Outcome of routine histopathological examination of gallbladder specimen following cholecystectomy in Egyptian population

Mohamed Tarek Kaddah, Mohamed F. Alshal, Mohamed Emam Sedqi, Mohamed H. Fahmy, Ahmed Maher Abd Elmonim

Department of General Surgery, Faculty of Medicine, Cairo University, Cairo, Egypt

Correspondence to Ahmed M. A. Elmonim, MD, Department of General Surgery, Faculty of Medicine, Cairo University, Cairo 11511, Egypt. Mobile: +0100 575 9947; e-mail: ahmed_maher_87@hotmail.com

Received: 8 June 2023
Revised: 27 June 2023
Accepted: 22 July 2023
Published: 6 October 2023

The Egyptian Journal of Surgery 2023, 42:642–646

Background
Gallbladder diseases (GBDs) are one of the most common surgical diseases. Gallbladder stones (GBSs) are the commonest pathology affecting the gallbladder. Gallbladder cancers (GBCs) are rare though lethal malignancy. GBCs represent a diagnostic and clinical challenge, since its presentation is often nonspecific and its diagnosis commonly occurs at an advanced stage.
Aim
The aim of this study is to evaluate the outcome of the routine histopathological examination of all cholecystectomy specimens.
Patients and methods
This study was a retrospective analysis, conducted on 1011 patients who underwent cholecystectomy for symptomatic cholecystitis, in KASR AL-AINY Hospital, General Surgery Department between June 2021 and November 2022.
Results
Age of patients ranged from 14 to 79 years, females patients were 857 and male patients were 154. Chronic cholecystitis was the most common GBD, 1006 specimens were benign. One specimen was premalignant; dysplasia, and 4 specimens were malignant; 1 case was focal intraepithelial neoplasia, and 3 cases were adenocarcinomas. There was no statistically significant difference between both sexes. The mean thickness of gallbladder was 0.39 cm. multiple gallbladder stones were found in 619 patients, single stones were found in 249 patients, and no stones were found in 143 patients. The largest stone size was 6.00 cm. Female patients have increased preponderance for the development of all GBDs. Nonneoplastic lesions were more common below fifth decade and neoplastic lesions thereafter.
Conclusion
In this study, the rate of incidental GBCs is very low. All cholecystectomy specimens were routinely sent for histopathology to detect incidental GBC.

Keywords:
cholecystectomy, gallbladder specimen, histopathological

Egyptian J Surgery 42:642–646

1110-1121

Introduction

Gallbladder diseases (GBDs) are one of the most common surgical diseases. The inflammatory lesions are more common than the neoplastic lesions. Gallbladder stones (GBSs) are the commonest lesions and account for more than 95% of GBDs [1]. The most common types of GBS are cholesterol and pigmented stones. The risk factors for development of GBS are combination of family history, increasing age, female gender, obesity, rapid weight loss, type of diet, sedentary life style, ethnicity, drugs, and medical factors etc. Most people with GBS are asymptomatic and are usually diagnosed incidentally on ultrasonography, computed tomography (CT) scans, or abdominal radiography. The inflammatory lesions of the GB include cholecystitis, cholesterosis, xanthogranulomatous, hyperplastic, and metaplastic lesions and most of these lesions are seen accompanying the cholelithiasis [1].

On the other hand, the neoplastic lesions; gallbladder cancers (GBCs) are rare though lethal malignancy with marked ethnic and geographical variations. They are more common in females mainly due to GBS [1]. GBCs represent a diagnostic and clinical challenge since its presentation is often nonspecific and diagnosis commonly occurs at an advanced stage. Prognosis is poor, as the overall survival rate for advanced GBC is 6 months, with 5-years survival rate less than 5%. It is found incidentally on

histopathological examination (HPE) after cholecystectomy and it is known as incidental gallbladder carcinoma (IGBC). The incidence of IGBC in GB specimens ranges between 0.2 and 3.3% [2].

In KASR AL-AINY Hospital, it has been a standard to submit all cholecystectomy specimens to routine HPE to diagnose eventual pathologies other than those related to gallstone diseases.

On the other hand, the role of routine HPE of cholecystectomy specimens has been questioned, due to the low incidence of GBCs and the high costs generated for the health system by sending each resected gallbladder to the pathologist [2].

Patients and methods

The present study was done at the department of General Surgery at KASR Al-AINY Hospital. The study proposal was approved by the institute ethics committee. This study is a retrospective analysis, conducted on patients who had performed cholecystectomy between June 2021 and November 2022 for symptomatic cholecystitis. All the gallbladder specimens were sent to the department of Pathology for routine HPE.

