Original Article

Thyroid hormones in female patients with depression

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Abstract

Introduction: Depression is known to mankind since years. Historically, this association has been described more than 200 years ago. About 1-4% of depressive patients have overt hypothyroidism, subclinical hypothyroidism occurs in 4-40% of these patients. The literature data on thyroid hormone values in patients of depression are controversial. In view of this, the present study was undertaken to contribute to a better understanding between thyroid activity and depression. Hypothyroidism and depression both are common in females hence female depressives were the focus of this study. **Aims and Objectives:** To assess serum T3, T4and TSH in female patients of depression. **Materials and Methods:** The study was carried out in department of Biochemistry and central investigation laboratory at M.G.M. Medical College and Hospital, Aurangabad during the time period of January 2015 and December 2015. The cases included 30 female patients in the age group of 20-60 years, attending psychiatry OPD and diagnosed with depression according to DSM-5 criteria for depressive disorders. 30 age matched healthy females belonging to same socioeconomic and geographical background as patients were selected as controls **Conclusion:** There was no significant difference between two groups with respect to marital status, religion, education, dietary habits and socioeconomic status. The mean T3, T4 and TSH values in female depressive cases were compared to controls. On comparison the difference between the two values was statistically significant($p<0.01$). This study suggests prevalence of subclinical hypothyroidism in depressive patients which could lead to unresponsiveness to conventional antidepressant therapy, inclusion of thyroid screening tests in depressives may help in proper management .However there is need to continue research in this field in order to clarify the etio-pathological significance of hypothyroidism in cases of depression.

Keywords: DSM -5 criteria: Diagnostic and statistical manual of mental disorders-5, T4: thyroxine, T3: tri iodothyronine, TSH: thyroid stimulating hormone.

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INTRODUCTION

Depression is known to mankind since years. Historically, this association has been described more than 200 years ago. Parry in 1825 reported an increased incidence of "nervous affectations" in thyroid disorders.[1] It is projected that that depression will be the second largest killer disease after heart disease by 2020 and will be the second leading cause of Disability Adjusted Life Years (DALYS). WHO-ranked it fourth among most urgent health problems worldwide.[2] In a cross sectional epidemiological study in India, the prevalence of hypothyroidism was found to be approximately one in ten adults. A significant higher proportion of females were diagnosed with hypothyroidism as compared to males (15.86% vs 5.02%).[3] Etiopathology of depression is multifactorial, though most widely studied among mood disorders is far away from ideally understood. Disorders of Hypothalamic pituitary adrenal axis (HPA) along with hypothalamic pituitary thyroid (HPT) axis closely linked with psychiatric disorders.[4] While hyperthyroidism may present with heterogeneous range of psychiatric symptoms hypothyroidism is invariably associated with depression. About 1-4% of depressive patients have overt hypothyroidism , subclinical hypothyroidism occurs in 4-40% of these patients.[5] According to the American Association of Clinical Endocrinologists, "The diagnosis

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of subclinical or clinical hypothyroidism must be considered in every patient with depression".[6] Indeed, among the various neuropsychiatric manifestations of thyroid disorders, depression remains the most common.[7] The literature data on thyroid hormone values in patients of depression are controversial[8]. In view of this, the present study was undertaken to contribute to a better understanding between thyroid activity and depression. Hypothyroidism and depression both are common in females hence female depressives were the focus of this study.

MATERIALS AND METHODS

The study was carried out in department of Biochemistry and central investigation laboratory at M.G.M. Medical College and Hospital, Aurangabad during the time period of January 2015-December 2015. The cases included 30 female patients in the age group of20-60 years, attending psychiatry OPD and diagnosed with depression according to DSM-V criteria for depressive disorders.30 age matched healthy females belonging to same socioeconomic and geographical background as patients were selected as controls

Exclusion Criteria

Pregnant and lactating women, patients with significant psychiatric comorbidity or significant chronic illness, those on medications affecting thyroid profile and those who were previously diagnosed as hypothyroid were excluded from study.

Procedure

Patients consent was taken . About 3 ml of fasting sample was collected ,sera was separated and serum levels of T3 ,T4, TSH were analyzed on IMMULITE 1000 analyzer using commercially available kits by chemilluminescence method.

