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Original Research Article

To Study Thyroid Dysfunction & Lipid Abnormalities in Patients Suffering from Cholelithiasis

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Abstract

Introduction: Gallstone disease (GSD) is one of the most common gastrointestinal diseases. Gallstones represent a significant burden for health care systems worldwide.

Aim: To study thyroid dysfunction & lipid abnormalities in patients suffering from cholelithiasis.

Methods: This was a hospital based case control study was carried at Department of General surgery, S. P. Medical College and associated group of PBM Hospital, Bikaner, Rajasthan. The subjects were divided into two groups based on presence of cholelithiasis. One group comprised 100 Patients of cholelithiasis in the case group and other had 100 healthy subjects in the control group. Serum lipid profile and thyroid function test has been used as a routine preoperative evaluation for the gallbladder surgery as a tool to check for functional status of the thyroid hence present study was design to investigate the relationship between the biochemical markers and cholelithiasis patients.

Results: In our study age difference in case group (45.01 ± 12.29yrs) as compare to control group (43.14 ±13.32yrs). Serum cholesterol level is significantly higher in case group (193.01± 36.83mg/dl) as compare to control group ((159.28±18.26 mg/dl). serum triglyceride level is significantly higher in case group (187.01± 66.01mg/dl) as compare to control group (107.84±19.67mg/dl). HDL level difference in case group (49.32±8.12mg/dl) as compare to control group (52.15.±6.32 mg/dl) was statistically insignificant. serum LDL level significantly higher in case group (142.01± 37.98) as compare to control group (95.12± 14.97 mg/dl). Among the study group, 2 patients had clinical hypothyroidism, 11 patients had Subclinical hypothyroid, 1 patients had hyperthyroid and 86 patients were in euthyroid state. Among the study group, 3 patients had Subclinical hypothyroid and 97 patients were in euthyroid state.

Conclusion: Our recommendation is that every patient with gallstones should be screened for lipid profile and thyroid status, serum TSH may be used as marker so that hypothyroid status could be diagnosed at early stage and progression to full blown hypothyroidism is halted.

Keywords: Gallstone Disease, Thyroid Dysfunction, Lipid Abnormalities.

Introduction

One of the most common gastrointestinal diseases is Gallstone disease, GGSD. Gallstones cause a significant burden for health care systems in the world. It was

once thought of in the West as a disease, but nowadays it is an increasingly common cause of illness and has led to hospital visits worldwide due to changes in food patterns. In Western society, this affects 10% of people. The incidence ranges from approximately 3 to 15 % in the Asian population.[1]

There may be an association between abnormal lipids and Gallstone disease, which is a common disorder. The lipid profile of serum is a set of blood tests that can be used as the first comprehensive diagnostic tool for abnormal lipids, such as cholesterol and triglycerides. The lipid profile typically includes High-density lipoprotein (HDL), Very Low-density lipoprotein (VLDL) Triglycerides, and Total cholesterol. Gallbladder function is integrated in the 'liver–Gall Bladder – intestine' axis, responsible for maintaining the homeostasis of triglycerides (TGs), free fatty acids (FFAs) and Cholesterol of the entire organism.[2]

For decades, there has been a discussion, whether thyroid disorders could cause gall stone disease. A number of effects on cholesterol metabolism are known to be caused by thyroid hormones. The bile can be supersaturated with cholesterol when serum cholesterol values rise in hypothyroidism, leading to a reduced bowel motility, diminished contractility and impaired emptying that results in prolonged accumulation of bile in the gallbladder. This may contribute to the retention of cholesterol crystals, which will allow for a long period of nucleation and constant growth in mature gallstones. Moreover, the secretion of bile can be reduced and this may affect its physical ability to clear precipitates from biliary ducts and gastrointestinal vessels. In addition, the oddi's sphincter is a receptor for thyroid hormone and thyroxin has a prorelaxing effect on it. An important functional mechanism that may promote the formation of gall stones is considered to be low bile flow and the sphincter of oddi dysfunction. A crucial factor in forming of bile duct stones is biliary stasis, which may be caused by sphincter of oddi stenosis, dyskinesia, or bile duct strictures.[3]

Cholecystectomy is the most frequently recommended conventional treatment for symptomatic gallstones. In some cases, bile acid ursodeoxycholic acid or chenodeoxycholic acid may also be used to dissolve radiolucent stones, but these medicines may cause gastrointestinal side effects and there is a high incidence of stone recurrence after discontinuation of treatment. In some cases, when patients have a single symptom of uncalcified gallstones, the use of lithotripsy is to be used in conjunction with Urodoxacholic acid. The risk of development of cholesterol gallstones has been shown to be influenced by dietary factors.[4]

This study is intended to examine the relationship between biological markers and patients with cholelithiasis, due to a lack of information about serum lipid levels and thyrofunction tests in Cholelithiasis patients.

