, morbidity and mortality for surgical procedures have long been accepted as part and parcel of the therapeutic process. From the late 1980s, however, it has become evident that less invasive interventional methods have reduced morbidity rates.

The concept of minimally invasive surgery aims to “minimize the trauma of any interventions process but still achieve a satisfactory therapeutic result”. The key feature of minimal access surgery is that it produces significantly less trauma than conventional open procedures (Malley C and Cunningham A.J 2001) [1].

Laparoscopic cholecystectomy has certainly revolutionised general surgery and in a very short span time has become the gold standard in gall bladder surgery. Born in secrecy and developed under an atmosphere of scepticism and hostility, laparoscopic cholecystectomy triumphed and was quickly accepted (R. David Rosin 1997)[2]

The widespread acceptance of this technique had been largely propelled by public awareness that laparoscopic cholecystectomy is associated with less pain, quicker return to normal activities and better cosmetic results. Previously it was applied to only young, healthy patient. However with growing surgical expertise and continuing improvements in technology, laparoscopic cholecystectomy is being performed on a much broader patient population like in elderly patients with multiple co morbid conditions, the very young, morbidly obese as well as on pregnant women.

The procedure of laparoscopic cholecystectomy operation involves the creation of an artificial pneumoperitoneum with the assistance of carbon dioxide insufflation to minimise visceral injury during trocar insertion, it also allows for the easy manoeuvrability of instruments and also to enable the use of diathermy.

The inert nature of carbon dioxide gas brings forth certain patho-physiological changes related to increased intra-abdominal pressure due to pneumoperitoneum. Exaggeration of these effects is also related to change of posture frequently practised in laparoscopic operation. These involve major organ system with particular attention on respiratory, cardiovascular, hepatic and urinary systems due to compression effects as well as peritoneal reabsorption of carbon dioxide.

The risks associated with general anaesthesia can be compounded by the physiologic changes induced by pneumoperitoneum and patient positioning, in already compromised patients preoperatively.

This study was carried out in those patients who has undergone open and laparoscopic cholecystectomy to ascertain the changes in liver function in post cholecystectomy patients as compared to pre operative status.

AIMS AND OBJECTIVES

To investigate the clinico-pathological analysis of calculous cholecystitis in relation to liver function tests in all pre-operative and post operative cases.

Patients are required to undergo liver function test prior to and after their line of management in order to facilitate the investigation. Patients with cholelithiasis as the main cause must undergo a cholecystectomy either open or laparoscopic.

For this study, both sets of liver function tests will be compared and analysed.

Besides demographics, patients were asked about the symptoms they had in the preoperative period. They were then interviewed in the postoperative period for improvement in their symptoms at an interval of one month.

Therefore in brief:

A. Assessment of hepatic status in pre- operative patients in comparison with postoperative patients.
B. Comparative evaluations of derangement of hepatic parameters in the preoperative period of patient undergoing different forms of gallbladder operations (conventional or laparoscopic cholec ystectomy).
C. To evaluate the usual time required for return of deranged hepatic function, if any, to normal levels.
D. To analyse the outcome of cholecystectomies in patients with symptomatic cholelithiasis for improvement in the preoperative symptoms.

MATERIALS AND METHODS

The study was conducted in a series of 60 cases of chronic calculus cholecystitis.

Patients were selected from surgical outpatient Department of Darbhanga Medical College and Hospital. Laheriasarai. The tenure of study was from April 2019 to December 2020.

A detailed clinical history was taken from every patient to ascertain the diagnosis of chronic calculus cholecystitis.

Particular features noted were:

- Type of pain - character, site, radiation, duration, relation with food and aggravating/ relieving factors.
- H/O jaundice and itching
- H/O Fever with chill and rigor (cholangitis)

Clinical examination was done – general survey, local and systemic examination to confirm chronic calculus cholecystitis and to exclude other possibilities. After clinically confirming the case, investigations were carried out (imaging and blood tests).

Ultrasonography of whole abdomen was done to confirm the diagnosis. It demonstrated presence of calculi in the gall bladder, size of gall bladder, peri-cholecystic inflammation, thickness of the wall, width of the common bile duct and if any stone /sludge was present in it. It is also informative regarding the condition of liver (i.e. echogenicity and intrahepatic biliary radicals) and both kidneys (i.e. echogenicity etc).

Routine blood tests were conducted (e.g. Haemoglobin percentage, total count and differential count of WBC, ESR and Blood sugar).

Liver function tests (serum bilirubin, AST, ALT and albumin) were done for all cases to exclude any liver disorder or CBD obstruction.

Renal function tests (routine urine examination, serum urea and creatinine, creatinine clearance) were done in all patients to exclude any renal compromise.

