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Original Research Article

Histopathological Spectrum of Lesions in Gall Bladder in Cholecystectomy Specimens in North West Rajasthan

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Abstract:

Background: Gallbladder diseases represent a common clinical and pathological condition, frequently encountered in surgical practice. These conditions range from benign non-neoplastic lesions, such as cholecystitis, to malignant neoplasms, including adenocarcinoma. Comprehensive histopathological examination of cholecystectomy specimens is essential for diagnosis and management.

Methods: This retrospective study analyzed 1,086 cholecystectomy specimens received over three years at Sardar Patel Medical College, Bikaner. Gross and microscopic features were evaluated, focusing on non-neoplastic and neoplastic lesions. Clinical and demographic data were also collected and analyzed.

Results: The mean age of patients was 45.93 ± 14.95 years, with the majority (49.42%) in the 41–60 age group. A significant female predominance was noted, with a female-to-male ratio of 3.9:1. Non-neoplastic lesions comprised 98.5% of cases, with chronic non-specific cholecystitis being the most prevalent (82.6%). Rare findings included xanthogranulomatous cholecystitis (4.9%) and eosinophilic cholecystitis (1.2%). Neoplastic lesions were identified in 1.5% of cases, predominantly adenocarcinomas (66.7%). A significant association between increased gallbladder wall thickness and malignancy was observed.

Conclusion: Chronic non-specific cholecystitis was the most common histopathological diagnosis, with a clear female predominance and peak incidence in the fifth to seventh decades of life. Gallbladder carcinoma, though rare, exhibited significant associations with gallstone presence and increased wall thickness. This study emphasizes the critical importance of thorough histopathological examination of all cholecystectomy specimens to ensure accurate diagnosis and early detection of malignancies.

Keywords: Cholecystectomy, Adenocarcinoma gallbladder, Eiosinophilic cholecystitis.

Introduction

Gallbladder diseases are frequently encountered in both surgical and medical outpatient departments (OPDs). The hallmark symptoms include biliary pain in the epigastrium and right upper quadrant of the abdomen, often radiating to the interscapular region, right scapula, or shoulder. These symptoms are typically accompanied by nausea, vomiting, jaundice, anorexia, fever, and chills. [1]

Gallbladder pathologies can be broadly classified into non-neoplastic and neoplastic lesions.

- **Non-neoplastic lesions** include congenital abnormalities such as choledochal cysts, atresia, multiseptated gallbladder, and pharyngeal cap, as well as acquired conditions like chronic calculous cholecystitis, acute cholecystitis (with or without stones), follicular cholecystitis, and xanthogranulomatous cholecystitis.
- **Neoplastic lesions** encompass benign growths such as adenomas, adenomyomatosis, and inflammatory polyps, as well as malignant tumors, including epithelial and mesenchymal cancers. [2]

Cholelithiasis is the most common pathology of the gallbladder, frequently leading to cholecystitis and other complications. Gallstone disease remains one of the most prevalent conditions requiring surgical intervention. [3] Chronic cholelithiasis can induce a range of histological changes in the gallbladder mucosa, including acute and chronic inflammation, granulomatous changes, glandular hyperplasia, metaplasia, dysplasia, and even malignancy. [4]

Approximately 70–90% of gallbladder cancer cases are associated with a history of cholelithiasis. The prevalence of acute cholecystitis is significantly higher in individuals over 50 years of age, occurring in 20.9% compared to 6.3% in younger individuals. [5] Chronic calculus cholecystitis, characterized by fibrosis and inflammation, accounts for the majority of cholecystectomies performed. Risk factors for cystic duct stones include obesity, female gender, and age over 40, with 90% of cases linked to calculous cholecystitis and 10% to acalculous cholecystitis. [6] Benign lesions such as adenomas and inflammatory polyps are common, while malignant gallbladder tumors include adenocarcinomas, squamous cell carcinomas, small cell carcinomas, and sarcomas. Gallbladder polyps, detected in up to 4.5% of adults during ultrasonography, are mostly benign; however, larger polyps (≥10 mm) have a 37–55% risk of malignancy. [7]

