

A STUDY OF PREVALENCE OF HYPOTHYROIDISM IN CHOLELITHIASIS

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ABSTRACT

BACKGROUND

For decades, there has been discussion whether thyroid disorders could cause gallstone disease. Gallstone formation is a complex process involving various mechanisms affecting the flow of bile and bile content. Hypothyroid patients are found to have biliary stasis because of slowed emptying of bile from the biliary tract into the duodenum. This is attributed to the decreased pro-relaxing action of thyroxine on sphincter of Oddi in hypothyroid individuals. The hallmark laboratory investigation to detect hypothyroidism and also a sensitive indicator for diagnosing early thyroid dysfunction is serum TSH level. Serum TSH level is the most accurate indicator of thyroid function. This study attempts to know the prevalence of hypothyroidism in cholelithiasis.

MATERIALS AND METHODS

A cross-sectional study was done between April 2014 to September 2014. 50 patients diagnosed as cholelithiasis in Department of General Surgery, Government Royapettah Hospital, were included in the study. Full history, clinical examination, ultrasound abdomen and laboratory blood test for free T3, free T4 and TSH were done for every patient. Data was analysed statistically using SPSS version 19.0.

RESULTS

Out of 50 patients of cholelithiasis, 29 (58%) were females and 21 (42%) were males. Thyroid disorder in form of hypothyroidism was found in 19 (38%) patients. In that, 11 (22%) patients presented with subclinical hypothyroidism and 8 (16%) patients with clinical hypothyroidism.

CONCLUSION

There is an increase in prevalence of hypothyroidism in cholelithiasis in this study. The prevalence was more among >40 years age group. This increase in prevalence could have an effect on the diagnostic and therapeutic workup of cholelithiasis patients.

KEYWORDS

Cholelithiasis, Hypothyroidism, Thyroid Hormone Assay.

HOW TO CITE THIS ARTICLE: Subramani B, Balasubramanian MVP, Madhavan L, et al. A study of prevalence of hypothyroidism in cholelithiasis. J. Evid. Based Med. Healthc. 2017; 4(11), 606-610. DOI: 10.18410/jebmh/2017/118

BACKGROUND

Among biliary pathology, gallbladder stones are the most common. Gallbladder stone prevalence varies among different parts of the world. About 10% in western countries and around 4% in India.¹ Biliary stasis is an important factor in gallstone formation. Altered lipid metabolism, sphincter of Oddi dysfunction and altered flow of bile has been noted in thyroid failure patients.^{2,3} Hypothyroidism causes increased serum cholesterol levels and supersaturation of bile with cholesterol causing decreased motility, contractility and filling of gallbladder causing prolonged residence of bile. This leads to gallstone formation. Delayed hilum duodenum

transit time impairs the clearance of precipitates from gallbladder and biliary tract.⁴ This study is performed to understand and reemphasise the relationship between hypothyroidism and gallstone disease.⁵

Definition

Subclinical hypothyroidism symptom free patient with TSH level above upper limit of normal and T3, T4 within normal limit.⁶

Clinical hypothyroidism in which there are symptoms of hypothyroidism with TSH level above the upper limit and T3, T4 or both decrease below normal limit.

Euthyroid group where clinical and lab tests are within normal range.⁷

OBJECTIVE OF THE STUDY

To know the prevalence of hypothyroidism in patients with cholelithiasis.

MATERIALS AND METHODS

The present study on "A study of prevalence of hypothyroidism in cholelithiasis" has been conducted by

Financial or Other, Competing Interest: None.

Submission 04-01-2017, Peer Review 11-01-2017,

Acceptance 28-01-2017, Published 04-02-2017.

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DOI: 10.18410/jebmh/2017/118



utilising cases admitted and managed in the Department of Surgery at Government Royapettah Hospital attached to Government Kilpauk Medical College Hospital, Chennai, over a period of six months from April 2014 to September 2014 after obtaining clearance from ethical committee. A cross-sectional study of 50 cases of cholelithiasis in specified period done. These cases were selected on the basis of the nonprobability (purposive) sampling method and studied in detail clinically. Full history, clinical examination and symptoms of hypothyroidism (loss of appetite, gaining weight, tiredness, constipation, cold intolerance, menstrual disturbances, etc.) with investigations of USG abdomen and thyroid function test were done.

Inclusion Criteria

Patients with cholelithiasis.

Exclusion Criteria

- Patients with previous history of hypothyroidism on treatment.
- Patients are divided according to history, clinical examination and lab estimation of T3, T4 and TSH as subclinical hypothyroidism, clinical hypothyroidism and euthyroid group as mentioned earlier. Data was analysed statistically using SPSS version 19.0.

