ORIGINAL ARTICLE

PREVALENCE OF THYROID DYSFUNCTION AND ITS RELATIONSHIP WITH THE SEVERITY OF MAJOR DEPRESSIVE DISORDER (MDD)

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Abstract

Objective: **The objective of this study is to determine the prevalence of thyroid dysfunction in Major Depressive Disorder and the factors that were associated with the severity of MDD.** ***Methods:*** **A total of 140 major depressive disorder patients researched are subjected for blood sampling to determine the blood thyroid abnormalities. The severity of illness of MDD was determined by the duration of illness, frequency of admission/ suicidal attempts, and the Hamilton rating scale for depression (HAM-D).** ***Results*****: Thirty-one of the 140 patients had thyroid dysfunction. There was no significant difference in the severity of illness among patients with MDD between thyroid dysfunction and normal function group (p=0.024).** ***Conclusion*****: Patients with MDD had high prevalence of thyroid dysfunction; however, the former had no correlation with later.** ***ASEAN Journal of Psychiatry, Vol. 18 (1): January – June 2017: XX XX.***

Keywords: Thyroid Dysfunction, Depression, Prevalence, Severity

Introduction

Major depressive disorder (MDD) is one of the most common mental disorders. Each year about 6.7% of U.S. adults experience MDD. There is a strong possibility that the etiology and treatment outcomes of depression could be related to the thyroid status. Although the role of free 3,5,3'-triiodothyronine (T3), thyroxin (T4) and thyroid-stimulating-hormone (TSH) in the pathophysiology of mental disorders is not clear, it has been suggested that small changes of thyroid hormone levels might be related to an altered brain function in depression [1,2]. An increase and a decrease in plasma TSH levels, a decrease in T3 or both T3 and TSH or increase in T4 and TSH with no change in levels was observed in patients with depression compared with healthy control [3 -5]. Few studies examined the prevalence of thyroid dysfunction in MDD. Ojha SP et al. (2013) performed a cross-sectional study to examine the prevalence of thyroid dysfunction in depressive patients and found that 21% of depressive patients had abnormal thyroid function tests 11.8% had subclinical hypothyroidism, 5.7% had been subclinical hyperthyroidism, and the remaining 4.3% had overt hypothyroidism [6]. Their study, however, excluded patients who had a history of thyroid disease and included all types of depressive disorder. This research aimed to examine the prevalence of thyroid dysfunction in patients with MDD. The objective of this study is to determine the prevalence of and correlation between thyroid dysfunction and severity of MDD.

Methods

This research was approved by the Ethics Committee of the Faculty of Medicine Chiang Mai University. Patients with MDD who came to the Psychiatric Outpatient Unit of Maharaj Nakorn Chiang Mai University Hospital were invited to participate. We invited patients with MDD who met inclusion and not met

exclusion criteria until met target number with a sample size of 140.

Inclusion criteria required that patients were at least 18 years old and had agreed to join this research. MDD was diagnosed by an experienced psychiatrist using the Mini-International Neuropsychiatric Interview (M.I.N.I) based on DSM- IV criteria [7].The M.I.N.I Thai-version was validated and found that the Kappa, sensitivity and positive predictive value on the diagnosis of current MDD episode, current suicide risk, lifetime psychotic disorder and current generalized anxiety disorder were very high, i.e. > 0.75 and > 0.81, respectively. The specificity, the negative predictive value and efficiency were very high on every diagnosis (>0.81). Subjects whose condition affected their ability to give general information were excluded. All subjects were interviewed for general information, history of illness, age of onset, number of hospitalizations and history of suicidal attempts. All subjects self-scored the Hamilton Rating Scale for Depression (HAM-D) to determine their severity of depressive symptoms. The severity of MDD was also determined by the frequency of admissions and suicidal attempts. All subjects received a blood exam for thyroid function at 8:00 am (to avoid the influence of circadian rhythm), after fasting overnight. Serum levels of total T3, total T4 and TSH were determined with electrochemiluminescence immunoassay technique. The normality ranges were as follows: T3: 2-4.4 pg/ml; T4: 0.3-1.7 ng/dl; TSH: 0.27-4.2 microIU/mL). Subjects who were being treated for thyroid dysfunction were also included in this study and were labeled as a thyroid dysfunction group.

Thyroid dysfunction was defined by level of triiodothyronine (freeT3), thyroxine (free T4) and thyroid-stimulating hormone (TSH) as shown in Table1 [8]. Subjects who were being treated for thyroid dysfunction were classified by their diagnosis.

Table 1. Definition of Thyroid Dysfunction

Level of Free T4 and/or Free T3	Level of TSH	Interpretation
Elevated	Low	Hyperthyroidism
Normal	Low	Subclinical Hyperthyroidism
Elevated	Normal or Elevated	Inappropriate TSH Secretion
Low	Elevated	Hypothyroidism
Normal	Elevated	Subclinical Hypothyroidism
Low	Low or Normal	Secondary Hypothyroidism

Statistical Analysis

The number of thyroid dysfunction patients and subtypes were shown in percentages. We used Spearman correlation coefficients to determine the correlation between the thyroid hormone level and the severity of depression.

