



A PROSPECTIVE OBSERVATIONAL STUDY OF PREVALENCE OF POST CHOLECYSTECTOMY SYNDROME AND TO EVALUATE THESE PATIENTS TO DETERMINE ITS POSSIBLE CAUSES IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Cholecystectomy is a common surgical procedure for gallstone-related conditions, generally improving patient outcomes. However, a subset of patients develop Post-Cholecystectomy Syndrome (PCS), presenting with persistent or new symptoms such as abdominal pain, bloating, or dyspepsia. PCS affects 5% to 30% [2] of patients and its etiology is often unclear, involving both biliary (e.g., retained stones, bile duct injury, sphincter of Oddi dysfunction) and non-biliary causes (e.g., GERD, IBS). Diagnosing PCS is challenging due to symptom overlap with other gastrointestinal disorders and often requires a process of exclusion using various imaging and endoscopic modalities. Treatment ranges from conservative management to invasive procedures, but outcomes vary due to the complex nature of PCS. This study aims to determine the prevalence and underlying causes of PCS in a tertiary care setting, helping to improve diagnostic accuracy and therapeutic strategies.[1]

KEYWORDS

Cholelithiasis, Post-cholecystectomy syndrome, Diagnosis, Management

INTRODUCTION

Cholecystectomy, the surgical removal of the gallbladder, is one of the most commonly performed procedure worldwide. The primary indication for this surgery is the presence of gallstones or cholecystitis, conditions that cause significant abdominal pain and other complications. While cholecystectomy typically alleviates these symptoms and improves the patient's quality of life, some individuals experience a range of persistent or new symptoms after surgery, collectively known as post-cholecystectomy syndrome (PCS). The prevalence of PCS varies, with studies suggesting that up to 5% to 30% of patients may experience symptoms postoperatively, making it an important clinical concern in patients recovering from gallbladder surgery. [1]

The onset of PCS is often characterized by symptoms similar to those seen before the surgery, including abdominal pain, bloating, indigestion, nausea, and sometimes diarrhea. These symptoms may arise shortly after the surgery or even months or years later. Despite the absence of the gallbladder, which stores bile produced by the liver and releases it into the small intestine to aid digestion, the cause of these symptoms remains poorly understood. While gallstones and other gallbladder diseases are no longer present, bile flow can still be disrupted, and changes in the gastrointestinal tract may contribute to new symptoms. As a result, the causes of PCS are often difficult to pinpoint, and this makes diagnosis and treatment challenging. [2]

Several theories have been proposed to explain the underlying causes of PCS. One prominent hypothesis is that dysfunction of the sphincter of Oddi, a muscular valve that controls the flow of bile and pancreatic juice into the small intestine, may lead to post-operative symptoms. When this sphincter is unable to relax properly, bile can build up, causing pain and other symptoms similar to those seen prior to surgery. Another possible cause is biliary dyskinesia, a condition where the gallbladder or bile ducts do not function optimally after cholecystectomy. Other causes could include bile duct injury or even small bowel bacterial overgrowth, which may occur due to changes in the gastrointestinal tract following the loss of the gallbladder. [3]

The clinical presentation of PCS can vary greatly from patient to patient, which makes it difficult to identify a single underlying cause for the condition. In many cases, patients report recurrent or persistent abdominal pain, bloating, nausea, or changes in bowel habits, but they

may also have normal findings on imaging tests. This makes diagnosing PCS a matter of excluding other potential causes of the symptoms. Moreover, these symptoms are often nonspecific, meaning they can overlap with other gastrointestinal conditions such as irritable bowel syndrome (IBS), acid reflux, or functional dyspepsia. Therefore, a careful assessment of the patient's medical history, symptoms, and diagnostic tests is necessary to make a proper diagnosis. [4]