OBSERVATION AND RESULTS

Total of 50 cases of cholelithiasis studied and following conclusions were drawn.

Age Distribution

Among the study group, 60% were in the age group of >41 yrs. 18% each in age groups 21-30 yrs. and 31-40 yrs. and 4% below 20 yrs.

Age	Number of Patients	Percentage
≤20	2	4.0
21-30	9	18.0
31-40	9	18.0
≥41	30	60.0
Total	50	100.0

Table 1. Age Distribution

Sex Distribution

Among the study group, 58.0% are females and 42.0% are males.

Age	Number of Patients	Percentage
Female	29	58.0
Male	21	42.0
Total	50	100.0

Table 2. Sex Distribution

Prevalence of Hypothyroidism

Among the study group, 38%, i.e. 19 patients had hypothyroidism and 62%, i.e. 31 patients were in euthyroid state.

Diagnosis	Number of Patients	Percentage
Euthyroid	31	62.0
Hypothyroid	19	38.0

Table 3. Prevalence of Hypothyroidism

Prevalence of Subclinical and Clinical Hypothyroidism-

Among the study group, 22%, i.e. 11 patients had subclinical hypothyroidism, 16%, i.e. eight patients had clinical hypothyroidism and 62%, i.e. 31 patients were in euthyroid state.

Diagnosis	Number of Patients	Percentage
Euthyroid	31	62.0
Subclinical hypothyroid	11	22.0
Clinical hypothyroid	8	16.0
Total	50	100.0

Table 4. Prevalence of Subclinical and Clinical Hypothyroidism

Distribution According to Age and Thyroid Function

Below 20 yrs. of age, all patients 100%, i.e. two patients were in euthyroid state. Between the age group of 21-30 yrs. 11.1%, i.e. one patient had thyroid dysfunction, 88.9%, i.e. eight patients were in euthyroid state. Between the age group of 31-40 yrs. 44.4%, i.e. four patients had thyroid dysfunction, 55.6%, i.e. five patients were in euthyroid state. Above 41 yrs. 46.6%, i.e. 14 patients had thyroid dysfunction, 53.3%, i.e. 16 patients were in euthyroid state. Among 50 patients, 38%, i.e. 19 patients had thyroid dysfunction and 62%, i.e. 31 patients were in euthyroid state.

Age	Euthyroid	Hypothyroid
≤20	2 (100%)	0 (0)
21-30	8 (88.9%)	1 (11.1%)
31-40	5 (55.6%)	4 (44.4%)
≥41	16 (53.3%)	14 (46.7%)
Total	31 (62%)	19 (38%)

Table 5. Distribution According to Age and Thyroid Function

Distribution According to Age and Subclinical, Clinical Hypothyroidism-

Among the patients less than 20 yrs. of age, subclinical hypothyroidism and clinical hypothyroidism was not found. All patients 100%, i.e. two patients were in euthyroid state. Between the age group of 21-30 yrs. 11.1%, i.e. one patient had subclinical hypothyroidism. Clinical hypothyroidism was not found. 88.9%, i.e. eight patients were in euthyroid state. Between the age group of 31-40 yrs. 11.1%, i.e. one patient had subclinical hypothyroidism, 33.3%, i.e. three patients had clinical hypothyroidism, 55.6%, i.e. five patients were in euthyroid state. Above 41 yrs. 30%, i.e. nine patients had subclinical hypothyroidism, 16.7%, i.e. five patients had clinical hypothyroidism, 53.3%, i.e. 16 patients were in

euthyroid state. Among 50 patients, 22%, i.e. 11 patients had subclinical hypothyroidism, 16%, i.e. eight patients had clinical hypothyroidism, 62%, i.e. 31 patients were in euthyroid state.

Age	Euthyroid	Subclinical Hypothyroid	Clinical Hypothyroid
≤20	2 (100%)	0 (0)	0 (0)
21-30	8 (88.9%)	1 (11.1%)	0 (0)
31-40	5 (55.6%)	1 (11.1%)	3 (33.3%)
≥41	16 (53.3%)	9 (30%)	5 (16.7%)
Total	31 (62%)	11 (22%)	8 (16%)

Table 6. Distribution According to Age and Subclinical, Clinical Hypothyroidism

Distribution According to Sex and Thyroid Function

Among males, 23.8%, i.e. five patients are hypothyroid and 76.2%, i.e. 16 patients are euthyroid. Among females, 48.3%, i.e. 14 patients are hypothyroid and 51.7%, i.e. 15 patients are euthyroid. Among 19 hypothyroid patients, five are males and 14 are females.