Gallbladder adenomyomatosis is marked by epithelial proliferation, muscle hypertrophy, and mucosal outpouching, resembling Rokitansky-Aschoff sinuses. Initially identified as a potential precancerous condition, segmental adenomyomatosis has been implicated in an increased risk of gallbladder cancer. [7] Gall bladder adenomyomatosis was first identified as a precancerous lesion by Aldridge et al. [8] Later, it was claimed in a number of articles that segmental adenomyomatosis had a greater incidence rate and was the cause of gallbladder cancer.[9,10] Due to its vague clinical manifestation, gall bladder carcinoma, which ranks fifth among gastrointestinal malignant tumours, is rarely identified at an early stage.[11] Gallbladder carcinoma is the fifth most common gastrointestinal malignancy, typically diagnosed at advanced stages due to its nonspecific symptoms. It predominantly affects individuals over 70 years of age and arises from chronic inflammation. [12] This aggressive cancer often invades neighboring organs, such as the liver, resulting in a poor prognosis. [13] Histological evidence of gallbladder cancer is found in 0.3–1.5% of cholecystectomy specimens. [14] In 15–30% of cases, malignancy is only identified postoperatively through microscopic examination. Ultrasonography is a valuable initial tool for detecting bile duct obstruction and other abnormalities. Advanced imaging modalities such as endoscopic ultrasonography, CT, MRI, and magnetic resonance cholangiopancreatography are crucial for differential diagnosis and assessing tumor extent. Histopathological examination of cholecystectomy specimens remains the gold standard for diagnosing malignancies and distinguishing benign from malignant lesions.

Our study aims to assess the prevalence of various histological changes in cholecystectomy specimens and underscore the importance of histopathological analysis in the diagnostic evaluation of gallbladder diseases.

Methods

This is a retrospective study of 3 years duration, from January 2020 to December 2023 at Department of Pathology, Sardar Patel Medical College, and Bikaner. The cholecystectomy specimens received at Department of Pathology at Sardar Patel Medical College and associated group of hospital; Bikaner constituted the sample for study. Autolyzed specimens and inadequate and poorly preserved resected specimen were excluded from the study. Patient's clinical data comprising of clinical features & laboratory investigation reports were collected from medical records in surgically resected specimens. Cholecystectomy specimens received were examined grossly for presence of pus, fibrin, hemorrhage, hyperemia, perforation, and presence of any localized lesion. Measurement of the specimen were noted. The specimen was fixed in 10% buffered formalin overnight. After fixation, the specimen was sectioned, if gall stones are present as per protocol. Gross findings of the mucosa and any other gross lesions were noted. Sections were taken from the fundus, body and neck of the gallbladder. Additional sections were taken from abnormal appearing mucosa.

Data analysis: After entering data into Excel worksheet, it will be analyzed with the help of frequency, proportion, mean, standard deviation and tests of significance wherever applicable

Results

In the present study, a total of 1,086 cholecystectomy samples were analyzed. The mean age of the study population was 45.93 ± 14.95 years, with the majority of cases (439; 49.42%) falling in the 41–60 age group, followed by 430 cases (39.59%) in the 21–40 age group. A significant female predominance was observed, comprising 802 (81.1%) females and 205 (18.9%) males, resulting in a female-to-male ratio of 3.9:1.

Histopathological examination revealed that non-neoplastic cases were the most prevalent, accounting for 1,071 cases (98.5%). Malignant lesions were identified in 15 cases (1.5%), while only a single case was classified as benign. As summarized in Table 1, chronic non-specific cholecystitis was the most frequent diagnosis, observed in 885 cases (82.6%), followed by acute on chronic cholecystitis in 104 cases (9.7%). Less common findings included xanthogranulomatous cholecystitis (52 cases; 4.9%), eosinophilic cholecystitis (13 cases; 1.2%), and tubercular granulomatous cholecystitis (1 case; 0.1%).