X- ray chest and ECG were also done as part of routine investigation.
Patients selected for the study were those who were

- Symptomatic
- With no h/o jaundice
- No h/o any urinary trouble
- USG showed gallstone with normal CBD diameter with or without presence of calculi in CBD.
- Liver function test reports were within normal range.
- Renal function test reports were also within normal range.

There were no specific criteria for selection of patients for laparoscopic (20 cases), and conventional (40 cases) cholecystectomy. They were randomly chosen from the above groups. Patients are required to undergo liver function tests prior to and after their line of management in order to facilitate the investigation. Patient with cholelithiasis as the main cause has undergone a cholecystectomy.

Preoperatively prophylactic antibiotic -ceftriaxone was given routinely. Every patient was catheterized under strict asepsis just before the starting of operation. Operations were conducted under general anaesthesia. Drugs used were thiopentone sodium, succinylcholine, long acting muscle relaxant, atropine, neostigmine & N2O etc. No hepatotoxic drug like halothane was used (patients were excluded from the study where halothane was used by compulsion). Throughout the operation time we tried to maintain uniform rate and type of fluid infused to the patient as far as possible.

Patients were followed up at regular intervals (upto 1 month) and were queried about persistence of preoperative symptoms or appearance of new signs & symptoms and were managed accordingly.

EXCLUSION CRITERIA

1. Individuals in which other 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 liver function test or preoperative history of jaundice.
5. Patients with bilioenteric fistula and those who developed major complications after cholecystectomy, requiring prolonged hospitalisation, such as biliary leak requiring hepatic jejunostomy, pancreatitis and major collections requiring laparotomy were also excluded from the study.

RESULTS AND DISCUSSION

In our study there is increased incidence of the disease in the age group of 31 – 40 years (40%) and 41 – 50 years (26%). This finding is almost consistent with the figures arrived at by Bateson, 1984 in a study conducted by him.

Bateson, 1984 [3] have arrived at a female: male ratio which varies between 3:1 to 5:1. In our study which covered 60 patients there were 48 females and 12 males, thus arriving at F: M ratio of 4:1.

In this study, 46% had weights between 51 – 60 kg and 38% had weights in the range of 41 – 50 kg. Only 6% weighed equal to or less than 40 kg and about 10% had weights over 60 kg.

Liver function tests were conducted preoperatively. All patients in the study had their preoperative liver function tests within normal range. These tests were repeated at completion of operation, on the second postoperative day and on the seventh postoperative day.

Andrei VE et al [4] conducted a study in 1998 showed elevation of bilirubin in about 5% cases in open cholecystectomy and 9% in laparoscopic cholecystectomy (LC). In our study elevation of bilirubin was about 16% in conventional cholecystectomy (CC), but in laparoscopic cholecystectomy it was about 36% (amongst them 24% was within normal range and 12% was more than the normal range) and 20% (amongst them 14% was within normal range are 6% more than the normal range) at deflation and on the second postoperative day, respectively.

Halevy et al [5] conducted a study in 1994, revealed elevation of AST in 73% patients in laparoscopic cholecystectomy. In out study it was about 80% (14% within normal range and 66% more than the normal range) at deflation and 84% (20% within normal range and 64% more than the normal range) on the 2nd postoperative day in comparison to 20% - 40% in CC respectively.

The above study also showed 82% increase in ALT level. In our study

ALT was increased in 60 % patients (6% within normal range and 54% more than the normal range) at deflation and 70% patients (4% within normal range and 66% more than the normal range) on the second postoperative day in LC. In MC and CC it was about 16-32% and 32-40% respectively during the same period.

Alkaline phosphatase had increased in our study in about 10% of patients in LC, 8% and 0% in CC. Andrei VE et al [4] in 1998 showed 4% and 0% in laparoscopic and open cholecystectomy respectively.

In patients who had abnormal liver function tests, were subjected to repeat measurements of the same on seventh postoperative day. In all cases abnormal values had returned to baseline values.

Serum albumin level was always within normal range in LC and CC.

The results indicate that a major proportion of pre-operative symptoms associated with gall stones were relieved after cholecystectomy. However, as reported earlier, the impact on individual symptoms remains variable. 96.51% of patients had complete relief from pain abdomen, 52.81% of patients got relief from nausea, 23.51% got relief from vomiting,45.69% got relief from dyspepsia, 49.54% got relief from fatty food intolerance, 4.59% got relief from flatulence, 4% got relief from back pain and 16% of the patients were relieved of heartburn. 23.88% of patients were completely free of all preoperative symptoms at the one month post-operative follow up session. A previous study reported similar effects of cholecystectomy.Around 12% percent patients had de novo development of one or more new symptoms. Analysis of symptom specificity has demonstrated that colicky pain in the right upper quadrant (biliary colic) associated with gallstones is completely relieved by cholecystectomy. Similarly, nausea, vomiting and heartburn are symptoms related to gall stones and are mostly relieved by removal of gall bladder. Our study found similar results. The resolution of heartburn after cholecystectomy is significant as this suggests that the symptom usually attributed to gastro-oesophageal reflux can be a manifestation of gallstone disease.

