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Original Research Article

Frequency of Gall Bladder Carcinoma Among Patients Presenting with Cholelithiasis

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Abstract: *Gallbladder carcinoma is an uncommon but aggressive malignancy that is frequently associated with long-standing cholelithiasis and is often diagnosed incidentally on histopathology after cholecystectomy.* ***Objective:*** *To determine the frequency of gall bladder carcinoma among patients with cholelithiasis presenting at Saidu Group of Teaching Hospital, Swat.* ***Methodology:*** *One hundred seventy-five patients aged 25 to 70 years presenting with cholelithiasis were enrolled in this study. All the patients underwent laparoscopic cholecystectomy. Every gallbladder was assessed for histopathological examination, and patients were evaluated clinically for jaundice, abdominal pain, and unexplained weight loss. Data analysis was performed using SPSS 23.* ***Results:*** *The mean age of the cohort in the present study was 46.06 ± 13.66 years, while the mean BMI was 25.65 ± 1.77 kg/m2. The study cohort had 133 females (76.0%) and 42 males (24.0%). Most of the patients resided in urban areas (63.4%) and belonged to the middle socioeconomic class (43.4%). Histopathological examination showed that gallbladder carcinoma was present in 6 patients (3.4%). Gallbladder carcinoma did not show an association with demographics.* ***Conclusion:*** *The frequency of gallbladder carcinoma in patients with cholelithiasis in the present study was 3.4%.*

Keywords: Gallbladder carcinoma, Cholelithiasis, Incidence, Histopathology, Cholecystectomy.

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Introduction

Gallstones are a prevalent gastrointestinal disorder worldwide. Many individuals with gallstones remain asymptomatic; however. Gallstones are particularly common in women, affecting more than a quarter of this population. A variety of factors influence their formation, and gallstones can differ in composition (1,2). The development of gallstones is typically associated with impaired gallbladder bile flow. When bile is not fully expelled, it may thicken into sludge, which can subsequently crystallise into gallstones. Biliary obstruction caused by conditions such as bile duct strictures or tumours can also contribute to gallstone formation. Cholelithiasis is most frequently associated with crystallisation of cholesterol in bile that is supersaturated with cholesterol, whereas pigmented gallstones represent the second most common type. Gallbladder cancer is an uncommon malignancy but accounts for nearly half of all biliary tract cancers (3-6).

The prognosis for gallbladder cancer is poor due to its aggressive tumour biology, late clinical presentation, and frequent diagnosis at an advanced stage. Early-stage disease may be curable by means of surgical excision followed by adjuvant therapy, whereas advanced or metastatic disease is typically managed with the aid of palliative chemotherapy. Gallstones larger than 3 cm are associated with a tenfold increased risk of gallbladder cancer (7,8). Additional risk factors include porcelain gallbladder, sclerosing cholangitis, and exposure to carcinogens (9,10). One study reported that the prevalence of gallbladder carcinoma among patients with cholelithiasis was 5.9% (11).

Gallbladder cancer is most frequently observed in the fundus of the gallbladder, with common sites of metastasis including the liver and regional lymph nodes. (8) Early detection is rare because its signs and symptoms often mimic those of cholecystitis or cholelithiasis. (9) Typical clinical manifestations include right upper quadrant pain, nausea and vomiting, and unintentional weight loss (12,14).

Gallbladder carcinoma arises from pre-existing gallstones and chronic gallbladder inflammation. Due to the paucity of literature on this subject at our regional level, the goal of this study is to determine the frequency of gallbladder carcinoma among patients with cholelithiasis presenting at Saidu Group of Teaching Hospital, Swat. The findings of this study will assist our health professionals by emphasizing the importance of early detection and tailored therapeutic interventions.

Methodology

This cross-sectional study was conducted from 29-06-2024 to 29-12-2024 in the Department of Surgery, Saidu Group of Teaching Hospitals, Saidu Sharif, Swat. Ethical approval was obtained before data collection commenced. The sample size is 175 patients, based on the frequency of gallbladder carcinoma 5.9%,(11) confidence level 95% and a margin of error 3.5%.

Patients aged between 25 and 70 years, of either gender, presented with cholelithiasis. Cholelithiasis was defined as patients complaining of abdominal pain (VAS > 5) and nausea/vomiting. Ultrasound evaluation was performed for Diagnosis, revealing all of the following features: hyperechoic (bright) foci within the gallbladder lumen and acoustic shadowing. Patients with known biliary tract diseases, pregnant patients, and patients with cardiac disease were excluded.

