THYROID FUNCTION IN DEPRESSION

G. C. BORAL¹, B.Sc., M.B.B.S, D.P.M., M.D. (Cal.), M.D., M.A.P.A (U.S.A.)
A. B. GHOSH², M.B.B.S., D.P.M., M.D.
S. K. PAL³, M.Sc.
K. K. GHOSH⁴, B.Sc., M.B.B.S., Dip. Card., M.D. (Cal.), F.C.S., M.I. Biol., F.R.I.C. (Lond.) &
D. N. NANDI⁵, M.Sc, M.B.B.S., Ph.D. (Cal.), D.P.M. (Scot.), F.R.CP. (Edin.), F.R.C. Psych.
(Lond.), F.A.P.A. (U.S.A.), Psychoanalyst.

SUMMARY

Studies on thyroid functions were performed on patients suffering from depression and compared with normal control group. 31 different cases of depression were studied for their thyroid function and showed a diminished level of $T_3$ and $T_4$ with a concomitant rise in TSH level. When the female population of these 31 cases was compared with their male counterparts the females showed a significantly lower thyroidal functional status than the males.

In recent years it has been mentioned that thyroid hormone potentiates therapeutic efficacy of tricyclic antidepressant drugs in cases refractory to it especially in female depressives. Similarly it has been observed that lithium in affective psychosis depresses thyroid function. These observations have stimulated the researchers in the field to study thyroid function in affective psychosis.

We too have tried to verify the following hypothesis, that the Depressive patients not responding to tricyclic antidepressants have subnormal thyroid functions and of these females have more marked.

MATERIALS AND METHODS

A series of patients suffering from depression who attended the psychiatric O.P.D. of Goenka Hospital of the University College of Medicine, Calcutta University, were taken up for this purpose. Only retarded depressives who remained refractory to 150 mg. daily doses of imipramine for eight weeks and with no evidence of physical illness were studied. Patients who were not suicidal and were not on antihypertensive drug regime or steroid therapy were included. Finally each case was assessed by one endocrinologist to determine any thyroidal dysfunction manifested clinically. Consent of the patient and their relatives were taken before admitting them to the study. Patients who were on drugs, were kept drug free for a period of at least 15 days. If during this period the condition of the patient deteriorated further they were excluded from the study. 31 depressive cases of which 16 males and 15 females were taken, and their age ranged between 22-53 years. In every case $T_3$, $T_4$ and TSH were estimated in sera in the fasting condition using radio-immunoassay procedure after Hollander et al. (1975). Controls matched for age, sex and socio-economic status were taken from the relatives of the patients attending psychiatric O. P. D. with no relationship with the patients. There are certain common medicines and food which

¹University College of Medicine, University of Calcutta.
²Medical Officer, Krishnanagar Sadar Hospital.
³Department of Bio-Chemistry, Instt. of Post-Graduate Medical Education & Research, Calcutta.
⁴Associate Professor, Department of Bio-Chemistry & Incharge of Radioimmunoassay Unit, Instt. of P. G. Medical Education & Research, Calcutta.
⁵Professor & Head of the Department of Psychological Medicine, Calcutta University.
directly influence $T_3$, $T_4$ and TSH levels of blood, hence necessary precautions were taken to ensure that patient was not able to obtain such food or drugs. Sometimes it was necessary to hospitalise these patients for collection of blood samples.

RESULTS

Table-1 shows the mean value, range and SEM of $T_3$, $T_4$ and TSH levels in normal control subjects and depressed patients. The results are given for males and females also in both the groups. No significant difference was observed in the normal control group between the two sexes regarding $T_3$, $T_4$ and TSH levels. However, in depressed patients a significantly lower level of $T_3$ and a significantly higher level of TSH was observed in females than in males. As a group depressed patients showed a significantly lower mean value of $T_3$ and $T_4$ levels and significantly higher mean value of TSH level than control subjects. A significantly lower mean level of $T_3$ and $T_4$ and significantly higher level of TSH in depressed males was observed as compared to normal males. Further, among females, it was seen that a significantly lower level of $T_3$ and $T_4$ and a significantly higher level of TSH exists in depressed group as compared to normal group.

DISCUSSION

While considering the results of biochemical parameters of 31 depressives in comparison to 31 controls it was observed that the levels of $T_3$ and $T_4$ were significantly lower and that of TSH significantly higher in the depressives. The comparison between male and female depressives revealed that $T_3$ and $T_4$ were significantly lower and TSH significantly higher in females as compared to males. These observed alterations of $T_3$, $T_4$ and TSH depict biochemical hypothyroid status in female depressives. This may be

|          | Male          | Female         | Total          |
|----------|---------------|----------------|----------------|
|          | Mean SEM Range| Mean SEM Range  | Mean SEM Range  |
| $T_3$    | 1.0 0.2 0.9—1.2 | 0.9 0.03 0.8—1.1 | 0.9 0.46 0.8—1.2 |
| Control Gr. | 1.4 0.04 1—1.3 | 1.4 0.03 0.9—1.3 | 1.3 0.05 0.9—1.3 |
| $T_4$    | 56.6 2.23 46—75 | 49.4 1.18 40—56  | 52.5 1.17 40—75  |
| Control Gr. | 72.5 3.30 50—100 | 74.6 3.15 55—110 | 73.6 3.26 50—110 |
| TSH      | 4.0 0.21 2.7—6.2 | 5.8 0.92 3.6—10.3 | 4.6 0.28 2.7—10.3 |
| Control Gr. | 3.0 0.36 0.78—4.0 | 3.4 0.32 0.78—4.2 | 3.1 0.33 0.78—4.2 |

Significance:—$T_3$—Dep. Male Vs. Dep. Female (p<0.001), Dep. Gr. Vs. Control Gr. (p<0.05), Dep. (Male) Vs. Control (Male)—p<0.001, Dep. Female Vs. Control Female (p <0.01).

$T_4$—Dep. Gr. Vs. Control Gr. (p<0.001), Dep. Male Vs. Control Male (p<0.001), Dep. Female Vs. Control Female (p<.001).

TSH—Dep. Gr. Vs. Control Gr. (p<0.001), Dep. Male Vs. Dep. Control (p<.001). Dep. Female Vs. Control Female (p<.001).
accounted due to the greater changes in the neurotransmitter system and may have more profound influence in females than in males. It has been observed that chronic accumulation of dopamine in the hypothalamic region leads to lesser availability of active TRH which might affect hormone synthesis as it is well recognised that for the action of TSH optimum amount of TRH is obligatory. The females in general are more emotional than males and as such they shall liberate more of catecholamines which might explain the findings of lower levels of $T_3$ and $T_4$ and higher level of TSH than those found in the corresponding males. These data compare well with the findings of Prange et al. (1970). TSH stimulation tests in such cases may be helpful in finding out the cause of this subclinical hypothyroid state so that a better appraisal can be made regarding the disorder and the mode of treatment.

REFERENCES
Gjessing, R. (1938). Somatology of Periodic Catatonia in Biochemistry, Schizophrenia and Affective Illness. J. Ment. Sci., 84, 608.
Prange, A. J. (JR.), Lara, P. P., Wilson, I. C., Alltop, L. B., Breese, G. R. (1970). Enhancement of Imipramine by thyroid stimulating hormone: Clinical and Theoretical Implications. Am. J. Psychiat., 127.