

## Association of Gallstone Disease with Hypothyroidism in Western Region of Nepal

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### Abstract

**Aims and Objectives:** To determine the association of gallstone disease with clinical hypothyroidism, subclinical hypothyroidism and to treat the patient as soon as the diagnosis is made. To determine the prevalence of thyroid deficiency (hypothyroidism and subclinical hypothyroidism) in gallstone diseases patients.

**Material and Methods:** A prospective hospital based descriptive cross sectional study, done in department of general surgery, Manipal Collage of Medical science Teaching Hospital, Pokhara.

160 patient of consecutive gallstone patients from outdoor and indoor department of surgery participated in the study. Patient who fail to give consent below and above age 15 and 85 years respectively and patient who is a known case of hypothyroidism is excluded from the study. The data was collected and analyzed by SPSS 20-0 version software.

**Results:** This study shows 75% female and 25% male, age wise minimum age was 16 and maximum age was 83. The mean age was 42.68 years. All 160 patients had gallstone in ultrasound of the abdomen without complication. The prevalence of hypothyroidism in gallstone patient in our study was 26.7%.

**Conclusion:** Higher association of hypothyroidism was seen (26.7%) in gallstone patients.

**Keywords:** hypothyroidism, gallstone diseases, subclinical hypothyroidism,

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Date of Submission: 17 -08-2017

Date of acceptance: 17-08-2017

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### I. Introduction

Cholecystectomy is the most common major abdominal procedure performed worldwide. Gallstone disease is one of the most common problems affecting the digestive tract. The prevalence of gallstone (33%) is related to many factors including age, gender and ethnic background. Certain condition predispose to the development of gallstones. Obesity, pregnancy, dietary factors, Crohn's diseases, terminal ileal resection, gastric surgery, hereditary spherocytosis, sickle cell diseases and thalassemia are all associated with an increased risk of developing gallstones<sup>1</sup>. Women are three times more likely to develop gallstone than men.<sup>2</sup> most patients (25%) will remain asymptomatic throughout life. For unknown reasons some patient progress to a symptomatic stage with biliary colic caused by stone obstruction the cystic duct.<sup>3</sup> Hypothyroidism is a state of decreased level of thyroid hormones with increased level of TSH (Thyroid Stimulating Hormone) in serum with symptoms and signs of the disease. Patient with subclinical thyroid diseases have few or no symptoms and signs of thyroid dysfunction and thus by its very nature subclinical thyroid disease is a laboratory diagnosis. For decades, there has been a discussion, whether thyroid disorder could cause gallstone disease. Particularly, there are several explanations for a possible relation between hypothyroidism and gallstone disease. These explanations include the known link between thyroid failure and disturbances of lipid metabolism, diminished bile secretion and reduced sphincter of Oddi relaxation. Recent studies also demonstrated the sphincter of Oddi expresses thyroid hormone receptors and thyroxin has a direct pro-relaxing effect on the sphincter.<sup>4,5,6</sup>

### II. Material And Methods

A prospective, hospital based descriptive cross-sectional study. Hundred and sixty patient (160) was included in this study from Manipal Teaching Hospital Pokhara. Consecutive gallstone patient from outdoor and indoor department of surgery giving consent for participation are included in the study. A detail history was obtained with special reference to symptomatology and the risk factors as per pro-forma. Clinical examination was performed and findings recorded as per pro-forma. The cases were subdivided as per the gender, patient were explained about the study and its implications. Thyroid function test were obtained from all patients. Identification of the patients as euthyroid, hypothyroid and both subclinical and clinical hypothyroidism was made on the basis of thyroid function test.

Patients were divided according to history, clinical examination and laboratory test (FT3, FT4, and TSH) into three groups.

Group 1: euthyroid group where clinical and laboratory tests were normal.

Group 2: Patients with subclinical hypothyroidism (without the symptoms) and with TSH concentration above the upper limit of normal range and FT4 and / or FT3 decrease below normal limit. (According to our laboratory readings)

Group 3: Patient with clinical hypothyroidism (with symptoms) and with TSH level above the upper limit and FT4 and/ or FT3 decrease below the normal limit. All these patients presented were without goiter. Firstly prevalence of thyroid deficiency was calculated in all the patients included in the study. Secondly the prevalence of thyroid deficiency was calculated in male and female category. Informed written consent was obtained from all patients. Ethical clearance was obtained from ethical committee. The data was collected and analyzed by SPSS-20.0 version software.