Patients were informed of the study and provided consent. Demographic information, including age, body mass index, gender, educational status, profession, socioeconomic status, and area of residence, was recorded for each patient.

All patients underwent a laparoscopic cholecystectomy under general anaesthesia for the management of gallstones. Laparoscopic cholecystectomy was performed by making three small incisions in the abdomen, around the umbilicus, to allow access for surgical instruments. Trocars were inserted through these incisions to create ports for the laparoscopic instruments and camera for the removal of the diseased gallbladder. After the removal, the gallbladder was evaluated for gallbladder carcinoma, which will be labelled among patients complaining of all of the following: Jaundice, abdominal Pain (VAS > 6), and unexplained weight loss. Histopathology assessment was performed for diagnosis, revealing the following: Glandular structures infiltrating the

gallbladder wall, abundant extracellular mucin production, chronic inflammation, and metaplasia of the gallbladder epithelium. A consultant surgeon supervised the whole assessment.

Data analysis was conducted using SPSS 23. Age and BMI were presented as mean and standard deviation. Gallbladder carcinoma and demographics (categorical) were presented using frequency and percentages. The chi-square test was used for stratification, with P-values ≤ 0.05 considered statistically significant.

Results

The present study enrolled 175 patients. Mean age was 46.06±13.664 years. The mean body mass index was 25.65±1.77 kg/m2.

The gender distribution showed that the majority of patients were female (133, 76.0%). The residential background showed that 111 (63.4%) cases were residing in urban areas. There were 90 literate patients (51.4%). Socioeconomic status revealed that 76 (43.4%) patients belonged to the middle class (income between 50,000 and 100,000 Rs/Month). Sixty-two patients (35.4%) were from the lower class (< 50000 Rs/Month) (Table 1)

The study observed that gallbladder carcinoma was diagnosed in a few patients. Six cases (3.4%) were found to have gall bladder carcinoma. One hundred sixty-nine patients (96.6%) did not have gall bladder carcinoma (Figure 1). Table 2 presents the stratification of gallbladder carcinoma with demographics. No significant differences were found.

Table 1 Demographics

Demographics		**n**	**%**
Gender	Male	42	24.0%
	Female	133	76.0%
Profession	Labour	14	8.0%
	Office work	38	21.7%
	Business	26	14.9%
	Other	97	55.4%
Area of residence	Urban	111	63.4%
	Rural	64	36.6%
Education status	Literate	90	51.4%
	Illiterate	85	48.6%
Socioeconomic status	Lower class (> 50K)	62	35.4%
	Middle class (50K to 100K)	76	43.4%
	Upper class (> 100K)	37	21.1%

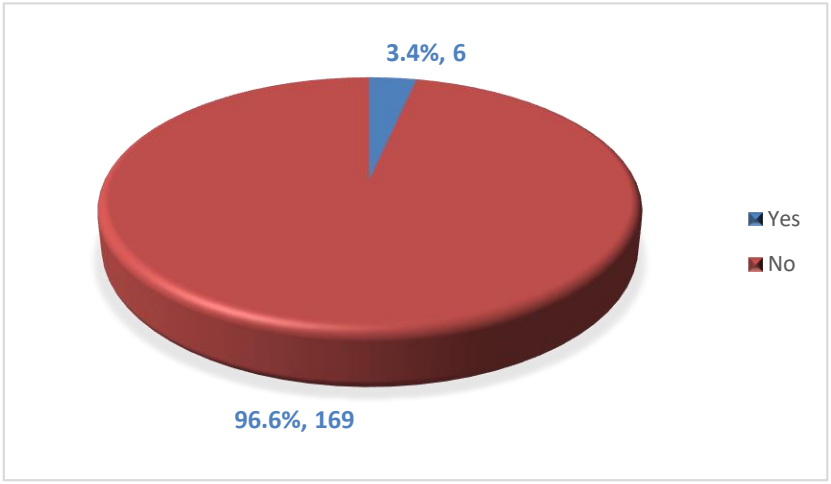

Figure 1: Frequency of gallbladder carcinoma

Table 2: Stratification of gallbladder carcinoma with demographics

		Gall bladder carcinoma				**P value**
		Yes		**No**		
		n	**%**	**n**	**%**	
Age groups (Years)	25 to 40	2	33.3%	68	40.2%	0.54
	41 to 55	1	16.7%	51	30.2%	
	56 to 70	3	50.0%	50	29.6%	
BMI (Kg/m^2)	18 to 24.9	1	16.7%	62	36.7%	0.31
	> 24.9	5	83.3%	107	63.3%	
Gender	Male	2	33.3%	40	23.7%	0.58
	Female	4	66.7%	129	76.3%	

