Section: Pathology

Original Research Article

HISTOPATHOLOGICAL SPECTRUM OF GALLBLADDER IN CHOLECYSTECTOMY SPECIMENS IN A TERTIARY CARE CENTER IN NORTH-EAST INDIA

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ABSTRACT

Background: Cholecystectomy is one of the most common elective surgeries globally. Microscopic examination of the gall bladder tissue reveals a surprising spectrum of diseases that cannot be detected by imaging and clinical examination. **Materials and Methods:** A retrospective study was conducted in our center where 1642 cholecystectomy specimens were analysed. Histopathological findings and demographic data were noted. Data was analysed using SPSS software. **Result:** Gallstones were reported in 1514 (92.2%) cases. The most common histopathological finding was chronic cholecystitis, seen in 832 (50.7%) patients followed by cholesterolosis seen in 451(27.5%) patients. Dysplasia was seen in 25(1.5%) and carcinoma in 9(0.5%) patients. **Conclusion:** Not all cholecystitis is the same. Histopathology distinguishes between rarer variants, premalignant and malignant lesions. Early detection of malignant lesions incidentally through histology helps in improving prognosis.

INTRODUCTION

Cholecystectomy is one of the most common elective surgeries globally. It is usually performed to treat symptomatic gallstones and their complications. Various pathologies can afflict the gall bladder including inflammatory, premalignant and malignant.[1] Microscopic examination of the tissue reveals a surprising spectrum of diseases that cannot be detected by imaging alone. Inflammatory conditions of the gall bladder are found to be more common than other GB pathologies, and cover a broad array of findings like acute, chronic, follicular, or xanthogranulomatous cholecystitis (XGC).[2,3] Gall bladder carcinoma is relatively rare but the more common entities like chronic cholecystitis can be a harbinger of metaplastic and dysplastic transformations and the future development of carcinoma.[4] Due to the possibility of a clinically silent and radiologically invisible premalignant or malignant lesion in the gall bladder, detailed histopathological examination holds a key place in the management of gall bladder disease other than mere surgical resection.[2]

MATERIALS AND METHODS

A retrospective study was conducted in our center where 1642 cholecystectomy specimens collected from the year 2023 to 2025 were analysed. Histopathological findings and relevant clinical and demograhic findings were noted. Data was analysed using SPSS software version 22.0, and R environment ver.3.2.2.

RESULTS

A total of 1642 cholecystectomy specimens were studied. 1098 (66.9%) patients were females and 544 (33.1%) were males. Mean age was 47.42±17.67 years for males and 45.17±15.59 years for females. Number of patients were significantly more in the age group 41-50 years among males (21%, $p<0.001$) and 31-40 years among females (23.9%, $p<0.001$) as shown in [Table 1]. Gallstones were reported in 1514 (92.2%) cases. The most common histopathological finding was chronic cholecystitis (50.7%, 832 patients) in both males (50%) and females (51%). Histological image is shown in [Figure 1]. Cholesterolosis [Figure 2] was found in 451 (27.5%) patients, acute cholecystitis in 80(4.9%), Chronic active cholecystitis in 133(8.1%), Acute on chronic cholecystitis in 71(4.3%),

Gangrenous in 3(0.2%), Mucocele in 22(1.3%), Porcelain GB in 2(0.1%), Xanthogranulomatous cholecystitis in 21(1.3%), Dysplasia [Figure 3] in 25(1.5%) and carcinoma [Figure 4] in 9(0.5%). Relative prevalence of histopathological findings is shown graphically in [Figure 5]. Porcelain GB and Carcinoma were seen exclusively in females. Diabetes was seen in 191 (11.6%) patients and hypothyroidism in 65 (4%) patients. Of the diabetic patients, 42 (22%) had cholesterolosis but it was not found to be statistically significant (p=0.07). Similarly 20 of the 65 patients with hypothyroidism, i.e. 30.8% were found to have cholesterolosis but it was not statistically significant (p=0.536).

Table 1: Age and sex wise distribution

Age in Years	Gender		Total	P Value
	Female	Male		
1-10	9(0.8%)	7(1.3%)	16(1%)	0.803
11-20	36(3.3%)	23(4.2%)	59(3.6%)	0.118
21-30	164(14.9%)	75(13.8%)	239(14.6%)	<0.001**
31-40	262(23.9%)	100(18.4%)	362(22%)	<0.001**
41-50	234(21.3%)	114(21%)	348(21.2%)	<0.001**
51-60	186(16.9%)	79(14.5%)	265(16.1%)	<0.001**
61-70	145(13.2%)	89(16.4%)	234(14.3%)	0.003**
71-80	53(4.8%)	47(8.6%)	100(6.1%)	0.617
81-90	9(0.8%)	9(1.7%)	18(1.1%)	1.000
91-100	0(0%)	1(0.2%)	1(0.1%)	1.000
Total	1098(100%)	544(100%)	1642(100%)	-
Mean ±SD	45.17±15.59	47.42±17.67	45.95±16.34	-

