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Prevalence of Thyroid Function Abnormality in Admitted Male Patients with Alcohol Dependence Syndrome

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Abstract

Objective: Alcohol is one of the commonest psychoactive substances consumed globally. There are evidences suggesting its role in causing thyroid abnormality. It has been reported to have multiple effects on the hypothalamo-pituitary-thyroid axis. This study aimed to look at the thyroid function abnormalities in admitted male patients with alcohol dependence syndrome.

Methods: Thyroid function parameters were compared among 30 male in-patients with Alcohol dependence syndrome (ADS) and 30 male in-patients with psychotic disorders as controls.

Results: 23.3% of patients in the alcohol dependence group had thyroid stimulating hormone (TSH) abnormality compared to 3.3% among control (psychotic disorders) group. 23.3% in the ADS group and 10% of the control group had free T4 (FT4) abnormality. TSH abnormality was seen more in individuals whose age of onset of alcohol use was 20-30 years which was statically significant (p=0.01). TSH abnormality was noted more in patients who consumed alcohol for more than 15 years and with quantity exceeding>720 ml.

Keywords: Alcohol dependence syndrome; Thyroid function test; Thyroid hormone; Admittedpatients

Introduction

Alcohol is one of the commonest psychoactive substances consumed globally. Alcohol dependence and withdrawal both cause peripheral thyroid hormone dysfunction and central hypothalamic pituitary-thyroid axis dysregulation. Most studies have shown that there is a reduction in peripheral thyroid hormone and blunted thyroid stimulating hormone response to thyrotrophin releasing hormone (TRH) in alcoholism [1]. One hypothesis for this phenomenon is a possible down regulation of the TRH receptors in the pituitary due to chronically high TRH concentration. These abnormalities have been frequently observed during withdrawal [2]. Some studies have shown that alcohol use may also confer some protective effects against thyroid nodularity, goiter and thyroid cancer [3,4]. Studies have shown that co-occurring liver cirrhosis in alcoholism was also considered as a possible contributor for the altered TRH response by its effect on the hypothalamo-pituitary thyroid (HPT) axis [2,5]. A Danish study reported significant protective role of alcohol in preventing autoimmune hypothyroidism [6]. Ozsoy et al. studied ADS patients during early and late withdrawal period and found that serum fT3 and fT4 levels were significantly lower in patients during late withdrawal, but they did not find any TSH abnormality during early and late withdrawal. When alterations of hormone levels were investigated throughout the withdrawal period, it was found that serum fT3 and fT4 levels decreased towards the late withdrawal [7]. Though a number of studies have been reported from western world, there is paucity of Indian literature on prevalence of thyroid function abnormalities in males with alcohol dependence syndrome.

Methodology

The study was conducted over a period of five months from December 2015 to April 2016 in the department of psychiatry at Father Muller's Medical College Hospital, Mangalore, India which is a multispecialty teaching hospital. It's an observational, cross-sectional, descriptive case control clinical study. The sample consisted of male patients admitted in the department of psychiatry and diagnosed with alcohol dependence syndrome according to ICD-10 criteria [8] without any other medical or psychiatric co-morbidity (except nicotine). Recruitment was done using convenient sampling technique and 30 male patients between the age group of 18 to 60 years were included in the study. 30 male patients with psychotic disorder admitted in the psychiatry ward between the ages of 18-60 years without thyroid disease, significant medical co-morbidities and who are not on any medications known to affect thyroid function tests formed the control group for the study. Patients and controls underwent a thorough clinical examination to rule out other medical disorders. Ethical clearance was taken from the institutional ethical committee. The design and nature of the clinical study was explained to the participants. A written informed consent was obtained from all those participating in the study. Socio demographic data were collected based on modified Kuppuswamy socio economic scale [9]. Clinical data were collected using appropriate clinical methods. The socio demographic and clinical data were documented in a specially designed proforma prepared for the study.

All the patients in the sample and the control group (n=60) were evaluated for TSH, T3, T4 and free T4 by electrochemiluminescence immunoassay method in Cobas 6000 analyzer using the early morning sample within the first week of admission. Statistical analysis was done using Pearson Chi-Square tests to compare the sample and control.

Results

Table 1 shows the socio-demographic details of the study sample. Majority, 44% of ADS group and 47% of the control group were in the age group between 31 to 40 years. 80% in the ADS group and 67% of the control group belonged to Hindu religion. In both the group large number of the patients were semi-skilled workers, married, staying in nuclear family and from rural background? There was no statistically significant difference found between the two groups in the socio-demographic variables except in the marital status.

Socio demographic variables		ADS Group, n=30	Control, n=30	p Value
Age (in years)	18-30	1 (3.3%)	10 (33.3%)	0.057
	31-40	13 (43.3%)	14 (46.7%)	
	41-50	10 (33.3%)	4 (13.3%)	
Education	Graduate or postgraduate	4 (13.3%)	3 (10.0%)	0.442
	Intermediate or post high school diploma	6 (20.0%)	8 (26.7%)	
	High school certificate	11 (36.7%)	7 (23.3%)	
	Middle school certificate	5 (16.7%)	3 (10.0%)	
	Primary school certificate	4 (13.3%)	9 (30.0%)	
Occupation	Profession	0 (0.0%)	1 (3.3%)	0.190
	Semi profession	0 (0.0%)	0 (0.0%)	
	Clerical, shop-owner, farmer	8 (26.7%)	3 (10.0%)	
	Skilled worker	6 (20.0%)	4 (13.3%)	
	Semi-skilled worker	11 (36.7%)	12 (40.0%)	
	Unskilled worker	5 (16.7%)	5 (16.7%)	
	Unemployed	0 (0.0%)	4 (13.3%)	
Marital status	Single	5 (16.7%)	12 (40.0%)	0.009
	Married	25 (83.3%)	18 (60.0%)	
Residence	Urban	3 (10.0%)	4 (13.3%)	0.68
	Rural	27 (90.0%)	26 (86.7%)	
Socioeconomic class	I	0 (0.0%)	1 (3.3%)	0.119
	II	4 (13.3%)	3 (10.0%)	
	III	15 (50.0%)	7 (23.3%)	
	IV	11| (36.7%)	17 (56.7%)	
	V	0 (0.0%)	2 (6.7%)	

Table 1: Socio demographic variables.