Several studies have reported that dyspepsia and fatty food intolerance are only partly relieved by cholecystectomy, raising doubts whether they are directly related to the gallstones. In the present study, we found that the fatty food intolerance was markedly improved after surgery. However, dyspepsia still persisted in 37.31% of patients at 1 month of follow-up and 2 patients (2.99%) developed this symptom de novo in the postoperative period. Removal of gallbladder is associated with several physiological changes in the upper GIT that may account for the persistence or appearance of new symptoms in these patients after surgery. Cholecysto-sphincter of Oddi reflex,cholecysto-antral reflex and cholecysto-oesophageal reflexes are all disrupted. Similarly, a number of local upper GI hormonal changes occur, leading to gastritis, alkaline duodeno-gastric reflux and gastro-esophageal reflux. These changes form the potential basis of persistence or de novo appearance of symptoms in the post-operative period known as post-cholecystectomy syndrome. Other abdominal symptoms such as flatulence, bloating or back pain were partly relieved in our patients. These are not directly related to gallstone disease. Except one,14 most studies have reported that the long term symptomatic outcome is not influenced by the surgical access used for cholecystectomy. However, chances of reporting adverse outcome are more in patients having developed a complication after surgery. This bias was removed in our study where only non-complicated cases were included for interview.

Attempts at defining clinical indices or scores of pre-operative symptoms which are definitely improved after cholecystectomy have met with limited success, even after multivariate analyses. Despite the persistence or de novo appearance of symptoms in the post-operative period, most of the patients felt satisfied with the outcome of surgery. Studies have indicated that the patients felt that these problems or symptoms were not interfering in their routine of life as much as the actual problems due to cholelithiasis in the preoperative period. Moreover, there is a placebo effect of surgery on the overall wellbeing of the patients who tend to ignore the minor abdominal problems after surgery.

SUMMARY AND CONCLUSION

The most susceptible age group was 31 – 50 years and female to male ratio was 4: 1. Liver function tests were done in the perioperative period (at deflation and on the second postoperative day) in all patients. Serum bilirubin, AST and ALT levels were raised significantly in laparoscopic cholecystectomy in comparison to conventional cholecystectomy from preoperative normal level. Level of serum alkaline phosphatase elevation was relatively less. All the deranged parameters normalized within seven days after operation.

Table: Showing the laboratory findings

Laboratory	Parameters	Percentage
Hb%	Normal Low	82 18
TC	Normal Elevated	10 90
DLC	Normal Raised Eosinophil	96 4
ESR	Normal Raised	84 16
BT,CT	Normal Prolonged	100 0
Serum Cholesterol	Normal Raised	80 20
RBS	Normal Raised	92 8
Serum Creatinine	Normal Raised	100 0
PT	Normal Prolonged	100 0

Having discussed the data and their significance, we can arrive at several important conclusions.

These are: -

1. Gall stone pathologies are very common in this part of the country.
2. Pain abdomen particularly in the right hypochondriac region was the commonest complaint. Referred pain to the inferior angle of scapula and positive Murphy's sign were the commonest clinical findings. Nausea, vomiting, flatulence, dyspepsia and abdominal lump were the next frequent complaints. Mild to moderate fever was present in 11% of cases.
3. Ultrasonography was the mainstay in confirmatory diagnosis of gall bladder pathologies and the findings correlated well with clinical findings in almost all the cases. It not only revealed the evidence of gall stones in gall bladder with signs of acute or chronic cholecystitis but also other changes in the common bile duct, liver, pancreas and so on.
4. Routine laboratory investigations of blood and special investigations like liver function tests were carried out in all the cases. Total WBC count was seen to be elevated in 90% cases. The findings of routine stool and urine examination were within normal limits.
5. All the cases were treated conservatively in the acute phase and were closely monitored for signs of improvement. Patients responding to conservative treatment were recalled after an interval of 4 to 6 weeks for cholecystectomy, while those patients who did not respond were subjected to emergency cholecystectomy. There were no major intraoperative or postoperative complications following interval cholecystectomy.
6. Cholecystectomy was done under general anaesthesia of which 20 cases had undergone laparoscopic cholecystectomy, 40 cases had undergone conventional cholecystectomy.

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