Original Article

OPEN ACCESS

Routine Histopathology of Gallbladder after Elective Surgery for Gallstones is Waste of Resources or Justified

Natasha Maryam[1], Summera Ambreen[2], Amna Batool[3]

[1-3]Postgraduate trainee, Dept of General Surgery, Nescom Hospital, Islamabad

Author`s Contribution

[12,33]Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work, Drafting the work or revising it critically for important intellectual content

Funding Source: None
Conflict of Interest: None

Received: Feb 21, 2025
Revised: July 19, 2025
Accepted: Sept 17, 2025

Address of Correspondent
Dr. Natasha Maryam
Postgraduate trainee, Nescom Hospital, Islamabad
natasha.maryam91@gmail.com

ABSTRACT

Objective: To determine the need for routine histopathological analysis of gallbladder specimens post-cholecystectomy in Pakistan, focusing on detecting unexpected pathologies.

Methods: This descriptive cross-sectional study was conducted at Islamabad Medical Complex, NESCOM, 1st august 2022 to 31st October 2023, involving 534 patients who were diagnosed with gallstones-induced acute or chronic cholecystitis, while excluding those with clinical or radiological indications of gallbladder carcinoma. All surgical specimens were carefully submitted for histopathological analysis, and the collected data were systematically evaluated using SPSS 26 version.

Results: Overall 534 mean age of patients was 49.03 +15.02 years. The chronic cholecystitis was the most frequent histopathological finding (85.0%), followed by acute on chronic cholecystitis (13.5%), while rare lesions included gallbladder polyps (0.7%) and mucinous adenocarcinoma (0.7%). Additionally, the distribution of histopathological outcomes across different age groups (p = 0.527) and between genders (p = 0.988) showed no statistically significant differences.

Conclusion: Study revealed that most gallbladder specimens following elective cholecystectomy for gallstones showed benign pathology, predominantly chronic cholecystitis, with only rare lesions such as gallbladder polyps or mucinous adenocarcinoma, and although incidental malignancy was uncommon, which indicating that the routine histopathological examination remains essential and justified to ensure early detection of unexpected neoplastic changes that could be missed on gross examination.

Key words: Gallstones, Cholecystectomy, Cholecystitis, Gallbladder carcinoma, Routine pathology, Gallbladder cancer.

Cite this article as: Maryam N, Ambreen S, Batool A. Routine Histopathology of Gallbladder after Elective Surgery for Gallstones is Waste of Resources or Justified. Ann Pak Inst Med Sci. 2025; 21(4):678-682. doi. 10.48036/apims.v21i4.1023.

Introduction

Cholecystectomy remains one of the most frequently performed abdominal surgeries worldwide, and standard protocols recommend that every gallbladder specimen undergo histopathological examination after surgery, even in the absence of gross abnormalities, to exclude occult malignancy.[1] Although such conditions are often not detected by routine clinical evaluation or imaging modalities, they may significantly influence patient management and disease outcomes. In particular, gallbladder carcinoma in its early stages is frequently asymptomatic and therefore remains undiagnosed until an advanced stage, underscoring the importance of a detailed and thorough postoperative histopathological assessment.[2-5]

In contrast, the prevailing practice in many tertiary care hospitals in Pakistan, including the primary investigator's institution, often involves discarding gallbladder specimens without histopathological analysis. This approach is based on the assumption that gallbladder carcinomas are invariably associated with macroscopic abnormalities, with the decision to submit specimens for histopathological evaluation relying largely on the surgeon's discretion. Additionally, this selective practice aims to reduce the financial burden on patients and the workload of pathology departments. However, it contradicts global medical standards, where routine

histopathological examination is considered essential for the detection of early-stage incidental gallbladder carcinomas.[4–9]

Gallstone disease constitutes a significant public health problem worldwide, and cholecystectomy is among the most commonly performed surgical procedures for its management. The practice of submitting gallbladder specimens for histopathological examination following cholecystectomy has been widely debated, balancing the clinical benefits of comprehensive evaluation against the constraints of limited healthcare budgets and the potential economic and psychological burden on patients.[8–10]

This issue is further complicated by the fact that gallbladder carcinoma is often concealed within cases of chronic cholecystitis and gallstone disease. Although its prevalence in association with gallstones varies considerably, prolonged chronic inflammation secondary to gallstones is considered a major etiological factor. Histopathological examination remains the cornerstone for diagnosing early-stage gallbladder carcinoma,[11,12] and a favorable prognosis is generally observed when the disease is detected incidentally at stage I.[11–14]

