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A STUDY ON PREVALENCE OF HYPOTHYROIDISM IN DIAGNOSED CASES OF CHOLELITHIASIS

Surgery

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ABSTRACT

Background: Gallstones are a common biliary pathology with varied composition and prevalence patterns globally. Emerging evidence suggests a potential association between hypothyroidism and gallstone disease, possibly due to altered lipid metabolism, reduced bile flow, and the influence of thyroid hormones on the sphincter of Oddi. **Objective:** This study aimed to determine the prevalence of hypothyroidism among patients diagnosed with cholelithiasis or choledocholithiasis and assess its significance as a potential risk factor. **Methods:** A cross-sectional observational study was conducted in the Department of General Surgery at Index Medical College, Hospital and Research Centre, from June 2023 to August 2024. Sixty patients diagnosed with gallstones or common bile duct (CBD) stones were included using purposive sampling. Clinical examination, routine investigations, imaging, and thyroid function tests were performed. Data were analyzed to assess demographic distribution, comorbidities, imaging findings, and thyroid profiles. **Results:** The mean age of patients was 46.24 years, with a male-to-female ratio of 1:2.3. Diabetes was the most common comorbidity (21%). Ultrasound findings revealed multiple gallstones in 68% of patients. Hypothyroidism was present in 26.6% of cases (16 out of 60), predominantly affecting females (87.5%) and patients aged 40–49 years. The association was statistically significant ($p < 0.05$). **Conclusion:** Hypothyroidism may be an important and often overlooked risk factor in the development of gallstones, especially among middle-aged females. Routine thyroid function screening should be considered in this population to facilitate early diagnosis and management of underlying hypothyroidism.

KEYWORDS

1. INTRODUCTION

Gallstone disease is one of the most prevalent disorders of the biliary system worldwide. Gallstones, which may be composed of cholesterol, pigment, or mixed substances, are classified based on their chemical composition. While cholesterol or mixed stones account for approximately 80% of cases in the USA and Europe, pigment stones are more common in Asia. These stones form due to an imbalance in the physico-chemical processes that maintain cholesterol in a soluble form within bile.

Recent research has turned attention to various metabolic and hormonal factors contributing to gallstone formation, including thyroid dysfunction. Hypothyroidism, a common endocrine disorder particularly among middle-aged women, is often underdiagnosed. It has been hypothesized that thyroid hormone deficiency may play a role in gallstone pathogenesis through multiple mechanisms: altered lipid metabolism leading to cholesterol supersaturation in bile, reduced bile flow, and impaired sphincter of Oddi relaxation due to decreased thyroxine activity.

Given this background, evaluating thyroid function in patients with gallstone disease could have significant diagnostic and therapeutic implications. This study was designed to assess the prevalence of hypothyroidism in patients with cholelithiasis and choledocholithiasis and to explore the potential link between these two commonly encountered conditions.

2. MATERIALS AND METHODS

Study Design And Setting:

A hospital-based cross-sectional observational study was conducted in the Department of General Surgery at Index Medical College, Hospital and Research Centre, Indore, over a period of 14 months—from June 2023 to August 2024.

Sample Size And Sampling Technique:

A total of 60 patients diagnosed with cholelithiasis or choledocholithiasis and admitted to the surgery department were included in the study. A non-random, purposive sampling technique was used to select the participants based on inclusion criteria.

Inclusion Criteria:

- Patients diagnosed with gallstones (cholelithiasis) or common bile duct stones (choledocholithiasis) based on clinical presentation and imaging.
- Patients willing to participate and give informed written consent.

Exclusion Criteria:

- Patients with a history of thyroid disorders already under treatment.
- Patients with known hepatic or biliary malignancies.
- Pregnant women.

Data Collection Procedure:

Upon admission, a brief clinical history and thorough physical examination were conducted. Baseline investigations such as complete blood count, liver function tests, and imaging studies (Ultrasound/CT abdomen) were performed. In addition, all patients underwent thyroid function tests, including TSH, T3, and T4 levels.

Patients requiring surgical intervention were operated on under standard aseptic precautions. Data were recorded regarding demographic variables, comorbidities (such as diabetes), imaging findings, surgical outcomes, and thyroid status.

Ethical Considerations:

Written informed consent was obtained from each participant or their legal guardian after explaining the nature and objectives of the study. Confidentiality and ethical standards were strictly maintained throughout the study.

