Histopathological evaluation of Gallbladder lesions in Cholecystectomy specimens - An experience at a tertiary care centre in Bangalore

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Abstract

Background: Cholecystectomy is one of the most common surgical procedures done all over the world. The resected specimens from the Pathology department for routine histopathological examination were subjected to evaluation. A wide spectrum of pathological lesions is found in the resected gall bladder. The aim of this study is to assess the histopathological spectrum of resected gall bladder specimens.

Materials & Methods: A prospective descriptive study was conducted in the tertiary care centre in Bangalore. A total of 227 gallbladder specimens received after emergency and elective cholecystectomies in the histopathology section of the Department of Pathology at a tertiary care centre in Bangalore from March 2024 to December 2024 were taken for study and evaluation.

Results: Out of 227 gallbladder specimens received, the majority of the cases showed features of Chronic Cholecystitis (n=194, 85.8%) followed by acute on chronic cholecystitis (n=8, 3.5%), Follicular cholecystitis (n=8, 3.5%), gangrenous cholecystitis (n=2, 0.9%), and Acute cholecystitis (n=4, 1.8%), two cases of xanthogranulomatous cholecystitis (0.9%), one case of eosinophilic cholecystitis (0.4%), one case of malakoplakia (0.4%) and three cases of adenomyomatosis (1.3%) of the gall bladder were seen. Dysplasia was observed in one case. Two cases of adenocarcinoma were diagnosed.

Conclusion: All gallbladder specimens must be thoroughly examined for gross features and microscopy for a conclusive diagnosis.

Keywords: Cholecystitis, Benign, Malignant, Histopathology, Gallbladder, Adenocarcinoma

Introduction

Cholecystectomy is one of the most common surgical procedures done all over the world. The resected specimens from the Pathology department were subjected to routine histopathological evaluation. A wide spectrum of pathological lesions exists in the resected gallbladders. Benign diseases, such as cholecystitis and polyps, as well as malignant ones like gallbladder adenocarcinoma, are also found in the resected gallbladders. The middle-aged group is the most commonly affected age group for gallbladder diseases. The incidence of cholecystitis with gallstones is 2-4 times higher in women compared to men, and the risk of gallstones is associated with factors like body weight, childbearing and estrogen hormone levels of the patients[1]. In India, chronic cholecystitis is one of the most commonly reported cases, which is almost invariably associated with cholelithiasis and has a prevalence of up to 29%. It is more commonly seen in the North Indian population (84%) compared to South Indian population(66.75%)[2]. Among the gallbladder cancers, gallbladder adenocarcinoma constitutes 80- 95% of the biliary tract cancers. The majority of the tumors can be diagnosed based on clinical, radiological, gross findings, histopathological findings and occasionally require immunohistochemistry. Some of them are also diagnosed as an incidental finding during histopathological evaluation (IGBC-Incidental gall bladder cancer)[3]. Nowadays, it has become a debatable topic to give a selective approach for the diagnosis of gallbladder tumors[4]. In India, the incidence of gall bladder tumors is 0.8-1% and

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is higher in Central India. Since histopathological evaluation remains the gold standard in the diagnosis of any gallbladder pathology, it is mandatory for the pathologists to carefully examine the gross specimens and microscopic findings to reach a correct diagnosis[5].

The aim of this study is to assess the histopathological spectrum of gallbladder specimens.

Materials and Methods

Approval from the Institutional Ethics Committee was obtained before conducting the study. This study is a prospective descriptive study conducted in the department of pathology at a tertiary care centre in Bangalore. Informed consent was taken from all the patients before the cholecystectomy procedure. All the Cholecystectomy specimens which were operated on in our tertiary care centre and received in the histopathology section of the department of pathology formed the material of the study. The study was conducted over a period of ten months from March 2024 to December 2024. Microsoft Word and Excel tools were used to generate graphs, tables and other visuals. Data were coded and entered into Excel and analysed.

Inclusion criteria: All the cholecystectomy specimens received with a written requisition form for histopathological examination were subjected to studies.