Age	Euthyroid	Hypothyroid
Male	16 (76.2%)	5 (23.8%)
Female	15 (51.7%)	14 (48.3%)
Total	31 (62.0%)	19 (38.0%)

Table 7. Distribution According to Sex and Thyroid Function

Distribution According to Sex and Subclinical, Clinical Hypothyroidism

Among 50 patients, 29 patients were males and 21 patients were females. Among 29 male patients, 14.3%, i.e. 3 patients had subclinical hypothyroidism, 9.5%, i.e. 2 patients had clinical hypothyroidism and 76.2%, i.e. 16 patients were in euthyroid state. Among 21 female patients, 27.6%, i.e. eight patients had subclinical hypothyroidism, 2.7%, i.e. six patients had clinical hypothyroidism and 51.7%, i.e. 15 patients were in euthyroid state. Among 50 patients 22.0%, i.e. 11 patients had subclinical hypothyroidism, 16.0%, i.e. eight patients had clinical hypothyroidism and 62.0%, i.e. 31 patients were in euthyroid state. Among 11 subclinical hypothyroid patients, three are males and eight are females. Among eight hypothyroid patients, two are males and six are females.

Age	Euthyroid	Subclinical Hypothyroid	Clinical Hypothyroid
Male	16 (76.2%)	3 (14.3%)	2 (9.5%)
Female	15 (51.7%)	8 (27.6%)	6 (20.7%)
Total	31 (62.0%)	11 (22.0%)	8 (16.0%)

Table 8. Distribution According to Sex and Subclinical, Clinical Hypothyroidism

Symptoms and Signs of the Patients in the Study

Abdominal pain was the most common symptom presenting in 34%, i.e. 17 patients. Among the specific symptoms of

hypothyroidism, easy fatigability was the most common symptom presenting in 16%, i.e. eight patients.

Symptoms and Signs	Yes	No
Abdominal pain	17 (34%)	33 (66%)
Vomiting	9 (18%)	41 (82%)
Fatigue	8 (16%)	42 (84%)
Weight gain	7 (14%)	43 (86%)
Constipation	6 (12%)	44 (88%)
Hoarseness	1 (2%)	49 (98%)
Menstrual disturbance	3 (6%)	47 (94%)
Obesity	5 (10%)	45 (90%)
Dry skin texture	1 (2%)	49 (98%)
Hair loss	3 (6%)	47 (94%)
Right hypochondrial tenderness	5 (10%)	45 (90%)

Table 9. Symptoms and Signs of the Patients in The Study

Symptoms and Signs Based on Thyroid Status of the Patients

Among eight patients of clinical hypothyroidism, seven patients presented with symptoms of weight gain.

Clinical Findings	Euthyroid	Hypothyroid
Fatigue	Yes 0 (0)	8 (42%)
	No 31 (100%)	11 (57.9%)
Weight gain	Yes 0 (0)	7 (36.8%)
	No 31 (100%)	12 (63.2%)
Constipation	Yes 0 (0)	6 (31.6%)
	No 31 (100%)	13 (68.4%)
Menstrual disturbance	Yes 0 (0)	3 (6.0%)
	No 31 (100%)	16 (84.2%)
Anaemia	Yes 3 (9.7%)	2 (10.5%)
	No 28 (90.3%)	17 (89.5%)
Obesity	Yes 0 (0)	5 (26.3%)
	No 31 (100%)	14 (73.7%)
Skin texture	Normal 31 (100%)	18 (94.7%)
	Dry 0 (0)	1 (5.3%)
Hair pattern	Normal 31 (100%)	16 (84.2%)
	Hair loss 0 (0)	3 (15.8%)

Table 10. Symptoms and Signs Based on Thyroid Status of the Patients

USG Findings among the Study Group

Among the study group, 58.0%, i.e. 29 patients had multiple calculi alone and 34.0%, i.e. 17 patients had single calculi. Patients with multiple calculi were more common.

USG Findings	Number of Patients	Percentage
MC	29	58.0
SC	17	34.0
MC+DGB	3	6.0
SC+GB POLYP	1	2.0
Total	50	100.0

Table 11. USG Findings Among the Study Group

Association of USG Findings with Thyroid Status

Among 19 patients of hypothyroidism, 11 patients had multiple calculi alone and one patient had multiple calculi with distended gallbladder.

