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Original Article

Frequency of Post-Cholecystectomy Syndrome in Laparoscopic Cholecystectomy Patients of a Tertiary Care Hospital of Punjab

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ABSTRACT

Objective: To measure the frequency of post-cholecystectomy syndrome and to evaluate its association with demographic and clinical factors among patients undergoing laparoscopic cholecystectomy.

Study Design: Cross-sectional analytical study.

Place and Duration of Study: Unit I, Department of Surgery, Combined Military Hospital, Karachi, Pakistan, from Jan to Dec 2024.

Methodology: A sample of 150 participants was subjected to laparoscopic cholecystectomy under general anesthesia, and they were followed for one year for development of post-cholecystectomy syndrome (PCS). Demographics and frequency of post-cholecystectomy syndrome were noted down, and its association with demographic and clinical factors was studied. The significance was calculated with the help of appropriate statistical tests (chi-square analysis), and the *p*-value <0.05 was considered significant.

Results: The frequency of post-cholecystectomy syndrome was 18%, and its significant association with age (*p*-value=0.01), with highest frequency noted between ages 40 and 60 years. Other parameters, including gender, body mass index, comorbid conditions (diabetes mellitus, hypertension, and smoking), and length of symptoms, did not show any substantial association.

Conclusion: The post-cholecystectomy syndrome continues to affect a considerable proportion of patients after laparoscopic cholecystectomy, particularly those in midlife. These findings highlight the importance of attentive postoperative follow-up and a broader diagnostic approach that considers both biliary and non-biliary causes of persistent symptoms.

Keywords: Abdominal pain, Cholecystectomy, Gallstone, Laparoscopy, Post-Cholecystectomy Syndrome.

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INTRODUCTION

Choledocholithiasis affects five to twenty percent of Americans, and a significant number of patients develop post-cholecystectomy syndrome after cholecystectomy.[1] The dogma that surgery relieves symptoms of cholecystitis is challenged by the statistics that reveal that a substantial number of patients experience biliary symptoms despite having cholecystectomies in the best centers of world. According to recent statistics, the incidence of post-cholecystectomy syndrome is almost forty percent, which is worrying. Isherwood *et al*., performed a systematic review on post-cholecystectomy syndrome and advocated that it showed a wide variation in its distribution, with a five percent to thirty percent prevalence, reaching a maximum of forty percent across the United Kingdom.[2] They considered biliary causes along with extra-biliary causes to be probable etiology instead of biliary causes alone.[3]

Some extra biliary causes include esophagitis, hepatitis, peptic ulcer, and biliary causes include retained calculi, cystic duct remnant, stricture, and retained calculi. Shirah *et al*., reported an increasing trend of post-cholecystectomy syndrome in Saudia Arabian population and suggested that extra-biliary causes were most likely to predominate in its development.[4] Post-cholecystectomy syndrome has emerged as a heterogeneous condition incorporating functional, psychosomatic, and biliary components instead of extra-biliary components alone. The absence of calculi and biliary tract abnormalities in some cases signifies extra-biliary involvement in the spectrum of post-cholecystectomy syndrome.[5]

By far, post-cholecystectomy syndrome has been accepted as a well-recognized entity, and varied

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etiologies underlying its origin demand a holistic approach involving a wide range of treatment options.6 Although sometimes these symptoms are mild, they are like pre-operative symptoms and are a source of strife for patients who consider cholecystectomy to be the end of agony and sigh of relief.7 The Asian population is also facing post-cholecystectomy syndrome, and studies from China and Pakistan show a prevalence of 15 percent and 20 percent, respectively. Shrestha advocated that incidence after laparoscopic cholecystectomy is even higher (45%), while some studies still suggest that only 5% of patients suffer from it.[8]

The rationale of our study is to observe a cohort of patients undergoing laparoscopic cholecystectomy for one year post-operatively for the development of post-cholecystectomy syndrome. The evidence regarding prevalence is conflicting in international and national studies. Our study will provide local statistics regarding this condition, and it will also try to establish an association with demographic and clinical factors.