The prevalence of PCS varies significantly across different populations, and the reported figures range widely from as low as 5% to as high as 30%. This discrepancy may be due to various factors, such as differences in patient demographics, surgical techniques, and the length of follow-up after surgery. Moreover, some studies may only consider patients with severe symptoms, while others may include those with milder complaints. It is also important to consider that PCS can be either short-term or long-term, with some patients experiencing symptoms only in the immediate post-operative period, while others may suffer from chronic symptoms. [5]

Several risk factors have been noticed, that may predispose certain individuals to develop PCS. Female gender, older age, and a history of chronic gallbladder disease are commonly seen in patients who develop PCS. Additionally, the type of surgery performed—whether laparoscopic or open cholecystectomy—may influence the likelihood of developing PCS. Laparoscopic surgery, while less invasive, has been associated with a slightly higher incidence of PCS, possibly due to the nature of the procedure. Understanding these risk factors is important for clinicians to identify at-risk patients who may benefit from closer monitoring and early interventions. [6]

Diagnosis of PCS can be quite challenging, as it involves the exclusion of other conditions that might mimic its symptoms. Common diagnostic tests, including abdominal ultrasound, computed tomography (CT) scans, and endoscopic retrograde cholangiopancreatography (ERCP), are often employed to rule out complications like bile duct injury or retained stones. However, these tests may not always reveal abnormalities, leaving clinicians to rely on clinical judgment and patient-reported symptoms for diagnosis. In some cases, additional tests such as motility studies of the bile ducts or duodenum may be necessary to further investigate potential causes. [7] Treatment options for PCS vary widely, as there is no one-size-fits-all

approach to managing this complex syndrome. Some patients may benefit from conservative management, such as dietary changes or medications to manage symptoms like pain, nausea, or bloating. Antispasmodic agents or bile acid supplements are often used to alleviate discomfort, while in some cases, prokinetic agents may be prescribed to improve gastrointestinal motility. If conservative treatments fail, more invasive procedures such as endoscopic sphincterotomy or the placement of a biliary stent may be considered. However, these treatments are often not universally effective, and a significant portion of patients remain symptomatic despite aggressive interventions. [8]

Despite these management strategies, the lack of a clear understanding of the exact causes of PCS often leads to a trial-and-error approach in treatment. Therefore, there is a critical need for further research into the pathophysiology, prevalence, and optimal management of PCS. This is especially true in a tertiary care setting, where a larger, more diverse patient population can be studied, providing valuable insights into the condition's prevalence, risk factors, and underlying causes. By improving our understanding of PCS, clinicians may be able to provide more targeted treatments, thus improving patient outcomes. [9, 10]

This study aims to evaluate the prevalence and to identify its possible causes in patients who have undergone cholecystectomy in the Department of General Surgery at KIMS and PBMS Hospital, Bhubaneswar—a tertiary care center equipped with advanced diagnostic and follow-up facilities. The study will involve a thorough clinical evaluation of post-cholecystectomy patients, including a review of their medical history, symptom assessment, and diagnostic tests. By identifying potential risk factors and causes of PCS, this study might help support the existing literature on the condition and improve diagnostic and treatment strategies for affected patients.

Aim And Objectives Of The Study:

1. To find out evidence of PCS with established pathophysiological conditions detected pre-operatively and remission by treatment and also to prevent future complications arising out of hidden causes of PCS.
2. To evaluate biliary vs non biliary causes of PCS.

Inclusion Criteria:

1. All patients who had undergone cholecystectomy in the Department of General Surgery at KIMS and PBMS Hospital, Bhubaneswar, and presented with symptoms of PCS were included.
2. Patients who reported experiencing abdominal pain within one year of undergoing cholecystectomy.
3. Patients presenting with symptoms like fatty food intolerance, dyspepsia, nausea, vomiting, heartburn, flatulence, indigestion, diarrhoea, jaundice, and intermittent episodes of abdominal pain were included.
4. Only symptomatic patients who were willing to provide informed consent for participation in the study were considered.

