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**Original Research Paper** 



Pathology

# HISTOMORPHOLOGICAL STUDY OF CHOLECYSTECTOMIES IN A TERITIARY CARE CENTER

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ABSTRACT Introduction: Cholecystectomy is the most common surgical procedure performed for cholelithiasis (gall stones). Cholelithiasis is one of the most common gastro intestinal disorder worldwide. Usually asymptomatic, but commonly encountered symptoms may be right upper quadrant pain, dyspepsia and belching. The incidence of cholelithiasis is 2-4 times more in women than in men. The aim of the present study is to identify various morphological patterns and frequency of gall bladder lesions in cholecystectomy specimens. Materials And Methods: The present study was a cross sectional descriptive study of all cholecystectomy specimens received in the department of pathology, NRI Institute of Medical Sciences, Sangivalasa, Visakhapatnam, Andhra Pradesh; conducted over a period of 12 months from September 2021 to August 2022. The relevant and detailed clinical history were taken and processing was done in these specimens for histopathological examination. Results: A total of 80 cholecystectomy specimens were received in the department. Out of which, 79 were inflammatory gall bladder lesions and only one case was reported as malignancy. The most common age group affected were in 4th to 5th decade with female preponderance comprising of 47cases (58.75%) while the gall bladder carcinoma was reported in 72 years of age. Among the inflammatory lesions, most common one was chronic cholecystitis comprising of 64 cases, 80.5% (63.6% associated with gall stones) were chronic cholecystitis, followed by 10 cases (12.5%) of acute cholecystitis (100% associated with gall stones), 2cases (2.5%) of polyps & Adenomyomatosis each. Only one case (1.25%) of each Cholesterolosis & gall bladder adenocarcinoma was reported. Conclusion: Chronic cholecystitis is the most common gall bladder disease for which cholecystectomies are being done. The present had reported various morphological patterns encountered in the cholecystectomy specimens received in the department.

**KEYWORDS**: Cholecystectomy, cholelithiasis, Eosinophilic cholecystitis, Lymphoeosinophilic cholecystitis, cholesterosis, Adenocarcinoma.

# INTRODUCTION:

Cholecystectomy is one of the most common surgeries performed. The indications for cholecystectomy vary from benign to neoplastic and include a range of pathologies from acute cholecystitis, chronic cholecystitis, adenomyomas, cholesterosis, metaplasia, dysplasia and frank carcinomas.

Cholelithiasis is the most common indication for elective cholecystectomy. The prevalence of cholecystectomies that were done due to cholelithiasis ranges from 2-29% in north India.  $^{\scriptscriptstyle [2,14]}$ 

Gallbladder carcinoma differs in different races and geographic regions<sup>(3,10)</sup>. The incidence is relatively common in North India, Pakistan, East Asia, Eastern Europe, and South America<sup>(7,3)</sup>. Various studies suggest that in India, there is female predominance in the incidence of gall bladder malignancy<sup>(4, 5)</sup>.

# MATERIAL AND METHOD:

This was a cross-sectional descriptive study of all cholecystectomy specimens received in the department of pathology over a period of 12 months from September 2021 to August 2022 in NRI Institute of Medical Sciences, Visakhapatnam, Andhra Pradesh. All cholecystectomy specimens that were received are included in the study irrespective of the preoperative diagnosis which includes both open and laproscopic cholecystesctomies. Detailed history and other investigations were obtained.

The specimens were received in 10% formalin. Proper fixation of gallbladder was done as the epithelium is susceptible to autolysis. The gross appearance of the gall bladder, presence or absence of any calculus and the colour of calculus, if present was noted. The sections given for histological study include cystic duct, three sections from fundus, body and neck of the gallbladder and lymph nodes when present. Additional sections were given from other gross lesions whenever required. The tissues were processed, paraffin embedding done and sections were stained with hematoxylin and eosin (H&E).

# **RESULTS:**

The total cholecystectomies received in the department over a period of one year was 80 cases. 79(98.75%) of these cases were inflammatory and 1(1.25%) was malignant.

# Sex distribution:

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Out of 80 cases, 47(58.75%) are females and 33(41.25%) are male. M:F ratio is 1:1.4 which shows female preponderance(Fig1).



Pie diagram1: Sex distribution of cases

Chronic cholecystitis was seen in 64 (80.5%) cases in which 37 (57.82%) are female and 27 (42.18%) are male in present study. 1 (1.25%) case each of Eosinophilic cholecystitis, lymphoeosinophilic cholecystitis and acute necrotizing cholecystitis were seen and all of them presented in males. Acute cholecystitis was seen in 10 (12.5%) cases, which shows equal preponderance in both males and females.

Gall stones (Table 1) are seen in 55(68.75%) cases, of these 33(60%) were females and 22(40%) were males. One (1.25%) male case with cholesterolosis and 2(2.5%) cases of polyps in female were observed. Only 1(1.25%) case of adenocarcinoma was found in the study.