Exclusion criteria: Autolysed specimens.

Specimens were kept for fixation in 10% formalin for 24 hours. Then they were carefully examined, and all the gross features were noted, after which multiple sections were taken as per the standard protocol. The presence of gallstones was checked in all the specimens and categorised into various types according to the procedure in place and literature references. After conventional processing, the specimens were embedded in paraffin wax. Sections of 4-5µm thickness were cut using Leica RM 2125 and stained using haematoxylin and eosin for histopathological study. Slides were examined under a microscope, and the morphological features were noted. Various lesions diagnosed were documented. A total of 227 gallbladder specimens were received and subjected to evaluation. The number of cases taken up for study was 226, as one of the cases was autolysed.

Results

Out of the total 227 gallbladder specimens, only 226 were taken for the study, in which 57 (25.2%) specimens belonged to males and 169 (74.8%) to females, where the latter contributed to the majority. [Table 1].

Table 1: Comparison of the gender of the patient with number of gallbladder lesions noted

Sex	No: of gallbladder lesions	Percentage
Male	57	25.2
Female	169	74.8

The most common age group for the diagnosis of gallbladder lesions in our study was between 66 and 75 years (n=66,29.2%), which is in contrast to the middle-aged group being the most common for cholecystitis [Table 2]. This was followed by a younger age group between 25 to 35 years contributing 60 gallbladder cases (26.5%), which is a matter of concern and opens up scope for further research to identify the root cause. The least number of cases were found between the age group of 56 to 65 years (n=22,10%).

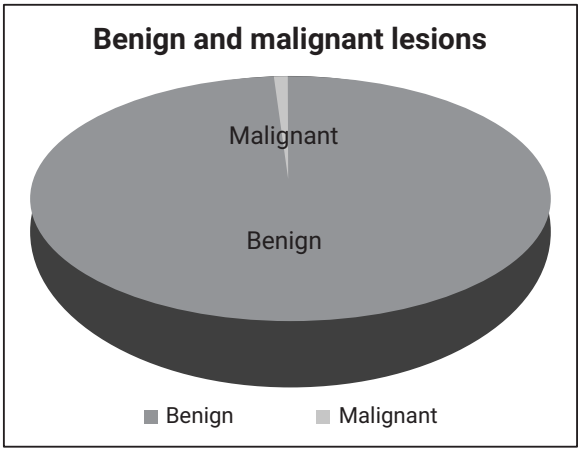
Table 2: Comparison of age distribution with number of gallbladder lesions noted

Age	No: of cases	Percentage
25-35	60	26.5
36-45	37	16.3
46-55	41	18.1
56-65	22	9.7
66-75	66	29.2

In our study, the majority of the cases were benign (n=223, 98.7%), with one case of dysplasia (0.4%) and only 2 malignant cases were diagnosed from gallbladder specimens (0.9%) [Table 3 and pie chart 1].

Table 3: Distribution of benign and malignant gallbladder lesions

Finding	No:	Percentage
Benign gallbladder	223	98.7
Dysplasia gallbladder	1	0.4
Malignant gallbladder	2	0.9
Total Biopsies received	226	100



Pie chart 1 showing percentage of benign and malignant lesions of gallbladder

On gross evaluation, benign gallbladder cases showed partial to complete loss of velvety mucosa, whereas dysplasia and malignant lesions showed complete loss of velvety mucosa. Wall thickness for benign lesions varied from 0.3cm to 1cm (Figure A and Figure B). Wall thickness for one case of dysplasia was 7.5cm. Grey white friable mass was seen on the cut surface of both the adenocarcinoma gallbladder cases with a wall thickness of more than 7cm (Figure-C).

A few of the benign gallbladder cases showed thinning of the fundus with the presence of an impacted gallstone. The majority of the gallbladders had gallstones out of which pigmented gallstones were the most common (n=198, 87.6%) followed by cholesterol gallstones (n=18, 8%) and mixed gallstones (n=6, 2.6%). No stones were retrieved from four gallbladders (1.8%).