Exclusion Criteria:

1. Patients diagnosed with gallbladder (GB) cancer.
2. Patients diagnosed with pancreatic cancer at the ampulla.
3. Patients with chronic pancreatitis.
4. Patients diagnosed with intestinal tuberculosis (TB).
5. Any patient unable or unwilling to provide informed consent for participation in the study was excluded.

Methodology

This prospective observational study was conducted to assess the prevalence and possible causes of Post-Cholecystectomy Syndrome (PCS) among patients who had undergone cholecystectomy. The study followed patients over a one-year period post-surgery without introducing any experimental intervention, focusing purely on clinical observation and follow-up.

The study was carried out in the Department of General Surgery at KIMS and PBMS Hospital, Bhubaneswar—a tertiary care center equipped with advanced diagnostic and follow-up facilities. The two-year study period, from March 2023 to February 2025, allowed sufficient time to monitor patients for early and delayed symptoms of PCS.

Patients were included if they had undergone cholecystectomy and presented within one year with symptoms such as abdominal pain,

indigestion, nausea, diarrhea, flatulence, or intolerance to fatty foods. Exclusion criteria included diagnosed cases of gallbladder or pancreatic cancer, chronic pancreatitis, intestinal tuberculosis, or unwillingness to provide informed consent.

A convenience sampling method was used, targeting a sample size of 300 patients to ensure meaningful statistical analysis. All participants underwent baseline assessments and were followed for one year. Clinical symptoms were regularly recorded, and patients underwent diagnostic evaluations including blood tests (CBC, LFT, amylase, lipase), imaging (ultrasound, CT scan, MRCP, HIDA), and endoscopy when indicated.

Psychological factors such as anxiety and depression were also considered during follow-up. Data was collected using structured proformas through interviews, records, and diagnostic findings. Regular follow-ups were conducted to monitor symptom progression, treatment response, and any emerging complications.

Data analysis involved descriptive and inferential statistics. Chi-square and t-tests were applied to assess associations between clinical variables and PCS. Ethical approval was obtained prior to the study, and informed consent was secured from all participants. Confidentiality and patient rights were strictly maintained throughout the study.

This structured approach aimed to generate valuable insights into the prevalence and diverse causes of PCS, thereby enhancing clinical understanding and guiding future management strategies.



Figure 1: Intra operative laparoscopic cholecystectomy showing Calots triangle & CVS.

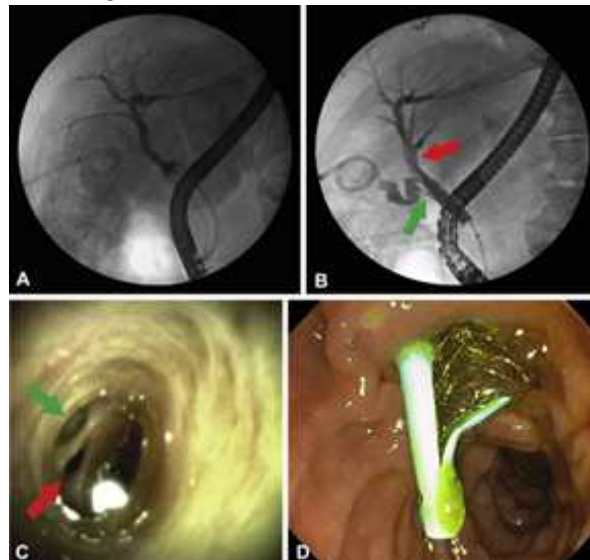


Figure 2: ERCP with Double Pigtail Stent done on a patient with CBD stones and continuous bile leak post operatively.

Data Analysis

Distribution Of Study Participants By Symptoms For PCS:

Out of 300 total individuals 250 patients had post operative pain after laparoscopic cholecystectomy, but only 55 patients out of 250 met the criteria for PCS.

These patients are further evaluated for definitive causes and treatment plans.