Data Analysis:

Collected data were compiled and analyzed statistically. The prevalence of hypothyroidism among gallstone patients was calculated. The significance of associations was assessed using appropriate statistical tools, with a p-value <0.05 considered statistically significant.

3. RESULTS

A total of 60 patients diagnosed with gallstones (cholelithiasis and/or choledocholithiasis) were included in the study. The data was analyzed to determine age and sex distribution, comorbidities, imaging findings, and thyroid status.

Table 1: Age And Sex Distribution Of Patients With Gallstones

Age Group (years)	Number of Patients	Percentage (%)
20–29	4	6.7%
30–39	12	20%
40–49	23	38.3%

50–59	13	21.7%
60+	8	13.3%
Total	60	100%

Mean Age: 46.24 years
Sex Distribution: 18 males (30%), 42 females (70%)
Male to Female Ratio: 1:2.3

Table 2: Comorbidities In Gallstone Patients

Comorbidity	Number of Patients	Percentage (%)
Diabetes Mellitus	13	21.7%
Hypertension	5	8.3%
Hypothyroidism	16	26.6%
None	26	43.3%

Table 3: Imaging Findings (USG/CT)

Finding	Number of Patients	Percentage (%)
Multiple Gallbladder Stones	41	68.3%
Single Gallbladder Stone	14	23.3%
Gallbladder + CBD Stones	3	5%
CBD Stones Only	2	3.4%

Table 4: Thyroid Profile Of Patients

Thyroid Status	Number of Patients	Percentage (%)
Euthyroid	44	73.3%
Hypothyroid	16	26.6%

Among 16 hypothyroid patients, 14 were females and 2 were males. The majority of hypothyroid patients were in the 40–49 years age group.

Key Findings:

- 26.6% of patients with gallstones had hypothyroidism, a statistically significant association ($p < 0.05$).
- Hypothyroidism was more prevalent in females, particularly in middle-aged women (40–49 years).
- Diabetes was the most common comorbidity observed.

4. DISCUSSION

This cross-sectional study evaluated the prevalence of hypothyroidism in patients diagnosed with gallstones (cholelithiasis and choledocholithiasis). The findings revealed a significant association, with 26.6% of the study population showing hypothyroidism. This supports the hypothesis that thyroid dysfunction, particularly hypothyroidism, may contribute to gallstone formation.

Gallstone disease is multifactorial in origin, with risk factors including age, gender, obesity, metabolic disorders, and genetic predisposition. The role of thyroid dysfunction, though often overlooked, has been increasingly highlighted in recent studies. Hypothyroidism can influence bile composition and flow by promoting cholesterol supersaturation and reducing gallbladder motility. Moreover, thyroid hormone receptors in the sphincter of Oddi suggest a direct effect of thyroid hormones on biliary dynamics.

In this study, a higher prevalence of hypothyroidism was observed in females, particularly those aged 40–49 years, aligning with known epidemiological trends of thyroid disorders. The male-to-female ratio among hypothyroid patients was 1:7, reflecting the higher susceptibility of women to both gallstones and hypothyroidism.

These results are consistent with earlier studies suggesting an association between hypothyroidism and gallstone formation. For instance, Inkinen et al. (2001) demonstrated a link between treated hypothyroidism and common bile duct stones. Similarly, Cicala et al. (2001) reported increased sphincter of Oddi basal pressure in patients with gallstones, which may be influenced by thyroid hormone levels.

While the findings are promising, limitations such as a small sample size and lack of follow-up data should be considered. Future large-scale, multicenter studies are needed to further validate these associations and to determine whether routine thyroid screening in gallstone patients is warranted.

Overall, the study reinforces the potential contributory role of hypothyroidism in gallstone disease and emphasizes the importance of including thyroid function tests in the diagnostic workup, especially in middle-aged females presenting with biliary pathology.

5. CONCLUSION

This cross-sectional study was conducted in the Department of General Surgery, Index Medical College Hospital. It can be concluded from the findings of this study that hypothyroidism is a probable risk factor for the development of gallstones, especially in middle-aged females. Clinicians should be aware of the possible hypothyroid background and consider examining the thyroid profile at least in females over 40 years of age, where the prevalence of clinical and subclinical hypothyroidism is highest.

6. REFERENCES

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