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Original Research Article

A clinical study on prevalence of subclinical hypothyroidism in patients with cholelithiasis in a tertiary care center in South India

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ABSTRACT

Background: Gall stones are the most common biliary pathology. Hypothyroidism has been shown to promote gall stone formation and prevalence of clinical hypothyroidism in patients with cholelithiasis is extensively studied. This study aimed to find the prevalence of subclinical hypothyroidism in patients with cholelithiasis.
Methods: A prospective study on 94 patients was carried in Saveetha medical college and hospital, Tamil Nadu, India between March 2017 and June 2019. All patients underwent imaging studies for confirmation of gall stone disease and serum FT3, FT4 and TSH estimation done.
Results: Out of 94 patients, 47 patients were between 30-50 years (50%). 30 (31.9%) patients were hypothyroid and 64 (68.1%) were euthyroid. Among the hypothyroid patients, 3 (3.2%) had clinical hypothyroidism and 27 (28.7%) had subclinical hypothyroidism. 80 (85.1%) patients had multiple calculi and 14 (14.9%) of patients had single calculus.
Conclusions: Majority of patients were in the age group of 30-50 years with females 53.2% and males 46.8%. Hypothyroidism was diagnosed in nearly one-third of patients in our study with a high prevalence of subclinical hypothyroidism (28.7%). No significant correlation was found with respect to age, gender, number of gall stones to serum TSH levels.

Keywords: Cholelithiasis, Subclinical, Hypothyroidism, Gall stone, Serum TSH

INTRODUCTION

Gall stones are the most common biliary pathology. They can be either CBD stones or gall bladder stones. Cholelithiasis is a multi-factorial disease with prevalence of 5-26% in different countries. In western countries 10-12% of adults develop gall stones.[1-3]

Gall stones can be classified as cholesterol stones, pigment stones and mixed stones. In the USA and Europe, 80% are cholesterol or mixed stones, whereas in Asia, 80% are pigment stones. Cholesterol or mixed stones contain 51-99 % cholesterol plus admixture of calcium salts, bile acids, bile pigments and phospholipids.[4,5]

The pathogenesis of gall stones is complex process involving factors affecting bile content and bile flow. A crucial factor in the forming of bile duct stones is biliary stasis, which may be caused by sphincter of oddi stenosis, dyskinesia or bile duct strictures.[6,7] Both low bile flow and sphincter of oddi dysfunction are regarded as important functional mechanisms that may promote gallstone formation.[8]

Study found link between thyroid dysfunction and disturbances of lipid metabolism that may consecutively lead to change of composition of the bile.[9] Recent studies also demonstrated low bile flow in hypothyroid subjects.[10] Furthermore, the sphincter of oddi expresses

thyroid hormone receptors and thyroxin has a direct pro-relaxing effect on the sphincter.[11]

There is dysmotility of digestive tract in hypothyroidism.[12] In various studies hypothyroidism has been linked with reduced bilirubin excretion due to decreased activity of UDP glucuronyl transferase.[13] Thyroxine treatment in some cases has been suspected to dissolve gall stones and CBD stones.[14] Song et al study suggested bile acids functioning as regulator by promoting or suppressing transcription at nuclear level and sphincter of oddi dysfunction.[15]

Hypothyroid is quite common in Indian population around 5-15% and subclinical hypothyroidism around 8-12%.[16]

Hypothyroidism is the most common cause of secondary hypercholesterolemia. Patients with hypothyroidism have serum level of cholesterol approximately 50% higher than level in euthyroid patients and 90% of all hypothyroid patients have elevated cholesterol level.[17]

METHODS

This prospective observational study was carried between March 2017 and June 2019 in Saveetha medical college and hospital in Tamil Nadu, India. A total of 94 patients in the age group of 18 to 70 years with confirmed diagnosis of cholelithiasis by ultrasound imaging were included in our study. Base line investigations, serum FT3, FT4, TSH, ultrasound neck was done.

Patients who were on treatment for thyroid disorders or on medications that affect thyroid hormone regulation were excluded from our study. Detailed history and clinical examination done, variables like age, sex, number of gall stones, USG neck findings noted and analyzed with serum TSH levels.

Patients with serum TSH >5.5 mIU/l and without any symptoms were considered as subclinical hypothyroid and those with symptoms were considered as clinically hypothyroid. Patients with serum TSH of 0.35-5.0 mIU/l and normal free T3, free T4 were considered as euthyroid.

RESULTS

Among the total 94 patients, 47 (50%) patients were between 30-50 years, 27 (28.7%) patients were more than 50 years and 20 (21.3%) patients were less than 30 years (Table 1). The mean and SD of age was 42.06±13.673. The maximum numbers of patients were females 53.2% (n=50) compared to males 46.8% (n=44) (Table 2).