Statistical analysis was done using student t test, p value < 0.01 was considered as statistically significant.

RESULTS

The mean age in cases was similar to that of controls. There was no significant difference between two groups with respect to marital status, religion, education, dietary habits and socioeconomic status. The age wise distribution of cases shows that there were maximum number of cases in age group 31-40 years as shown in table no.1

Table 1: Age wise distribution of healthy control and depressives cases

Age (years)	Control (n=30)	Cases (n=30)
20-30	7	7
31-40	8	11
41-50	7	8
51-60	8	4
Total	**30**	**30**

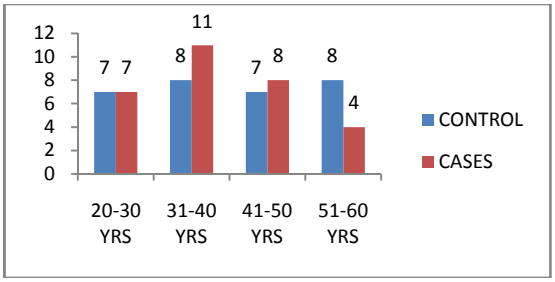

Figure 1: Age wise distribution of healthy control and depressive cases

Table no. 2 shows comparison of serum values of T3, T4, and TSH between cases and controls. The mean value of T3 in cases was 50.3 ± 24.2 and in controls it was116.3 ± 36.3. The difference was found to be statistically significant.($p<0.001$). The mean T4 value in cases was6.63 ± 3.37as compared to 10.57 ± 2.61 in controls. On comparison the difference between the two values was statistically significant($p<0.001$). The mean TSH difference in cases 5.21 ± 1.78 and in controls 3.27 ± 0.97, was statistically significant on comparison.($p<0.01$). These findings are represented graphically in bar diagram no.2,3,4.

Table 2: Comparison of thyroid profile between healthy control and depressive cases

Variable	Controls(n=30 mean±S.D.	Cases(n=30 mean±S.D.	P value
TT3(ng/dl)	116.3 ± 36.3	50.3 ± 24.2*	<0.001
TT4(µg/dl)	10.57 ± 2.61	6.63 ± 3.37*	<0.001
TSH(µIU/ ml)	3.27 ± 0.97	5.21 ± 1.78*	<0.01