Aim: To asses thyroid dysfunction & lipid abnormalities in patients suffering from cholelithiasis

Methods: A hospital based case control study was carried out at tertiary care hospital in north west Rajasthan. Case group comprised 100 Patients of cholelithiasis and other had 100 healthy subjects in the control group. Patients with thyroid function abnormalities, thyroidectomy, pregnancy, other major diseases, sepsis or cholangitis and taking medications affecting thyroid function (anticholestrol medications) were excluded. After taking informed consent, patients have been divided as follows, based on their background, medical examination and lab estimates for T3, T4, and TSH. The present study was designed to investigate the relationship of biochemical markers with cholelithiasis

patients, since serum lipid profile and thyroid function tests have been used as a routine preparative test for gallbladder surgery in order to identify functional status of their thyroid.

Statistical Analysis: data thus collected was entered in excel sheet and analyzed using Epi info software using chi sq and students t test with $p<0.05$ for significance.

Results

In our study age difference in case group (45.01 ± 12.29yrs) as compare to control group (43.14 ±13.32yrs). In Case group male are 46 and 47 male in control group. This table shows insignificant gender difference in case group as compare to control group.

Table 1: Sociodemography

Sociodemography	CASE	CONTROL	P value
Age	45.01 ± 12.29	43.14 ± 13.32	0.651
Gender			
Male	46	54	0.99
Female	47	53	

Serum cholesterol level is significantly higher in case group (193.01± 36.83mg/dl) as compare to control group ((159.28±18.26 mg/dl). serum triglyceride level is significantly higher in case group (187.01± 66.01mg/dl) as compare to control group (107.84±19.67mg/dl). HDL level difference in case group (49.32±8.12mg/dl) as compare to control group (52.15.±6.32 mg/dl) was statistically insignificant. serum LDL level significantly higher in case group (142.01± 37.98) as compare to control group (95.12± 14.97 mg/dl).

Table 2: Lipid profile

Lipid profile	CASE	CONTROL	P value
CHOLESTEROL (mg/dl)	193.01 ± 36.83	159.28 ± 18.26	0.01*
Triglyceride (mg/dl)	187.01 ± 66.01	107.84 ± 19.67	0.0001*
HDL(mg/dl)	49.32 ± 8.12	52.15 ± 6.32	0.604
LDL(mg/dl)	128.32 ± 37.98	95.12 ± 14.97	0.01*

Free T3 level lower in case group (3.14± 0.98pg/ml) as compare to control group (3.31± 0.54 pg/ml). free T4 level higher in case group (1.28± 0.47ng/dl) as compare to control group (1.23± 0.32ng/dl). TSH level significantly higher in case group (2.67± 0.53mU/L) as compare to control group (2.03± 0.26mU/L).

Table 3: Thyroid profile

Thyroid Profile	CASE	CONTROL	P value
T3 (pg/ml)	3.14 ± 0.98	3.31 ± 0.54	0.01*
T4(ng/dl)	1.28 ± 0.47	1.23 ± 0.32	0.01*
TSH(mu/l)	2.67 ± 0.53	2.03 ± 0.32	0.01*

Among the cases, 2 patients had clinical disease, 11 patients had Subclinical hypothyroid, 1 patients had hyperthyroid and 86 patients were euthyroid. Among control, 3 patients had Subclinical hypothyroid and 97 patients were in euthyroid state.

Table 4: thyroid profile

Thyroid profile	Cases	Control	P-value
Subclinical hypothyroid	11(11.00%)	3(3.00%)	0.62
Clinical hypothyroid	2(2.00%)	0(0.00%)	
Hyperthyroid	1(1.00%)	0(0.00%)	
Euthyroid	86(86.00%)	97(97.00%)	

Discussion

In the present study, in case group male are 46 and female are 54 out of 100. In control group male are 47 and female are 53 out of 100 (p>0.05). This present study shows age wise statistically insignificant difference between both group and mean age of case group was 45.01 ± 12.29 years and control Group was 43.14 ±13.32years. Similar distribution was seen by Tamhankar et al.[5]

In present study, serum total cholesterol (193.01± 36.83mg/dl) in cholelithiasis cases were higher than in control group (159.28±18.26 mg/dl) (p <0.05).