A total of 1,146 patient records were thoroughly reviewed and after applying the inclusion and exclusion criteria listed below, a total of 1011 patients were selected to be evaluated in this study. The patient's records included age, sex, nationality, number and size of gall stones, average thickness of gallbladder wall and histopathological diagnosis.

Inclusion criteria

Patients who underwent elective or emergency cholecystectomy, Patients older than 14 years and Egyptian nationality as shown in Fig. 1.

Exclusion criteria

Patients suspected or diagnosed with hepatobiliary malignancies prior to surgery, Patients younger than 14 years and foreign nationality.

All patients with cholecystitis were scheduled for LC. Open cholecystectomy was performed for cases which could not be completed by laparoscopic approach. The GB specimens were fixed in 10% neutral buffered formalin and were sent to the pathology department.

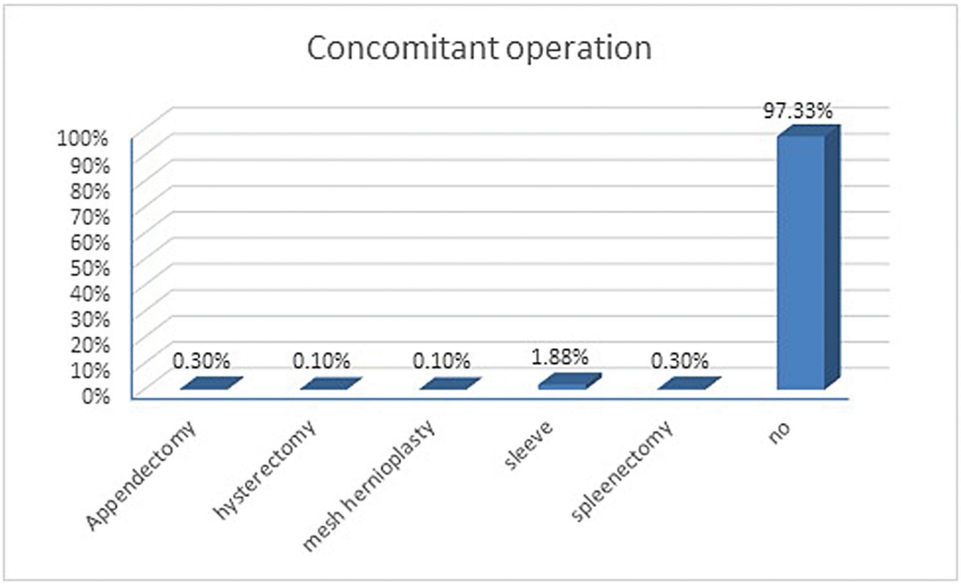
Data analysis

Data was coded and entered using the statistical package for the Social Sciences (SPSS) version 28 (IBM Corp., Armonk, NY, USA). Quantitative data

Table 1 Demographic data, age

	Mean	Standard deviation	Median	Minimum	Maximum
Age	40.26	12.82	39.00	14.00	79.00
		Count		%	
Sex					
F		857		84.8%	
M		154		15.2%	

Figure 1



Conmitant operations.

Table 2 GB average thickness and gallbladder stones

	Mean	Standard deviation	Median	Minimum	Maximum
Average thickness	0.39 cm	0.30 cm	0.30 cm	0.10 cm	2.00 cm
		Count		%	
Gall stones No					
Single		249		24.63%	
Multiple		619		61.23%	
None		143		14.14%	

was summarized using mean and standard deviation while categorical data was reported using frequency (count) and relative frequency (percentage).

Results

Tables 1–7.

Discussion

In KASR AL-AINY Hospital, it has been a standard to submit all cholecystectomy specimens to routine HPE to diagnose eventual pathologies other than those related to gallstone disease. Most publications related to the HPE of cholecystectomy specimens are focused on the incidental GBCs.

Radiodiagnosis is helpful in detecting early lesions having gross abnormality including increased wall thickness but not all early GBCs show obvious lesions on ultrasonography Kapoor and colleagues [3].

The present study showed that; out of 1011 specimens, 1006 (99.50%) were benign. One (0.10%) case was premalignant; tubulovillous adenoma with low grade dysplasia and 4 (0.4%) cases were malignant. Regarding the 4 malignant cases, 1 (0.10%) case was focal intraepithelial neoplasia (focal carcinoma insitu) and 3 (0.30%) cases were adenocarcinoma.

