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Original Research Article

POST-CHOLECYSTECTOMY SYNDROME: A STUDY OF 200 CONSECUTIVE PATIENTS WITH GALL BLADDER PATHOLOGY WHO UNDERWENT LAPAROSCOPIC CHOLECYSTECTOMY

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Abstract: *Post-cholecystectomy syndrome (PCS) is a medical condition that can develop after cholecystectomy. It is characterized by several gastrointestinal symptoms, including abdominal pain, dyspepsia, bloating, and diarrhea, which can limit patients' quality of life. Understanding the underlying cause, risk factors, and effective intervention is essential to improve patient safety in clinical practice. This study aims to evaluate the frequency of post-cholecystectomy syndrome (PCS), analyze its symptoms and demographic features, and identify likely risk factors. This observational longitudinal study included 200 patients who underwent laparoscopic cholecystectomy in the surgical department of Shaikh Zayed Hospital Lahore between Jan 1st, 2021, and Jan 1st, 2022. Data were retrieved from electronic medical records, and patients were followed for PCS. The data was analyzed using SPSS software, version 25. Of 200 patients, 45 (22.5%) were diagnosed with Pcs. The ratio of males to females was 1:1.64. Age ranges from 19-78, and most belong to the 5th decade of life. Common symptoms are right upper quadrant abdominal pain in 33 (73.3%), nausea in 23 (51.1%), dyspepsia, vomiting in 16 (35.6%), and presenting signs included right hypochondriac region tenderness in 18 (40%), jaundice and epigastric tenderness in 4 (8.9%) cases. Common causes included Psychiatric disease in 8 (17.8%), helicobacter pylori infection in 7 (15.6%), muscle pathology in 6 (13.3%), and gastritis in 5 (11.11%), respectively. Based on the results it can be concluded that to provide effective treatments for individuals with PCS, it is essential to take signs seriously, conduct a comprehensive evaluation to reach an accurate diagnosis and treat the underlying cause appropriately.*

Keywords: Post cholecystectomy Syndrome (PCS), Biliary Tract Disorders, Cholecystectomy Complications

Introduction

Post-cholecystectomy syndrome (PCS) refers to a cluster of gastrointestinal symptoms that either persist or recur after cholecystectomy. It comprises symptoms such as nausea, vomiting, gas bloating, jaundice, diarrhea, or abdominal pain manifesting at any time after cholecystectomy (Womack and Crider, 1947).

It can be classified as early if it happens right after surgery and as late if it occurs months or years later (Girometti et al., 2010). This illness has been found to impact up to 40% of patients despite symptoms developing over 2 days to 25 years (Saleem et al., 2021).

The most frequently performed abdominal surgery for treating symptomatic gallbladder stones (GBS) is laparoscopic cholecystectomy (LC). However, despite advancements in the procedure, some patients still experience post-operative symptom (Lum et al., 2006; Schofer, 2010; Womack and Crider, 1947). Laparoscopic cholecystectomy can alter the gastrointestinal system's physiological and hormonal response to meals. (Alotaibi, 2023) The causes can be categorized as biliary or non-biliary, originating in the stomach, pancreas, esophagus, or blood vessels. Although it has been predominantly observed in elderly females, it is also common in young people at varying rates (Georgescu et al., 2022; Shirah et al., 2018). According to reports, 50% of these patients have organic pancreatic biliary and gastrointestinal illnesses, while the remaining patients have psychosomatic or extra-intestinal diseases. Furthermore, the cause of chronic abdominal pain is unknown in 5% of patients undergoing laparoscopic cholecystectomy (Girometti et al., 2010).

Even though gallstone disease (GSD) is one of the most prevalent digestive disorders in women, many cholecystectomies are performed daily in female patients around the world, increasing the likelihood of PCS development. It is difficult to assess the risk of PCS before surgery because no current risk stratification guidelines are available (Georgescu et al., 2022). The treatment choices for the post-cholecystectomy syndrome are centered on the specific cause. Many articles revealed different approaches to treating each cause; consequently, the syndrome gives rise to varying success and morbidity rates. New advancements in laparoscopic and endoscopic therapeutic options have decreased open-exploration surgical methods (Shirah et al., 2018).