Table 2 describes the clinical variables studied. 70% of patients had consumed alcohol for more than 15 years and 66.7% of patients had more than 720 ml/day, the commonest drink being whisky. In the study 50% of the patients developed dependence to alcohol within 5 years of usage. Age of onset of alcohol in 50% of patients was between 20-30 years. 85.7% patients developed uncomplicated withdrawal symptoms and many had hepato-biliary complications. In the sample 96.7% of the patients were using nicotine simultaneously.

Duration of consumption of alcohol (in years)	<1	0 (0.0%)
	1-5 years	2 (6.7%)
	5-15 years	7 (23.3%)
	>15 years	21 (70.0%)
Amount of alcohol	<180 ml	0 (0.0%)
	180-360 ml	5 (16.7%)
	360-720 ml	5 (16.7%)
	>720 ml	20 (66.7%)
Duration of dependence to alcohol	<1	1 (3.3%)
	1-5 years	8 (26.7%)
	5-15 years	15 (50.0%)
	>15 years	5 (16.7%)
Age of onset of alcohol use	<10 years	0 (0.0%)
	10-20 years	12 (40.0%)
	20-30 years	15 (50.0%)
	>30 years	3 (10.0%)
Other substance use	Nicotine	29 (96.7%)
	Cannabis	1 (3.3%)
Withdrawal symptoms	Uncomplicated	26 (86.7%)
	Delirium	4 (13.3%)
	Seizure	1 (3.3%)

Table 2: Clinical variables.

The thyroid function abnormality in the two groups is shown in Table 3. 23.3% of patients had TSH abnormality in the ADS group compared to 3.3% among the controls. In the ADS group 16.6% had increased TSH and 6.7% had decreased TSH. TSH abnormality were seen more commonly in patients who were consuming alcohol for more than 15 years and who were dependent on alcohol for 5-15 years. 71.4% of patients with TSH abnormality were consuming alcohol more than 720 ml. Patients with TSH abnormality had age of onset of alcohol ranging between 20-30 years which was statistically highly significant (p=0.01). The study also revealed FT4 abnormality in relation to duration in years of alcohol consumption (p=0.049).

Discussion

In the study large number of people was between the age group of 31-40 years (44%). A study conducted by Ozsoy et al. showed that majority of the participants was between the age group of 28-54 years [7]. There is no statistical significant difference found in socio demographic variables between the ADS group and control group. The frequency of TSH and Free T4 abnormality was seen in 23.3% of patients each in the ADS group. There was no statistically significant difference in T3 abnormality among the two groups whereas T4 abnormality was seen in 13.3% of patients of ADS group. This finding is discordant with study done by Ozsoy et al.; where reduced T3 levels, normal T4 and TSH levels were noticed during the beginning of detoxification [7].

TFT Abnormality	ADS Group n=30	Controls n=30	p Value
TSH	23.30%	3.30%	0.166
FT4	23.30%	10%	0.166
T4	13.30%	3.30%	0.161
T3	10%	16%	0.618

Table 3: Thyriod function test abnormalities. TFT: Thyroid Function Test; TSH: Thyroid Stimulating Hormone; FT4: Free Thyroxine 4; T4: Thyroxine 4; T3: Thyroxine 3.

Hermann et al. reported of T3 and T4 abnormality in ADS patients during early withdrawal [1]. However our study did not find any statistically significant difference in T3.

This study also revealed that TSH abnormality are more commonly seen in patients who take alcohol for more than 15 years and

consuming more than 720 ml of alcohol/day. FT4 abnormality in relation to duration of consumption of alcohol was significant (p=0.049). Earlier studies showed reduced FT3 level as duration of alcohol use increased [7]. TSH abnormality was seen in the patients whose age of onset was 20-30 years and it is statistically highly significant (p=0.01). In this study 96.7% of ADS patients used nicotine also as seen in many people with alcohol dependence [10]. Majority of the ADS group patients were drinking whisky similar to other Indian studies [11]. T3 abnormality in relation to type of alcohol was significant (p=.035), the authors couldn't find literature looking at type of alcohol use and thyroid abnormality. The strengths of the study are that it used ICD-10 criteria for diagnosis, other medical and psychiatric co-morbidities were ruled out. Early morning thyroid sample collection looking at T3, T4, TSH and also free T3 plus free T4. Limitations are its small sample size, sample having only admitted male patients and its cross sectional design. The investigations were not included as part of this study. No formal scales were administered to know the severity of drinking. A study with a larger sample and blind assessments would be desirable.

Conclusion

The effect of alcohol on the HPT axis is significant and alcohol consumption affects almost all aspects of the functioning of the thyroid gland. It is extremely important to evaluate for thyroid abnormalities in patients with Alcohol dependence syndrome. More studies are needed to further understand and identify the mechanisms that underlie the bidirectional interactions between alcohol and thyroid which will help in the management of these disorders.

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