These results were comparable with the results of following studies;

Table 3 Histopathological findings in gallbladder specimens

	Count	%	95% CI
Pathology (B or M)			
Benign	1006	99.50%	98.92-99.81
Premalignant	1	0.10%	0.01-0.46
Malignant	4	0.40%	0.13-0.94

Table 4 Distribution of gallbladder pathology

	Count	%	95% CI
Acute On Top Of Chronic Cholecystitis	59	5.84%	3.94-8.54
Chronic Calcular Cholecystitis	947	93.66%	83.46-95.4
Tubulovillous adenoma with low grade dysplasia	1	0.10%	0.01-0.46
Focal Intraepithelial Neoplasia (Focal Carcinoma In Situ)	1	0.10%	0.01-0.46
Adenocarcinoma	3	0.30%	0.08-0.79

Table 5 Summarized gender wise distribution of histopathological findings

	F		M		
	Count	%	Count	%	*P* value
Pathology (B or M)					
Benign	854	84.89%	152	15.11%	0.169
Premalignant	0	0.00%	1	100.00%	0.152
Malignant	3	75.00%	1	25.00%	0.484

Table 6 Summarized age wise distribution of histopathological findings

	Age		
	Mean	Standard deviation	95% CI
Pathology (B or M)			
Benign	40.20	12.81	39.41-41
Premalignant	53.00	.	.
Malignant	52.25	10.72	35.19-69.31

Table 7 Summarized pathology versus number of stones

	Gall stones number					
	Single		Multiple		None	
	Count	Row *N* %	Count	Row *N* %	Count	Row *N* %
Pathology (B or M)						
Benign	246	24.48%	617	61.39%	142	14.13%
Premalignant	0	0.00%	1	100.00%	0	0.00%
Malignant	2	50.00%	1	25.00%	1	25.00%

Vaishali and colleagues [4] showed predominance of nonneoplastic lesions accounting for 97.67% of all the GB lesions.

Chin and colleagues [5] reported; that a total of 1,375 gallbladder specimens showed that 7 (0.5%) of them were reported as adenocarcinomas, 4 of which were diagnosed preoperatively by CT. Only 3 (0.2%) of the 1375 specimens showed evidence of dysplasia and were premalignant, 1 case was diagnosed preoperatively by CT. The other two were diagnosed intraoperatively from their features and confirmed subsequently by HPE.

In the present study, out of 1011 cases, the mean age of the benign cases was 40.20±12.81 years, the age of the premalignant case was 53 years, and the mean age of the malignant cases was 52.25±10.72 years. The number of benign female cases was 854 (84.89%) and male cases was 152 (15.11%); and there was only one male premalignant case (100.00%). The number of malignant female cases was 3 (75%) and there was only one malignant male case (25%).

Similar findings were noted by other studies.

Ashesh Kumar Jha and colleagues reported that out of total of 921 patients, the mean age of the patients was 43.10±13.90 years, ranging between 15 and 83 years of which 694 were females and 227 were males. Benign GBD was reported in a lower age group than in premalignant and malignant diseases. The mean age for benign disease was 43 years, followed by malignant disease with a mean age of 49 years and premalignant disease 54 years Jha and colleagues [6]. Similar findings were noted by Choi and colleagues [7].

The association of GBSs and GBCs is well described; although it is still unclear whether GBSs are a risk factor or may somewhat facilitate the occurrence of the disease Mauro and colleagues [8].

In the present study, 85.87% of benign cases had GBSs, and all premalignant and malignant cases had GBSs.

Similar results were reported by the following studies; CharÞ S, *et al.*, reported that the relative risk of developing GBCs is more for patients with GBSs compared with those without. The dominant mechanism suggested for the strong association of GBSs with GBCs is the role of the chronic inflammatory process within the gallbladder leading to transformation from metaplasia to dysplasia and malignancy Charp and colleagues, Hamdani and colleagues [9,10].

In accordance to routine approach, the study of Agarwal and colleagues [11]. compared patients in whom the GBCs was diagnosed after cholecystectomy on HPE (93 patients) with GBCs patients in whom the gallbladder was not sent for HPE and presented late with symptoms (77 patients), and showed that the former patients had a longer overall survival.

On the other hand, a more selective approach entails the examination of the specimen only if the GB looks abnormal pre or intraoperatively.

Conclusion

The rate of incidental GBC in the present study was very low. The large number of cholecystectomy operations, may prevent GBC by interrupting the progression of chronic inflammation and dysplasia towards malignancy.

All cholecystectomy specimens were sent for HPE to detect incidental gallbladder cancer. The present study revealed different types of histopathological lesions following laparoscopic cholecystectomy. Chronic cholecystitis was the most common GBD in the present study.

Female sex, aging and GBSs have increased preponderance for the development of all GBDs, including malignancy.

Financial support and sponsorship

Nil.

Conflicts of interest

No conflict of interest.

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