Even though PCS is a frequent clinical occurrence, there is a shortage of information regarding hospitalization and medical expenses related to the diagnosis. Because there are numerous causes of PCS, identifying precise etiology becomes crucial in preventing hospitalization and enhancing the quality of life for patients. This review's objective is to investigate the details regarding the clinical patterns and etiology of the illness and propose a diagnostic approach for these patients.

Methodology

[Citation: Rizwan, M., Anwar, M.I, Laique, M.H., Mehmood, T., Javed, D., Askari, M.A., Abid, M.Z.U. (2023). Post-cholecystectomy syndrome; a study of 200 consecutive patients with gall bladder pathology who underwent laparoscopic cholecystectomy. *Biol. Clin. Sci. Res. J.*, **2023***: 606*. doi: https://doi.org/10.54112/bcsrj.v2023i1.606]

Patients who underwent a laparoscopic cholecystectomy at the General Surgery Department of Sheikh Zayed Hospital Lahore between Jan 1st, 2021, and Jan 1st, 2022, were identified and included in the study (an Observational longitudinal study). All procedures were carried out by two consultants who were experienced in laparoscopic cholecystectomy. All of the information was obtained from electronic medical record files. The study aimed to evaluate the frequency of post-cholecystectomy syndrome (PCS), analyze symptoms and demographic features, and identify likely risk factors. It included 200 patients who underwent laparoscopic cholecystectomy for gallstone disorders in a single center.

These individuals were assessed in outpatient clinics for post-cholecystectomy syndrome within a specified time after surgery. Data on PCS frequency, demographics, symptoms, and risk factors were availed and analyzed using appropriate statistical methods. Ethical concerns were addressed.

Patients with acute symptoms were admitted to the emergency room, while those with chronic conditions were directed to outpatient surgical clinics. The study included individuals aged 18 and up who had gallstone disease and exhibited symptoms or signs of post-cholecystectomy syndrome. Laparoscopic to open cholecystectomy conversion due to adhesions or unclear anatomy, as well as many comorbidities (more significant than two), were excluded.

A standard preoperative workup was conducted on all patients included in this study, i.e., complete blood profile, blood chemistry analysis, chest x-ray, EKG, abdomen ultrasound, and computed tomography scan. Then, they underwent a standard laparoscopic cholecystectomy in an aseptic environment using four ports. Patients were given antibiotics 30 minutes before anesthesia induction and continued for their hospital stay. MRCP, followed by ERCP guided stone extraction, was performed in cases where common bile duct stones were suspected before surgery. Following surgery, all patients were given regular follow-ups at two weeks, then as per the patient's need (Symptoms). Postoperative complications were monitored in all patients. When medically treatable causes were confirmed, patients were treated as outpatient clinic cases or referred to the appropriate specialty for further management.

The Statistical Package for Social Sciences (SPSS) software, version 25, was used to examine the data. Quantitative data such as age are expressed as mean standard deviation (SD). The incidence of PCS in male and female predisposition, the pattern of symptoms, and the causes of post-cholecystectomy syndrome were determined in terms of frequencies and percentages. The chi-square test with a significance level of 0.05 was used to see if there was a significant difference in the risk of post-cholecystectomy syndrome in men and women.

Results

The study included 200 individuals who underwent laparoscopic cholecystectomy for gallstone disease. Among them, 45 patients (22.5%) were diagnosed with Post-cholecystectomy syndrome. The ratio of males to females was 1:1.64, with 17 men (37.8%) and 28 women (62.2%), as shown in the figure. The patients' mean age was 48.29±12.44 years, ranging from 19 to 78.

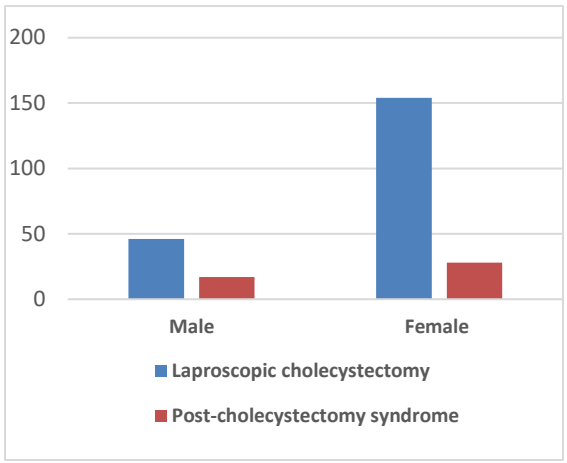

Figure: Male Female Predisposition

The reported symptoms included right upper quadrant abdominal pain in 33 (73.3%), nausea in 23 (51.1%), dyspepsia, vomiting in 16 (35.6%), diarrhea in 8 (17.8), abdominal colic in 11 (24.4%), and fever in 9 (20%) patients. Presenting signs included right hypochondriac region tenderness in 18 (40%), jaundice, and epigastric tenderness in 4 (8.9%) cases (Table-1).

