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Original Article

A RETROSPECTIVE ANALYSIS OF SELECTIVE HISTOLOGICAL EXAMINATION VERSUS ROUTINE HISTOLOGICAL EXAMINATION AFTER CHOLECYSTECTOMY FOR GALLBLADDER STONES.

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Abstract

Background

The usual histological examination is carried out after the cholecystectomy procedure has been completed to determine whether or not the patient has a malignancy. There is a very low probability that cancer will be discovered during a routine checkup after cholecystectomy. The study aims to investigate the incidence of gall bladder cancer among patients who have had cholecystectomy surgeries.

Method

A retrospective study was conducted and the data of the patients who underwent cholecystectomy for gallbladder stones were included in this study. The patients in which incidental gall bladder cancer was recorded were compared with the patients with no gall bladder cancer in terms of the morphology of the gall bladder, histopathology of the gall bladder specimen, and other clinical features. The risk factors associated with gall bladder cancer were determined.

Results

Out of 1198 cases analyzed, 4 patients (0.33%) had IGBC. The average age was 53 years, with malignancy patients averaging 72 years and benign cases 43 years. Among IGBC patients, 3 were female and 1 male, showing a significant correlation with female gender ($p < 0.05$). Emergency cholecystectomy was performed in 143 cases, with 3 (2.1%) having cancer, compared to 1 in the elective surgery group ($p = 0.02$). All cancer patients exhibited macroscopic abnormalities like thickened walls, polyps, ulceration, and calcification. The average survival time for IGBC patients was 15 months, with treatments including chemotherapy and radiotherapy.

Conclusion

Risk factors associated with gall bladder cancer identified in this study include female gender, advanced age, conversion of the surgery, emergency surgery, and macroscopic abnormalities in the gall. Selective histopathology for diagnosis of gall bladder cancer in patients undergoing cholecystectomy is effective and does not compromise the health of the patients.

Recommendation

Selective histopathology should be preferred over routine histopathological examination after cholecystectomy.

Keywords: *Incidental gall bladder cancer, risk factors, cholecystectomy*
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Introduction

Cancer of the gall bladder is a kind of cancer that has a catastrophically bad prognosis. When it comes to gall bladder cancer, the majority of instances are considered to be benign. It is necessary to do a histopathological study to verify the existence of the prognosis. The gall bladder condition that is caused by stones is quite common, and the therapy that is now accessible for it is a laparoscopic cholecystectomy [1]. The usual histological examination is carried out after the cholecystectomy procedure has been completed to determine whether or not the patient has malignancy.

There is a very low probability that cancer will be discovered during a routine checkup after cholecystectomy. Particularly when taking into account ethnicity, the prevalence of such a phenomenon is uncommon among the Western population in comparison to the Asian population [2]. Even though regular examinations uncover fifty to sixty per cent of gall bladder cancer cases, the total incidence of gall bladder cancer that is discovered by incident ranges from one-tenth of one per cent to five per cent [3]. Because gall bladder cancer does not present any symptoms, it is not feasible to discover this kind of cancer at an earlier stage, except for a routine medical examination.

Taking into consideration the expense, the amount of time, and the level of competence involved, the routine inspection is controversial. Additionally, the research suggests that before conducting the operation, some characteristics may assist in knowing the possibility of malignancy [4]. This is in addition to the fact that the prevalence is minimal. Several factors might enhance the likelihood of a patient developing

gallbladder cancer. These factors include the patient's ethnicity, the patient's gender, the patient's advanced age, patients with elevated levels of alkaline phosphatase, and patients who have open surgery after having laparoscopic surgery [5]. The assessment of gall bladder cancer by histological investigation, whether it be routine or selective, involves critical debate. This research is being carried out at our institution to investigate the incidence of gall bladder cancer among patients who have had cholecystectomy surgeries.

Method

Study design

A retrospective cohort study was

Study setting

The study was conducted at Department of Surgery, M.G.M Medical College & Hospital, Jamshedpur for three years from May 2021 to June 2024.

Participants

A total of 1198 individuals were included in the study.

Inclusion Criteria

- Patients who underwent cholecystectomy for gallbladder stones.
- Patients whose gallbladder specimens were received by the pathology department for histopathological examination.
- Patients with complete clinical and demographic data available.

Exclusion Criteria

- Patients who were suspicious of cancer before the surgery.
- Patients with other gallbladder diseases such as gallbladder polyps or porcelain gallbladder.
- Patients with incomplete clinical or demographic data.
- Patients whose gallbladder specimens were not received or were inadequate for histopathological examination.

Bias

Since the study is retrospective, there is a risk that the sample might not be representative of all patients undergoing cholecystectomy. Inclusion criteria were strictly adhered to, and all eligible patients over the study period were included to ensure a comprehensive sample. Efforts were made to include a wide range of cases to minimize selection bias.

