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Original Research Article

Prevalence of gallbladder pathology: a four-year experience at a secondary care hospital in Mexico city

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ABSTRACT

Background: Biliary tract diseases represent a common cause of medical consultation and surgical intervention in Mexico, with a rising incidence. Elective cholecystectomy is among the most frequently performed surgical procedures in secondary care hospitals, reflecting the significant clinical burden of this pathology.
Methods: A retrospective, descriptive and observational study was conducted in a secondary care hospital, including 12,475 patients. Demographic data, diagnoses, types of surgical intervention and the conversion rate from laparoscopic to open cholecystectomy were analyzed.
Results: The prevalence of biliary disease in the study population was 7.79%. The conversion rate from laparoscopic to open surgery ranged from 2.6% to 18%, depending on the specific diagnosis and the surgical team's experience. Acute cholecystitis and pyocolecyst were identified as the main factors increasing technical difficulty due to severe inflammation and an elevated risk of biliary tract injury, leading to conversion to open surgery. These findings underscore the complexity involved in surgically managing certain biliary conditions.
Conclusions: The high prevalence of biliary pathology and the considerable conversion rate highlight the necessity for careful clinical and surgical evaluation, as well as the importance of experienced surgeons to optimize management and reduce complications.

Keywords: Cholecystitis, Gallbladder pathology, Laparoscopic cholecystectomy, Prevalence

INTRODUCTION

During the 18th and 19th centuries, advances in pathological anatomy and surgery facilitated a better understanding of gallbladder diseases. A significant milestone occurred in 1882 when Karl Langenbuch performed the first open cholecystectomy in Berlin, marking the beginning of modern surgical treatment for gallbladder pathologies.[1] Throughout the 20th century, the refinement of surgical techniques and the development of imaging modalities such as ultrasonography, cholangiography and later computed tomography, facilitated more precise and earlier diagnosis of biliary diseases.[2] According to data from the global burden of disease study 2019, the estimated global prevalence of gallbladder and biliary tract diseases was approximately 193 million cases.[3] The diagnosis is established through clinical evaluation, which includes constant colicky pain in the right upper quadrant and localized signs of inflammation and peritonitis in the same area, accompanied by a positive Murphy's sign (Figure 1).

This clinical assessment is further supported by ultrasonographic findings (Figure 2).[4] Symptoms typically result from the ingestion of high-fat foods. Associated symptoms may include nausea, chills, abdominal distension and diarrhea. Uncomplicated biliary

colic usually resolves spontaneously within 30 minutes to six hours. Treatment is predominantly surgical, preferably performed within 24 to 48 hours of admission, with early intervention favored over delayed or interval surgery. Up to 20% of cases require emergency surgery to manage gangrenous cholecystitis or gallbladder perforation. Various epidemiological studies have reported that between 10% and 15% of adults in the United States have cholelithiasis, corresponding to an estimated 20 to 25 million diagnosed patients.

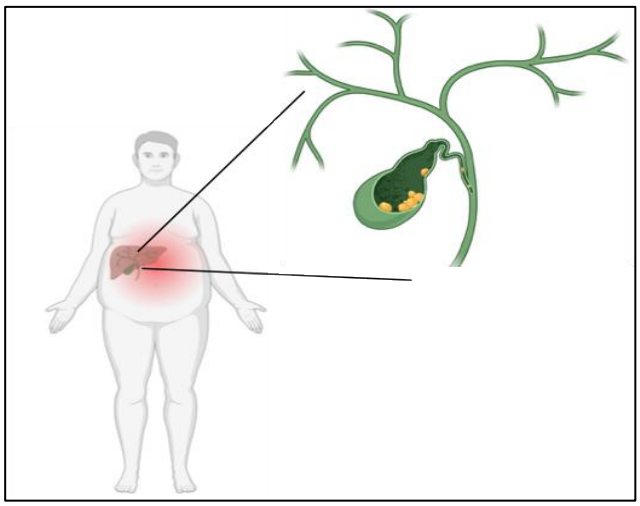

Figure 1: Anatomy of the extrahepatic biliary tract illustrating the location of calculi in the gallbladder, cystic duct and their extension into the common bile duct.

