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**Original Research Article**

# Evaluation of patients undergoing cholecystectomy with special reference to post-cholecystectomy syndrome

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## ABSTRACT

**Background:** Significant percentage of patients remain symptomatic even after the cholecystectomy surgery for gall stone disease. Traditionally, this has been termed Post-Cholecystectomy syndrome which may consist of same symptoms for which cholecystectomy was performed or it may be a new set of symptoms that have developed after cholecystectomy. Aim of this study to find out incidence as well as pre-operative, intra-operative and post-operative determinants for the post- cholecystectomy syndrome.
**Methods:** This is the prospective study, done in the Department of Surgery, Dr BSA Medical College and Hospital, New Delhi. Total 102 number of patients were included in this study, out of which 51 patients underwent open and another 51 patients underwent laparoscopic cholecystectomy.
**Results:** The mean age of the patients was 40.29±10.69 years with an age range of 19 to 80 years. Incidence rate of post cholecystectomy symptoms were16.66% (n=17). Incidence of post-cholecystectomy syndrome in patients who underwent laparoscopic cholecystectomy were 15.69% (n=8) while in the open cholecystectomy group it was 17.64% (n=9). Out of seventeen symptomatic patients, eight (47.05%) were having the biliary disease while nine patients (52.95%) were having non-biliary cause.
**Conclusions:** As authors studied present symptomatic group of patients thoroughly, it has become clear that the post-cholecystectomy symptoms are multiple and diverse arising from various causes; which in reality has no relation with the removal of gall bladder. Hence the appellation 'post-cholecystectomy syndrome is inappropriate and instead we have used the term 'Post-Cholecystectomy Symptoms' for these patients.

**Keywords:** Bile reflux gastritis, Biliary leak, Gall stones, Laparoscopic cholecystectomy, Post-cholecystectomy syndromes

## INTRODUCTION

Cholecystectomy is the gold standard for the treatment for symptomatic gall stone disease.[1] Despite the generally excellent results after undergoing cholecystectomy for gall stone disease, small number of patients remain symptomatic even after surgery. As incidence of cholecystectomies are very high, these significant percentage of patients have aroused much interest. It has been suggested by Pirbram (1950) that there exists a special "post-cholecystectomy syndrome" (PCS). Pribram (1950) had attributed these symptoms to the anatomical and physiological consequences of cholecystectomy.[2]

In 1973, Bodvall has studied 1930 patients and defined post-cholecystectomy syndrome as biliary colic or pain and dyspepsia which are similar to symptoms prior to

cholecystectomy.[3] He classified them in to two group- one group of the patients in which symptoms were attributed to organic causes and another group in which symptoms were considered to be due to functional causes so called biliary dyskinesia.

Post-Cholecystectomy Syndrome (PCS) is defined as a complex of organic and functional disorder that occurs after cholecystectomy. The syndrome may consist of same symptoms for which cholecystectomy was performed or it may be a new set of symptoms that have developed after cholecystectomy, which are compatible with extrahepatic biliary disease.[3,4]

However, most of the recent investigators are convinced that there is no justification for using the term "post-cholecystectomy syndrome" as these patients have multiple and diverse causation which are not consequence of cholecystectomy. Rather, incomplete or erroneous diagnosis and faulty surgical procedures are responsible in majority of the cases.[5-7]

Post-Cholecystectomy symptoms include biliary colic or pain, flatulent dyspepsia which are similar to symptoms prior to cholecystectomy. These symptoms may vary from patient to patient and includes very mild dyspepsia and occasional abdominal discomfort to severe recurrent acute form of biliary distress. There is long list of causes of PCS which may be faulty diagnosis, faulty surgery, residual CBD stones, remnant cystic duct stump, post-operative adhesions, bile reflux, sphincter of Oddi dysfunction, overlooked neoplasm, etc.

With the advent of ERCP, endoscopic biliary manometry and hepatobiliary scintigraphic studies of sphincter of Oddi function, the role of "gall bladder – sphincter of Oddi function" in the genesis of these disorders have been better defined.

Now, it seems reasonable that cholecystectomy may produce physiological alterations which may result in:

- Increased duodenogastric reflux
- Sphincter of Oddi dysfunction
- Removal of functioning gall bladder

With this background knowledge an effort has been made to define what is "post-cholecystectomy syndrome", and also to find out the incidence and etiological pattern in these patients.