Profession	Labour	0	0.0%	14	8.3%	0.86
	Office work	1	16.7%	37	21.9%	
	Business	1	16.7%	25	14.8%	
	Other	4	66.7%	93	55.0%	
Area of residence	Urban	3	50.0%	108	63.9%	0.48
	Rural	3	50.0%	61	36.1%	
Education status	Literate	4	66.7%	86	50.9%	0.44
	Illiterate	2	33.3%	83	49.1%	
Socioeconomic status	Lower class (> 50K)	2	33.3%	60	35.5%	0.74
	Middle class (50K to 100K)	2	33.3%	74	43.8%	
	Upper class (> 100K)	2	33.3%	35	20.7%	

Discussion

The current study was conducted on patients presenting with cholelithiasis, and the incidence of gallbladder carcinoma was observed. The study's cohort had a mean age of 46.06 years, consistent with findings from several studies. The mean age reported by Abbasi et al. was 47.71 years, and the study by Khan et al. reported 53.8 years, all mentioning the fifth decade of life. (15,16) The mean age reported in this study is slightly lower than the 49.2 years reported by Alam et al. for carcinoma patients and 61.4 years reported by Ullah et al. for carcinoma cases (17,18). A female predominance was observed in this study, with 76.0% of patients being female. This finding aligns with several studies that reported a female predominance. (15-18)

The mean BMI of the patients in this study was 25.65, which places the average patient in the overweight category. This is a relevant clinical variable, as obesity is a recognised risk factor for cholelithiasis. In their study, Shamim et al. found a significant association between higher BMI and cholesterol gallstones. (19)

The main finding of this study was the frequency of gallbladder carcinoma, 3.4%. This figure is higher than the 0.68% reported by Haq et al. and the 0.9% reported by Ullah et al., but lower than the 4% and 5.9% reported by Naqvi et al. (11). The 2% frequency found by Abbasi et al. is the closest comparable figure. (15) This variation is expected and can be attributed to several factors. Differences in sample size, geographical location, patient selection criteria, and the sensitivity of histopathological examination can influence the reported frequency. The finding suggests that gallbladder carcinoma is relatively rare and is a significant finding in cholecystectomy specimens for cholelithiasis in this region.

Although not analysed in the present study, the associated risk factors in the literature point towards pathological findings. Khan et al. and Alam et al. observed that chronic cholecystitis, porcelain gallbladder, and gallbladder wall thickening were the significant associated factors. (16,17) The current study confirmed a baseline frequency of gallbladder carcinoma. Still, it did not analyze associations between carcinoma and ultrasound or histopathological features such as wall thickness or stone characteristics. This represents a potential area for further research.

The novelty of the current study lies mostly in the inclusion of socioeconomic and anthropometric data. By reporting BMI, profession, education, and income levels, along with gallbladder carcinoma, this study provides a holistic snapshot of the patient demographic. It moves beyond clinical and pathological reporting to the socio-economic determinants of health that may influence disease presentation and access to timely cholecystectomy. This contribution is important as it provides a foundation for future research into how non-clinical factors impact the risk and detection of gallbladder carcinoma in high-prevalence regions.

Several limitations of this study must be acknowledged. The sample size of 175, while suitable for demographic description, may limit statistical power for multivariate analysis of risk factors, especially given the low frequency of carcinoma reported in this study. The single-centre, cross-sectional design limits the generalisability of the findings to other populations in different settings.

Conclusion

In conclusion, this study found a lower frequency of gallbladder carcinoma in patients with Cholelithiasis. It is suggested that future multi-centre studies with a larger sample size should be conducted. These should integrate clinical, sonographic, histopathological, and socioeconomic variables to develop a predictive Model for identifying patients with cholelithiasis at the greatest risk of malignancy, thereby optimizing surgical and oncological management.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department concerned.
Consent for publication
Approved
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Conflict of interest

The authors declared no conflict of interest.

Author Contribution

FH (TMO)
Manuscript drafting, Study Design, Conception of Study, Development of Research Methodology Design
AUH (Professor)
Review of Literature, Data entry, Data analysis, and drafting articles.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the study's integrity.

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