



PREVALENCE OF HYPOTHYROIDISM IN GALL STONES DISEASE PATIENTS IN TERTIARY CARE CENTRE IN NAVI MUMBAI

General Surgery

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KEYWORDS

INTRODUCTION

Gallstones are the most common biliary tree disease, both in India and in Western countries. The prevalence rate of gallstone disease in general populations ranges from 10% to 15%, indicating its wide occurrence and impact on a significant portion of the population^[1]. The prevalence of the illness is higher among females, elderly people, and individuals who possess specific risk factors like obesity, sudden weight reduction, and a physically inactive way of life^[1].

Gallstones can be divided into three main types: cholesterol, pigment (black, brown) or mixed stones. In the USA and Europe, 80% are cholesterol or mixed stones, whereas in Asia, 80% are pigment stones.^[2]

Gallstone formation involves multiple factors, such as impaired bile flow, increased cholesterol saturation, and altered gallbladder motility.^[3]

Hypothyroid is also quite common in Indian population around 5-15%, and subclinical hypothyroidism around 8-12%.^[4]

Considerable debate has been going on regarding the potential association between thyroid conditions and the development of GSD in last few decades.

Multiple causes have been enumerated for potential link between gallstone diseases and hypothyroidism. The action of hormones secreted by the thyroid gland on cholesterol metabolism is well-established^[5]. Increased serum cholesterol levels in hypothyroidism cause bile to become supersaturated with cholesterol, which impairs filling, decreases contractility, and prolongs the time bile can stay in the gallbladder and flow through it^[6-7]. These circumstances help keep cholesterol crystals in place, giving them enough time to form and continue to grow and lead to the maturation of gallstones^[6]. Apart from this the decreased amount of bile secretion can physically hinder the removal of accumulated substances from the gallbladder and biliary ducts^[8]. Additionally, thyroid hormones receptors are present in the sphincter of Oddi (SO) facilitating its relaxation

AIM:-

Prevalence of hypothyroidism in gall stones disease patients in Tertiary care centre in Navi Mumbai.

MATERIALS AND METHODS:- Objectives

The objective of this study is to

1. Determine prevalence of hypothyroidism in gall stones patients
2. Correlation of body mass index (BMI) with gall stones patients.

Methodology

Type of study: It was a cross-sectional study done in DY Patil Hospital, Navi Mumbai on patients presenting to OPD in General Surgery department to determine the prevalence of hypothyroidism in gall stones disease patients along with the correlation of body mass index (BMI) with gall stones patients.

Study Approval And Study Population: Before the commencement of this study- the ethical clearance was taken from Institutional Ethics Committee of DY Patil Medical Hospital, Navi Mumbai. Patients of gall stone disease of age between 15 years and 80 years from October 2023 and October 2024.

Sample Size
195 cases

$$X = \frac{Z^2 \cdot xPx(1-P)}{e^2}$$

Where, Z is the level of significance at 5%, i.e., 95% confidence interval = 1.96

P = Incidence of hypothyroidism = 16% = 0.16
E = Error of margin = 10% = 0.10

By this formula,
X = 51.63
X = 52 patients needed in this study.

Patients were selected by the purposive sampling method.

Inclusion Criteria:

1. Patients that gave consent for the study
2. With gall stone disease detected on ultrasonography
3. Above the age of 15 years.
4. Below the age of 80 years.

Exclusion Criteria:

1. Patients below 15 years and above 80 years and pregnancy.
2. Patients with known malignancies.
3. Previous surgeries like ileal resection or vagotomy.

4. Pregnant patients.
5. Did not consent for the study.

RESULTS

Table 1 provides a comprehensive overview of the patient characteristics in the study.

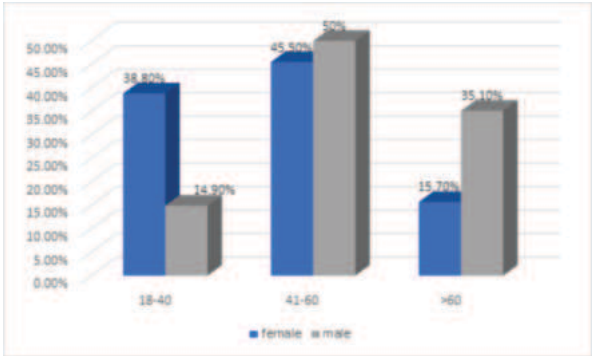
In our study the mean age of the patients is 48.19+ 14.5. The age distribution shows that the majority of patients (47.2%) were between 41-60 years old, with 29.7% in the 18-40 age group and 23.1% over 60 years. The gender distribution was predominantly female, with 62.1% of patients being women compared to 37.9% which were men. Regarding Body Mass Index (BMI), the largest group was in the 25-29.9 range (44.1%), followed by 18.5-24.9 (29.2%). Most patients had normal thyroid-stimulating hormone (TSH) levels (84.6%), with only 15.4% showing elevated TSH. The liver function tests (ALT, AST, ALP) and bilirubin levels were largely within normal ranges, with minimal abnormalities.