### III. Results

This study was conducted to know the association of gallstone diseases with hypothyroidism in western part of Nepal. The data collected in one hundred sixty patients with gallstone disease visiting outpatient department of surgery and those admitted in surgical ward. Collected data were entered in micro-soft excel sheet and converted into SPSS (Statistical Package for Social Sciences) software version 20.0 for statistical analysis. Descriptive statistics were calculated in mean and standard deviation and also tabular representation were done.

Table 1: Mean and Standard Deviation of Age				
Sample Size	Minimum Age	Maximum Age	Mean Age	Standard Deviation
160	16	83	42.68	15.3

Total number of patient under study was 160. Minimum age was 16 and maximum age was 83. The mean age was 42.68 years.

Table 2: Frequency Table Based on Gender		
Sex	Frequency	Percent
Male	41	25.4
Female	119	74.6

Among 160 patients, 41 (25%) were male and 119 (75%) were females. These all patient were diagnosing to have gallstones confirmed by ultrasonography abdomen.

Table 3: Depicting the status between male and female patient			
Sex	Status Group		Total
	Euthyroid	Hypothyroidism	
Male	34	7	41
Female	83	36	119
Total	117	43	160

Among 160 patients 117 (73.2%) were euthyroid and 43 (26.7%) patients were diagnosed to have hypothyroidism. In 43 patients 36 were female and 7 were male.

Table 4: Thyroid Status		
Status	Frequency	Percent
Euthyroid	117	73.2
Subclinical Hypothyroidism	34	21.1
Clinical Hypothyroidism	9	5.6

Among 43 hypothyroid patients 34 (21.1%) were subclinical hypothyroidism while remaining 9 patients (5.6%) were diagnosed to have clinical hypothyroidism.

Table 5: Thyroid status according to Sex				
Sex	Status Group			Total
	Euthyroid	Subclinical Hypothyroidism	Clinical Hypothyroidism	
Male	34	4	3	41
Female	83	30	6	119
Total	117	34	9	160

Out of total 117 euthyroid patients 34 were male and 83 were female. And out of 34 subclinical hypothyroidism patients 4 were male and 30 were females and among clinical hypothyroidism 3 were male and 6 were female.

#### **IV. Discussion**

An association between gallstone disease and hypothyroidism has been explained by various factors. Hypothyroidism decreases liver cholesterol metabolism, diminishes bile secretion and reduced sphincter of Oddi relaxation. A 90% of hypothyroid patients have elevated cholesterol levels, triglyceride levels or both, a decrease biliary bile salt concentration in hypothyroidism has been reported, serum hypercholesterolemia in hypothyroidism may cause bile to super saturate in cholesterol. A direct consequence of cholesterol super saturated bile is reduced motility, depressed contractility and impaired filling of the gallbladder giving rise to prolonged residence of bile in the gallbladder, this may contribute to the retention of cholesterol crystals there by allowing sufficient time for nucleation and continuous growth into mature gallstone.<sup>5</sup>

The laboratory hallmark of primary hypothyroidism and the most sensitive test for dictating early thyroid failure is an increased TSH concentration. In the subclinical form, an increased TSH level is accompanied by a normal T4 and T3 level and patient is asymptomatic. The prevalence of hypothyroidism in patient of gallstone disease in our studies was 26.7% among them 21.1% were subclinical hypothyroid and 5.6% were clinical hypothyroid patient. In our study total number of patient with hypothyroidism 43 i.e. 26.7% in which male were 7 (4.2%) and female were 36 (22.5%). The higher proportion of hypothyroidism in women with cholelithiasis compare to men was mainly due to earlier symptomatology of gallstone diseases in women as well as the higher incidence of thyroid diseases in women in general. This leads to an earlier dictation and treatment of hypothyroidism in women. In our study the prevalence of hypothyroidism is higher (26.7%) compare to other studies where the prevalence was 10.6% (Hasan H. Zaini et al), 11.4% (Johanna L, Gediminas K) and 10.3% (Henry Volxke) but findings of preponderance for gallstone diseases as well as hypothyroidism in females are similar in all the studies.

#### **Acknowledgement**

This work is devoted to the students, researchers or anyone who is overwhelmingly interested in delving into the facts found during the work and carries it further. It gives me an immense pleasure to express my gratitude to all who have contributed to completing the work.

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\*Dr. Pradeep Ghimire MS, FRCS ED. "Association of Gallstone Disease with Hypothyroidism in Western Region of Nepal." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)* , vol. 16, no. 08, 2017, pp. 40–42.