



PREVALENCE OF SUBCLINICAL HYPOTHYROIDISM IN GALL BLADDER STONE AND CBD STONE DISEASE PATIENTS – A THREE YEAR STUDY

Surgery

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ABSTRACT

For decades there has been discussion whether thyroid disorders could cause gall stone diseases. . A cross sectional study was done in Dept of General Surgery, S.M.S. Medical college, Jaipur from July 2014 to June 2017 to know the prevalence of subclinical hypothyroidism in patients with biliary stone (gall stone +/- CBD stone) disease in a tertiary care centre. . During this period total of 205 patients with gall stone disease (study group) and 202 (control group) were studied to see the relation between hypothyroidism and biliary stones disease. For every patient with diagnosed gallstone, full history and clinical examination was taken and laboratory blood test for T3, T4 and TSH. A total of 205 cases were included in the study group out of which 168 (82%) were females and 37(18%) were males , 170 (83%) had only gall bladder stones whereas 35 (17%) had both gall bladder and CBD stones. . The maximum no. of cases belonged to the age groups between 21-50 yrs. 54(26%) patients of gall stone had subclinical hypothyroidism than 18(9%) of non gall stone patients.

Out of these 54 patients with Sub clinical hypothyroidism 47 were female where as remaining 7 were male. Peak age was less than 40 years. In this study, the higher proportion of hypothyroidism in women with cholelithiasis compared to men was mainly due the earlier symptomatology of gallstone disease in women as well as the higher incidence of thyroid disease in women in general. This leads to an earlier detection and treatment of hypothyroidism in women. Female patients with Gallstones should be checked for serum TSH, T3 and T4 because of high incidence of hypothyroidism among group.

KEYWORDS

cholelithiasis , Sub clinical hypothyroidism, gall stone disease.

Background :

Biliary stones (gall bladder stones and common bile duct stones) are hardened concretions that develop due to supersaturation of bile. The known risk factors for development of biliary stones include genetics, body weight, high fat diet, diabetes, women taking estrogen containing pills and decreased motility of gall bladder. Of late there has been discussion whether hypothyroidism could lead to formation of biliary stones.

Aim -

Aim of our study is to analyze the prevalence of subclinical hypothyroidism in patients of biliary stones and subsequently finding a correlation between hypothyroidism and formation of biliary stones.

To determine the association of proportion of subclinical hypothyroidism in gall stone patients with age & sex of the patient.

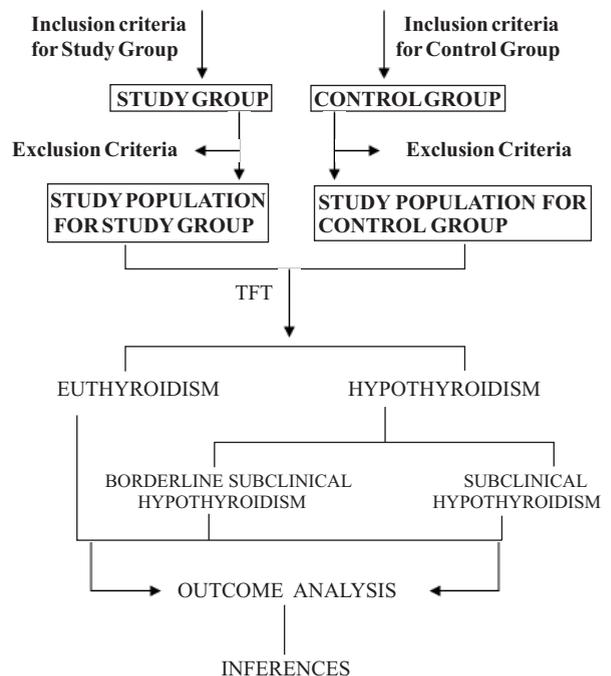
To assess the Odd's Ratio (Hezard ratio) of hypothyroidism in gall stone patients

Materials And Methodology -

A hospital based analytical observational study was done in Dept of General Surgery, SMS Medical College & hospital between the period July 2014 to June 2017 to find out the proportion of subclinical hypothyroidism in gall stone patients (+/- CBD stone) and in non gall stone patients in a tertiary care centre and its statistical significance. During which period total of 205 patients with gall stone disease (study group) and 202 (control group) were studied to see the relation between hypothyroidism and gall stones. For every patient with diagnosed gallstone, full history and clinical examination was taken and laboratory blood test for T3, T4 and TSH.