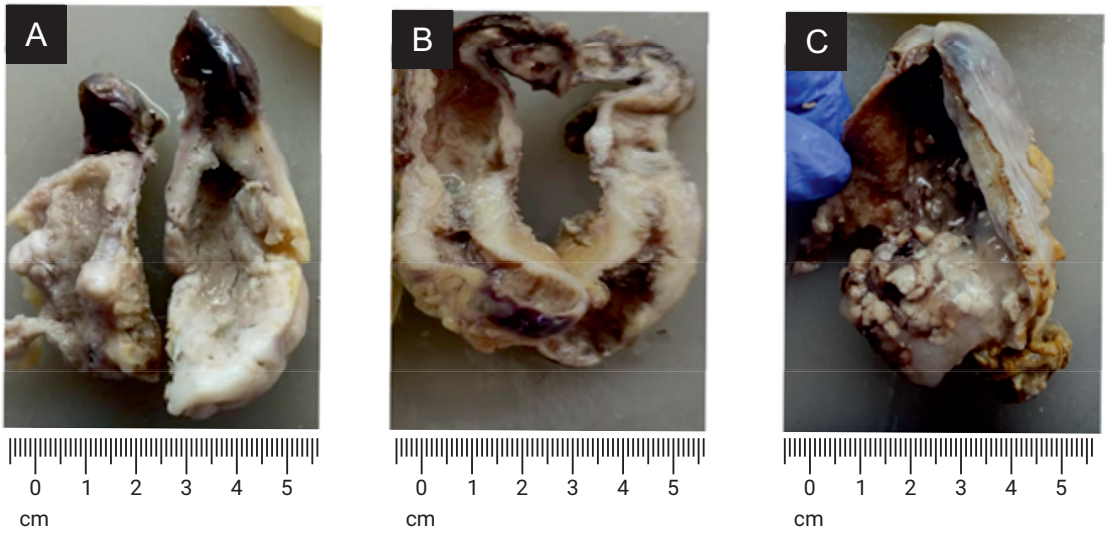


Figure A: Case of adenomyomatosis of gall bladder showing thickened wall (0.7cm) with loss of velvety mucosa and thinned out fundus, Figure B: Case of Malakoplakia of gallbladder with thickened wall (1cm) with loss of velvety mucosa, Figure C: Case of adenocarcinoma of gallbladder showing distended gallbladder with irregular grey white friable mass (7x4.5x3cm)

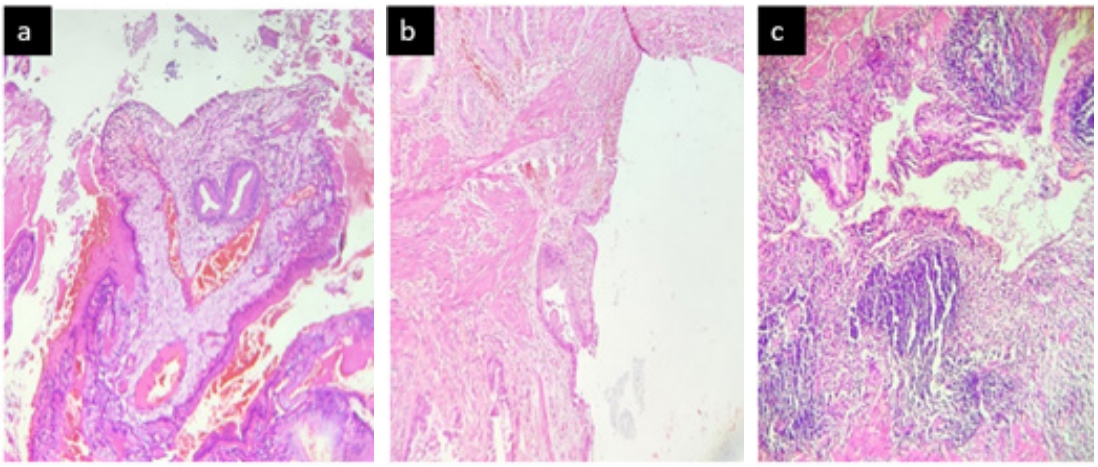
The majority of the cases were diagnosed as Chronic Cholecystitis 194 (85.8%) (figure a) followed by acute on chronic cholecystitis 8 (3.5%), three cases of adenomyomatosis (1.3%) (figure b), gangrenous cholecystitis 2 (0.9%) and acute cholecystitis 4 (1.8%). Two cases of xanthogranulomatous cholecystitis (0.9%), one case of eosinophilic cholecystitis (0.4%), one case of malakoplakia (0.4%) and follicular cholecystitis 8 (3.5%) (figure c) of the gallbladder were observed in the specimens. Dysplasia was also observed in one gallbladder specimen (0.4%). Well-differentiated adenocarcinoma-biliary type (figure d, figure e and figure f) and moderately differentiated adenocarcinoma-biliary type were diagnosed in two cases of gallbladder (0.9%) [Table 4].