Table 2 directly addresses the study's primary objective, revealing that 15.4% of patients with gallstones (30 out of 195) had hypothyroidism, while the vast majority 84.6% (165) patients were euthyroid. This finding suggests a notable presence of hypothyroidism among gallstone patients, though it does not represent a majority of the studied population.

Table 3 explores the relationship between hypothyroidism and BMI, revealing some interesting patterns. The p-value of 0.03 indicates a statistically significant association between BMI and hypothyroidism. Notably, the highest proportion of hypothyroidism was observed in the 25-29.9 and 30-34.9 BMI ranges. Specifically, 50% of patients with hypothyroidism were in the 25-29.9 BMI category, and 36.7% were in the 30-34.9 range. Interestingly, no patients with a BMI below 18.5 had hypothyroidism, while those in the overweight and obese categories showed a higher prevalence of the condition.

Hypothyroidism was found in 20.6% (25) of the 121 female patients who participated in the same study, whereas 96 (81%) were found to be euthyroid. When it came to male patients, there were 5 cases of hypothyroidism (6.8%) and 69 (93.2%) patients were euthyroid.

In our study majority of the hypothyroid patients of gall stone disease were females which were 83%(25) and remaining 16.7%(5) were male.

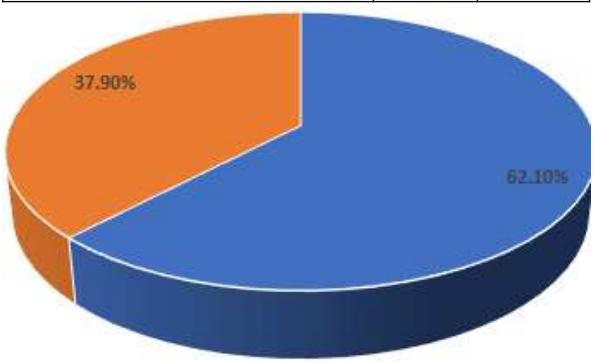


Graph 1: Distribution Of Age Of Patients According To Gender

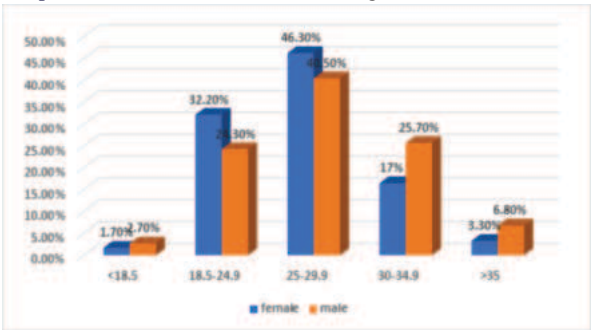
Table 1: Clinicodemographic Profile Of Patients With Gallstones

Variables	N (%)	
Age (mean±SD)	48.19±14.5	
Age (in years)	18-40	58 (29.7%)
	41-60	92 (47.2%)
	>60	45 (23.1%)
Gender	Female	121 (62.1%)
	Male	74 (37.9%)
BMI	<18.5	4 (2.1%)
	18.5-24.9	57 (29.2%)
	25-29.9	86 (44.1%)
	30-34.9	39 (20%)
	>35	9 (4.6%)
TSH	0.4-5.5	165 (84.6%)
	≥5.6	30 (15.4%)
ALT	Normal	194 (99.5%)

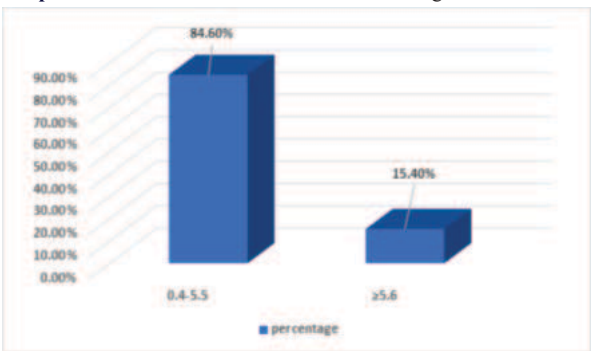
	Abnormal	1 (0.5%)
AST	Normal	192 (98.5%)
	Abnormal	3 (1.5%)
ALP	Normal	189 (96.9%)
	Abnormal	6 (3.1%)
T.bilirubin	Normal	189 (96.9%)
	Abnormal	6 (3.1%)
D.bilirubin	Normal	195 (100%)
	Abnormal	-