STUDY DESIGN

PT. ADMITTED AT SMS HOSPITAL



INCLUSION CRITERIA:

Study group - Radio logically diagnosed gall stone

Control group - Patients with various other symptoms/sign, without

gallstone disease detected on ultrasonography or in the medical history, having normal Serum-bilirubin and no cholecystectomy performed.

EXCLUSION CRITERIA:

- Biochemically diagnosed Hypothyroidism.
- Patients with phenytoin /carbamazepine therapy
- Patients having surgical thyroid illness
- Pregnant patients
- Age<10years
- Seriously sick patients
- Patient of chronic medical illness

Subclinical hypothyroidism is defined as a serum TSH concentration above the statistically defined upper limit of the reference range when serum free T4 (FT4) concentration is within its reference range.²¹

Subclinical hypothyroid - Symptom free patients with S-TSH well above the upper limit of the normal range (>4.2 mU/l)

Borderline-subclinical hypothyroid - Symptom free patients with S-TSH just beyond the upper limit of the normal range (3.5-4.2 mU/l)

- Grade I=S-TSH 3.5–4.2 mIU-liter ,S-FT4<0.9 ng/dl
- Grade II=S-TSH 3.5–4.2 mIU-liter ,S-FT4 0.9–1.76 ng
- Grade III=S-TSH >4.2 mIU-liter,S-FT4 0.9–1.76 ng/dl
- Grade IV=S-TSH >4.2 mIU-liter,S-FT4 <0.9 ng/dl

RESULTS

A total of 205 cases were included in the study group out of which 168 (82%) were females and 37(18%) were males (Fig 1), 170 (83%) had only gall bladder stones whereas 35 (17%) had both gall bladder and CBD stones (Fig 2). The distribution is shown in Table 1

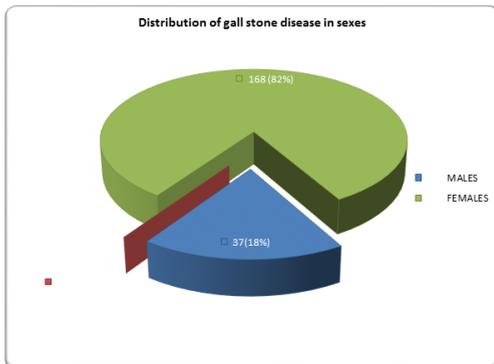


Fig 1-shows the distribution of gallstone disease in males and females. Out of a total of 205 cases, 168(82%) were female and 37(18%) were male.

Table 1 - shows the distribution of gallstone cases amongst gender group and gallbladder stones or CBD stone group.

	Gall Bladder stones only	with CBD stones	
MALE	24	13	37 (18%)
FEMALE	146	22	168(82%)
	170 (83%)	35(17%)	205

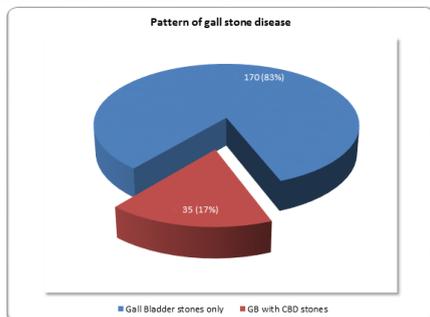


Fig 2- shows the pattern of gallstone disease. Out of a total of 205 cases 170(83%) had gallstones only and 35(17%) had CBD stones with or without gallbladder stones.

Of the total of 205 gallstone disease the age wise distribution of patients was as shown in the Table-2 below and depicted in Fig 3.

Table 2- shows the age wise distribution of gall stone cases in the two gender groups. The maximum no. of cases belonged to the age groups between 21-50 yrs.