Table 4: Histopathological spectrum of gall bladder lesions

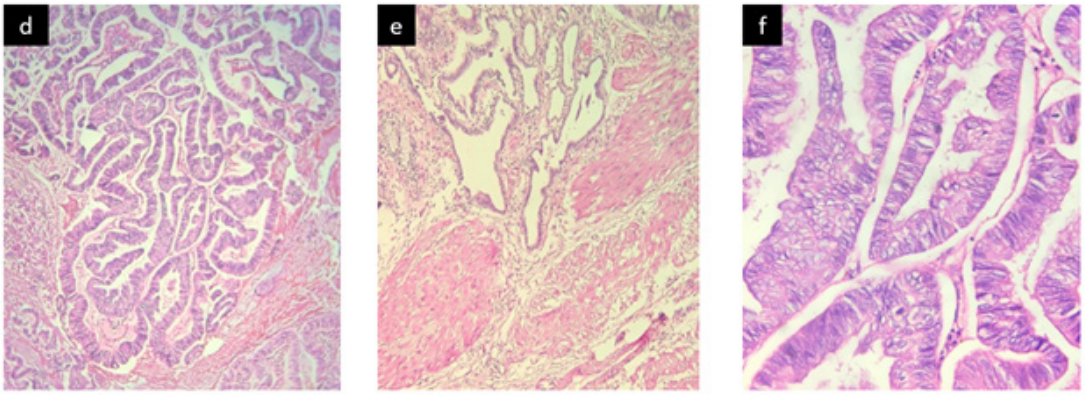
Histopathological Diagnosis	Number	Percentage
Chronic Cholecystitis	194	85.8
Acute Cholecystitis	4	1.8
Acute on Chronic Cholecystitis	8	3.5
Gangrenous Cholecystitis	2	0.9
Follicular Cholecystitis	8	3.5
Adenomyomatosis	3	1.3
Xanthogranulomatous Cholecystitis	2	0.9
Eosinophilic Cholecystitis	1	0.4
Malakoplakia	1	0.4
Dysplasia	1	0.4
Adenocarcinoma	2	0.9
Total	226	100

There were two cases of carcinoma gallbladder (n=2, 0.9%), out of which one case was suggestive of adenocarcinoma gallbladder based on findings in the ultrasound abdomen report and the other one was suggested based on intraoperative findings

suggestive of carcinoma[4]. Both were later confirmed through histopathological evaluation. The former patient was a 50-year-old male and the latter was a 47-year-old female.



a:Chronic cholecystitis with cholesterolosis; b:Adenomyomatosis of gall bladder; c:Follicular cholecystitis



Well differentiated adenocarcinoma – Biliary type; d:short and long tubular glands; e:invasion of glands into muscularis propria; f:glands lined by cuboidal to pseudostratified columnar epithelium with mild pleomorphism

Discussion

Gallbladder lesions are one of the most commonly encountered lesions in general surgery. In our study, 222 out of 226 gallbladder specimens (98.2%) had gallstones, of which pigmented gallstones constituted the majority of the cases (n=198, 87.6%) followed by cholesterol gallstones (n=18, 8%) and mixed gallstones (n=6, 2.6%). No stones were present in four gallbladder specimens (1.8%). According to the study conducted by Bansal et al[2] , out of 104 gallbladder specimens with gallstones, mixed stones were the most common (n=48, 46%) followed by pigmented gallstones (n=39, 38%) and cholesterol gallstones (n=17, 16%).