METHODOLOGY

We took the permission of the ethical committee of the hospital first, with IERB number: 162, and performed this study at the Department of Surgery of Combined Military Hospital (CMH), Karachi, Pakistan, from Jan to Dec 2024. The sample was calculated with the help of the WHO sample size calculator and used following statistical parameters: 95% confidence interval, 6% margin of error, and the estimated prevalence of post-cholecystectomy syndrome to be 18%.[7] The sample came out to be 119. We enrolled 150 patients undergoing laparoscopic cholecystectomy through non-probability consecutive sampling. We followed up patients for one year for development of post-cholecystectomy syndrome Figure-1.

Inclusion Criteria: We included patients aged 18 to 75 years, both males and females, who underwent laparoscopic cholecystectomy under general anesthesia. Patients who were diagnosed with symptomatic cholelithiasis, who had uneventful surgery, and a comparable duration of surgery (between 40-50 minutes), and were discharged after 48 hours. Only those patients were included who had controlled diabetes mellitus, hypertension, and a smoking history greater than 5 years.

Exclusion Criteria: Patients with anemia, renal disease (serum creatinine greater than 1.2mg/dl), who had open cholecystectomy, who were converted to open cholecystectomy due to technical difficulties and adhesions, and patients who developed complications in immediate post-operative period. Pregnant patients were also not included in this study.

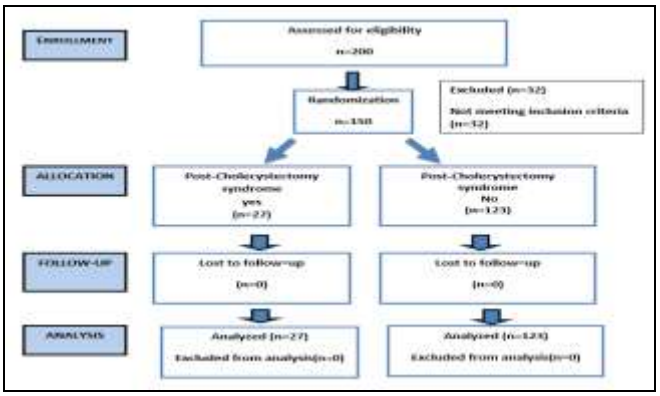

Figure-1: Consort Flow Chart

The patients were enrolled in study after informed consent, and they were booked for laparoscopic cholecystectomy after all necessary workups, including history, examination, laboratory investigations, radiological imaging, and pre-anesthesia assessment. The patients who had an uneventful cholecystectomy and were discharged on 2nd post-operative day, and they have procedure duration between 40-50 minutes, were included to prevent bias. The patients who showed clinical instability or immediate complication (right upper quadrant pain, nausea/vomiting, intolerance to food intolerance and diarrhea) were excluded. The patients were labelled to have post-cholecystectomy syndrome if they had symptoms including: upper quadrant abdominal pain, nausea, dyspepsia, vomiting, right hypochondriac region tenderness, jaundice, epigastric tenderness, helicobacter pylori infection, muscle pathology, and gastritis.[9] The demographic details of all patients were jot down including frequency of age groups (18-45 and 46-75) years, gender, frequency of body mass index (BMI) categories (BMI≤30 and >30), presence of diabetes mellitus, hypertension, smoking, duration of biliary symptoms (right upper quadrant pain for more than three months along with nausea and vomiting). The primary outcome was frequency of Post-Cholecystectomy Syndrome (PCS), and secondary outcome was association of Post-Cholecystectomy Syndrome (PCS) with demographic and duration of symptoms.

Data was analyzed by using Statistical Package for Social Sciences (SPSS) 22.00.The data was qualitative. Age and body mass index were also divided into categories. Frequency and percentage were calculated for different qualitative variables, and chi-square analysis was employed to compare frequencies and compute the *p*-value. A p-value of less than 0.05 showed there was a significant statistical association.