From a clinical perspective, this high prevalence constitutes a substantial burden on healthcare systems, particularly regarding surgical demand, imaging diagnostics and postoperative follow-up.[5] Concurrently, population surveys in Europe reveal a prevalence ranging from 5.9% to 21.9%, while in Asia, data varies between 3% and 20%, with significantly lower rates reported in sub-Saharan African regions. These variations reflect the influence of dietary, genetic and socioeconomic factors on the development of biliary pathology. In the United States, it is estimated that over 700,000 procedures are performed annually, with laparoscopic surgery being the preferred surgical approach.[6,7]

Therefore, it is imperative to analyze the prevalence and incidence of biliary pathology in Mexico. The risk factors and population characteristics are well documented in the literature. This information will enable optimization of medical care, reduction of hospital overload and guide necessary changes in the structure and functioning of surgical services, aligning them with the actual needs of the population.

METHODS

This was a descriptive, retrospective, cross-sectional and observational study conducted at Hospital Sanatorio Durango. The study period extended from January 1, 2014, to December 31, 2018. We included all patients admitted to the surgical service during this period with a confirmed surgical pathology diagnosis. The patient selection criteria consisted of all surgical service admissions recorded within the study timeframe, regardless of age, sex or specific diagnosis, as long as a surgical pathology was documented in the patient records. Records lacking essential clinical data were excluded from the analysis.

Data collection was performed by reviewing 12,475 patient medical records from the hospital archive. Information on demographics, surgical diagnoses, procedures performed and outcomes was extracted and entered into a coded database to maintain patient confidentiality. Patient identifiers were anonymized by assigning unique case numbers accessible only to the research team. Ethical approval for this retrospective study was obtained from the hospital's Ethics and Research Committee prior to data collection. Given the retrospective nature and use of anonymized data, the study posed no risk to patients. Procedures to safeguard personal data included coding identifiers and restricted access to the database. Data were securely stored on the principal investigator's computer with limited access to authorized personnel. These ethical considerations are detailed in the Declarations section.

Statistical analysis was carried out using appropriate descriptive statistics. Continuous variables were summarized by means and standard deviations or medians and interquartile ranges, as appropriate. Categorical variables were presented as frequencies and percentages. The data analysis was performed using IBM SPSS Statistics V21.0.

RESULTS

If more translation or refinement is needed, please provide additional text. The gallbladder is visualized with a nodular, echogenic image projecting a posterior acoustic shadow, located in the gallbladder neck, along with thickening of the gallbladder wall. This thickening is characterized by the presence of the double-rail sign and increased echogenicity. In image A, corresponding to a transverse section, the characteristic double-rail pattern of inflammatory gallbladder wall thickening is clearly identified.

Image B shows a longitudinal view where an impacted stone is seen in the gallbladder neck. In image C, also in the longitudinal plane, the acoustic shadow caused by the stone located in the gallbladder neck is observed. Image D displays increased Doppler signal corresponding to the cystic artery. These findings are consistent with cholecystitis and gallstone disease, demonstrating active inflammation and obstruction at the gallbladder neck. The combination of wall thickening, double-rail sign, and increased Doppler vascularization suggests an acute

inflammatory process with local hemodynamic impact (Figure 2).

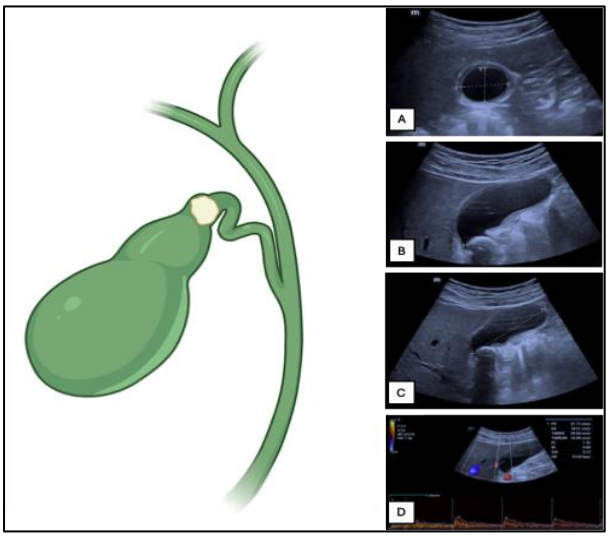

Figure 2 (A-D): Characteristic ultrasonographic findings of lithiasis and acute cholecystitis in the gallbladder.