Age	10-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
Sex								
Males	3	4	6	9	8	6	1	0
Females	5	39	47	32	22	18	5	0
Total	8(4%)	43(21%)	53(26%)	41(20%)	30(15%)	24(12%)	6(3%)	0

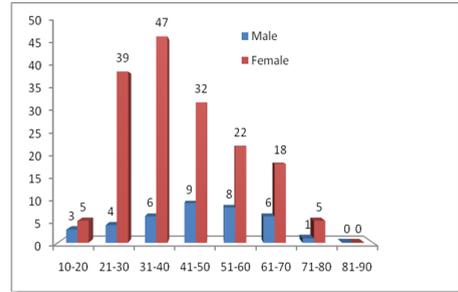


Fig 3 - shows the age wise distribution of gall stone cases in the two gender groups.

Among 205 patients of study group and 202 patients of control group, various socio-demographic factors were well distributed.

Table 3 - showing socio-demographic profile of study population

S. No.	Socio-demographic factor	Study Group	Control Group	Significance test P value Level of Significance
1.	Age	Mean Age ± SD 43.5 ± 14.96	Mean Age ± SD 39.8 ± 16.17	Unpaired T test P Value = 0.13 Not Significant
2.	M/F Ratio	0.22	0.17	Chi-Square test P Value = 0.38 Not Significant

Of the 205 patients of study group and 202 patients of control group evaluated, various parameters of thyroid function (TSH, & FT4) were evaluated and the pattern of thyroid status that emerged is shown in the Table 4 below.

Table 4 - distribution of thyroid status in study and control group

	Euthyroid	Subclinical Hypothyroid	Hyperthyroid	
Gall Stone patients	146 (72%)	54 (26%)	5 (2%)	205
Non-gall Stone patients	179 (89%)	18 (9%)	5 (2%)	202

54(26%) patients of gall stone had subclinical hypothyroidism than 18(9%) of non gall stone patients.

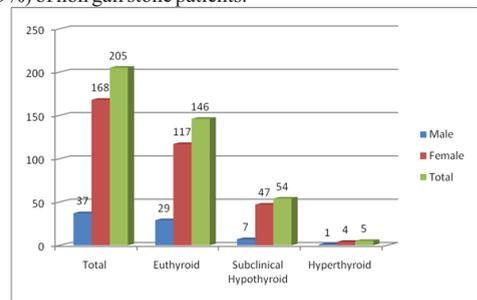


Fig 4 - shows distribution of thyroid status in study group.

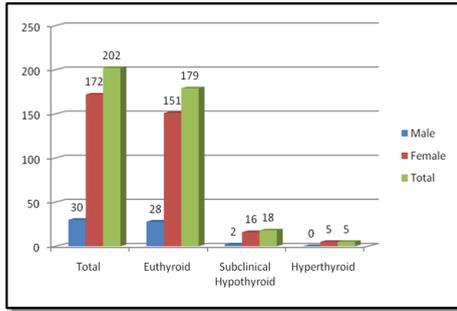


Fig 5 - shows distribution of thyroid status in control group.

The subclinical hypothyroid state has been further divided into Borderline-subclinical (TSH = 3.5-4.2 mIU/l), Subclinical (TSH = >4.2 mIU/l) according to the serum TSH levels. (Table 5, Fig.6)

Table 5 - pattern of thyroid status in study and control group.

	Euthyroid	Subclinical Hypothyroid	Border line subclinical Hypothyroid	Hyperthyroid
Gall Stone patients	146 (72%)	42 (20%)	12(6%)	5 (2%)
Non-gall Stone patients	179 (89%)	14 (7%)	4(2%)	5 (2%)

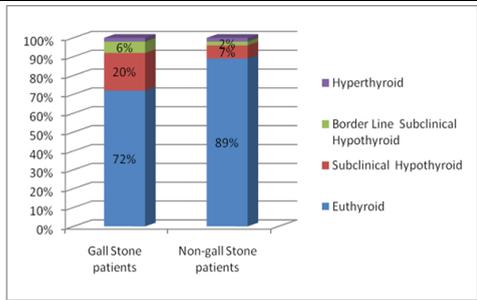


Fig 6 - comparison of the pattern of thyroid status in patients of gallstone disease and non-gall stone disease

A total of 205 cases in gall stone comprised 170 (83%) of only gall bladder stone patients and 35(17%) of CBD stone patients with or without gall bladder stone

Table 6 - pattern of thyroid status in only gall bladder stone patient and associated CBD stone patient.