In our study, chronic cholecystitis is the most common gallbladder lesion (85.8%), and the majority of these are reported in females. These findings are in concordance with Benkahouda et al[3], Yadav et a[4], Hasan et al[5] and Khattak et al[6].

According to Joshi et al[7], the most common age group of presentation was between 21-40 years (45.80%), followed by the 41-60 years age group (39.60%). Similar findings were seen in the study conducted by Shah et al[8] and Khan DM et al[9]. Whereas in our study, the majority of the cases were diagnosed in the age group between 66 to 75 years (n=66, 29.2%). This was followed by the younger age group between 25 to 35 years (n=60, 26.5%), which is a matter of concern. This could be because of the changing lifestyle and food habits adopted by young people, but this needs to be studied further for the prevention of this rising pattern.

In our study, we received two cases of gallbladder adenocarcinoma (0.9%) in which both of which were biliary type. One case was suggestive of adenocarcinoma gallbladder based on findings in the ultrasound abdomen report, and the other one was suggested based on intraoperative findings suggestive of carcinoma. Both were later confirmed through histopathological evaluation. There is a global trend of a rise in incidental gallbladder carcinoma diagnoses[10,11]. But we didn't receive any incidental gallbladder carcinoma cases. In the study conducted by Jha et al[12], the incidence of incidental gallbladder carcinoma was low (0.41%), and the majority of the

carcinoma cases were diagnosed with the help of preoperative and intraoperative findings. However, considering the rising concern and difficulty in diagnosing them preoperatively or intraoperatively, all the gallbladder specimens must be carefully examined for both gross and microscopic features to give an accurate diagnosis.

Based on our study, we have diagnosed two cases of gallbladder adenocarcinoma and one case of dysplasia in the gallbladder out of 226 gallbladder cases. According to the study conducted by Ramesh et al.[13], out of 804 gallbladder cases, there were 10 cases of gallbladder adenocarcinoma and three cases of dysplasia in the gallbladder.

In our study, two cases of gallbladder adenocarcinoma belonged to the middle age group, in which one was a 50-year-old male and the other was a 47-year-old female.

According to the study conducted by Gupta S et al[14], the majority of the gallbladder cancer patients (42.6%) belonged to the middle age group (46 to 59 years) with no significant difference in sex preponderance. In the study conducted by Singh et al[15], the mean age for gallbladder cancer was 48.31 years. Diagnosis of gallbladder carcinoma is crucial as it has been identified as a growing Indian healthcare concern[16].

The role of histopathology remains crucial in diagnosing gallbladder pathology[17]. Some researchers advocate selective histopathological evaluation[18]. In the systematic review conducted by Bastiaenen et al[19], debate exists about the safety and selectiveness of gallbladder histology. Considering the significant global burden of gallbladder carcinoma in the twenty-first century[20], particularly due to the possibility of diagnosis of incidental cases, it is more prudent to adopt routine histopathological examination rather than a selective approach, as this can improve early detection and patient outcomes.

Conclusion

Cholecystectomy is the most common surgical procedure done worldwide. The most common disease of gallbladder is Chronic Cholecystitis with Cholelithiasis. In conclusion, all gallbladder specimens must be thoroughly examined for gross features like characteristics of mucosa, thickness of the wall, presence of stones and bile, appearance of the gallbladder surface and narrowing of the neck of the gallbladder. Routine histopathological examination is the gold standard for the diagnosis of gallbladder lesions. Microscopic features must be noted carefully without missing any foci of dysplastic cells or malignancy.

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