In Pakistan, the selective approach to histopathological examination poses a substantial challenge, particularly in view of the late-stage presentation of gallbladder carcinoma, which is commonly observed due to the lack of routine screening and limited diagnostic facilities. Furthermore, understanding the demographic patterns of gallbladder disease, including age- and gender-related variations, is essential for effective healthcare planning and resource allocation in a resource-limited setting.[3,4] Hence, the present study aims to evaluate the frequency and outcomes of histopathological findings following cholecystectomy and to assess the necessity of routine histopathological examination of gallbladder specimens in all patients undergoing this procedure. By addressing the balance between clinical benefit and practical constraints, this study seeks to inform surgical practice in Pakistan and provide insights relevant to other developing countries facing similar healthcare challenges.

Methodology

This cross-sectional study was conducted in the Department of General Surgery at Islamabad Medical Complex, NESCOM. The study was carried out from 1 August 2022 to 31 October 2023 after obtaining ethical approval from the Hospital Ethics Committee of Islamabad Medical Complex. A total sample size of 534 patients was included in the study, calculated using the WHO sample size calculator.

All patients aged 15 years or older, of either gender, diagnosed with acute or chronic cholecystitis secondary to gallstones and admitted through the Outpatient Department for cholecystectomy were included. Only those patients whose gallbladder specimens showed no clinical, radiological, or intraoperative gross evidence suggestive of carcinoma were enrolled. Patients with clinical or radiological evidence (ultrasonography and/or CT scan) of gallbladder carcinoma, as well as those in whom gross intraoperative abnormalities suggestive of malignancy were observed, were excluded from the study.

After obtaining informed consent, all selected patients underwent cholecystectomy, followed by a detailed clinical evaluation with particular attention to the right hypochondrium. Baseline laboratory investigations and specific diagnostic tests, most notably abdominal ultrasonography, were performed. Following surgery, all gallbladder specimens, except those with obvious gross abnormalities, were carefully labeled with patient identification details, preserved in containers containing 10% buffered formalin, and sent to the pathology laboratory for routine histopathological examination.

All data were meticulously recorded using a predesigned proforma and subsequently analyzed using the Statistical Package for Social Sciences (SPSS), version 26.0. The chi-square test was applied for statistical analysis, and a p-value of <0.05 was considered statistically significant.

Results

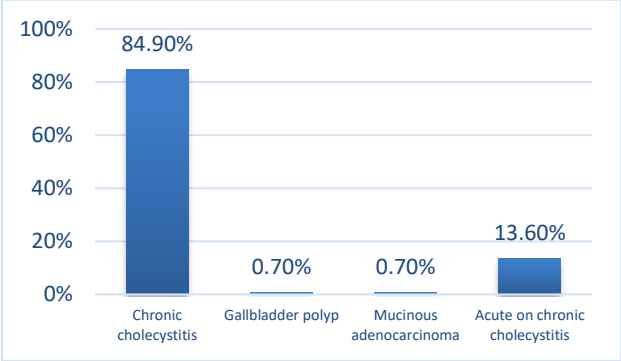
This study included overall 535 patients with an overall mean age of 49.03 +15.02 years, with majority belonged to the age group of 35–45 years (28.0%) and 45–55 years (25.0%) age groups, followed by 15–35 years (14.4%), 55–65 years (17.0%), 65–75 years (12.0%), and only (3.6%) cases were presented with age group of 75–85 years. Based on gender the females constituted the majority of the study population (75.1%) compared to males (24.9%). Additionally, the most common complaint was pain in the right hypochondrium (79.3%), while abdominal pain was reported in 20.7% of cases. Nausea/vomiting was observed in 13.3%, dyspepsia in 6.9%, and jaundice in 6.9%, while few patients presented with a palpable mass in the right hypochondrium (0.6%), whereas other nonspecific complaints were noted in 6.9% of the patients. Table I

Table I: Baseline and clinical informative variables of the study population. (n=535)

Variables			N	%
Age groups	15-35 years		77	14.4
	35-45 years		150	28.0
	45-55 years		134	25.0
	55-65 years		91	17.0
	65-75 years		64	12.0
	75-85 years		19	3.6
	Total		535	100.0
Gender	Female		402	75.1
	Male		133	24.9
	Total		535	100.0
Sign and symptoms	Pain at upper hypochondria	Yes	424	79.3
		No	111	20.7
	Nausea/vomiting	Yes	71	13.3
		No	464	86.7
	Dyspepsia	Yes	37	6.9
		No	498	93.1
	Abdominal pain	Yes	111	20.7
		No	424	79.3
	Jaundice	Yes	37	6.9
		No	498	93.1
	Mass in RHC	Yes	3	0.6
		No	532	99.4
	Others	Yes	37	6.9
		No	498	93.1

Based on the histopathological finding the most of the patients were diagnosed with chronic cholecystitis (84.9%), followed by acute on chronic cholecystitis in 13.6% of patients, while rare findings included mucinous adenocarcinoma and gallbladder polyps, each accounting for 0.7% of cases. Figure 1

Based on stratification the chronic cholecystitis was the most frequent histopathological diagnosis across all age groups and both genders.