# Table 1: Total number of cases associated with gall stones

Parameter	No. of cases	Percentage (%)
Cases with gall stones	55	68.75
Cases without gall stones	25	31.25
Total	80	100

Most of the cases in present study diagnosed as chronic cholecystitis followed by acute cholecystitis on histopathological examination (Table 2)

# Table 2: Incidence of different conditions in present study

S.No	Histological diagnosis	Incidence
1	Chronic cholecystitis	80.5%
2	Acute cholecystitis	12.5%
3	Cholesterolosis	1.25%
4	Polyps	2.5%
5	Adenomyomatosis	2.5%
	Gall bladder carcinoma	1.25%

# Cholelithiasis:

In present study, 68.75% of cases are with gall stones that are seen in association of 100% with acute cholecystitis and acute necrotizing cholecystitis, eosinophilic cholecystitis, 63.6% with chronic cholecystitis, 50% with polyps.

#### Cholesterolosis:

In present study only 1 (1.25%) case was seen which also had co existent features of chronic cholecystitis.





Fig 1A, 1B: Photomicrographs show lipid laden macrophages in mucosal villi (H&E ; 2A-10x, 2B-40x)

#### Acute cholecystitis:

It may occur with stone impaction or without stones. In present

study 12.5% acute cholecystitis cases are detected and all are associated with gall stones.

### Chronic cholecystitis :

In the present study 80.5% cases of chronic cholecystitis was detected with a female preponderance. 63.6% are associated with gall stones. Most of the cases show Rokitansky-Aschoff sinuses. Fibrosis is also seen in 95% cases.

n our study 1(1.25%) case noted in male and not associated with stones (Fig 4). In present study 1(1.25%) case of eosinophilic cholecystitis noted in male patient along with gall stones association.



Fig 2: Photomicrograph shows Rokitansky-Aschoff sinuses in chronic cholecystitis (H&E; 10x)



Fig 3A, 3B: Photomicrographs show lympho-eosinophilic infiltration in gall bladder wall (H&E; 3A-40x, 3B-40x)



Fig 4: Photomicrograph shows eosinophilic infiltrate in gall bladder

# Polyps:

The terms mucosal hyperplasia, hyperplastic polyp, villous hyperplasia and inflammatory polyp and are most commonly seen in chronic cholecystitis. These are benign and incidentally detected (Fig6). In present study 2.5% polyp cases are identified and both are inflammatory polyps. Of these 1(50%) case is associated with calculi.





Fig 5A,5B : Photomicrographs show polyp composed of inflammatory cells and hyperplastic mucosal glands

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# Adenomyomatosis:

In our study 2 (2.5%) cases of adenomyomatosis were identified among them, 1(50%) case was associated with choledochal cyst.



Fig 6: Photomicrograph shows cystically dilated glands and muscle hypertrophy

# Carcinoma gall bladder :

Only one(1.25%) case observed in our institute out of 80 cases which is seen in female and not associated with gall stones.



Fig 7A,7B: Photomicrographs show tumor cells arranged in glandular and solid pattern, moderate loss of glandular architecture and necrotic areas

# DISCUSSION:

In total 80 cases of cholecystectomies received in our institute in one year study, except 1 case remaining 79 (98.7%) cases are inflammatory cases. Only 1(1.3%) case of Adeno carcinoma Gallbladder was detected, This is similar to studies done by Kumar et al (1.25%)<sup>[13]</sup> and Brajesh et al<sup>[3]</sup> (2.5%). The mean age of presentation in this study is 49.5 years which is similar to studies done by Smitha et al<sup>[6]</sup> (50 years) and Roshan et al<sup>[7]</sup>. (48.2 years) Female preponderance (58.75%) is seen which is similar to studies done by Gaharwar et al<sup>[11]</sup> and Smitha et al.

### Cholelithiasis:

Gallstones are a major cause of morbidity and mortality throughout the world. They may be associated with acute cholecystitis, chronic cholecystitis with its variants, and carcinoma gallbladder<sup>[1]</sup>. Cholelithiasis produces a series of pathological changes like hyperplasia, metaplasia and dysplasia which may leads to gallbladder cancer <sup>[9,11]</sup>. Higher incidence in women may be due to risk factors like body weight, child bearing and estrogens. The incidence increases with age, possibly due to progressive increase in the secretion of biliary cholestrol.

In present study, 68.75% of cases are with gall stones similar to studies done by Kumar et al (80.25%) and Amandeep et al (80%)<sup>(1)</sup>.

# Chronic cholecystitis:

Most cases of chronic cholecystitis show chronic inflammation, and it may vary greatly in severity and distribution. Grossly enlarged, shrunken or of normal size, wall is markedly thickened. Microscopically Rokitansky-Aschoff sinuses are characteristic feature (Fig3), inflammatory cells and fibrosis are seen<sup>[2,4]</sup>. Hyperplastic and metaplastic changes and hypertrophy of the muscularis may be present with longstanding disease<sup>[4,5]</sup>. Most of cases in present study were chronic cholecystitis whose incidence was 80.5%, whereas studies done by Smitha et al (88.67%) and Kumbhakar D et al (86.25%)^{\tiny [8]}.