A number of studies which looked at the role diet played as a potential risk factor for formation of Gallstones, including energy intake, cholesterol, fats, fiber, carbohydrates, vitamins & minerals and alcohol consumption. In different studies, the relationship of cholesterol intake with gallstone disease has been mixed. Recent findings reveal that orphan nuclear receptors play a role in regulating the metabolism of lipids and hepatic cholesterol, which open new perspectives to better understand how food constituents are involved in creating cholesterol gallstones.[6]

The present study observe comparatively low serum HDL level in patients with cholelithiasis (49.32±8.12mg/dl) than control group (52.15.±6.32 mg/dl), (p >0.05). The present study observes significantly high serum triglyceride level in Case group (187.01± 66.01mg/dl) than control group (107.84±19.67mg/dl). LDL levels were higher 142.01± 37.98 mg/dl in cases and lower in controls (95.12± 14.97 mg/dl), (p <0.05).

This study has shown that patients with cholelithiasis are at a low serum levels of HDL, high level of triglyceride, total cholesterol and LDL in line with other studies.[6,7] Archana et al[8] have shown that increased lipids in cholelithiasis appear to play an important role in the pathogenesis of Gallstones in females aged 45 years or older. Similar results were found by Virupaksha HS et al[9].

In Spanish men, certain investigators reported a positive association between gallstone and serum triacylglycerol levels; others did not find such an association.[7,10] The present study has shown a considerable variation in triacylglycerol levels, although within the normal range of 150 mg.dl. The hypothesis that serum cholesterol and triacylglycerol levels are positively correlated with gallstone disease is therefore supported.

In our study among the cases, 2 patients had clinical hypothyroidism, 11 patients had Subclinical hypothyroid, 1 patients had hyperthyroid and 86 patients were euthyroid. Among the controls, 3 patients had Subclinical hypothyroid and 97 patients were in euthyroid state.

Similarly Suaad L Ibrahim (2018) found that there were 10 (0.1%) low level, 38(38%) euthyroid, and 52(52%) had high levels of TSH. In females, a very high prevalence of normal serum TSH was seen at 71.69%, 13.52% and 15.24% for both the highest and lowest levels respectively. In contrast, male prevalence for high levels of TSH was 92.47% and 4.83% at low levels of TSH.[1]1 Also RanaRanjit Singh (2016) found almost similar thyroid dysfunction in male and females. [12]

Conclusion:

We recommend checking for the lipid profile and thyroid state in every patient with gallstones, serum TSH can be used to identify hypothyroid status at an earlier stage so that hypothyroidism does not progress into full blown hypothyroidism.

References

1. Hung SC, Liao KF, Lai SW, Li CI, Chen WC. Risk factors associated with symptomatic cholelithiasis in taiwana population. BMC Gastroenterol. 2011; 10: 11-111.

2. Saraya A, Irshad M, Gandhi BM, Tandon RK. Plasma lipid profile in gallstone patients from North India. Trop Gastroenterol. 1995;16 (4): 16-21.
3. Inkinen G, Sand J, Norback I. Association between common bile duct stones and treated hypothyroidism. Hepatogastroenterology 2000; 47:919-21.
4. Vassilakis JS, Nicolopoulos N. Dissolution of gallstones following thyroid administration. Hepatogastroenterology 1981; 28:60-1.
5. Thamil Selvi R, Sinha P, Subramaniam PM, Konapur PG, Prabha CV. A clinicopathological study of cholecystitis with special reference to analysis of cholelithiasis. Int J Basic Med Sci. 2011;2(2):68-72.
6. Cuevas A, Miquel JF, Reyes MS, Zanlungo S, Nervi F. Diet as a risk factor for cholesterol gallstone disease. J Am Coll Nutr. 2004; 23(3):187-196.
7. Olokoba AB, Bojuwoye BJ, Katibi IA, et al. Relationship between gallstone disease and serum lipids in normal adult Nigerians. African Scientist. 2006; 7(3):113-116.
8. Archana Gupta et al. Study of lipid profile in patients of hypothyroidism and correlation with incidence of gallstone. Iosr journal of dental and medical sciences (IOSR-JDMS). June, 2017; 16(6):42-47.
9. Virupaksha HS, Rangaswamy M, Deepa K, et al. Correlation of serum lipids and glucose tolerance test in cholelithiasis. International Journal of Pharma and Bio Sciences. 2011; 2(1):224-228.
10. Aulakh R, Mohan H, Attri AK, Kaur J, Punia RP. A comparative study of serum lipid profile and gallstone disease. Ind. J. Pathol Microbiol. 2007; 5(2): 308-312.
11. Abdulbary, Meison & Ibrahim, Suad. The Impact of Thyroid Dysfunction and TSH on the Pathogenesis of Gallstone and its Composition. 2018.
12. Singh RR, Gupta A, Shah S, Shah AS, Ded KS, Bhatia AS. Prevalence of hypothyroidism in patients with biliary stones: a prospective study. Int Surg J 2016;3:2022-4