

# Prevalence of Thyroid Disorders in Patients of Gall Bladder Stones: A Prospective Study.

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## ABSTRACT

**Background:** Gall bladder stones are one of the commonest abdominal disorder requiring hospitalization and surgery in India. In European countries more than 10% prevalence of gall bladder stone has been recorded. Different studies suggested that sluggish movement of bile during hypothyroidism may induce formation of stone in gall bladder. Moreover, use of thyroxine for dissolving gall bladder stone has been suggested in studies. However, relation of thyroid hormones and gall bladder stone is still unclear. Therefore, present study was designed to assess if there is any relation between thyroid hormones disorders and gall bladder stones. **Methods:** It was cross sectional type of study which was conducted in departments of general surgery of TMMC & RC, Moradabad. This study was carried out from April 2017 to December 2017. Study population included 100 patients of cholelithiasis undergoing for cholecystectomy. Surgical profile along with full history including name, age, sex etc was recorded in the study. Similarly, full history of control group subjects was taken. Thyroid hormones in serum total tri iodothyronine (T3), free thyroxine (FT4), and TSH were measured by Enzyme Linked Immunosorbent Assay (ELISA) method. **Results:** Gall bladder stone were more common in female patients (60) in comparison of male patients (40). Hypothyroid disorder was found in 20% male gall bladder patients. Whereas, 7.5% hyperthyroid disease in male cholelithiasis patients. Euthyroid status was observed in 72.5% male gall bladder patients. Hypothyroid disorder was found in 14% female gall bladder patients. Whereas, 7% hyperthyroid disease in female cholelithiasis patients. Euthyroid status was observed in 65% female gall bladder patients. **Conclusion:** Findings of the current study suggest that female population suffers more in comparison of male population. Further, prevalence of gall bladder stones were more in 51 to 60 years age group population. Further, no definite relation was observed between thyroid hormones disorders either hypothyroid or hyperthyroid and gall bladder stones. However, more studies of on larger populations are required to assess if there is any relation between thyroid disorders and gall bladder stones.

**Keywords:** Gall bladder stones, hypothyroid, hyperthyroid, bile.

## INTRODUCTION

Gall bladder stones are one of the commonest abdominal disorder requiring hospitalization and surgery in India. In European countries more than 10% prevalence of gall bladder stone has been recorded.<sup>[1,2]</sup> More than 16 prevalence of common bile duct stone in gall bladder stone patients have been recorded.<sup>[3]</sup> on the basis of different composition and pathogenesis three types of gall bladder stone found cholesterol, black pigments and brown pigments. Among them pigment stones (80%) in Asian population while cholesterol stone (80%) in European population most commonly found.<sup>[4]</sup> Incidence of thyroid disorders is increasing since last few decades in India.<sup>[5]</sup>

Decrease of thyroid hormones T3 and T4 and increase of TSH is considered as hypothyroidism while increase of T3 and T4 and decrease of TSH is called hyperthyroid.<sup>[6]</sup>

Thyroid hormones are known to alter the lipid metabolism. In hypothyroidism lipid metabolism is decreased whereas, in hyperthyroidism lipid metabolism is increased.<sup>[7]</sup> Various studies have been done to see decrease or increase of thyroid hormones can induce the tendency of gall bladder stones as changes in lipid metabolism rate may alter the composition of bile in thyroid patients. 8 Different studies suggested that sluggish movement of bile during hypothyroidism may induce formation of stone in gall bladder. Moreover, use of thyroxine for dissolving gall bladder stone has been suggested in studies.<sup>[6-8]</sup>

However, relation of thyroid hormones and gall bladder stone is still unclear. Therefore, present study was designed to assess if there is any relation between thyroid hormones disorders and gall bladder stones.

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## MATERIALS AND METHODS

It was cross sectional type of study which was conducted in departments of general surgery of TMMC & RC, Moradabad. This study was carried out from April 2017 to December 2017. Study population included 100 patients of cholelithiasis undergoing for cholecystectomy.

All the patients were radiologically diagnosed for biliary stones. Patients of more than 18 years of age and both sexes were included in the study. Patients having altered thyroid hormones level and euthyroid were included in the study. Patients suffering from any type of chronic disease were excluded from the study.