Age	MC	SC	MC+DGB	SC+GB POLYP
Euthyroid	18 (58.1%)	10 (32.3%)	2 (6.5%)	1 (3.2%)
Hypothyroid	11 (57.9%)	7 (36.8%)	1 (5.3%)	0 (0)
Total	29 (58%)	17 (34.0%)	3 (6.0%)	1 (2.0%)

Table 12. Association of USG Findings with Thyroid Status

DISCUSSION

Gallstone formation is a complex process involving various mechanisms affecting the flow of bile and bile content. Many factors like decrease in liver cholesterol metabolism, reduced hepatic bile secretion, reduced flow of bile into duodenum and impaired sphincter of Oddi relaxation contribute to formation of gallstones in hypothyroidism.^{2,3} Hypothyroid patients are found to have biliary stasis because of slowed emptying of bile from the biliary tract into the duodenum.² This is attributed to the decreased pro-relaxing action of thyroxine on sphincter of Oddi in hypothyroid individuals.^{8,9} The hallmark laboratory investigation to detect hypothyroidism and also a sensitive indicator for diagnosing early thyroid dysfunction is serum TSH level. Serum TSH level is the most accurate indicator of thyroid function.^{6,7} This study done in Government Royapettah Hospital included 50 patients of cholelithiasis diagnosed in the Department of General Surgery. Out of 50 patients, 29 (58%) were females and 21 (42%) were males. Among the study group, 60% i.e., 30 patients were in the age group of >41 yrs. 18%, i.e. nine patients each in age groups 21-30 yrs. and 31-40 yrs. and 4% below 20 yrs. Out of 50 patients, 19 (38%) patients were found to be hypothyroid. In that, 11 (22%) patients had subclinical hypothyroidism and 8 (16%) patients with clinical hypothyroidism.

In a study done by Hassan H. Zaini and Kussay M. Zwain, the results were as follows. Prevalence of hypothyroidism in Hassan study was 10.6% and peak age group between 51-60 years.¹⁰ In my study, prevalence of hypothyroidism is 38% and peak age group more than 40 years. Among the symptoms of hypothyroidism, easy fatigability was present in 16%, i.e. 8 patients. In ultrasound findings of cholelithiasis, 58%, i.e. 29 patients had multiple calculi alone. This increase in prevalence could have effect on the diagnostic and therapeutic workup of cholelithiasis patients. So, we should be aware of thyroid status in patients of cholelithiasis and should be screened for thyroid function. TSH should be measured as most are subclinically hypothyroid with special consideration to patients of more than 40 yrs. of age. Hence, hypothyroidism should also be considered as a separate risk factor in cholelithiasis patients.

CONCLUSION

- There is an increase in prevalence of hypothyroidism in cholelithiasis in this study.
- Subclinical hypothyroidism is more common than clinical hypothyroidism.

- Hypothyroidism has a higher prevalence in females than males.
- Patients more than 40 yrs. of age with cholelithiasis are more likely to have hypothyroidism.
- TSH should be measured as most are subclinically hypothyroid with special consideration to patients of more than 40 yrs. of age.
- This increase in prevalence could have effect on the diagnostic and therapeutic workup of cholelithiasis patients.

Hypothyroidism should be considered as a separate risk factor like age, sex, obesity in cholelithiasis patients. So, we should be aware of thyroid status in patients of cholelithiasis and should be screened for thyroid function.

SUMMARY

- In the present study conducted in Government Royapettah Hospital, 50 patients with cholelithiasis were studied.
- Among the 50 patients under study, 21 (42%) patients were males and 29 (58%) patients were females.
- Majority of patients, i.e. 30 (60%) patients were in the age group >40 yrs.
- In this study, abdominal pain was the most common symptom.
- Among the specific symptoms of hypothyroidism, easy fatigability was the most common.
- Among the study group, majority of the patients, i.e. 29 (58%) had multiple calculi alone.
- In the study group, 19 (38%) patients had hypothyroidism and 31 (62%) patients were in euthyroid state.
- Among the 19 patients, five patients are males and 14 patients are females.
- Majority of patients had subclinical hypothyroidism when compared to clinical hypothyroidism. Among the 19 hypothyroid patients, 11 patients had subclinical hypothyroidism and eight patients had clinical hypothyroidism.
- Among the 21 male patients studied, five patients, i.e. 23.8% had hypothyroidism. In that, three patients had subclinical hypothyroidism and two patients had clinical hypothyroidism.
- Among the 29 female patients studied, 14 patients, i.e. 48.3% had hypothyroidism. In that, eight patients had subclinical hypothyroidism and two patients had clinical hypothyroidism.

- Among the 30 patients more than 40 yrs. of age, 14 patients, i.e. 46.7% had hypothyroidism. In that, nine patients are subclinically hypothyroid and four patients are clinically hypothyroid.
- So, all patients diagnosed to have cholelithiasis should be evaluated for hypothyroidism.

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