	Euthyroid	Subclinical Hypothyroid	Border line subclinical Hypothyroid	Hyperthyroid
Only Gall Bladder Stone	120 (70%)	36 (21%)	10(6%)	4 (2%)
With CBD Stone	26 (74%)	6 (17%)	2(6%)	1 (3%)

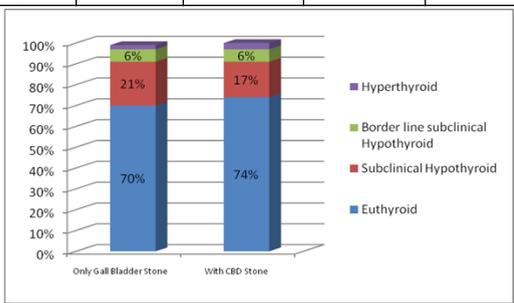


Fig 7 - comparison of the pattern of thyroid status in patients of only gall bladder stone and with CBD stone.

The number of cases diagnosed with subclinical hypothyroidism in

various sex groups and expressed as a percentage of the cases in that particular sex group is shown in Table 7 below and depicted in Fig 4, 5

Table 7 - shows the distribution of subclinical hypothyroid in various sex groups and also as a percentage of total cases in same sex group.

Sex	Study Group			Control Group			P Value L. S.
	Cases	%		Cases	%		
Male	7	37	19%	2	30	7%	P = >0.05 Not Significant
Female	47	168	28%	16	172	9.4%	P = <0.001 Highly Significant
P Value L.S.	P = >0.05 Not Significant			P = >0.05 Not Significant			

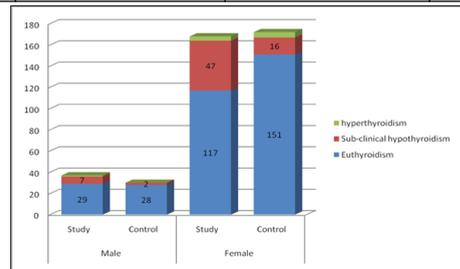


Fig 8 - Comparison of sexwise distribution of thyroid disease in both groups.

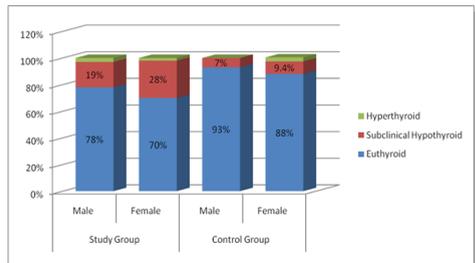


Fig 9 - comparison of the pattern of thyroid status in different sex of gall stone and without gall stone patients

The number of cases diagnosed with subclinical hypothyroidism in various age groups and expressed as a percentage of the cases in that particular age group is shown in Table 8 below and depicted in Fig 10

Table 8(a) - shows the distribution of subclinical hypothyroid in gallstone cases in various age groups and also as a percentage of total gallstone cases in same age group.

	10-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
Subclinical hypothyroid	3	10	12	9	9	10	1	0
Cases	8	43	53	41	30	24	6	0
Percentage(%)	38%	23 %	23 %	22 %	30%	42 %	17%	0%

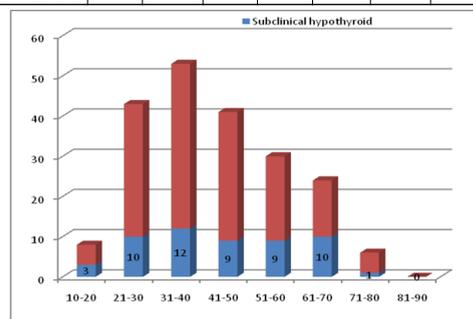


Fig 10(a) - shows the no. of subclinical hypothyroidism cases in different age groups of patients with gallstone disease.

Table 8(b) - shows the distribution of subclinical hypothyroid in non gallstone cases in various age groups and also as a percentage of total non gallstone cases in same age group.