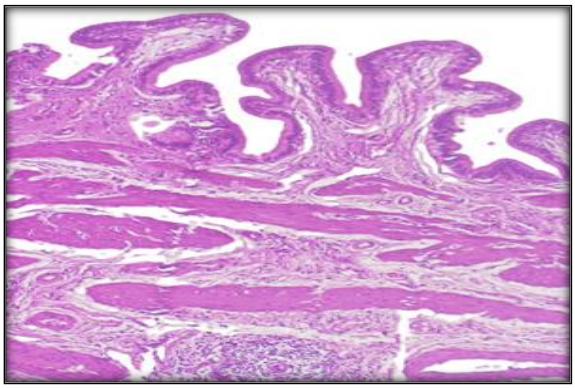

Figure 1: Chronic Cholecystitis

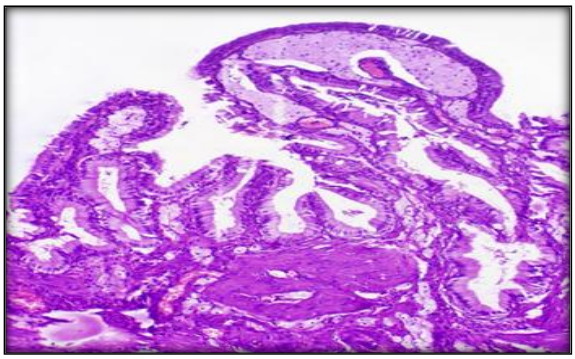

Figure 2: Cholesterolosis

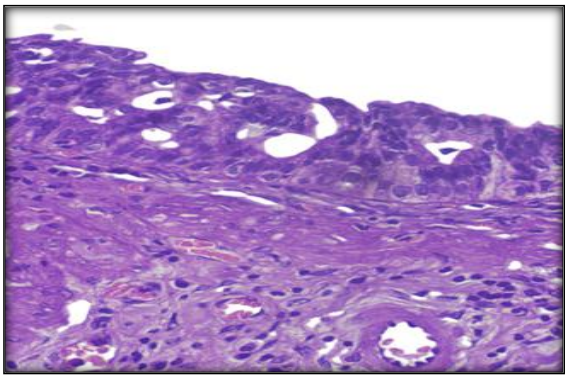

Figure 3: Dysplasia (Biliary intraepithelial neoplasia)

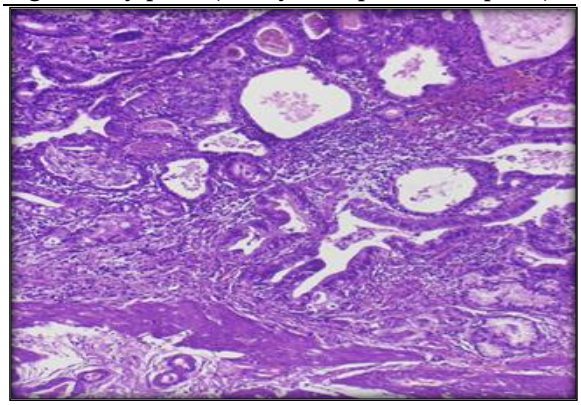

Figure 4: Carcinoma (invasive adenocarcinoma)

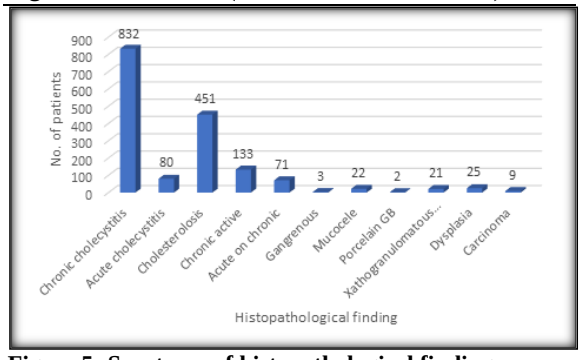

Figure 5: Spectrum of histopathological findings

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DISCUSSION

Cholecystectomy, the surgical removal of the gall bladder, is one of the most common elective surgeries performed worldwide to address gallstones and the complications and functional issues arising from it. Histopathological examination of the resected specimen may reveal a myriad of findings including malignancy.