Table – 1 Distribution Of Symptoms Among Study Participants

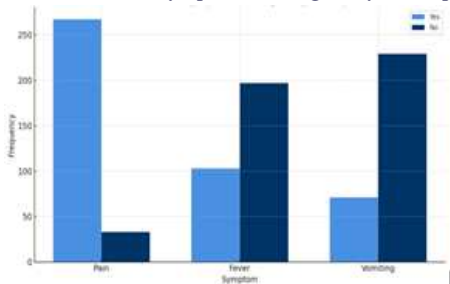


Table – 2 Distribution Of Study Participants By Comorbidities

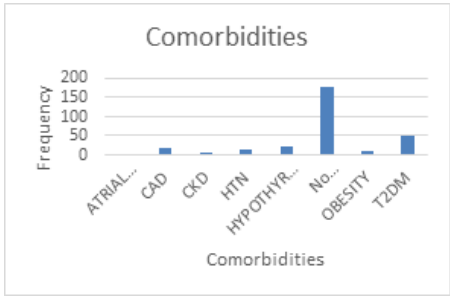


Table – 3 Distribution Of Study Participants By Biliary Causes

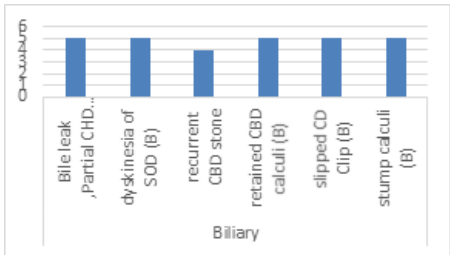


Table – 4 Distribution Of Study Participants By Non-biliary Causes

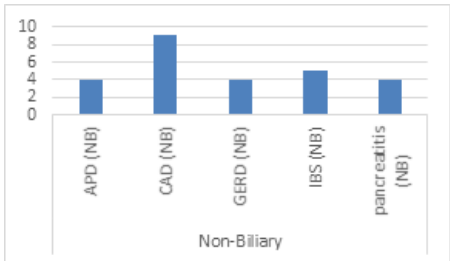


Table – 5 Comparative Distribution Of Study Participants By Biliary Vs Non-biliary Causes

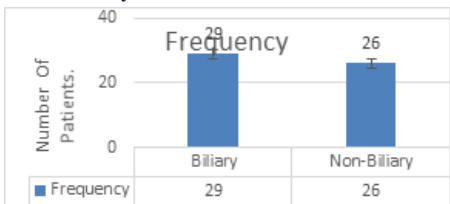
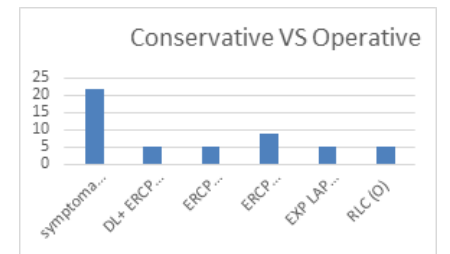


Table – 6 Distribution Of Study Participants By Different Modalities Of Conservative And Operative Managements Methods.



DISCUSSION
Post-Cholecystectomy Syndrome (PCS) remains a relevant postoperative concern, affecting a subset of patients despite successful cholecystectomy [5]. In this prospective observational study of 300 patients at KIMS and PBMS Hospital, 55 patients (18.3%) met criteria for PCS, while a larger group experienced transient symptoms. This underscores the need to differentiate true PCS from common post-surgical discomfort.

Preoperative Factors And Diagnostic Oversights: Many PCS cases arose due to inadequate preoperative evaluation, particularly failure to identify non-biliary conditions like GERD, acid peptic disease (APD), or IBS. [1,2] These conditions were often misattributed to gallstones, leading to inappropriate surgery. Functional disorders such as Sphincter of Oddi Dysfunction (SOD)[6], found in 1.7% of patients, are challenging to diagnose preoperatively. Additionally, 3% had retained or recurrent CBD stones, highlighting the underutilization of preoperative imaging like MRCP or ERCP.