Among the malignant cases, adenocarcinoma was the most frequently diagnosed subtype, present in 10 cases (66.7%), followed by papillary adenocarcinoma in 3 cases (20%) and mucinous adenocarcinoma in 1 case (6.7%).

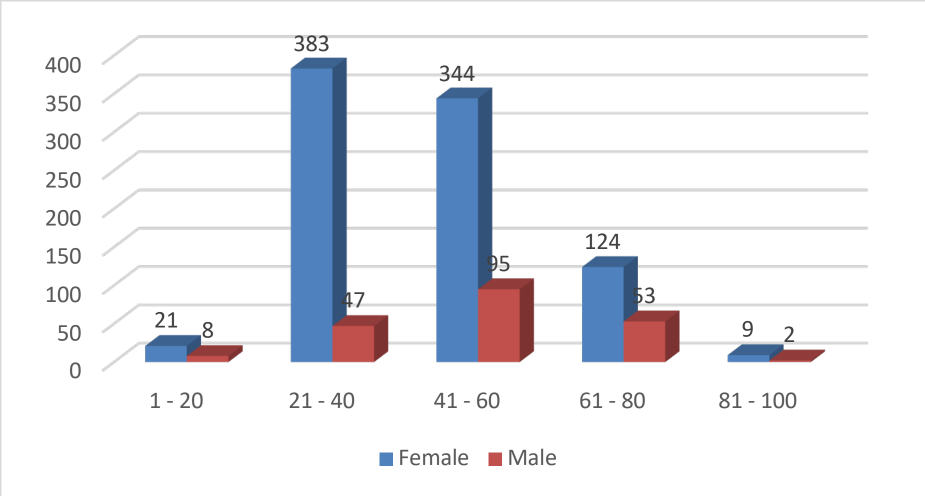


Figure 1: Age and gender wise distribution of cases.

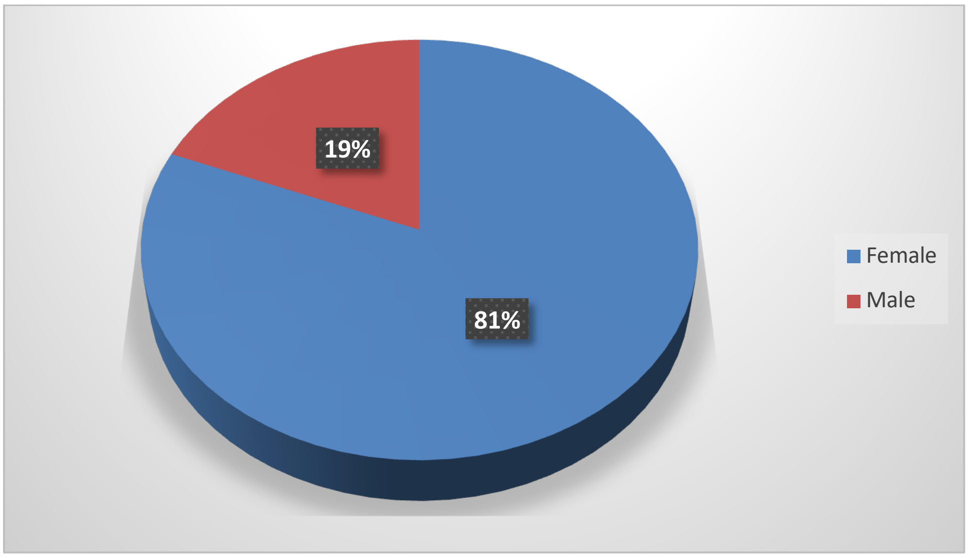


Figure 2: Male to female ratio in the present study.