The chronic cholecystitis predominant (24.6%) in age group of 35–45 years and 45–55-year age group as (20.3%), acute on chronic cholecystitis was reported more often in the 45–55 year group (4.1%) and 35–45 year group (3.0%), while the polyps and mucinous adenocarcinoma were rare findings, with only a few cases distributed sporadically across the middle age groups. Based on gender stratification, males accounted for the majority of cases (75%), with chronic cholecystitis being the leading finding (63.4%), while females represented 25% of the study population, again showing chronic cholecystitis as the predominant diagnosis (21.5%), while the findings were statistically insignificant based on (p = 0.527) and gender (p = 0.988). Table II

Discussion

Incidental gallbladder carcinoma refers to a malignancy that is identified only after cholecystectomy performed for presumed benign gallbladder disease.[14] However, the decision between selective versus routine histopathological evaluation of gallbladder specimens has

Table II: Histopathological findings according to age and gender. (n=535)

VARIABLES		HISTOPATHOLOGICAL FINDINGS					p-value
		Acute on chronic cholecystitis	Chronic cholecystitis	Gallbladder polyp	Mucinous adenocarcinoma	Total	
Age groups	**15-35**	7	68	0	2	77	0.527
		1.3%	12.7%	0.0%	0.4%	14.4%	
	35-45	16	132	2	0	150	
		3.0%	24.6%	0.4%	0.0%	28.0%	
	45-55	22	109	2	1	134	
		4.1%	20.3%	0.4%	0.2%	25.0%	
	55-65	14	76	0	1	91	
		2.6%	14.2%	0.0%	0.2%	17.0%	
	65-75	12	53	0	0	65	
		2.2%	9.9%	0.0%	0.0%	12.1%	
	75-85	2	17	0	0	19	
		0.4%	3.2%	0.0%	0.0%	3.5%	
Gender	**Male**	56	340	3	3	402	0.988
		10.4%	63.4%	0.6%	0.6%	75.0%	
	Female	17	115	1	1	134	
		3.2%	21.5%	0.2%	0.2%	25.0%	

long been debated, primarily due to the rarity of the condition and its generally poor prognosis.[14] Therefore, this study was conducted to address this important concern in 535 patients, with an overall mean age of 49.03 ± 15.02 years, and a predominance of females (75.1%) compared to males (24.9%).

In alignment with the present study, Ashraf S et al.[15] reported that among 200 elective laparoscopic cholecystectomy cases, females constituted 165 (82.5%) and males 35 (17.5%), with a female-to-male ratio of 4.7:1. The mean age was 39.6 ± 11.01 years for males and 36.16 ± 14.24 years for females. Similarly, Jadoon S et al.[16] reported that 88% of participants were women and 11.8% were men, with a mean age of 35.81 ± 8.12 years. The female predominance observed in gallbladder disease may be attributed to hormonal influences, as well as pregnancy and multiparity, which are known to increase disease risk.

In the present study, the most common presenting complaint was pain in the right hypochondrium (79.3%), while generalized abdominal pain was reported in 20.7% of cases. Nausea and vomiting were observed in 13.3% of patients, dyspepsia in 6.9%, and jaundice in 6.9%, while a palpable mass in the right hypochondrium was noted in only 0.6% of cases. Other nonspecific complaints were reported by 6.9% of patients. These findings are supported by Sathish Kumar B et al.,[17] who reported pain as the most common symptom in 98% of patients, followed by nausea and vomiting in 56%, dyspepsia in 24%, and fever in 8%. On physical examination, tenderness was present in 96% of cases, guarding in 30%, and a palpable mass in 8%.[17] Conversely, Noureen S et al.[18] reported that most patients presented with abdominal pain (95.2%), followed by nausea and vomiting (78.6%), fever (61.9%), and loose motions in a smaller proportion (4.8%).