The present study was done to find the histopathological spectrum of resected gall bladder specimens. The mean age of the population studied was found to be 45.95±16.34 years. Gall bladder pathologies usually afflict the middle aged population.[5] In the studies by Khan et al. and Banerjee et al., they found majority of the patients to be in the 4th decade.[6,7] Gall bladder pathologies typically affect females more than males. This is evident from the male to female ratio of 1:2 found in our study. Studies done by Gupta et al. and Giri et al. also found female preponderance.[5,8]

In nearly all the studies, the most common histopathological finding was chronic cholecystitis. We found chronic cholecystitis to comprise 50.7% of the study population. It was found in 53.2% by Gupta et al., 60% by Baig et al. and 50.8% by Tyagi et al.[5,8,10]

Acute cholecystitis was seen in 4.9% cases in our study. It was lower compared to an earlier study by Gupta et al. where they found it to be 6.45%.[5] It was also comparatively higher than the 2.6% reported by Sharma et al.[11] There is wide variation in incidence of acute cholecystitis across studies.

There was a particularly high prevalence of cholesterolosis in our study. It was seen in 27.5% of the patients. It was reported in only around 7% cases by Gupta et al. and Giri et al.[5,8] Almas et al. reported a high prevalence of 32.8% in their study.[12] Mohan et el. reported cholesterolosis in a mere 2.9% while the study by Sagwan et al. found it in 9.43%.[13,14] Medical literature thus reports a prevalence of cholesterolosis ranging between 5-30%. Cholesterolosis is a benign, usually asymptomatic condition characterised by the abnormal deposition of cholesterol esters and triglycerides within the macrophages of the gall bladder wall, particularly in the lamina propria. Prevalence of cholesterolosis reported from cholecystectomy cohorts like our present study are often higher because the gallbladder is already diseased, mandating a cholecystectomy in these cases. Autopsy studies often reveal lower prevalence rates of cholesterolosis.[15]

Porcelain gall bladder is a rare morphological condition characterised by extensive, diffuse calcification of the gall bladder wall.[16] It was seen in 2 females (0.1%) in our study. For decades it was thought to be a highly premalignant lesion. But modern data suggests the risk to be 2-7% only.[16]

Xanthogranulomatous cholecystitis (XGC) is a rare, severe and destructive variant of chronic cholecystitis. It is characterised by marked, eccentric thickening of the GB wall and intense inflammation that frequently extends to adjacent organs like the liver, duodenum and colon.[17] The clinical significance of XGC lies in its ability to masquerade as gall bladder carcinoma. Its overall prevalence ranges from 1.3-1.9%.[18] Our study also reported the prevalence to be 1.3%.

Dysplasia is characterised by abnormal epithelial proliferation, structural atypia and architectural disordered growth within the lining epithelium of the gall bladder. It is an early neoplastic process. It was seen in 1.5% cases in our study. It was reported in 3.68% cases in the study by Gupta et al,[5] but it was comaparatively much higher in the study by Khanna et al. where they found it in 8.5% patients.[19]

Gall bladder carcinoma (GBC) was seen in 9 cases (0.5%) in our study. Across various studies, prevalence ranges from 0.5-1.05%.[20] The study by Almas et al. found carcinoma in a mere 0.2% cases while Gupta et al. reported 1.15% in their study.[5,12] GBC constitutes 80% of all biliary tract cancers.[21] It has a bleak prognosis because of late presentation in its disease course.[22] When a gall bladder specimen is studied meticulously after a cholecystectomy done for signs and symptoms caused by one of various pathologies, including gall stones, an occult malignancy can be caught early. Hence, histopathological examination remains the gold standard for ensuring that early stage gallbladder cancer is not missed.

The prevalence of type 2 diabetes (T2DM) in our study was 11.6%. The relationship between T2DM and gallbladder pathologies is well established, multifactorial and bidirectional. Diabetic patients exhibit a 2-3 fold increase in the prevalence of cholelithiasis.[23] In a study by Hazari et al., the prevalence of diabetes was 35.48% in patients with cholelithiasis.[24] Ali et al. reported a prevalence of 36.6%.[25]

The prevalence of hypothyroidism among patients with gall bladder disease undergoing cholecystectomy has been reported to be 5.7-27%.[26] The association between hypothyroidism and gall bladder disease, specifically gallstones is well documented. Thyroid hormones serve as primary regulators of metabolism, hepatic function and smooth muscle contractility. When thyroid hormone levels drop, it triggers alterations that directly promote stone formation and biliary stasis. Our study reported a prevalence of 4% and all were associated with gallstones.

CONCLUSION

Histopathological examination of resected gall bladder specimens exhibits a wide spectrum of abnormalities ranging from benign inflammation to

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premalignant and malignant states. It is therefore pertinent to study the profiles of histological specimens painstakingly so that macroscopically silent but sinister conditions like malignancies can be caught early and management initiated promptly.

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