Surgical profile along with full history including name, age, sex etc was recorded in the study. Similarly, full history of control group subjects was taken. Ethical approval to the present study was given by the ethical committee of TMMC & RC, Moradabad. Inform written consent was taken from all the participants of the study before the study started.

### Biochemical Parameters

Thyroid hormones in serum total tri iodothyronine (T3), free thyroxine (FT4), and TSH were measured by Enzyme Linked Immunosorbent Assay (ELISA) method.<sup>[9]</sup>

### Statistical analysis

All the data was collected and distribution of data was analyzed in percentage. Un paired student t test was used to assess the thyroid hormones significance. The p value <0.05 was considered as statistically significant. SPSS v2.1 was used for statistical calculations

## RESULTS

[Figure 1] shows that gall bladder stone were more common in female patients (60) in comparison of male patients (40).

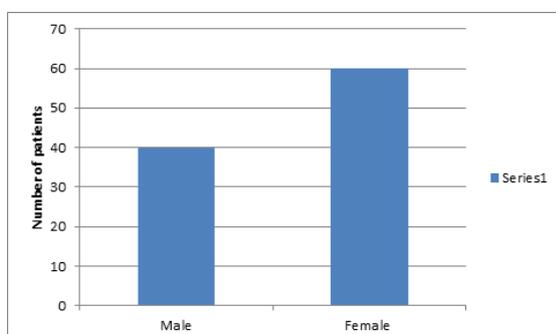


Figure 1: Distribution of cholelithiasis patients according to sex.

[Figure 2] shows that among 100 gall bladder stone patients 25 patients, 30 patients and 45 patients

belong to less than 40 years, 41 to 50 years and more than 50 years age group respectively. Among 40 male gall bladder stone patients 10 patients, 14 patients and 16 patients belong to less than 40 years, 41 to 50 years and more than 50 years age group correspondingly. Among 60 female gall bladder stone patients 15 patients, 16 patients and 39 patients belong to less than 40 years, 41 to 50 years and more than 50 years age group respectively.

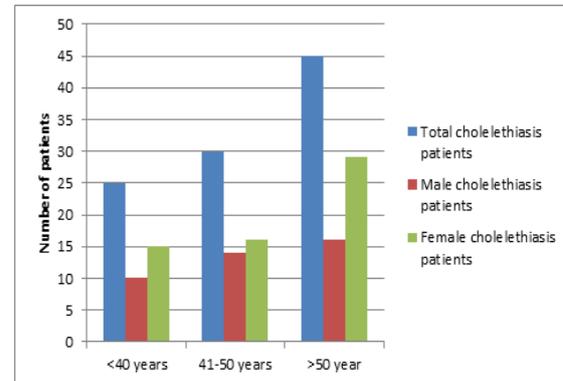


Figure 2: Distribution of cholelithiasis patients according to age.

It is evident from table 1 that hypothyroid disorder was found in 20% male gall bladder patients. Whereas, 7.5% hyperthyroid disease in male cholelithiasis patients. Euthyroid status was observed in 72.5% male gall bladder patients.

Table 1: Distribution of thyroid status in male cholelithiasis patients.

Variables	Total	Hypothyroid	Euthyroid	Hyperthyroid
Gall bladder stone	26	5 (19.2%)	19 (73.07%)	2 (7.16%)
CBD and Gall bladder stone	14	3 (21.4%)	10 (71.4%)	1 (7.14%)
Total	40	8 (20%)	29 (72.5%)	3 (7.5%)

[Table 2] shows that hypothyroid disorder was found in 14% female gall bladder patients. Whereas, 7% hyperthyroid disease in female cholelithiasis patients. Euthyroid status was observed in 65% female gall bladder patients.

Table 2: Distribution of thyroid status in female cholelithiasis patients.