RESULTS

The study group comprised one hundred fifty patients who completed the study protocol successfully. The age of 49(32.7%) patients was between 16 and 18 years, and the age of 101(67.3%) patients was between 46 and 75 years. There were 74(49.3%) males and 76(50.7%) females in the study group. Fifty-two patients (34.7%) had a duration of symptoms of less than six months, while 98(65.3%) patients had a duration of symptoms greater than or equal to six months. Twenty-eight patients (18.7) had diabetes mellitus, 42(28.0%) had hypertension, and 53(35.3%) were smokers. The body mass index (BMI) of 77(51.3%) patients was less than 30 kg/m^2, and 73(48.7%) patients were greater than 30 kg/m^2. The patients with a BMI greater than 36 were excluded from the study. The primary outcome was development of Post-Cholecystectomy Syndrome (PCS). Twenty-seven (18.0%) patients developed post-cholecystectomy syndrome, and 123(82.0%) did not develop it. The demographics and primary outcome are shown in Table-I. When compared to demographics, it was found that older patients with an age range of 61 to 80 years developed post-cholecystectomy syndrome more than younger patients (88.1% versus 69.4%) with a *p*-value of 0.01. The rest of the demographics did not show a significant association with the incidence of post-cholecystectomy syndrome, and their distribution was similar between patients who had PCS versus those who did not have PCS, with p-Values greater than 0.05 as seen in Table-II. Figure-2 gives a pictorial comparison of demographic and clinical factors between patients with PCS and non-PCS.

DISCUSSION

The findings of our cross-sectional analytical study comprising 150 patients showed that post-cholecystectomy syndrome is quite prevalent (18.0%), and it is a challenging complication that can result in unhappy patients despite uneventful gall bladder removal. The above incidence is in alignment with past studies, which advocate a varied prevalence between 10 and 40 percent. Although laparoscopic cholecystectomy has gained a lot of popularity due to its short duration, small scar and quick recovery,[10] yet the development of PCS is linked to it by many authors.[11] Although post-cholecystectomy syndrome was first described by Womak and Crider in 1947, it took a long time for it to be recognized as an established entity due to a lack of consensus regarding its diagnosis, symptomatology, etiology, and management.[12]

Table-I: Baseline Characteristics of study Participants (n=150)

Variables	n (%)
Age	
18 to 45 years	49(32.7)
46 to 75 years	101(67.3)
Gender	
Male	74(49.3)
Female	76(50.7)
Duration of gall stone	
≤ 6 months	52(34.7)
> 6 months	98(65.3)
Diabetes Mellitus	
Yes	28(18.7)
No	122(81.3)
Hypertension	
Yes	42(28)
No	108(72)
BMI status	
≤ 30 kg/m^2	77(51.3)
> 30 kg/m^2	73(48.7)
Smoking status	
Yes	53(35.3)
No	97(64.7)
Post-cholecystectomy syndrome	
Yes	27(18)
No	123(82)

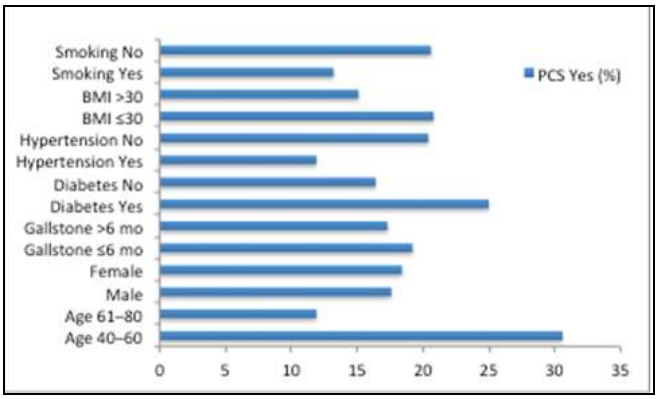

Figure-2: Distribution of Post-Cholecystectomy Syndrome (PCS) Cases by Patient Characteristics, Showing the Percentage of Affected Individuals Across Demographic and Clinical Subgroups

Most patients recovered uneventfully in the post-operative period; a notable subset continued to experience upper abdominal pain, dyspepsia, or bloating beyond the usual convalescence. These observations underscore a key clinical point: laparoscopic cholecystectomy is generally very effective for treating gallstone disease, but it does not guarantee complete symptom resolution for all patients.[13]

Table-II: Association of patient characteristics according to the post-cholecystectomy syndrome groups (n=150)

Variables	Post-cholecystectomy syndrome Yes (n=27) Frequency (%)	Post-cholecystectomy syndrome No (n=123) Frequency (%)	*p*-value
Age			
40 to 60 years	15(30.6)	34(69.4)	0.01
61 to 80 years	12(11.9)	89(88.1)	
Gender			
Male	13(17.6)	61(82.4)	0.89
Female	14(18.4)	62(81.6)	
Duration of gall stone			
≤ 6 months	10(19.2)	42(80.8)	0.77
> 6 months	17(17.3)	81(82.7)	
Diabetes Mellitus			
Yes	07(25)	21(75)	0.28
No	20(16.4)	102(83.6)	
Hypertension			
Yes	05(11.9)	37(88.1)	0.22
No	22(20.4)	86(79.6)	
BMI status			
≤ 30 kg/m2	16(20.8)	61(79.2)	0.36
> 30 kg/m2	11(15.1)	62(84.9)	
Smoking status			
Yes	07(13.2)	46(86.8)	0.25
No	20(20.6)	77(79.4)	