Table 1. Pattern of presenting symptoms of post-cholecystectomy syndrome

Presentation	Number of patients	Percentage %
Right upper quadrant abdominal pain	33	73.30
Nausea	23	51.10
Vomiting	16	35.60
Dyspepsia	16	35.60
Diarrhea	8	17.80
Fever	9	20.00
Abdominal colic	11	24.40
Jaundice	4	8.89
Right upper quadrant abdominal tenderness	18	40.00
Epigastric tenderness	4	8.90

The post-cholecystectomy syndrome was in 45 patients in whom follow-up was made either in an inpatient or outpatient facility. The diagnostic laboratory data illustrated elevated liver enzymes in 10 (22.2%), alkaline phosphatase in 7 (15.6%), amylase in 5 (11.1%), WBC in 5 (11.1%), elevated bilirubin in 2 (4.4%) and positive Helicobacter pylori serology in 7 (15.6%) patients (Table -2).

The chi-square test indicated a substantial link ($p = 0.007$) between gender and post-cholecystectomy syndrome. This finding shows a statistically significant relation between gender and the incidence of post-cholecystectomy syndrome. The obtained p-value indicates that the probability of observing this relationship is less than 0.007. These results highlight the possible influence of gender in the development or manifestation of post-cholecystectomy syndrome.

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A total of four patients with right hypochondriac pain and jaundice were detected, and they were referred to the GI department for further management.

Proton pump inhibitors helped 11 of the 16 patients who presented with dyspepsia, while H-Pylori eradication therapy helped the remaining seven patients who tested positive for H. Pylori. Following surgery, one patient experienced bile leakage from the liver bed drain, which had been managed conservatively.

Table 2.The laboratory findings of Post-cholecystectomy syndrome

Findings	Number of Patients	Frequency %
High liver enzymes	10	22.2
High bilirubin	2	4.4
Positive h-pylori serology	7	15.6
High alkaline phosphatase	7	15.6
High amylase	5	11.1
High WBC	5	11.1

In the current study, the following were the most common causes of the post-cholecystectomy syndrome: helicobacter pylori infection in 7 (15.6%), pancreatitis in 2 (4.4%), peptic ulcer disease in 4 (8.9%), retained CBD stone in 1 (2.2%), hepatitis 4 (8.9%), gastritis 5 (11.11%), muscle pathology 6 (13.3%), Psychiatric disease 8 (17.8%), CBD stricture in 2 (4.4%), and no known cause in 10 (22.2%) individuals (Table -3).

Table 3. Causes of Postcholecystectomy Syndrome

Cause	Number of Patients	Percentage (%)
Peptic Ulcer Disease	4	8.9
Gastritis	5	11.11
Muscular Pathology	6	13.3
Psychiatric Illness	8	17.8
Hepatitis	4	8.9
Pancreatitis	2	4.4
CBD Stricture	2	4.4
Bile Stump Leakage	1	2.2
Retained Stones	2	4.4
CBD Sludge	2	4.4
No Obvious Cause	10	22.2

Discussion

The present study reported an incidence rate of 22.5% for post-cholecystectomy syndrome, which is consistent with similar trends across different regions of the world. The occurrence of post-cholecystectomy syndrome can be observed in about 10% of patients who have undergone a cholecystectomy (Aldahshan et al., 2021), with its incidence varying between 5-30% in the literature due to the wide range of associated signs and symptoms.

It is worth noting that patients may present with extra-biliary and unrelated organic disorders that they had before the cholecystectomy procedure (Aldahshan et al., 2021; Girometti et al., 2010).