Variables	Total	Hypothyroid	Euthyroid	Hyperthyroid
Gall bladder stone	45	10 (22.2%)	31 (68.8%)	4 (8.8%)
CBD and Gall bladder stone	15	4 (26.6%)	8 (53.2%)	3 (20%)
Total	60	14 (23.3%)	39 (65%)	7 (11.6%)

[Table 3] shows thyroid hormones level of patients suffering from gall bladder stones. TSH level was significantly high in hypothyroid patients in comparison of euthyroid patients ( $p < 0.01$ ). On the other hand, TSH level was significantly low in hyperthyroid patients compare to euthyroid subjects ( $p < 0.01$ ).

**Table 3: Thyroid profile of cholelithiasis patients.**

Variables	T3 (ng/ml)	FT4 (ng/ml)	TSH (μIU/ml)
Hypothyroid Patients (22)	0.33±0.16	0.9±0.46	30.73±15.42
Euthyroid Patients (68)	1.07±0.2	1.24±0.4	2.35±1.41
Hyperthyroid Patients (10)	2.98±1.1	2.3±0.3	1.35±0.72

## DISCUSSION

Aetiological factors of gall bladder stones have been evaluated more sincerely since last two decades. Thyroid hormones alteration has been considered as risk factor for gall bladder stone along with classical aetiological factors like fair, fat and flabby.<sup>[10]</sup> Experimental studies have suggested that malfunctioning of sphincter of oddi and sluggish flow of bile may lead to formation of gall bladder stones.<sup>[11,12]</sup> However, exact relation of thyroid disorder and gall bladder stone has been not established in previous studies.<sup>[13,14]</sup>

Results of the current study have shown that incidence of gall bladder stones were higher in 41 to 50 years age group both in males and females. These findings are consistent with findings of the previous study of Fraquelli M et al in which they recorded a significant relation of increasing age with prevalence of gall bladder stones in 330 cholelithiasis patients.<sup>[15]</sup> They recorded 51 % prevalence of cholelithiasis in more than 50 years age group patients. Similarly, Volzke H observed in 4202 gall bladder stones patients that cholelithiasis was more common with advancing age.<sup>[16]</sup> Likely, Chen CY recorded higher prevalence of gall bladder stones in 40 to 50 years age group patients.<sup>[17]</sup>

Findings of the present study have shown that there more prevalence of gall bladder stones in females in comparison of males. These findings are in agreement of earlier study of Volzke et al in which they observed females predominance in cholelithiasis patients compare to males.<sup>[18]</sup> Alike, Yousif H Y and Hayat N recorded significantly higher prevalence of gall bladder stones in females in comparison of males.<sup>[19,20]</sup>

Results of the present study have shown that among 40 male gall bladder stone patients 20% patients were suffering with hypothyroid disorder. Whereas, 7.5% male cholelithiasis patients were suffering from hyperthyroid disease. On the other hand, there were 23.3% female patients were suffering with hypothyroid and 11.6% female patients were suffering from hyperthyroid disease. However, there was similar prevalence of hypo and hyperthyroid in both male and female patients.

These findings are in agreement of previous study of Saravanakumar A et al as they observed hypothyroidism in more than 10% male and female gall bladder stone patients.<sup>[21]</sup> There was no significant difference in prevalence of hypothyroid between male and female patients.

Similarly, Ahmad MM et al recorded 8% prevalence of hypothyroid in cholelithiasis patients.<sup>[22]</sup> Moreover, they observed prevalence of gall bladder were increasing with advancement of age. Most of the gall bladder stone patients belong to 51 to 60 years age group in their study. Female patients were more suffering with gall bladder stone compare to male patients.

Zaini HH et al recorded that prevalence of hypothyroid was more common in female compare to male.<sup>[23]</sup> They observed 13.3 % female gall bladder stone patients were suffering from hypothyroid.

Singh RR conducted a study to assess the relation of thyroid disorders and gall bladder stones in male patients.<sup>[24]</sup> They recorded 24% patients were suffering with hypothyroid disease and 12% patients were suffering from hyperthyroid disorder.

## CONCLUSION

Findings of the current study suggest that female population suffers more in comparison of male population. Further, prevalence of gall bladder stones were more in 51 to 60 years age group population. Further, no definite relation was observed between thyroid hormones disorders either hypothyroid or hyperthyroid and gall bladder stones. However, more studies of on larger populations are required to assess if there is any relation between thyroid disorders and gall bladder stones.

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