Results

One hundred forty patients with MDD were participated in the study. There were 45 males (32.2%) and 95 females (67.8%) respectively. Demographic data was shown in Table 2. There were 31 of 140 participants (22.1 percent) with thyroid dysfunction. Six patients had hyperthyroidism; four patients were subclinical hyperthyroidism. Six patients had inappropriate TSH secretion; eight had hypothyroidism; seven had subclinical hypothyroidism, and six patients had secondary hypothyroidism (Table 3). The characteristics of subjects who had thyroid dysfunction and normal thyroid function were shown in Table 4. The results demonstrated no significant association between thyroid dysfunction with duration of depressive illness, HAMD, admission frequency and suicidal attempts frequency (Table 4). When we examined each of the hormone levels with

those factors, we found that the level of free T3 had a significant negative correlation with the HAMD (p=0.024) (Table 5).

Table 2. Characteristics of Subjects in Study

Sex	
Male	45 (32.2%)
Female	95 (67.8%)
Age Group	
≤30	2 (1.9%)
31-45	26 (9.4%)
46-60	90 (60.4%)
≥61	22 (28.3%)
Duration of Illness	
<1 year	65 (52.8%)
1 to <3 years	57 (32.1%)
≥3 years	18 (15.1%)

Table 3. Distribution of patients on basis of Thyroids status

Status of Thyroid	N (%)
Normal	109 (77.9%)
Hyperthyroidism	6 (4.3%)
Subclinical hyperthyroidisms	4 (2.8%)
Inappropriate TSH Secretions	6 (4.3%)
Hypothyroidism	0 (0%)
Subclinical Hypothyroidism	1 8 (5.7%)
Secondary Hyperthyroidism	7 (5%)

Table 4. Thyroid Function Test and Major Depressive Disorder

Variables	Thyroid Function Test		T-Test (p-value)
	Normal (n=109)	Abnormal (n=31)	
Age	48.92	51.3	-.810 (.419)
Duration of Illness(months)	71.91	89.19	-1.226 (.222)
HAMD	8.35	10.81	-1.938 (.060)
Admission Frequency	0.53	0.45	.389 (.698)
Suicide Frequency	0.45	1.17	-1.062 (.296)

Table 5. Spearman correlation coefficients (p-value)

Variables	FT3	FT4	TSH
Age	-.079 (.351)	-.088 (.300)	-.044 (.606)
Duration of Illness	-.104 (.221)	-.113 (.184)	-.022 (.793)
HAMD	-0.190 (0.024)	-0.096 (0.261)	0.103 (0.224)
Admission Fequency	.061 (.476)	-.009 (.916)	0.077 (0.364)
Suicide Frequency	0.081 (0.345)	0.050 (0.560)	0.077 (0.368)

Discussion

The prevalence of thyroid dysfunction in our study (22.1%) was quite high compared with studies in the general population(7.2%)[9].But it was close to other studies in patients with MDD.Ojha's and Loosen's findings was 21%and 25% respectively. Seventeen of 140 (12%) had subclinical thyroid dysfunction, which was the same as Gold's finding (15%)[10].This This confirmed that thyroid dysfunction is a common comorbidity with MDD, although Ojha's study included all types of depressive disorders. From our finding, there was no specific kind of thyroid dysfunction in MDD, which was the same as Ojha's finding.

There was no significant correlation between thyroid dysfunction and severity of MDD (duration of depressive illness, HAMD, admission frequency and suicidal attempts frequency).This contrasted with Ojha's finding, which showed a correlation between severity of depression and thyroid dysfunction. The reason may be because the onset of thyroid dysfunction in our group may have differed from Ojha's. Also, there are many factors that affect the severity of MDD that may be different in our population and Ojha's population.

The finding that the level of free T3 had a significantly negative correlation with HAMD, supported the hypothesis that thyroid hormone may affect depressive disorder. Our finding regarding T3 activity corresponded with Stipcevic who examined thyroid activity in patients with MDD [11]. He found that significantly lower T3 activity in MDD patients compared with the control group. Joffe examined thyroid hormone levels and recurrence of MDD and found that time to recurrence of episodes was inversely correlated to serum T3 (Joffe 2000). This confirmed that T3 had some correlation with the course and severity of MDD. Although, screening thyroid tests are often routine for depressed inpatients and data suggest that thyroid screening may add little to diagnostic evaluation and the review of the literature suggests that there are no conclusive data on the role of thyroid function in depression, it was recommended to do thyroid screening in patient with MDD who did not response to treatment. Limitation of our study was due to it being a cross-sectional study which was limited in showing the effects of thyroid dysfunction over the course or severity of depression.

Conclusion

Thyroid dysfunction is a common comorbidity associated with major depressive disorder. Although there was no correlation between any kind of thyroid dysfunction and severity of illness, the level of freeT3 showed a correlation with the severity of a major depressive disorder. A prospective study may add to our knowledge on this effect.

Acknowledgements

Our study was funded by the Faculty of Medicine Chiang Mai University.

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Received: 10 March 2017 Accepted: 8 May 2017