Lympho-eosinophilic cholecystitis is characterized by significant lymphocytic component, at least 50% of infiltrate composed of eosinophils<sup>[5,6]</sup>. Eosinophilic cholecystitis is a rare, usually acalculous and associated with hypersensitivity reactions<sup>[5]</sup>. Exclusive eosinophils as primary inflammatory are seen (Fig5). Incidence of eosinophilic cholecystitis low in India and most of studies show 0.25 to 6.4%, whereas in this study 1.25 % were identified and in study done by Roshan et al has 0.7%.

# Cholesterolosis:

In this condition gall bladder shows accumulation of lipid within macrophages in lamina propria. Grossly linear yellow streaks are seen in mucosal ridges, surrounded by congested mucosa(Fig 2). Microscopically lipid filled foamy cells are seen in villi<sup>[24,5]</sup>. Cholestrolosis (1.25%) in our study considered as low compared to studies done by Roshan et al (6.7%) and Mohan et al<sup>[14]</sup> (10.1%).

# Acute cholecystitis:

Three types : calculous, acalculous and emphysematous. Grossly, enlarged , distended, wall thickened and hemorrhagic foci are seen. Histologically, edema, congestion, hemorrhage, fibrin and mucosal ulceration are seen<sup>[4,5,13]</sup>. Not only neutrophils, other inflammatory cells composed of lymphocytes, eosinophils and pigment laden macrophages may also seen.

Acute necrotizing cholecystitis seen in elderly, critically ill, post operative and trauma patients. Histologically present as necrosis with mixed inflammatory cells, epithelial atypia may present<sup>(4.5)</sup>. Acute cholecystitis in our study were 12.5% cases which are more compared to studies done by Kumar et al (6%) and Roshan Verma et al (9.7%).

### Adenomyomatosis:

Adenomyomatosis(Fig 7) is a condition in which diffusely involved trabeculated thickening of gall bladder wall, cystically dilated glands and hypertrophic smooth muscle, epithelium may show metaplastic changes<sup>(4,5)</sup>. The incidence of Adenomyomatosis in present study was 2.5% in constrast to study done by Roshan et al (0.1%).

# Gall bladder Polyps:

Gall bladder Polyps are of following types: Mucosal injury polyps, cholesterol polyps, other rare specific types polyps. Mucosal injury polyps are: Fibromyoglandular polyps, Polypoid pyloric gland metaplasia, inflammatory polyps and stromal polyps. Rare specific type include: Inflammatory fibroid polyp, Hamartomatous polyp, Heterotropias<sup>[16,17]</sup>.

# Carcinoma gall bladder:

Gallbladder carcinoma is a rare but fatal disease characterized by poor prognosis and absence of effective therapy carcinoma and is the commonest malignancy of the biliary tract. The reported incidence of carcinoma in India varies from 4.4 to 12.4%. Gallstones appear to be the most important risk factor, being reported in 70- 98% cases of gallbladder cancer, a far higher prevalence than that in age matched general population.

Despite the strong association between carcinoma and presence of gallstones, relationship between gallstones and carcinoma has not been established. Only 1-3% of patients with gallstones develop carcinoma and many patients without gallstones develop carcinoma. The median survival in most cases is less than 6 months<sup>[14]</sup>.

Patients of gall bladder carcinoma normally present in

females and present with right upper quadrant pain, anorexia and elevated alkaline phosphatase. But in our case patient present with obstructive jaundice and pruritis<sup>[9,10]</sup>.

Transmural penetration of adenocarcinoma is common and tumor extends into the sub serosal or adventitial connective tissue readily due to the thin wall of the gallbladder, may invade the liver and adjacent structures by direct extension<sup>12</sup> In our case liver is involved and lymph nodes are involved

Histologically, the most common carcinoma is adenocarcinoma NOS, followed by papillary adenocarcinoma. Other uncommon variants include:intestinal type, mucinous, clear cell, signet ring, adeno-squamous, squamous cell, small cell and undifferentiated carcinomas<sup>[10]</sup>. In our study it is moderately differentiated adenocarcinoma(Fig 8).

Carcinoma gall bladder incidence in our study is 1.25%, similar to Kumar et al (1.25%) whereas 2.3% in study by Roshan et al.

# CONCLUSION:

Various diseases were identified in gall bladders received in the department. Every gall bladder after cholecystectomy should be studied by histopathological examination. Adequate sectioning is required in cases to assess epithelial changes arising from cholelithiasis and chronic cholecystitis which may progress to dysplasia or even into malignancy. This study highlights the commonest pathologies and some uncommon diseases that may be found in one of the commonest specimens received in pathology.

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