Objectives of present study were to find out the incidence of post-cholecystectomy syndrome and to clarify the influence of cholecystectomy upon symptoms in order that the patients might be better counselled pre-operatively, to know the possible effect of pre-operative, intra-operative and post-operative determinants on the pattern of post-cholecystectomy syndrome and to compare the incidence of post-cholecystectomy syndrome in between laparoscopic and open cholecystectomy.

## METHODS

This is the prospective study, done in the Department of Surgery, Dr BSA Medical College and Hospital, New Delhi. Total 102 number of patients were included in this study, out of which 51 patients underwent open and another 51 patients underwent laparoscopic cholecystectomy.

The patients of all age group and both sexes were included in the group. The patients who underwent CBD exploration along with cholecystectomy were also included in this study.

Patients underwent cholecystectomy for other diseases for e.g. – GB Polyp, Porcelain gall bladder, malignancy etc. were excluded from this study. Patients harbouring other intra-abdominal condition as suggested by clinical examination and radiological investigations were also excluded from this study.

All the Pre-operative, intra-operative and post-operative detail of the patients recorded meticulously. Pre-operative data includes history, clinical examination and all pertaining investigation reports.

Intra-operative record included detail of different incisions or ports, anatomy and position of gall bladder and its related structure, status of cystic duct and CBD, adhesions and any intra-operative complications. Post-operative recorded data includes post-op events, history and all complains, examination findings and investigations reports. All patients were followed up minimum for three months and maximum for ten months.

The mean and standard deviation of all parameters were obtained and subjected to statistical analysis using the student's t test.

For comparing proportion, Chi square test / Yates corrected Chi square test was applied throughout the study a test level of 5% was used.

## RESULTS

Total of 102 patients were selected in the study over the period of approximately one year.

Out of this, 51 patients were a case of laparoscopic cholecystectomy while another 51 patients undergone open cholecystectomy. The mean age of the patients was 40.29±10.69 years with an age range of 19 to 80 years. Important details of patient's epidemiological profile are tabulated in Table. 1.

Total number of patient with post cholecystectomy symptoms were seventeen with incidence rate of 16.66%.

Incidence of post-cholecystectomy syndrome in patients who underwent laparoscopic cholecystectomy were 15.69% (n=8) while in the open cholecystectomy group it was 17.64% (n=9).

**Table 1: Epidemiological parameters.**

| | No. (n=) | Age (yrs.) range | Male (n/%) | Female (n/%) | Symptomatic (Post-cholecystectomy) (n/%) | Asymptomatic (Post- cholecystectomy) (n/%) |
|---|---|---|---|---|---|---|
| Total | 102 | 19-80 | 19 (18.62%) | 83 (83.37%) | 17 (16.66%) | 85 (83.33%) |
| Lap. Chol. | 51 | 19 -80 | 6 (11.76%) | 45 (88.23%) | 8 (15.68%) | 43 (84.31%) |
| Open Chole. | 51 | 25-70 | 13 (25.49%) | 38 (74.50%) | 9 (17.64%) | 42 (82.35%) |

**Table 2: Disease pattern of post-cholecystectomy symptoms.**

| Biliary Diseases | No. of patients | % | Non-biliary diseases | No. of patients | % |
|---|---|---|---|---|---|
| CBD Calculi | 4 | 23.52 | Bile reflux gastritis | 5 | 29.4 |
| Sphincter of Oddi dysfunction | 2 | 11.76 | Hiatus hernia | 1 | 5.88 |
| Papillary stenosis | 1 | 5.88 | Duodenal ulcer | 1 | 5.88 |
| CBD Ascariasis | 1 | 5.88 | TB of liver | 1 | 5.88 |
| | | | Functional | 1 | 5.88 |
| Total | 8 | 47.05 | Total | 9 | 52.95 |

Symptomatic patients were divided in to two groups according to underlying pathology. Out of seventeen symptomatic patients, eight (47.05%) were having the biliary disease while nine patients (52.95%) were having non-biliary cause. Out of nine patients of nonbiliary group, in one we could not find any underlying disease and it was seem to be functional. Most common cause of biliary disease in our study was CBD stone while most common cause in the non-biliary disease group was found to be bile reflux gastritis (Table 2).

**Table 3: Distribution of different degrees of post-op biliary distress.**

| Severity of post-op biliary distress | No. of patients | % |
|---|---|---|
| Symptomatic cure | 85 | 83.33 |
| Dyspepsia only | 6 | 5.88 |
| Mild pain attack | 5 | 4.9 |
| Occasional attack of severe pain | 4 | 3.9 |
| Severe biliary distress | 2 | 1.9 |
| Total | 102 | |

There were wide variation of degree and severity of post-op biliary distress symptom. It varied from symptom free condition to mild dyspepsia and pain to severe recurrent acute biliary stress.