This study investigated 45 cases of post-cholecystectomy syndrome, of which 28 (66.2%) were female. A review article by Shirah et al. cited a study that reported a higher incidence rate of post-cholecystectomy syndrome in female patients (59.2%) compared to male patients (40.8%) (Shirah et al., 2018). However, the higher absolute incidence in females may be due to a higher number of females undergoing cholecystectomy and does not necessarily mean that they are at a higher risk for developing symptoms after the operation. The mean age of the study population was 48.29±12.44 years, and the prevalence of PCS was higher in younger age groups, consistent with the global trend. In a study by Freud et al., age and gender have been recognized as risk factors for PCS. The incidence was highest (43%) in patients aged 30 to 69 years, with a female-to-male incidence ratio of 1.8:1 in patients aged 20 to 29 years (Freud et al., 1960). The rationale for this finding could be that a considerable proportion of patients in the local community with gallstones and related disorders are in the same young age categories as those reported globally.

The patients in this study exhibited signs and symptoms aligned with previous literature. The author noted that most patients presented with one or two clinical findings rather than multiple complaints. Some findings were specific and linked to a particular cause, while others were unclear and necessitated a complete workup to eliminate potential causes. Pain and tenderness in the right upper quadrant were the most common symptoms and signs. According to Shirah et al., the most prevalent symptoms of post-cholecystectomy syndrome were right hypochondriac region pain, nausea, vomiting, dyspepsia, abdominal colic, and fever (Shirah et al., 2018). The most prevalent signs were tenderness in the upper right abdomen, jaundice, generalized tenderness, and epigastric tenderness. Freud reported that 93% of patients experienced colic, 76% had pain, 24% had jaundice, and 38% had a fever (Freud et al., 1960). Steen et al. found that 71% of patients had pain, 36% experienced diarrhea or nausea, and 14% had bloating or gas (Aflah and Muhar, 2022). After cholecystectomy, various changes in physiology occur in the GI tract that can lead to the persistence of previous or the development of novel symptoms. These changes include disruptions in reflexes such as cholecysto-antral, cholecystosphincter of oddi, and cholecysto-esophageal. Other alterations also affect gastrointestinal physiology, causing significant clinical patterns and symptoms (Adrian et al., 1986; Goyal and Chaudhury, 2008; Muller et al., 1984; Webb et al., 1988). A thorough investigation of any clinical manifestation of post-cholecystectomy syndrome is crucial and a standard protocol in our clinical pathway.

This study found that PCS has a multifactorial etiology, and Helicobacter pylori infection, gastritis, muscle pathology, and psychiatric disease were the most common causes. This is consistent with previous studies that have identified extra-biliary causes as the primary etiologies. Pcs causes can be classified as biliary, extra biliary, organic & psychological (Isherwood et al., 2019). Literature has shown that the major causes of PCS are often extra-biliary, such as reflux esophagitis/peptic ulcer disease, dyspepsia (Isherwood et al., 2019; Jaunoo et al., 2010; Madacsy et al., 2015) & psychiatric issues (Larmi et al., 1975).

Many patients present with unclear results, which necessitate performing preoperative psychiatric assessments, which should include proper evaluation of the patient's mental state before surgery, as Mertens et al. similarly concluded in their paper (Mertens et al., 2010).

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The presence of residual or new bile duct stones is the most common established biliary cause of PCS, with a prevalence of 5-15%(22). Other reasons include bile salt-induced diarrhea/gastritis, abscess, chronic biloma, bile leak, biliary strictures, stenosis, and sphincter of Oddi dyskinesia (Jaunoo et al., 2010; Madacsy et al., 2015). The timing of these causes changes over time, with gastric causes being more frequent in the first three years following cholecystectomy and biliary pathologies being more common (Skalicky, 2011). According to the literature, bile duct injuries are prevalent in patients who went through laparoscopic cholecystectomy and can be associated with syndrome development in a very significant correlation that has been reported to be ranging between 0.4 and 4% (Jaunoo et al., 2010; Thieu et al., 2020; Thurley and Dhingsa, 2008). We observed a temporary factor associated with postoperative symptoms that eventually resolved. This factor was elevated preoperative alkaline phosphatase levels. Despite a standard common duct caliber on ultrasound, patients with elevated alkaline phosphatase experienced early symptoms within the first week after cholecystectomy. Although some authors suggest that these symptoms stem from surgery-related complications (Girometti et al., 2010; Schofer, 2010), our study found no such associations. The link between early symptoms and elevated alkaline phosphatase diminished over subsequent visits and was no longer significant. This temporary response likely indicates transient cholestasis or sphincter dysfunction, overwhelmed by increased bile flow through the common duct after surgery. Symptoms gradually resolved as the choledochus adapted. Sphincter spasms and local tissue trauma during surgery may also contribute to early postoperative symptoms (Lum et al., 2006; Madacsy et al., 2015).