Comparable figures have been documented in other countries. A systematic review from the Netherlands by Latenstein et al., showed that ongoing symptoms after cholecystectomy remain frequent, with pooled prevalence estimates generally ranging from 10% to 30%, closely matching the 18% found in our cohort.14 Similarly, Arora *et al*., from India, reported that PCS still affects a considerable subset of patients, even when the procedure is technically successful.[15] More recently, Lee *et al*., in a prospective Scandinavian study, observed that almost 20% of patients reported post-cholecystectomy pain at months, again indicating the highest rate.[16]

Patients with diabetes mellitus demonstrated a higher percentage of PCS in our data; however, this did not reach statistical significance (p=0.28). Even so, the biological plausibility remains compelling. Diabetes is associated with autonomic neuropathy and altered gastrointestinal motility, both of which may contribute to persistent upper abdominal complaints. Functional disturbances arising from these mechanisms may be mistaken for biliary pathology after gallbladder removal, as reported by Samad *et al*.[17] Hypertension, on the other hand, showed no meaningful association with PCS in our analysis. These interpretations are consistent with a wider body of mechanistic evidence.[17]

Alotaibi *et al*., identified disordered intestinal motility and functional bowel disorders as principal contributors to ongoing post-cholecystectomy symptoms, particularly among patients with metabolic comorbidities.[18] Similarly, Nam *et al*., reported that autonomic imbalance and disturbance of the gut–brain axis are major factors driving persistent PCS-related complaints.[19] Although biliary causes—such as residual common bile duct stones or sphincter of Oddi dysfunction—rightly receive priority during the initial evaluation, non-visceral pain sources, most notably abdominal myofascial pain syndrome (AMPS), may more accurately account for symptoms when both imaging and laboratory investigations are unrevealing as concluded by Kegnaes *et al*.[20] Emerging evidence suggests that in more than half of patients with post-cholecystectomy pain, AMPS rather than true biliary disease is responsible.[21] Although our study did not directly assess early postoperative analgesia, prior investigations show that inadequate pain control in the first 48 hours after surgery increases the risk of chronic pain at one year, underscoring the importance of anticipatory, multimodal perioperative analgesic strategies to mitigate the development of persistent symptom syndromes.[22]

Overall, these data support the view that PCS is a heterogeneous clinical syndrome with multiple underlying mechanisms rather than a single, uniform disorder.[23] The study confirms the reports of literature that initial evaluation should follow a structured, stepwise algorithm. Initial workup ought to prioritize basic laboratory studies and noninvasive imaging, reserving advanced modalities such as ERCP for patients with biochemical or anatomical evidence of biliary disease. The relatively higher frequency among middle-aged patients suggests a potential age-related vulnerability that merits further study, particularly as gallstone disease is increasingly recognized in younger individuals. Clarifying demographic trends and pathophysiologic pathways may improve risk

stratification, inform resource planning, and reduce long-term morbidity.

LIMITATIONS OF STUDY

Finally, several limitations should be recognized. Selection bias may be present if patients who attended follow-up differed systematically from those who did not. Recall bias is another concern, given that participants were asked to report symptoms retrospectively. Misclassification or information bias may have occurred due to subjective interpretation of symptoms or inconsistencies in diagnostic thresholds. Unmeasured confounders—such as psychological status, opioid use, or previous abdominal procedures—may also have affected the associations observed. Observer bias likewise cannot be fully ruled out. Future population-based studies using wider sampling frames are needed to improve external validity and bolster causal inference.

CONCLUSION

post-cholecystectomy syndrome continues to affect a considerable proportion of patients after laparoscopic cholecystectomy, particularly those in midlife. These findings highlight the importance of attentive postoperative follow-up and a broader diagnostic approach that considers both biliary and non-biliary causes of persistent symptoms.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

JSU & MAA: Data acquisition, data analysis, critical review, approval of the final version to be published.

MOF & SR: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

RH: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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