Out of total of 102 patients, 85 (83.33%) were not having any symptoms post-operatively. 4.9% to 5.88% of these patients had attack of mild abdominal pain and dyspepsia respectively. Only two (1.9%) of these patients suffered symptoms of severe biliary distress like acute abdominal pain, vomiting, fever due to recurrent cholangitis or other problems (Table 3).

**Table 4: Liver function test in biliary and non-biliary group.**

| | Serum bilirubin mean | Serum alkaline phosphatase mean |
|---|---|---|
| Biliary group | 0.33 | 31.5 |
| Non-biliary group | 0.44 | 17.55 |

In the absence of overt jaundice, serum alkaline phosphatase levels were higher in biliary group while serum bilirubin levels fall within normal range in both the groups (Table 4).

**Table 5: CBD diameter on USG abdomen examination.**

| | Number of patients | Mean | Standard deviation |
|---|---|---|---|
| Biliary group | 8 | 6.87 | 3.03 |
| Non-biliary group | 9 | 4.27 | 1.12 |
| t = 1.905, d.f. -15, p<0.05 | | | |

The diameter of CBD on USG abdomen was significantly more in patients having symptoms related to biliary system as compared to patients with disease confined to other organs (Table 5).

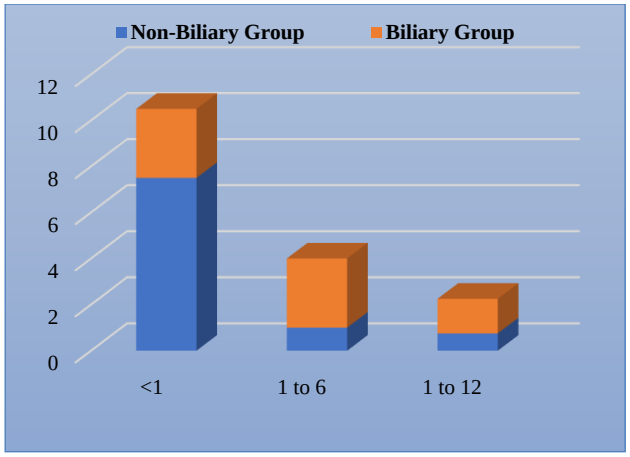


**Figure 1: Patient distribution with respect to symptom free period.**

The interval between cholecystectomy and appearance of symptoms were compared between biliary and non-biliary disease group and no difference found in both the group. Majority of patients became symptomatic within 1-2 months of surgery (Figure 1). There was no major difference found in the age group between symptomatic and asymptomatic group of the patients. In the both group majority of the patients were in the age group 30-39 years and thereafter there is decline in the number of patients with advancing age. Post-cholecystectomy symptoms were more common in female sex (Table 6).

**Table 6: Symptomatic versus asymptomatic patients.**

| | Symptomatic | Asymptomatic |
|---|---|---|
| Mean age (Yrs.) | 37.73 | 40.53 |
| Sex ratio (Female: Male) | 4:1 | 7.5:1 |
| Cholecystectomy with choledocholithotomy (n=/%) | 1 (10%) | 9 (90%) |
| Cholecystectomy (n=/%) | 16 (17.39%) | 76 (82.60%) |
| Single stone (n=) | 6 | 22 |
| Multiple stones (n=) | 11 | 63 |

The incidence of post-operative biliary distress appears to be lower in patients who underwent choledocholithotomy (10%) as compared to the patients who underwent cholecystectomy alone (17.39%) but this difference was not statistical significant at $p<0.05$. Intra-operatively majority of both symptomatic and asymptomatic group of the patients were harbouring multiple stone in their gall bladder (Table 6). There was no major difference found in pre-operative symptoms of both the symptomatic and asymptomatic group (Table 7). ERCP was found to be 100% efficacious in diagnosing CBD calculi, CBD Ascariasis and papillary stenosis (Table 8).