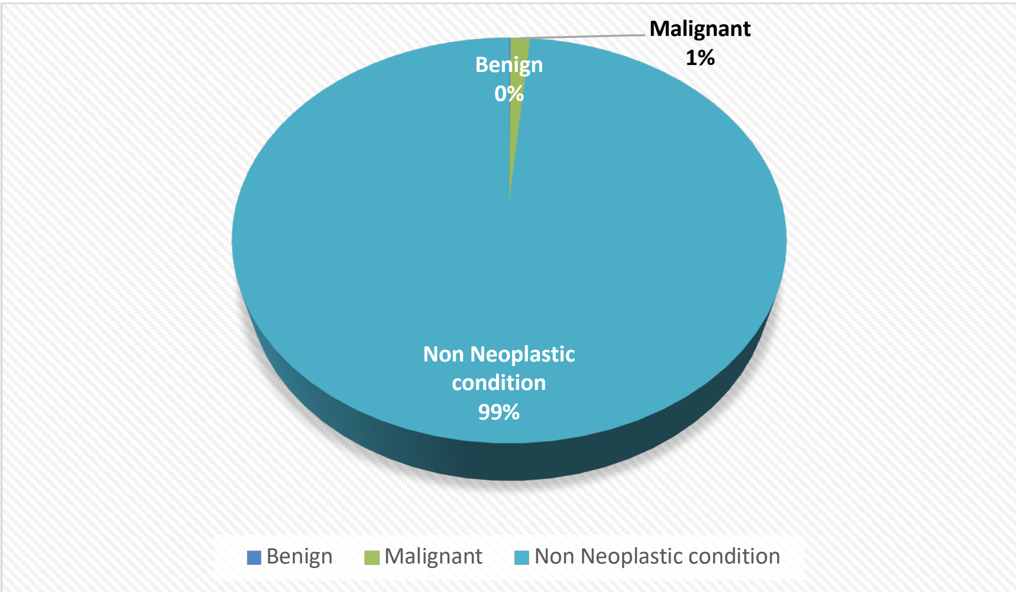


Figure 3: Distribution of cases according to category of lesion

Table 1: Histopathological diagnosis in present study

Type of Lesion	Diagnosis	No. of cases	Percent
Non Neoplastic condition	Acute on Chronic Cholecystitis	104	9.7%
	Chronic Non Specific Cholecystitis	885	82.6%
	Eosinophilic cholecystitis	13	1.2%
	Gangrenous Cholecystitis	1	0.1%
	Ischemic Cholecystitis	10	0.9%
	Necrotic Cholecystitis	4	0.4%
	Perforated gall bladder	1	0.1%
	Tubercular Granulomatous Cholecystitis	1	0.1%
	Xanthogranulomatous Cholecystitis	52	4.9%
	Total	1071	100.0%
Benign	Papillary Adenoma Biliary type with choledochal cyst	1	100.0%
	Total	1	100.0%
Malignant	Adenocarcinoma	10	66.7%
	Adenosquamous Carcinoma	1	6.7%
	Mucinous Adenocarcinoma	1	6.7%
	Papillary Adenocarcinoma	3	20.0%
	Total	15	100.0%

