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Correlation of Subclinical Hypothyroidism in Cholelithiasis: A Case Control Study

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Abstract

Gall stone disease is one of the most common cause for hospital admissions, with thyroid disorders being the most common endocrinopathy world wide.

Aim: To establish correlation between subclinical hypothyroidism in the formation of gall stones and bile duct stones.

Materials and Methods: Hospital based case control study on 400 patients in surgical OPD. S. TSH used for assesment of thyroid function and Cholelithiasis as diagnosed by ultrasound or suspected.

Statistical: Categorical variables are expressed as Number and percentage of patients and compared using Pearson's Chi Square test for Independence of Attributes/ Fisher's Exact Test.

Continuous variables are expressed as Mean, Median and Standard Deviation and compared using Mann-Whitney U test.

Statistical software SPSS version 20 has been used.

Result: 400 patients evaluated. Out of 400 there were 7 with low (<0.3 mIU/L), 232 with normal, 161 with high TSH (>3 mIU/L). The proportion of cholelithiasis among males and females 38 and 62 % respectively. Significantly larger proportions of patients in Cases (male = 55.26%; female = 54.03%) have High TSH than Control (male = 38.82%;female = 41.13%), p value < 0.001 i.e significant.

Conclusion: There is an association between hypothyroidism and formation of gall stones.

Keywords: Cholelithiasis – stones in gallbladder; Endocrinopathy – disease of endocrine glands; TSH – thyroid stimulating hormone.

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Introduction

Gall stones disease are one of the most common cause for hospital admissions . The disease frequently occurs in young, prevalence in otherwise healthy is 11–36%.[1] Most gallstones are silent, but still contributes substantially to health care, costs, and the complications can sometimes be life threatening. The prevalence differs in countries, ethnicity, age, gender. The reported prevalence in northern India is 6.12%[2] also, the gallbladder stones is 7 times more common in north than south Indians.[3] Principle factors that lead to the formation of gallstones are bile stasis, worms, bacteria, chemical alterations, pH alterations, change in bile composition and sludge . Thyroid disease is commonest endocrinopathy worldwide.[4] There has been a discussion for long if thyroid disorders are responsible for stone formation. There are several explanations for a possible relation between hypothyroidism and gallstone disease.

In this study, the association between gall stone disease, and previously undiagnosed hypothyroidism is to be determined. Also to study the prevalence of previously undiagnosed hypothyroidism in all patients of gallstones.

Materials and Method

The study is a case control conducted on the patients attending the Surgery OPD in our hospital in over a period of 2 years.

Categorical variables are expressed as Number of patients and percentage of patients and compared

across the groups using Pearson's Chi Square test for Independence of Attributes/ Fisher's Exact Test as appropriate.

Continuous variables are expressed as Mean, Median and Standard Deviation and compared across the groups using Mann-Whitney U test.

The statistical software SPSS version 20 has been used for the analysis.

An alpha level of 5% has been taken, i.e. if any p value is less than 0.05 it has been considered as significant.

Number of patients: 200 in each group.

Inclusion criteria

Cases: All patients coming in the OPD with diagnosed or suspected of cholelithiasis or choledocolithiasis.

Control: All other patients coming for treatment of diseases other than cholelithiasis and choledocholithiasis.

Exclusion criteria

Pregnancy and paediatric population.

Previous history of thyroid surgery or any known thyroid ailment.

Known cases of haematological disorders.

Patient on drugs causing hypothyroidism: Amiodarone, Lithium, antidepressants, Phenytoin, Interferon, Imatinib.

Patient on drugs causing gallstones: OCPs, Fenofibrate, Gemfibrozil.

Selection of patients in this study was based on strict inclusion and exclusion criteria.

Observation and Results

A total number of 400 patients visiting surgical OPD were included and divided into cases and controls following the inclusion and exclusion criteria strictly. it was found that the S. TSH levels are significantly higher in the cases (4.23±2.06) than the control group (3.00±1.94) in general (Table 1) as well as gender wise (Table 2). Significantly larger proportions of patients for both the sexes in the Case group have a higher* TSH levels (male = 55.26%; female = 54.03%) than the Control group (male = 38.82%; female = 41.13%), with p value < 0.001 i.e significant (Table 3).

low (< 0.3 mIU/L), normal (0.3–3 mIU/L) and high* (> 3 mIU/L) serum TSH levels.

Tabel 1: The TSH level in Case group (4.23±2.06) is significantly higher than that in the control group(3.00±1.94).

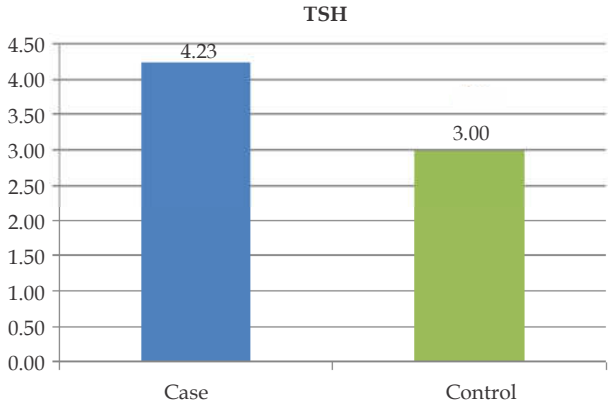
	TSH		
Group	**Mean**	**Median**	**Std. Deviation**
Case	4.23	4.69	2.06
Control	3.00	2.55	1.94
p Value		<0.001	
Significance		Significant	

Table 2: The TSH level in Case group is significantly higher than that in the control group for both genders.