The limitations of this study include its single-center design, which may restrict the findings' generalizability to other institutions. Patients were followed up for a short duration after surgery. However, long-term effects beyond the 12-month mark were not assessed. Data completeness and reliability may suffer as a result of potential follow-up loss. Unmeasured confounding variables may also have an impact on the study's results.

Conclusion

In conclusion, our study provides significant information about the occurrence, etiology, and clinical presentation of the post-cholecystectomy syndrome in a sample of patients with laparoscopic cholecystectomy for gallstones—the patients presented with various symptoms associated with several risk factors. To provide effective treatments for individuals with PCS, taking signs seriously, conducting a comprehensive evaluation to reach an accurate diagnosis, and treating the underlying cause appropriately is essential. It may be necessary to have effective patient-physician communication with questions aimed explicitly at eliciting commonly expected postoperative problems to identify the rather subtle symptoms of PCS.

The relatively high occurrence rate of post-cholecystectomy syndrome emphasizes the need for more research with bigger sample sizes and more extended follow-up periods to confirm our findings and evaluate the long-term implications of the post-cholecystectomy syndrome.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department Concerned.

Consent for publication

Approved

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Conflict of interest

The authors declared absence of conflict of interest.

Author Contribution

MUHAMMAD RIZWAN
Conception of Study, Development of Research Methodology Design, Study Design,, Review of manuscript, final approval of manuscript
Coordination of collaborative efforts.
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Coordination of collaborative efforts.
MUHAMMAD HAMZA LAIQUE
Manuscript revisions, critical input.
Coordination of collaborative efforts.
TARIQ MEHMOOD
Data acquisition, analysis.
DANIYAL JAVED
Data entry and Data analysis, drafting article
MUHAMMAD ALI ASKARI
Data acquisition, analysis.
MUHAMMAD ZAIN UL ABID
Coordination of collaborative efforts.

References

Adrian, T., Savage, A., Bacarese-Hamilton, A., Wolfe, K., Besterman, H., and Bloom, S. (1986). Peptide YY abnormalities in gastrointestinal diseases. *Gastroenterology* **90**, 379-384.

Aflah, M., and Muhar, A. M. (2022). Sindrom Pasca-Kolesistektomi. *Cermin Dunia Kedokteran* **49**, 560-563.

Aldahshan, A. A. S., Salamah, A. R., Fayoumi, N. M., Alkhudaydi, S. A., Alhijji, M. K. M., Alnahwi, Q. A. A., Balghsoon, A. A., Alomran, A. O., Muhaisin, S., and Altalhi, B. I. H. (2021). An overview on post-cholecystectomy syndrome diagnostic & management approach. *Archives of Pharmacy Practice¦ Volume* **12**, 39.

Alotaibi, A. M. (2023). Post-cholecystectomy syndrome: A cohort study from a single private tertiary center. *Journal of Taibah University Medical Sciences* **18**, 383-389.

Freud, M., Djaldetti, M., De Vries, A., and Leffkowitz, M. (1960). Postcholecystectomy syndrome: a survey of 114 patients after biliary tract surgery. *Digestion* **93**, 288-293.

[Citation: Rizwan, M., Anwa, M.I, Laique, M.H., Mehmood, T., Javed, D., Askari, M.A., Abid, M.Z.U. (2023). Post-cholecystectomy syndrome; a study of 200 consecutive patients with gall bladder pathology who underwent laparoscopic cholecystectomy. *Biol. Clin. Sci. Res. J.*, **2023***: 606.* doi: https://doi.org/10.54112/bcsrj.v2023i1.606]

Georgescu, D., Caraba, A., Ionita, I., Lascu, A., Hut, E. F., Dragan, S., Ancusa, O. E., Suceava, I., and Lighezan, D. (2022). Dyspepsia and gut microbiota in female patients with postcholecystectomy syndrome. *International Journal of Women's Health*, 41-56.