**Table 7: Pre-operative symptom.**

| Symptoms | No. of symptomatic patients | % | No. of asymptomatic patients | % |
|---|---|---|---|---|
| RHQ pain | 13 | 76.4 | 68 | 80 |
| Flatulent dyspepsia | 14 | 82.3 | 77 | 90.5 |
| Nausea/vomiting | 8 | 47.05 | 64 | 32.9 |
| Epigastric pain | 7 | 41.17 | 28 | 7.05 |
| Jaundice | 1 | 5.8 | 6 | 7.05 |

**Table 8: USG versus ERCP.**

| Diagnosis (No. of cases) | | No. of patients diagnosed by | |
|---|---|---|---|
| | | USG Abdomen | ERCP |
| CBD Calculi (4) | In Dilated CBD (1) | 1 | 1 |
| | In Normal CBD (3) | 0 | 3 |
| Pap. Stenosis (1) | | 0 | 1 |
| Sphincter of Oddi dysfunction (2) | | 0 | 1 |

## DISCUSSION

Out of 102 patients in our series, 85 patients (83.33%) had complete symptomatic relief after series. Symptoms persisted in 16.66% of the patients. Amongst the symptomatic group, duodenogastric reflux with gastritis was found in 5 patients and sphincter of Oddi dysfunction was responsible for contribution of symptoms in in two patients. In different study the incidence of post-cholecystectomy syndrome reported between 4 to 40%; but in most studies all the symptomatic patients were included irrespective of the underlying aetiology.[8]

In present study no significance difference of age between incidence of asymptomatic and symptomatic group found and same has been reported in many other study.[9] In present study, the highest frequency of post-op biliary distress is seen in the age group 30-39 years and the frequency of distress decreased with advancing age. Bodvall in his study of 1930 patients reported a

statistically significant gradual decrease in the frequency of distress with advancing age.[10]

Even though post cholecystectomy symptoms are more common in females compared to males, this difference was not statistically significant at p.0.05. Gauma et al in his study of 315 patients found no significant association between sex and post-op complaints.[9] In the same study they have found higher frequency of post-op biliary distress in the patients who had longer pre-op history. In our study also, we have found longer pre-op history of gall stone disease in the symptomatic group of the patients.

In our study the occurrence of post-op symptoms was similar irrespective of the type of surgery performed. However, Bodvall reported that the frequency of post-op biliary distress was significantly lower in the patients in whom choledocholithotomy was performed concurrently.[10] Same study also reported that number of gall stones does not influence the outcome of post-op symptoms. In our study, we also found that the number of stones in the gall bladder did not influence the outcome of post-op symptoms.

There was no significant difference in the interval between surgery and appearance of symptoms amongst the biliary and non-biliary groups. Majority of the patients became symptomatic within 1-2 months of surgery. Literature also mentions that post-cholecystectomy syndrome presents within a few weeks of surgery while in the other half it first appears months or even years later.[11] As far as level of liver enzymes are concerned, in our study the serum bilirubin fell within a normal range in both the groups but alkaline phosphatase levels were higher in the biliary group. Johnson in his study also reported the determination of serum alkaline phosphatase activity to be of greater significance in assessing the cause of the post-cholecystectomy syndrome than the determination of the icterus index.[12]

USG abdomen is of valuable help in the diagnosis of post-cholecystectomy symptoms by measuring CBD diameter and excluding or detecting pathological changes of the upper abdominal organs. We found significant increase in CBD diameter in the patients of biliary group. However, Ruddel et al reported that the overlap in bile duct calibres between obstructed and non-obstructed duct implies that bile duct calibre per se will not distinguish between the presence or absence of retained stones in the post-cholecystectomy patients.[13] But there are so many study concluded that still USG abdomen should be first line of investigation and it can avoid unnecessary other invasive investigations.[14-17]

In our study ERCP was mainstay of diagnosis for majority of patients belonging to biliary group. It proved to be 100% efficacious in the diagnosis of retained CBD calculi, papillary stenosis and provided a clue to the diagnosis of Sphincter of Oddi dysfunction (dilated CBD and delayed clearance of contrast). Even so many different study also concluded that ERCP is the investigation of the first choice in the complex post-cholecystectomy symptomatic patients.[13,18-21]

Most recent study found incidence of post cholecystectomy syndrome 19.8% while in our study it was 16.66%. Most striking feature of that study is that they found helicobacter pylori infection is the second most common cause for post-cholecystectomy syndrome while in our study we did not find such cause in patients.[22]

## CONCLUSION

As we studied our symptomatic group of patients thoroughly, it has become clear that the post-cholecystectomy symptoms are multiple and diverse arising from various causes; which in reality has no relation with the removal of gall bladder. Hence the appellation ‘post-cholecystectomy syndrome is inappropriate and instead we have used the term ‘Post-Cholecystectomy Symptoms’ for these patients. However, with the help of ERCP and hepatobiliary scintigraphy, it has become clear that there is a group of well-defined clinical syndromes which may be attributed directly or indirectly to some missing function of gall bladder.

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