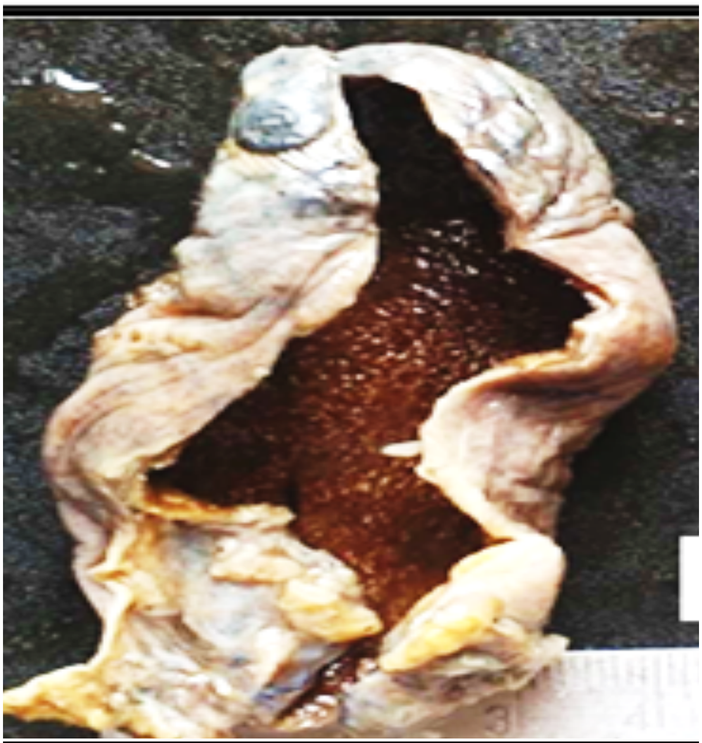
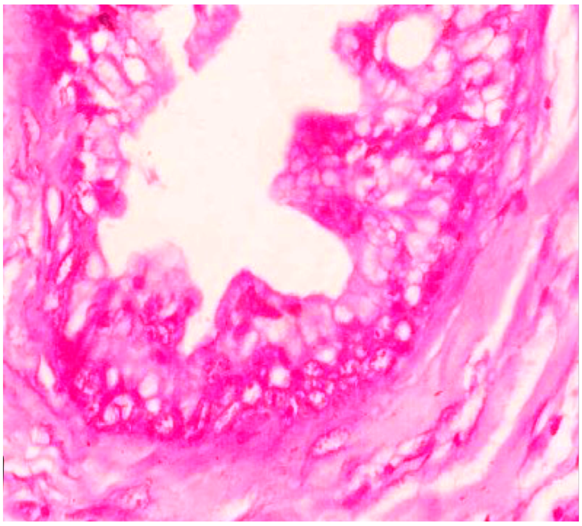


Figure 4: Gross appearance of Xanthogranulomatous Cholecystitis



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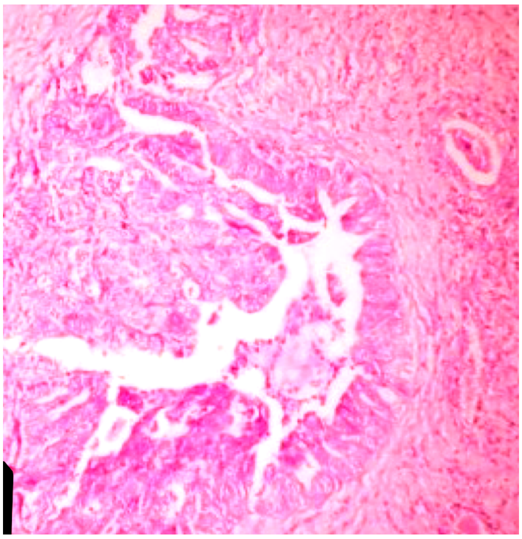

B

Figure 5 (A and B): Histopathological section of gall bladder showing Adenocarcinoma of the gallbladder with dysplastic mucosa, complex branching of the glandular structures and infiltration of tumour cells into muscularis propria (A, B: H&E stain-40x)

Discussion

The present study aimed to analyse the histopathological spectrum of surgically removed gallbladders, determine the age and sex distribution among patients with gallbladder lesions, and. A total of 1,086 cholecystectomy specimens were examined during the study period.

Demographics and Gender Distribution: Most (81.1%) of the cases in the present study were female patients, with a male-to-female ratio of 1:3.9. These findings are consistent with previous studies, such as Mondal B et al. [15], who reported a female predominance of 80.8% (male-to-female ratio of 1:4.2), and H Mohan et al. [16], with an even higher ratio of 1:6.4. However, studies by Beena D et al. [17] (1:1.2) and Awasthi N [18] (1:2.6) also demonstrated female predominance, albeit with lower ratios compared to our study. Overall, the results of these studies highlight the higher susceptibility of females to gallbladder diseases.