Based on routine histopathological examination in this study, the majority of patients were diagnosed with chronic cholecystitis (84.9%), followed by acute-on-chronic cholecystitis in 13.6% of cases. Rare findings included mucinous adenocarcinoma and gallbladder polyps, each accounting for 0.7% of cases. In agreement with these findings, Alabi A et al.[19] reported that among 1,473 cholecystectomy specimens examined histologically, most cases (87.4%) showed chronic cholecystitis, with one case of papillomatosis with high-grade dysplasia and two cases (0.14%) of incidental gallbladder carcinoma, both occurring in females aged 52 and 78 years.

Similarly, Di Mauro D et al.[20] found chronic cholecystitis to be the predominant histopathological finding (99.3%), with incidental gallbladder carcinoma identified in six patients. Supporting these results, Jha AK et al.[21] reported that 97.6% of specimens showed benign lesions, with chronic calculous cholecystitis being the most frequent diagnosis (95.01%), followed by cholesterosis (9.9%) and xanthogranulomatous cholecystitis (6.51%); incidental gallbladder carcinoma was detected in 17 specimens. In comparison, Kozan R et al.[22] demonstrated that chronic cholecystitis was the most common finding (74.9%), followed by xanthogranulomatous cholecystitis (1.6%), acute cholecystitis (1.6%), and other rare inflammatory and hyperplastic conditions, with one case each of a normal gallbladder and gallbladder carcinoma.

Likewise, Jamal Z et al.[1] reported that among 266 cholecystectomy specimens, chronic cholecystitis was present in 67.3% of cases, acute cholecystitis in 14.7%, polyps in 3.8%, adenomyomatosis and gangrenous cholecystitis in 2.6% each, and acute-on-chronic cholecystitis in 2.6%. Other findings, including dysplasia, cholesterolosis, xanthogranulomatous cholecystitis, metaplasia, and intracholecystic papillary neoplasm, were rare.[1]

Overall, consistent with previously published literature, chronic cholecystitis was the most common histopathological diagnosis in the present study. However, the detection of incidental gallbladder carcinoma underscores the importance of routine histopathological examination, as early diagnosis allows timely intervention and may prevent disease progression and mortality. Although routine histopathology may not be highly cost-effective, particularly in resource-limited tertiary care settings, its clinical significance remains substantial. This study has certain limitations, including the lack of correlation between histopathological findings and associated risk factors, which could help identify high-risk patients during routine evaluation. Therefore, further large-scale studies are recommended to explore these associations and optimize patient care.

Conclusion

This study revealed that the majority of gallbladder specimens following elective cholecystectomy for gallstones demonstrated benign pathology, predominantly chronic cholecystitis, with only few uncommon lesions like gallbladder polyps or mucinous adenocarcinoma, while the detection of incidental malignancy is rare, which indicating that although the routine

histopathological examination may appear resource-intensive relative to its diagnostic yield, it remains justified as very essential to ensure early identification of unexpected neoplastic changes that could otherwise be missed on gross examination alone, as well as justifying maintaining routine histopathology of gallbladder specimens as a standard practice in elective cholecystectomy.