	10-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
Subclinical hypothyroid	-	2	4	6	2	3	1	0
Cases	24	46	42	41	26	18	5	0
Percentage (%)	0%	4.3 %	9.5 %	14.6 %	7.7%	16.7 %	20%	0%

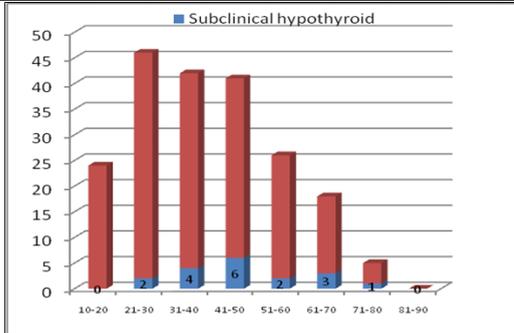


Fig 10(b) - shows the no. of subclinical hypothyroidism cases in different age groups of patients without gallstone disease

For comparison between age wise occurrence of sub clinical hypothyroidism in study and control group, patients divided in 3 groups < 30 Years, 31-50 years, >50 years.

Table 9 – Comparison of age wise distribution of subclinical hypothyroidism in both groups.

Age Group	Study Group			Control Group			P Value L.S.
	SCH	Cases	%	SCH	Cases	%	
<30 Years	13	51	25%	2	70	2.8%	P = <0.001 Highly Significant
31-50	21	94	22%	10	83	12%	P = >0.05 Not Significant
>50	20	60	33%	6	49	12.3 %	P = 0.010 Significant
Value L.S.	P = >0.05 Not Significant			P = >0.05 Not Significant			

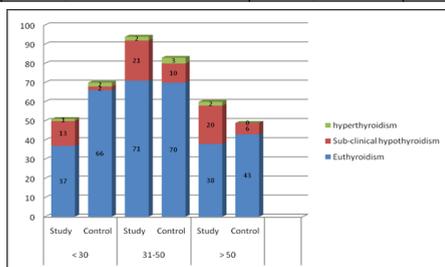


Fig 11 – Comparison of age wise distribution of thyroid disease in both groups.

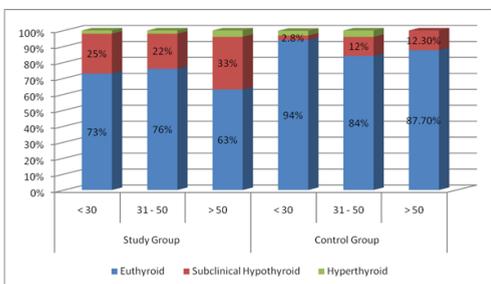


Fig 12 – comparison of pattern of thyroid status in different age groups of study and control group

CONCLUSIONS AND RECOMMENDATIONS

1. In conclusion, there is an association between thyroid disorders and the presence of bile duct stones. Thyroid testing in patients with gallstone and bile duct stones is recommended because hypothyroidism may be a predisposing factor for stone passage from the gallbladder.
2. subclinical hypothyroidism has emerged as a probable risk factor for gallstone formation. Subclinical hypothyroidism is a preventable condition and hence treatment of subclinical hypothyroidism may lead to prevention of gallstone disease.
3. Women < 30 yrs should be evaluated for thyroid function and subclinical hypothyroidism treated with l-thyroxine. This may be considered even when TSH values b/w 4.5-10 [Future studies are supposed to establish a hypothesis]. This age group constitutes the highest risk for developing gallstones if subclinical hypothyroidism is present.(Odds ratio -11.63)
4. Subclinical hypothyroidism is a widely prevalent condition in the population associated with gallstone disease besides much other pathological condition (infertility, obesity, depression etc.). Hence, population based screening program in elder age groups (>50 yrs) especially in female of gall stone disease to identify subclinical hypothyroidism and institute treatment could reduce the burden on health services.
5. The present study found an increased prevalence of subclinical hypothyroidism in Indian population when compared to western literature which needs to be confirmed by a larger population based survey in India.

Implication for Practice -

Among Subclinical Hypothyroidism ,the incidence is more common in females and the age group of 21-50 years .So we recommend that TSH level should be checked for every patient with cholelithiasis and it may be a SERUM MARKER for detecting SCH and as the hypothyroidism is a preventable condition and hence treatment of subclinical hypothyroidism may lead to prevention of gallstone disease. It will also reduce the full blown hypothyroidism and its comorbid states due to hypercholesterolemia like CVA and CVD.

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