Girometti, R., Brondani, G., Cereser, L., Como, G., Del Pin, M., Bazzocchi, M., and Zuiani, C. (2010). Post-cholecystectomy syndrome: spectrum of biliary findings at magnetic resonance cholangiopancreatography. *The British journal of radiology* **83**, 351-361.

Goyal, R. K., and Chaudhury, A. (2008). Physiology of normal esophageal motility. *Journal of clinical gastroenterology* **42**, 610.

Isherwood, J., Oakland, K., and Khanna, A. (2019). A systematic review of the aetiology and management of post cholecystectomy syndrome. *The Surgeon* **17**, 33-42.

Jaunoo, S., Mohandas, S., and Almond, L. (2010). Postcholecystectomy syndrome (PCS). *International journal of surgery* **8**, 15-17.

Larmi, T., Mokka, R., Kemppainen, P., and Seppälä, A. (1975). A critical analysis of the cystic duct remnant. *Surgery, Gynecology & Obstetrics* **141**, 48-52.

Lum, Y. W., House, M. G., Hayanga, A. J., and Schweitzer, M. (2006). Postcholecystectomy syndrome in the laparoscopic era. *Journal of Laparoendoscopic & Advanced Surgical Techniques* **16**, 482-485.

Madacsy, L., Dubravcsik, Z., and Szepes, A. (2015). Postcholecystectomy syndrome: from pathophysiology to differential diagnosis-a critical review. *Pancreat Disord Ther* **5**, 2.

Mertens, M. C., Roukema, J. A., Scholtes, V. P., and De Vries, J. (2010). Trait anxiety predicts unsuccessful surgery in gallstone disease. *Psychosomatic medicine* **72**, 198-205.

Muller, E. L., Lewinski, M. A., and Pitt, H. A. (1984). The cholecysto-sphincter of Oddi reflex. *Journal of Surgical Research* **36**, 377-383.

Saleem, S., Weissman, S., Gonzalez, H., Rojas, P. G., Inayat, F., Alshati, A., and Gaduputi, V. (2021). Post-cholecystectomy syndrome: a retrospective study analysing the associated demographics, aetiology, and healthcare utilization. *Translational Gastroenterology and Hepatology* **6**.

Schofer, J. M. (2010). Biliary causes of postcholecystectomy syndrome. *The Journal of emergency medicine* **39**, 406-410.

Shirah, B. H., Shirah, H. A., Zafar, S. H., and Albeladi, K. B. (2018). Clinical patterns of postcholecystectomy syndrome. *Annals of Hepato-biliary-pancreatic Surgery* **22**, 52.

Skalicky, M. (2011). Dynamic changes of echogenicity and the size of the papilla of Vater before and after cholecystectomy. *Journal of International Medical Research* **39**, 1051-1062.

Thieu, H., Dat, B. B., Nam, N. H., Reda, A., Duc, N. T., Alshareef, A., Nguyen, J. G., Ngoc, N. M., and Huy, N. T. (2020). Antibiotic resistance of Helicobacter pylori infection in a children's hospital in Vietnam: prevalence and associated factors. *Minerva medica* **111**, 498-501.

Thurley, P. D., and Dhingsa, R. (2008). Laparoscopic cholecystectomy: postoperative imaging. *American Journal of Roentgenology* **191**, 794-801.

Webb, T. H., Lillemoe, K. D., and Pitt, H. A. (1988). Gastrosphincter of Oddi reflex. *The American journal of surgery* **155**, 193-198.

Womack, N. A., and Crider, R. L. (1947). The persistence of symptoms following cholecystectomy. *Annals of surgery* **126**, 31.

[Citation: Rizwan, M., Anwa, M.I, Laique, M.H., Mehmood, T., Javed, D., Askari, M.A., Abid, M.Z.U. (2023). Post-cholecystectomy syndrome; a study of 200 consecutive patients with gall bladder pathology who underwent laparoscopic cholecystectomy. *Biol. Clin. Sci. Res. J.*, **2023***: 606.* doi: https://doi.org/10.54112/bcsrj.v2023i1.606]