After the cholecystectomy, the patient's fall bladder sample and gallstone sample were received by the pathology department. Macroscopic condition and the anatomy were taken from the surgeon's note. The specimens were flushed with saline and then histopathological examination was carried out.

The demographic, clinical data, and macroscopic appearance of the gall bladder along with the histopathological reports obtained from the pathology department were arranged systematically. The occurrence of incidental gall bladder cancer was recorded. The patients in which incidental gall bladder cancer was recorded were compared with the patients with no gall bladder cancer in terms of the morphology of the gall bladder, histopathology of the gall bladder specimen, and other clinical features. The risk factors associated with gall bladder cancer were determined. A multidisciplinary team of pathologists, hepatologists, oncologists, and radiologists critically analysed the factors that led to gallbladder cancer.

Ethical consideration

Permission for conducting the study was obtained from the ethical committee of the M.G.M Medical College & Hospital, Jamshedpur.

Statistical analysis

The data was arranged on an Excel sheet to compare the clinical features with the occurrence of gall bladder cancer, and further it was subjected to statistical analysis by the chi-square method. P-value obtained less than 0.05 indicated that the risk factor was significantly associated with the occurrence of gall bladder cancer.

Result

The data of 1198 patients who underwent cholecystectomy were reviewed in this study. The average age of the total patients participating in this study was 53 years. However, the patients who had benign gallbladder stones had an average age of 43 years and those who had malignancy of the gallbladder had an average age of 72 years. The p-value between the age of the patients with malignancy and without malignancy

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was less than 0.05 which indicated that age correlated with the occurrence of gall bladder cancer. 0.33% of the patients that is only 4 patients were found to have malignancy out of 1198 cases. Among these 4 patients, 3 were female and was male. The p-value of gender in the case of malignancy and benign was found to be less than 0.05 which indicated that gender correlated with the occurrence of malignancy. Out of 1198 cases, 12% of the cases that is 143 cases underwent emergency cholecystectomy. Amongst the 143, 2.1 % of the patients that is 3 patients had gall bladder cancer. In the elective surgery group, a single patient had gallbladder cancer. Thus, the p-value was 0.02 which indicated that the type of surgery was associated with the occurrence of malignancy. Among the 4 patients who had gall bladder cancer 3 had adenocarcinoma and 1 had adeno squamous carcinoma. All the 1198 specimens were sent for histopathological examination. In 80% of the cases, it was chronic cholecystitis. Table No. 2 gives the details of the histopathological examination of the specimens.

Table no. 1: Demographic and clinical profile

Variable	Total Cases	Benign Cases	Malignant Cases	p-value
Number of Patients	1198	1194	4	-
Average Age (years)	53	43	72	<0.05
Gender				
- Male	-	-	1	<0.05
- Female	-	-	3	
Type of Surgery				
- Emergency Cholecystectomy	143 (12%)	140	3	0.02
- Elective Cholecystectomy	1055 (88%)	1054	1	
Histopathological Findings				
- Chronic Cholecystitis	958 (80%)	958	0	
- Gallbladder Cancer	4 (0.33%)	0	4	
• Adenocarcinoma	-	-	3	
• Adeno Squamous Carcinoma	-	-	1	

Table no.2: Histopathological findings

Sr no.	Histopathology	Frequency (%)
1.	Cholecystitis chronic	958 (80%)
2.	Cholecystitis with cholestrosis	435 (2.2%)
3.	Cholecystitis with empyema	144 (1.2%)
4.	Cholecystitis with mucocele	54 (4.5%)
5.	Xanthogranulomatous	14 (1.2%)
6.	Gall bladder cancer	04 (0.33%)

Table no.3: Morphology of the gall bladder

Morphological appearance	Frequency
Normal	939
Thick walls	259
Polyps	07
Ulceration	14
Calcification	19
Nodularity	06
Irregularity	133

Morphology of the gall bladder was determined from the operative notes of the surgeon. Table no.3 gives the details of the morphology of the gall bladder. Among the 1198 cases, 78% of the cases had normal morphology of the gall bladder. The remaining cases had polyps, calcification, irregularity, nodularity, thickened walls, and ulceration. All the cases of gall bladder cancer had an abnormal morphological appearance. Also, all the cases of gall bladder cancer were converted from laparoscopic surgery to open surgery reason being the morphology of the gall bladder. The p-value associated with the conversion rate of the surgery was found to be 0.02 which indicated that conversion was significantly associated with the occurrence of gallbladder cancer.

Table no. 4 gives the details of the patients diagnosed with gallbladder cancer. 4 patients diagnosed with cancer died within the study period. The survival of these patients ranged from 6 months to 28 months, with an average survival of 15 months. Treatment given to these patients after cholecystectomy included chemotherapy in

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3 patients and 1 of them with chemotherapy radiotherapy was given. However, 1 of them received only palliative care due to the later stage of detection. 939 cases had normal morphology. Each of the specimens that underwent histopathology required 1606 INR and 20 minutes of pathological examination. If the selective histopathological examination approach was utilized as per the morphological appearance, 1508034 INR could be saved along 313 working hours could be reduced.