Percentage distribution by gender of patients treated at Sanatorio Durango during the period from 2014 to 2018. Females represent 69% of the patients, depicted in orange, while males account for 31%, shown in blue. The visualization highlights a higher frequency of care for women compared to men during this timeframe (Figure 3).

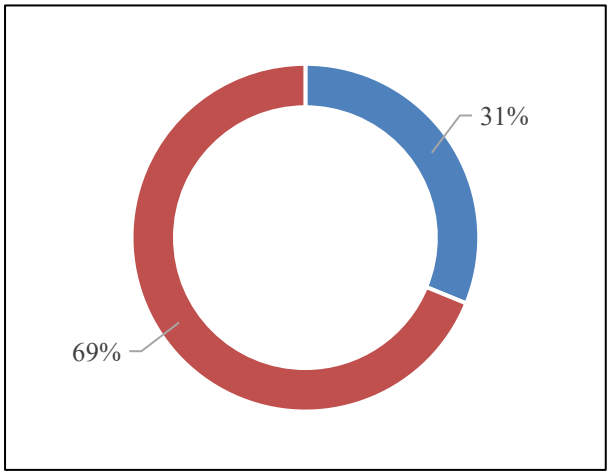

Figure 3: Gender distribution of patients treated at Sanatorio Durango, 2014–2018.

This bar chart represents the annual distribution of biliary pathology cases diagnosed in patients at Sanatorio Durango during the period from 2014 to 2018. The visualization allows observation of temporal trends in the incidence of this disease, facilitating the identification of interannual variations in the clinical burden of biliary pathology. The values represent the absolute number of patients per year, serving as a key tool for evaluating the epidemiological evolution within this hospital population (Figure 4).

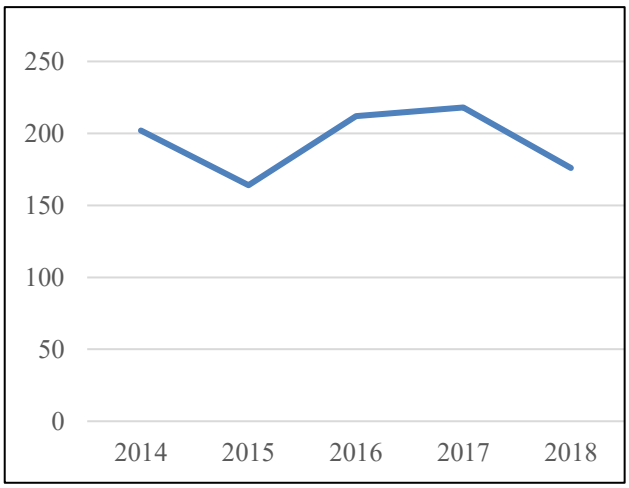

Figure 4: Annual frequency of biliary pathology in patients treated at Sanatorio Durango, 2014–2018.

The frequency of different types of surgical morbidity recorded in patients treated at Sanatorio Durango during the period 2014–2018. There were 668 cases of chronic calculous cholecystitis (CCL), 369 cases of acute exacerbation of chronic calculous cholecystitis, 114 cases of hydrocholecyst, 88 cases of pyocolecyst, and 4 cases of biliary tract disruption. These complications represent significant postoperative adverse events that affect clinical outcomes and require appropriate management to minimize risks. Analyzing these frequencies contributes to evaluating the surgical morbidity burden in this population and highlights the need to optimize surgical strategies and perioperative care (Figure 5).

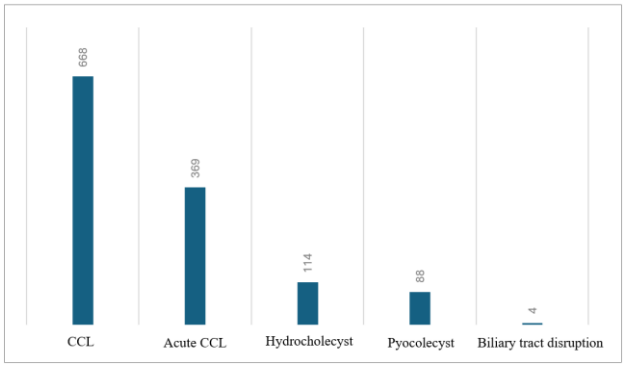

Figure 5: Frequency of surgical morbidity in patients at Sanatorio Durango, 2014–2018.