Out of 94 patients, 30 (31.9%) were hypothyroid and 64 (68.1%) were euthyroid. Among the hypothyroid patients, 3 (3.2%) had clinical hypothyroidism and 27 (28.7%) had subclinical hypothyroidism (Table 3). 7 (7.4%) patients had thyroid enlargement diagnosed by ultrasound neck (Table 4). 80 (85.1%) patients had multiple calculi and 14 (14.9%) of patients had single calculus (Table 5).

Table 1: Age wise distribution.

Age (in years)	Patients (n)	Percentage (%)
<30	20	21.3
30-50	47	50
>50	27	28.7
Total	94	100

Table 2: Gender wise distribution.

Gender	Patients (n)	Percentage (%)
Male	44	46.8
Female	50	53.2
Total	94	100

Table 3: Prevalence of hypothyroidism (clinical and subclinical).

Based on TSH levels	Number (n)	Percentage (%)
Euthyroid	64	68.1
Hypothyroid (clinical)	3	3.2
Hypothyroid (subclinical)	27	28.7
Total	94	100

Table 4: Thyroid enlargement (by USG neck) and TSH levels in patients with cholelithiasis.

TSH levels	Goitre, n	Non-goitre, n	Total
Euthyroid	3	61	64
Hypothyroid	4	26	30
Total n (%)	7 (7.4)	87 (92.6)	94 (100)

Table 5: Distribution based on number of gall stones.

Number of calculi	Patients (n)	Percentage (%)
Single	14	14.9
Multiple	80	85.1
Total	94	100

Table 6: Correlation between TSH levels and age.

Age (in years)	Euthyroid	Hypothyroid	Total
<30	15	5	20
30-50	32	15	47
>50	17	10	27
Total	64	30	94

Chi square value (X^2)=1.786; p=0.775 (not significant).

Table 7: Correlation between gender and TSH levels.

Gender	Euthyroid	Hypothyroid	Total
Male	28	16	44
Female	36	14	50
Total	64	30	94

X^2=1.534; p=0.464 (not significant).

Table 8: Correlation between TSH levels and number of gall stones.

Gall stones	Euthyroid	Hypothyroid	Total
Single	11	3	14
Multiple	53	27	80
Total	64	30	94

X^2=1.069; p=0.586 (not significant).

On correlating age and serum TSH levels, 15 of the hypothyroid patients was in the age group of 30-50 years, 10 patients above 50 years and 5 patients below 30 years. Chi square value (X^2) 1.786 and p=0.775 (Table 6).

Among the hypothyroid patients, 16 were males and 14 were females. Correlation between gender and TSH levels showed Chi square value 1.534 and p=0.464 (Table 7).

Among euthyroid patients, 11 had single gall stone and 53 had multiple gall stones. Among hypothyroid patients, 3 had single gall stone and 27 had multiple gall stones. Chi square value 1.069 and p=0.586 (Table 8).

DISCUSSION

In our study majority of patients were in the age group of 30-50 years. The mean age was 42.06 years. This was similar to study done by Khuroo et al.[18] In studies by Inkinen et al and Honore et al it was noted that high gallstones prevalence was found in women >65 years of age.[8,19]

In our study 53.2% and 46.8% were females and males respectively. In a study by Bhattacharya 71.4% were female, 28.6% were male.[20] Similarly, Sharma et al had 70% females and 30% males in their study.[21]

31.9% (n=30) were found hypothyroid in this study. Prevalence of clinical hypothyroidism was 3.2% (n=3) and subclinical hypothyroidism was 28.7% (n=27). Volzke et al in his study found that there were (10.3%) patients with high TSH and (88.6%) with normal TSH.[22] In a study by Singha et al the prevalence of previously undiagnosed thyroid disorder in the form of hypothyroidism was found in 13.2% patients, subclinical hypothyroidism was 5.0%, borderline subclinical hypothyroidism was 6.6% and clinical hypothyroidism was 2.2%.[23] There was high prevalence of subclinical hypothyroidism in our study.

There was no significant correlation found between high serum TSH levels and age (p=0.775), gender (p=0.464) and number of gall stones (p=0.586) in our study (p<0.05 was significant). Among cholelithiasis with hypothyroidism patients, males (17%) were found more than females (14.9%) in our study. Völzke et al in his study showed there was an independent relation of high serum TSH levels with gallstones among males, predominantly among those who had sonographically detected gallstones.[22]

CONCLUSION

From our study we conclude cholelithiasis is commonly found in the age group of 30-50 years. Hypothyroidism was diagnosed in nearly one-third of patients with cholelithiasis in our study with a high prevalence of subclinical hypothyroidism (28.7%). No significant correlation was found with respect to age, gender, number of gall stones to serum TSH levels. High prevalence of hypothyroidism was found in male patients too which needs a thorough evaluation.

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