Table no. 4: Details of the patients with gall bladder cancer

Sr no.	Indication before cholecystectomy	Operative procedure	Morphology of the gall bladder	Post operative treatment	Survival months
1.	Biliary colic	Laparoscopic surgery converted to open surgery	Thick walls and nodules	Chemotherapy	18 months
2.	Acute cholecystitis	Laparoscopic surgery converted to open surgery	Thick wall and polyps	Chemotherapy + radiotherapy	8 months
3.	Biliary colic	Laparoscopic surgery converted to open surgery	Thick wall ulceration and polyps	Palliative care	6 months
4.	Acute pancreatitis	Laparoscopic surgery converted to open surgery	Thick wall and calcification	Chemotherapy	23 months

Discussion

Detection and diagnosis of gallbladder cancer are difficult due to the similarity of its symptoms associated with gallbladder stones. Also, the prognosis of this disease makes it difficult to manage it. The cholecystectomy performed to treat the gall bladder stone is usually followed by routine histopathological examination of the gall bladder specimen. The diagnosis of incidental gall bladder cancer during this histopathological examination is quite rare with a range of 0.19% to 0.29% [6]. Similarly, this study found 0.38% of the incident gall bladder cancer cases during the routine examination after cholecystectomy. It has been reported in a previous study that older patients are prone towards the occurrence of gall bladder cancer [7]. A study also reported that there were no patients below 50 years who had gallbladder cancer [8]. In this study as well, it was found that the patients with advanced age had gall bladder cancer.

Considering the ethnicity the literature states that the Asian population has a higher occurrence of gall bladder cancer compared to the Western population [2,9]. Since this study included patients of Asian origin the ethnicity factor could not be verified in this study. Gender plays a significant role in determining the occurrence of gallbladder cancer. A study reported that more than 70% of the gall bladder cancer were females [10]. This finding is consistent with our study which reported that 75% of the gall bladder cancer patients were females. A study reported that patients with gall bladder cancer have distinctive features which are not related to histopathology which include female gender, advanced age, high alkaline phosphate level, diabetes mellitus, hypertension and conversion of laparoscopic surgery to open surgery [11]. This study also found that all the patients with gall bladder cancer underwent conversion from laparoscopic surgery to open surgery.

The treatment received by the patients of gall bladder cancer included chemotherapy and radiotherapy. The average survival time of the patients with gallbladder cancer was 15 months which was consistent with the time reported in the literature [12]. The peculiarity of gall bladder cancer patients was the morphology of the gall bladder found during the gross examination of the gall bladder at the time of cholecystectomy [13]. Amongst the 1198 cases of cholecystectomy, 939 cases had abnormal gall bladder appearance most of them had thickened walls of the gallbladder. All the cases of gall bladder cancer were reported from these 939 cases. A study stated that the morphology of gall bladder cancer is abnormal which includes thickened walls, polyps, ulceration, calcification, and irregularity [14]. Similar morphology has been found during the course of this study as well.

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If a selective histopathology examination was conducted considering the morphology of the gall bladder hefty number of resources could be saved. In this study, each specimen required 1606 INR and 20 minutes. Since 939 cases had normal morphology approximately 15 lakh INR and 300 working hours could be saved. Various studies have reported such statistics in favour of selective histopathological examination [1,3,7]. Although a study stated that dysplasia and early malignancy of the mucosal lining can be hidden in a normal morphology on the other hand such cases only have cholecystectomy as their primary option for treatment [15].

Generalizability

The study's findings indicate that older age, female gender, and emergency cholecystectomy are significant risk factors for gall bladder cancer, while selective histopathological examination based on macroscopic abnormalities can effectively diagnose malignancies without compromising patient health. Applying these insights to larger populations, healthcare providers can enhance screening protocols for high-risk groups, optimize resource allocation, and improve early detection and treatment strategies, ultimately leading to better patient outcomes and more efficient healthcare systems.

Conclusion

Risk factors associated with gall bladder cancer identified in this study include female gender, advanced age, conversion of the surgery, emergency surgery, and macroscopic abnormalities in the gall. Selective histopathology for diagnosis of gall bladder cancer in patients undergoing cholecystectomy is effective and does not compromise the health of the patients.

Limitation

This study was conducted in a single institution, considering the low prevalence a large cohort is required from multiple institutes to confirm the findings of this study.

Recommendation

Selective histopathology should be preferred over routine histopathological examination after cholecystectomy.

Acknowledgement

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List of abbreviation

IGBC- Incident gall bladder cancer

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Conflict of interest

The authors declare no conflict of interest.

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