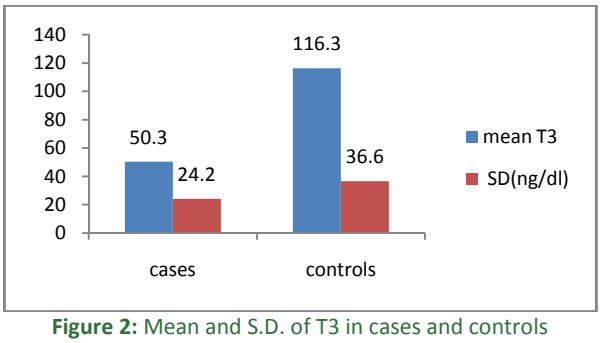

Figure 2: Mean and S.D. of T3 in cases and controls

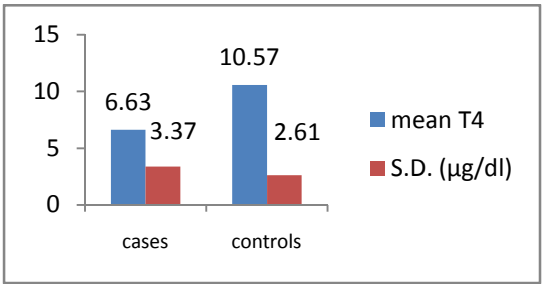

Figure 3: Mean and S.D.of T4 in cases and controls

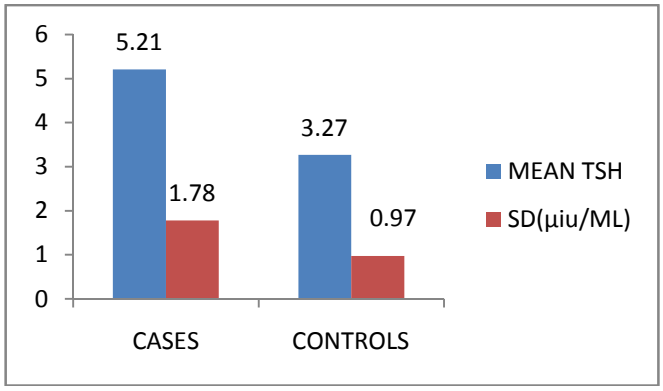

Figure 4: Mean and S.D. of TSH in cases and controls

Table no. 3 shows thyroid hormone status in cases and controls .36.6% patients of depression had raised TSH and T3,T4 normal (subclinical hypothyroidism) while 3% had raised TSH and T3,T4 decreased (overt hypothyroidism).among controls 26 (86.6%) were euthyroid and 4 (13.4%) had subclinical hypothyroidism.

Table 3: Thyroid hormone status in cases and controls.

Thyroid status	Cases	Controls
Subclinical hypothyroidism	11(36.6%)	2(6.6%)
Clinical hypothyroidism	1(3.3%)	0(0%)
Euthyroid	18(60%)	28(93.4%)
Total	**30(100%)**	**30(100%)**

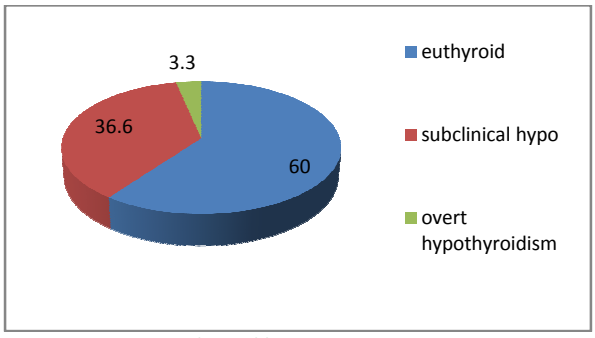

Figure 5: Thyroid hormone status in cases

DISCUSSION

The possibility of relation between thyroid gland, brain and behavior has been the subject of intense research in recent years.[9] As depression is more common problem of females, we planned our study in female patients. Previous studies done in this field have shown inconsistent data which may be attributable to heterogeneity of depression and inclusion of patients on antidepressant medications. We tried to minimize these confounding factors by including newly diagnosed drug naïve patients of depression. The age wise distribution of cases showed that maximum number of cases were in age group of 31-40 years which is in agreement with findings of previous studies.[10] Mean T3 was lower in cases as compared to controls, which was statistically significant. This was in agreement with previous studies by Nandekar *et al*[(11)], Saxena *et al*[12], Fava *et al*[13], Tappy *et al*[14] and Bottai *et al*[15]. Statistically significant lower mean T4 level was in cases as compared to controls, though T4 levels were within the normal limits. Similar was observed by Saxena *et al*[12], Fava *et al*[13] and Bauer *et al*.[16] Mean TSH level was increased in cases as compared to controls, difference was statistically significant. Similar was observed by Nandekar *et al*[11], Saxena *et al*[12], Tappy *et al*[14] and Wahby *et al*.[17] 36.6% patients of depression had subclinical hypothyroidism,3.3% had overt hypothyroidism. Similar observation by, Baral *et al*[18] and Chakraborti *et al*[19] Depression is multifactorial. Serotonin depletion plays a central role in pathogenesis of depression, Serotonin lack is sufficient to explain changes in hypothalamo- pituitary thyroid axis (HPT) axis with serotonin having negative effect on TRH. Lack of serotonin causes increase in TRH and TSH.[20] Another hypothesis put forward is brain hypothyroidism in setting of systemic euthyroidism. Thyroid hormone transport and uptake in brain and neuronal cells is defective. Activity of deiodinase 2 (DI 2) enzyme responsible for T4 to T3 conversion in brain is decreased, hence bioavailability of T 3 reduced in brain.[21] Thyroid supplementation has proved as an effective adjunct to treatment of depression in many unresponsive cases. Thyroid hormone increases cortical serotonin release which may act as co-transmitter to norepinephrine, accelerate and enhance the clinical response to antidepressants.[22] This study suggests prevalence of subclinical hypothyroidism in depressive patients which could lead to unresponsiveness to conventional antidepressant therapy, inclusion of thyroid screening tests in depressives may help in proper management .However there is need to continue research in this field in order to clarify the etio-pathological significance of hypothyroidism in cases of depression.

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