Age Distribution: The age of patients ranged from 1 year to 88 years, with a mean of 45.93 ± 14.95 years. The highest number of cases was observed in the 41–60 age group (439; 49.42%), followed by the 21–40 age group (430; 39.59%). These results are in agreement with studies by Awasthi N [18], Murmu S et al. [19], and Mittal R et al. [20], where most cases were found in the fifth decade of life. However, Mondal B et al. [15] reported a peak incidence in a younger age group (20–29 years).

Non Neoplastic lesions: Non-neoplastic conditions constituted the majority of cases in the present study (1,071; 98.5%). These included chronic non-specific cholecystitis (885; 82.6%), acute on chronic cholecystitis (104; 9.7%), xanthogranulomatous cholecystitis (52; 4.9%), eosinophilic cholecystitis (13; 1.2%), and tubercular granulomatous cholecystitis (1; 0.1%). This aligns with findings from Beena D et al. [17], (99.5%) Murmu S et al. [19] (98.1%), and Mittal R et al. [20] (98.23%).

The incidence of xanthogranulomatous cholecystitis in the present study (4.9%) is comparable to H Mohan et al. [16] (2.3%) and Mittal R et al. [20] (3.2%) but higher than Murmu S et al. [19] (0.94%) and Beena D et al. [17] (1%). Eosinophilic cholecystitis, a rare condition, was observed in 1.2% (13 cases) of the present study. This incidence is similar to H Mohan et al. [16] (0.5%) but higher than Sharma I et al. [22] (0.31%). Selvi TR et al. [23], however, reported a higher incidence (3.8%), possibly due to differences in sample size or study region.

Table 2: Comparison of incidence of non-neoplastic lesions in the present study with other studies

Study by	Total number of gallbladders studied	Total number of non-neoplastic gallbladders	Percentage
H Mohan et al [16]	1100	1086	98.72%
Beena D et al [17]	200	199	99.5%
Awasthi N [18]	732	732	100%
Murmu S et al [19]	106	104	98.1%
Mittal R et al [20]	1305	1282	98.23%
Present study	1087	1071	98.5%

Malignant Lesions and Gallstones

Malignant lesions accounted for 1.5% (15 cases) of the specimens, with adenocarcinoma being the most common subtype (66.7%; 10 cases). Other subtypes included papillary adenocarcinoma (20%; 3 cases) and mucinous adenocarcinoma (6.7%; 1 case). Female predominance was noted among patients with malignant lesions, with a female-to-male ratio of 3:1, similar to findings by Murmu S et al. [19].

The comparison of prevalence of malignant lesions in various previous studies is shown in Table 3.

Table 3: Comparison of incidence of gall bladder carcinoma in the present Study with other studies

Study by	No. of cases of malignant lesions	Percent
H Mohan et al [16]	12cases	1.09%
Beena D et al [17]	1case	0.5%
Awasthi N [18]	0cases	0
Murmu S et al [19]	2cases	1.88%
Mittal R et al [20]	13cases	1%
Sharma I et al [22]	22 cases	0.86%
Present study	30cases	1.35%

Conclusion

Gallbladder diseases exhibit a wide spectrum of histopathological presentations. This study aimed to evaluate the histological changes in both non-neoplastic and neoplastic lesions of the gallbladder. The majority of lesions were non-neoplastic, with chronic cholecystitis constituting the largest proportion. In line with previous research, this study demonstrated a clear female predominance. It can therefore be concluded that chronic cholecystitis is the most common diagnosis in female patients, particularly in the fifth to seventh decades of life. The incidence of gallbladder carcinoma in this study was 1.4%. The findings indicated a statistically significant association between increased gallbladder wall thickness and the presence of carcinoma, highlighting its potential as a predictive marker. This study underscores the importance of meticulous examination of all cholecystectomy specimens. Thorough sampling of thickened areas and any suspicious regions within the gallbladder is essential to ensure accurate diagnosis and avoid missing cases of gallbladder carcinoma.

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