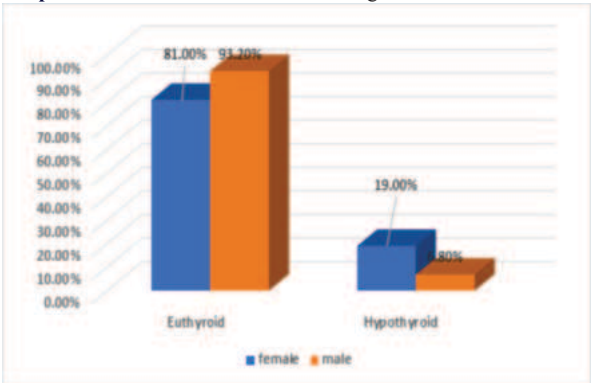
Graph 2: Distribution Of Patients According To Gender



Graph 3: Distribution of BMI Of Patients According To Gender



Graph 4: Distribution Of Patients According To TSH



Graph 4: Distribution of TSH of patients according to gender

Table 2: Prevalence Of Hypothyroidism In Patients With Gallstones

Prevalence	N (%)
Present	30 (15.4%)
Absent	165 (84.6%)
Total	195 (100%)

Table 3: Association Of Hypothyroidism With Body Mass Index (BMI)

BMI	Hypothyroidism		p-value
	Absent	Present	
<18.5	4 (2.4%)	0	0.03
18.5-24.9	54 (32.7%)	3 (10%)	
25-29.9	71 (43%)	15 (50%)	
30-34.9	28 (17%)	11 (36.7%)	
>35	8 (4.8%)	1 (3.3%)	
Total	165 (100%)	30 (100%)	

DISCUSSION:-

This study aimed to evaluate the prevalence of hypothyroidism among patients with gall stone disease and whether these investigations should be included in regular examinations for these individuals. Surgeons most commonly encounter gall stone disease in their clinical practice. The possible link between hypothyroidism and gall stone disease has been an area of interest for researchers, and further research is required to draw definitive conclusions and establish facts for the same.

This study was conducted among 195 patients diagnosed with GSD. Women were predominant at 121 (62.1%) compared to men at 74 (37.9%). An evaluation of the thyroid profile was performed for each of the 195 patients, and the results revealed that 30 (15.4%) patients had hypothyroidism and the other 165 (84.6%) patients were found to be euthyroid. Hypothyroidism was found in 20.6% (25) of the 121 female patients who participated in the same study, whereas 96 (81%) were found to be euthyroid. When it came to male patients, there were 5 cases of hypothyroidism (6.8%) and 69 (93.2%) patients were euthyroid.

Study	Number of patients having hypothyroidism	Percentage of patients having hypothyroidism	Number Euthyroid patients	Percentage Euthyroid patients	Total
Present study	30	15.4	165	84.6	195
Arbab et al. (2020) [15]	16	8.16	177	91.7	193
Ghadhban et al. (2019) [16]	8	7.8	95	92.2	103
Hassan et al. (2011) [17]	12	8	138	92	150
Ibrahim et al. (2014) [18]	52	52	48	48	100
Raza et al. (2020) [19]	50	45	60	55	110

Studies by Tombisana et al., Raghuvanshi et al., and Laukkanen et al. have demonstrated that patients with hypothyroidism have decreased biliary flow due to delayed gallbladder emptying, which plays an important role in the development of GSD.⁽⁹⁾

Few studies have examined patients with gall stone disease to determine the occurrence of previously undiagnosed thyroid disorder, with the results suggesting a potential association between hypothyroidism and gall stone disease. The diagnosis and management of patients with gall stone disease may be influenced by the increased frequency of thyroid dysfunction.

Study conducted by Völzke et al.^[10] among 3,749 persons, aged 20 to 79, concluded that there was an independent correlation between GSD and increased levels of serum TSH.

Ghadhban et al. found out through their study that 95 (92.2%) were found to be euthyroid, whereas eight of them (7.8%) were found to have subclinical hypothyroidism^[11]. Hassan et al. performed a study

that showed 12 cases of hypothyroidism out of the 138 patients included^[12]. Ibrahim et al. and Raza et al. also had the same results of 52% and 45% of patients diagnosed with cholelithiasis having hypothyroidism,^[13,14].

Our study showed that in all euthyroid patients 35% (58) were underweight/normal BMI category, whereas 60% (99) were in overweight/obese BMI category. Patients with hypothyroidism, 10% (3) were underweight/normal BMI category, whereas 86% (26) were in overweight/obese BMI category.

Raza et al. conducted a study comparing thyroid status and BMI with cholelithiasis. His study stated that among euthyroid patients 11.7 % were underweight/normal and 88.3 % patients were overweight/obese. Those with hypothyroidism, 4 % were underweight/normal and rest 96 % were overweight/obese. The above results of his study were consistent with our study.^[13,14]

CONCLUSIONS:-

In our study we have high prevalence of hypothyroidism with cholelithiasis in females with BMI >25. Our study revealed that 30 out of 195 patients suffering from cholelithiasis were hypothyroid. From this study we can procure that there is a possibility of hypothyroidism in patients diagnosed with cholelithiasis in 7-20% of the cases.

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