References

1. Jamal Z, Yu Z, Zafar N, Li D. Reconsidering routine histopathological examination of gallbladder specimens in cholecystectomy: optimizing clinical practice and resource management. Cureus. 2024;16(7):e64762. https://doi.org/10.7759/cureus.64762
2. Poller DN. Histopathological assessment of the gallbladder after routine cholecystectomy is essential for high-quality healthcare. Br J Surg. 2022;109(4):299–300. https://doi.org/10.1093/bjs/znab422
3. Khan S, Rashikh MA, Rehman KU, Berjis H. Selective or routine histology of cholecystectomy specimens for diagnosing incidental carcinoma of gallbladder and correlation with careful intraoperative macroscopic examination? A systematic review. Asian Pac J Cancer Prev. 2021;22(3):651–657. https://doi.org/10.31557/APJCP.2021.22.3.651
4. Bhatti A, Waqar A, Zia S, Hussain N, Zulfiqar T. A cross-sectional study on the risk factors of gallbladder stones. Int J Res Med Sci. 2016;4(11):5041–5046. https://doi.org/10.18203/2320-6012.ijrms20163814
5. Halldestam I, Kullman E, Borch K. Incidence of and potential risk factors for gallstone disease in a general population sample. Br J Surg. 2009;96(11):1315–1322. https://doi.org/10.1002/bjs.6687
6. Salinas G, Velásquez C, Saavedra L, Ramírez E, Angulo H, Tamayo JC, et al. Prevalence and risk factors for gallstone disease. Surg Laparosc Endosc Percutan Tech. 2004;14(5):250–253. https://doi.org/10.1097/00129689-200410000-00003
7. Völzke H, Baumeister SE, Alte D, Hoffmann W, Schwahn C, Simon P, et al. Independent risk factors for gallstone formation in a region with high cholelithiasis prevalence. Digestion. 2005;71(2):97–105. https://doi.org/10.1159/000084525
8. de Pancorbo CM, Carballo F, Horcajo P, Aldeguer M, de la Villa I, Nieto E, et al. Prevalence and associated factors for gallstone disease: results of a population survey in Spain. J Clin Epidemiol. 1997;50(12):1347–1355. https://doi.org/10.1016/S0895-4356(97)00198-4
9. Festi D, Dormi A, Capodicasa S, Staniscia T, Attili AF, Loria P, et al. Incidence of gallstone disease in Italy: results from a multicenter, population-based Italian study (the MICOL project). World J Gastroenterol. 2008;14(34):5282–5289. https://doi.org/10.3748/wjg.14.5282
10. Chen YC, Chiou C, Lin MN, Lin CL. The prevalence and risk factors for gallstone disease in Taiwanese vegetarians. PLoS One. 2014;9(12):e115145. https://doi.org/10.1371/journal.pone.0115145
11. Rosenberg J. Routine or selective histopathology of the gallbladder. Laparosc Surg. 2023;7:5. https://doi.org/10.21037/ls-22-55
12. Wilkinson DS. Carcinoma of the gallbladder: an experience and review of the literature. Aust N Z J Surg. 1995;65:724–727. https://doi.org/10.1111/j.1445-2197.1995.tb00545.x
13. Channa NA, Soomro AM, Ghangro AB. Cholecystectomy is becoming an increasingly common operation in Hyderabad and adjoining areas. Rawal Med J. 2007;32(2):128–130.
14. Khan S, Rashikh MA, Rehman KU, Berjis H. Selective or routine histology of cholecystectomy specimens for diagnosing incidental carcinoma of gallbladder and correlation with careful intraoperative macroscopic examination? A systematic review. Asian Pac J Cancer Prev. 2021;22(3):651–657. https://doi.org/10.31557/APJCP.2021.22.3.651
15. Ashraf S, Khan MS, Wattoo NM, Rashid AR, Zia SA. Gender-based differences in the outcome of laparoscopic cholecystectomy in patients with gallstones. Pak Armed Forces Med J. 2024;74(4):961–965.
16. Jadoon S, Nawaz M, Javed S, Imtiaz H, Jadoon O, Taimoor A. Prevalence of gallstones in patients undergoing cholecystectomy in a tertiary care hospital. J Ayub Med Coll Abbottabad. 2021;33(1):102–104.
17. Sathish Kumar B, Reddy V, Reddy SV, Ram Mohan C, Koneru J. Clinical presentation and management of cholelithiasis. Int Surg J. 2019;6:2164–2167. https://doi.org/10.18203/2349-2902.isj20192386
18. Noureen S, Khan NA, Shahid A, Idrees M, Ahmed M, Shah MH, et al. Patterns of gallbladder diseases and associated risk factors in a tertiary care hospital of Pakistan. Cureus. 2025;17(1):e78093. https://doi.org/10.7759/cureus.78093
19. Alabi A, Arvind AD, Pawa N, Karim S, Smith J. Incidental gallbladder cancer: routine versus selective histological examination after cholecystectomy. Surg J (N Y). 2021;7(1):e22–e25. https://doi.org/10.1055/s-0040-1722175
20. Di Mauro D, Orabi A, Myintmo A, Reece-Smith A, Wajed S, Manzelli A. Routine examination of gallbladder specimens after cholecystectomy: incidence and clinicopathological aspects of incidental gallbladder carcinoma. Discover Oncol. 2021;12(1):4. https://doi.org/10.1007/s12672-021-00399-5
21. Jha AK, Ali A, Kumar M, Bhadani PP, Murthy NB, Chandrakant K. Outcome of routine histopathological examination of gallbladder specimens following elective laparoscopic cholecystectomy. J Carcinog. 2021;20:19. https://doi.org/10.4103/jcar.jcar_19_21
22. Kozan R, Özaydin S, Bayhan H, Leventoğlu S, Karamercan A, Anadol AZ, et al. Routine histopathological examination after laparoscopic cholecystectomy: can we safely abandon it? Turk J Gastroenterol. 2021;32(2):218–224. https://doi.org/10.5152/tjg.2021.20334