Etiological Profile: Of the PCS patients, biliary causes were slightly more common (52.7%) than non-biliary (47.3%). Biliary causes included bile leak, stump calculi, retained CBD stones, SOD, and slipped clips, often diagnosed via ERCP or MRCP. Non-biliary causes included GERD, APD, IBS, CAD, and pancreatitis. [5,6] These may have predated surgery and were underdiagnosed, reinforcing the importance of thorough preoperative gastrointestinal assessment.

Demographic Insights: PCS showed no statistically significant variation across age or gender. Females (64%) predominated, consistent with gallstone epidemiology. Non-biliary causes like GERD and CAD were more common in males, while APD was slightly more frequent in females. The 30–69 age group reported the highest symptom burden and operative interventions.

Diagnostic And Surgical Considerations: Ultrasound was performed in all patients, but advanced diagnostics were limited (MRCP 8.7%, ERCP 13.3%, UGIE 8.7%). Intraoperative findings, such as frozen Calot's triangle (10%) and adhesions, were associated with technical difficulty and higher complication risk.

Management Patterns: Among PCS cases, 7.3% were managed conservatively (mostly non-biliary cases), while 9.7% required surgical or endoscopic interventions for biliary complications. Management was symptom-driven rather than influenced by age or sex.

In conclusion, PCS is multifactorial, with both biliary and non-biliary origins. Improved preoperative evaluation and selective use of advanced imaging could reduce its incidence and guide effective management

Limitations Of The Study
This single-center study with a sample size of 300 may limit generalizability to broader populations. The short postoperative follow-up period might have missed late-onset PCS symptoms or complications. Diagnostic tools like MRCP, UGIE, and CECT were not uniformly used, and specialized tests for functional disorders (e.g., SOD, IBS) were unavailable, possibly leading to underdiagnosis. Incomplete preoperative evaluation and reliance on retrospective documentation introduce potential bias. The absence of standardized diagnostic criteria for PCS adds subjectivity and may blur distinctions between persistent and new symptoms. Additionally, the study lacked a control group, limiting comparative analysis. Observer and selection bias are possible, as only patients returning to the same hospital were included. Importantly, psychological factors—known to contribute to PCS-like symptoms—were not assessed. These limitations highlight the need for multicenter studies with standardized protocols and broader diagnostic frameworks.

CONCLUSION
This study underscores the heterogeneous nature of Post-Cholecystectomy Syndrome. While the majority of patients recover uneventfully, a small yet significant subset (18.3%) develops PCS, necessitating a structured diagnostic approach.

Chronic Cholecystitis (CCC) remains the most common preoperative condition associated with PCS. Biliary causes slightly outnumber non-biliary ones, but the latter are often underdiagnosed despite their

impact on patient well-being. Advanced diagnostics such as ERCP, MRCP, and UGIE, although underutilized, are crucial for detecting occult pathology. Identifying and managing systemic comorbidities such as diabetes and CAD are essential to prevent symptom overlap and misattribution.

Management must be **tailored to the underlying cause**, with **operative interventions reserved for structural abnormalities**, while **conservative care suffices** for functional or systemic conditions. Importantly, the study highlights the **value of preoperative risk assessment** and thorough follow-up in preventing and promptly addressing PCS.

Recommendations:

- A standardized post-cholecystectomy follow-up protocol should be instituted to identify early signs of PCS.
- A multidisciplinary evaluation involving surgery, gastroenterology, and internal medicine may improve outcomes in PCS patients.
- Education on the non-biliary causes of PCS should be emphasized among clinicians to prevent over-reliance on biliary imaging alone.
- A more liberal use of MRCP and UGIE in patients with persistent or unexplained symptoms could enhance diagnostic yield.

This study contributes to a growing understanding of PCS and supports the need for individualized evaluation and targeted management to reduce morbidity and enhance quality of life post-cholecystectomy.

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