From a total of 12,475 patient records analyzed, the following results were obtained for patients treated at Sanatorio Durango between 2014 and 2018. Females comprised 69% of the study population, while males accounted for 31% (Figure 3). The prevalence of biliary pathology was 7.79%, with 31.2% male and 38.8% female patients affected (Figure 4). The mean age was

50.59 years, ranging from 10 to 96 years. The average weight was 73.53 kg, with a minimum of 40 kg and a maximum of 147 kg. Among the recruited patients, 669 were female (68.8%), 174 (17.9%) had a diagnosis of diabetes mellitus, 27.2% (264 patients) had systemic arterial hypertension and 66 (6.8%) presented with dyslipidemia.

The detailed anatomy of the extrahepatic biliary tract, highlighting the main structures: the gallbladder, cystic duct, and common bile duct. It also depicts the areas with the highest presence of calculi (gallstones), located in various anatomical regions including the gallbladder, cystic duct, and common bile duct. The image facilitates the understanding of the spatial distribution of stones and their potential impact on the pathophysiology and surgical management of biliary pathology (Figure 1).

Regarding surgical interventions, the majority of procedures were performed laparoscopically (85.4%), with a 2% conversion rate to open cholecystectomy. Open cholecystectomy accounted for 14.6% of surgeries (142 cases). Of the 972 surgeries performed, 96.9% were total cholecystectomies and 3.1% were partial. The most common postoperative findings among surgical patients were chronic calculous cholecystitis (68.7%), acute exacerbation of chronic calculous cholecystitis (38%), hydrocholecyst (11.7%) and pyocolecyst (9.1%). In the overall sample, postoperative findings included cholelithiasis (88.5%), chronic calculous cholecystitis (93%), acute exacerbation of chronic calculous cholecystitis (16.8%), cholesterolosis (25.8%), porcelain gallbladder (0.7%), gallbladder polyps (2.3%) and incidental cancer (0.6%) (Figure 5).

DISCUSSION

The observed prevalence of 7.79% aligns with the global biliary pathology prevalence of 6.1%, as estimated by Bejarano et al. The burden of gallbladder diseases in Mexico is estimated at 14%, which may be attributed to specific population characteristics such as age, gender, comorbidities or diagnostic criteria.[8]

It is noteworthy that 68.8% of the sample were female, resulting in a female-to-male ratio of 2.2:1. This female predominance is consistent with the medical literature, which indicates that women have twice or more the risk of developing gallstone disease compared to men. This disparity is attributed to hormonal factors such as estrogen, which increases cholesterol secretion in bile and progesterone, which reduces gallbladder motility. Additional well-established risk factors include pregnancy, oral contraceptive use and hormone replacement therapy.[9-14] The conversion rate from laparoscopic to open surgery varies between 2.6% and 18%, depending on the type of pathology and the surgical team's experience, according to various series and reports.[15-17] Furthermore, acute cholecystitis and pyocolecyst are the primary factors necessitating conversion due to technical difficulty, severe inflammation and increased risk of biliary injury. This body of evidence allows us to conclude that cases prompting surgical approach conversion correspond to those with greater clinical severity, thereby reinforcing international criteria regarding surgical conversion. Additionally, the findings observed in this population may enrich the national understanding by identifying local factors that influence surgical practice in biliary pathology.

CONCLUSION

The prevalence of biliary pathology in the studied sample was 7.79%, a value consistent with the global prevalence. This suggests that local variables such as age, gender, comorbidities and diagnostic criteria significantly influence the clinical and epidemiological expression of the disease. A female predominance was identified, aligning with international literature associating gallstone disease with the female sex. The results indicate that open surgery remains a viable and necessary option for selected cases, particularly in the presence of advanced acute or chronic complications. Local data analysis contributes valuable insights for the development of context-specific surgical protocols.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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