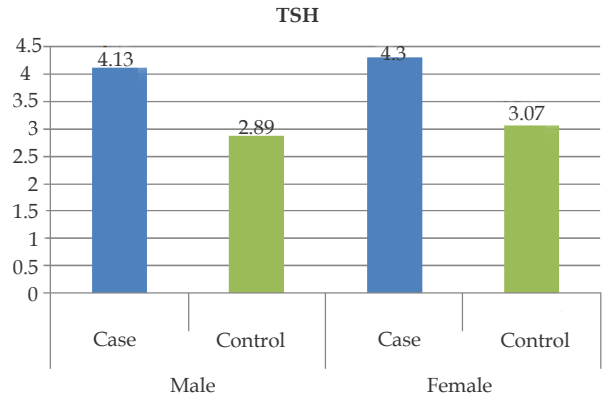
Sex	Mean	N	Std. Deviation	
	Case	4.13	4.69	2.13
Male	Control	2.89	2.46	1.98
	p Value	0.001		
	Significance		Significant	
Female	Case	4.30	4.69	2.03
	Control	3.07	2.56	1.92
	p Value	<0.001		
	Significance		Significant	

Table 3: Significantly larger proportions of patients in case group (male = 55.26%;female = 54.03%) have High TSH as compared to Control (male = 38.82%;female = 41.13%) in both Male and Female patients,with p value < 0.001 i.e significant. low (< 0.3 mIU/L), normal (0.3–3 mIU/L) and high (> 3 mIU/L) serum TSH levels.

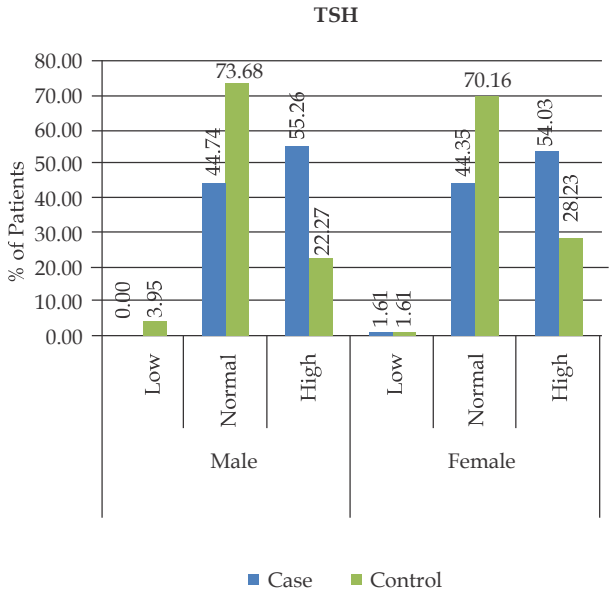
Sex			Group		Total	P Value	Significance
			Case	Control			
Male	TSH	Low	0(0)	3(3.95)	3(1.97)	<0.001	Significant
		Normal	34(44.74)	56(73.68)	90(59.21)		
		High	42(55.26)	17(22.37)	59(38.82)		
	Total		76(100)	76(100)	152(100)		
Female	TSH	Low	2(1.61)	2(1.61)	4(1.61)	<0.001	Significant
		Normal	55(44.35)	87(70.16)	142(57.26)		
		High	67(54.03)	35(28.23)	102(41.13)		
	Total		124(100)	124(100)	248(100)		



Graph 1: The TSH level in Case group is significantly higher than that in the control group.



Graph 2: The TSH level in Case group is significantly higher than that in the control group for both genders.



Graph 3: Significantly larger proportions of patients in case group (male = 55.26%; female = 54.03%) have High TSH as compared to Control (male = 38.82%;female = 41.13%) in both Male and Female patients. low (< 0.3 mIU/L), normal (0.3–3 mIU/L) and high (> 3 mIU/L) serum TSH levels.

Discussion

This is a hospital based study conducted in a tertiary care center in eastern India. In this study 400 patients of different sex were enrolled. 200 patients were cases i.e those patients who are diagnosed with or suspected of cholelithiasis and 200 were control group who presented with other complaints with each group fulfilling the exclusion criteria. In our study we found that the cases have significantly increased TSH than the control group. 54.5% cases have significantly increased TSH than control which is 26%.

Out of 200 cases 109 patients have increased TSH and 89 patients have TSH in normal range i.e 109 were hypothyroid in which males were 42 and females were 67. 89 were euthyroid in which males were 34 and females were 55 in number.

As compared to control group where out of 200 patients 52 patients were hypothyroid (increased TSH) with 17 males and 35 females and 143 were euthyroid with 56 males and 87 females and 5 patients were hyperthyroid.

Sex wise: In this study there were 124(62%) females and 76(48%) males. In 109 hypothyroid cases males were 42(38.5%) and females were 67 (61.4%) and 89 euthyroid cases males were 34 and females were 55. This is because prevalence of cholelithiasis is higher in females. It is believed that pregnancy and sex hormones place women at slightly higher risk, and the view has been supported by several epidemiologic studies. Bansal found 65% females and 35% males in their study of 104 patients.[5] Bhattacharya showed 71.4% were female; 28.6 % were male[6] Similarly, Sharma study had 70% females and 30 % males in their study.[7]

Conclusion

This study was conducted to explore prevalence of subclinical hypothyroidism in patients of cholelithiasis, so that correlation of subclinical hypothyroidism and cholelithiasis could be found. In this study, as we expected majority of patients were females, as both hypothyroid and cholelithiasis is common in females. 54.5% patients were diagnosed with hypothyroidism. This study corroborated earlier studies as mentioned in discussion part, and also lead us further in understanding the relationship of hypothyroidism in the development of cholelithiasis. Further large population studies are needed in this direction to

compare these findings leading to recommendations for screening for early diagnosis of hypothyroid state at subclinical level by regularly monitoring TSH so that they can be treated at early stages and burden of cholelithiasis thus can be prevented and reduced.

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