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THYROID FUNCTION IN DIFFERENT PSYCHIATRIC DISORDERS

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SUMMARY

Thyroid function viz. estimation of T_3, T_4 & TSH (Thyroid Stimulating Hormone) were studied in cases of depression, mania and schizophrenia, each category numbering thirty one. These values were compared with corresponding values estimated in normal control group of individuals of identical age, sex and socio economic status. The depressives and schizophrenics showed subclinical or chemical hypothyroidism while the manic showed slightly higher values for T_3 and T_4 when compared to normal control subjects.

Gjessing's (1938) observations that stupor and excitement occuring in phases in periodic catatonias were due to metabolic disorders related to the hypo and hyper functions of the thyroid and could be treated successfully by thyroid extract, has been rather inspiring for other workers in striving to investigate its interrelation of mental illness and organic influences. Noteworthy works have been carried out in this direction by Kraepelin (1921), Mott (1919), Cade (1964), Berger (1954), Kuhn (1958), Slater and Roth (1969).

In recent years the interesting findings by Prang *et al.* (1969, 1970, 1971) that thyroid hormone potentiates the efficacy of Tricyclic antidepressant drugs particularly in cases refractory to these antidepressants alone has thrown new light on the study of interrelationship of thyroid hormones and affective illness. Further, Lithium salts used in affective psychoses were found to depress thyroid functions thus adding new dimensions to the research in the field of study of thyroid functions in affective psychoses.

In the present paper the authors have tried to explore and assess the status of thyroid hormones i.e. T_3, T_4 and TSH (Thyroid Stimulating Hormone) in 31 depressive 31 Manic and 31 schizophrenic patients.

MATERIAL AND METHOD

A series of cases for this study has been taken from amongst the psychotic patients who attended the psychiatric out patient department of the University College of Medicine, Calcutta. Age of patients varied between 22 and 52 years. Case history in detail, was obtained and mental status recorded. Only those cases were taken for study where two psychiatrists agreed on the diagnosis of a patient examined separately. Physical examination was carried out. Patients on antihypertensive drugs or steroids were excluded. Finally each case was examined by an endocrinologist to exclude, on clinical grounds, any possibility of thyroid dysfunctions.

Patients now so selected did not take any medication for their psychiatric problems for a period of 15 days before under-

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taking the study. Those whose condition deteriorated due to drug withdrawal were also excluded from the study and were allowed to resume their drugs.

31 cases of depression, 31 cases of mania and 31 cases of schinophrenia were in all taken up. Controls matched for age, sex and socioeconomic status were taken from the persons accompanying the patients attending E.N.T. out-patients department, care being taken to see that none of the control groups was suffering from any physical or mental disorder. Equal number of males and females were taken in the control group. In each group there were 16 males and 15 females. Serum of each individual included in the study was collected in fasting condition and using Radiommunoassay procedure after Holander, *et al.* (1975), the T_3, T_4 and TSH (Thyroid Stimulating Hormone) were estimated for every individual. Results thus obtained were statistically evaluated against those of the control group. All the patients were kept hospitalised during this period of study.

RESULTS

The Table showing the range mean and SEM of T_3, T_4 and TSH (Thyroid stimulating Hormone) in the normal controls, depressive, manic and schizophrenic. Here it shows that T_3 and T_4 are low both in depressive and in schizophrenic. It may be noted that the depressive have lower level of T_3, T_4 than that of schizophrenic. The TSH (Thyroid Stimulating Hormone) level markedly increased in schizophrenic and statistically a very low level of TSH was observed in mania.

DISCUSSSION

From the Table it is evident that the depressives have got a low T_3, T_4 and a raised TSH (Thyroid Stimulating Hormone) in comparison with that of normal individual. Raised TSH (Thyroid Stimulating Hormone) indicates that the thyroid gland did not work properly in those subclinical subjects leading them to subclinical or chemical hypothyroidism. The phenomenon may be explained by the changes in the neurotransmitter system. As we know the basic homeostatic mechanism of different hormones, peptide hormones in particular, depend on hypothalamic control via the hypothalamo-hypophyseal portal system which carries hypothalmic factors to the pituitary and thereby controls the pituitary. It has been well documented for the efficacy of TSH (Thyroid Stimulatnig Hormone) a minimum amount of TRH (Thyroid Releasing Hormone) is obligatory. The secretion of T.R.H. is dependent on two factors namely Dopamine and Serotonin. When there is decrease in dopamine concentration due to greater utilisation via the M.A.O. (Monoamine Oxidase) pathway or through COMT (Catecholamine O Methyl Transferase)

TABLE—*Mean, Range and Sem values of T_3, T_4 and TSH in different groups*

	T_3 (ng/ml)			T_4 (ng/ml)			TSH (μ ml)		
	Range	Mean	Sem	Range	Mean	Sem	Range	Mean	Sem
Normal ..	0.9—1.8	1.38	0.046	50—100	73.6	3.7	0.78—4.2	3.07	0.334
Depression ..	0.82—1.2	0.93**	0.46	40—75	52.48**	1.17	2.7—10.3	4.58	1.17
Mania ..	1.1—1.9	1.61	0.29	65—115	83.92	2.38	0.78—1.1	0.84**	0.67
Schizophrenia ..	0.85—1.25	1.05**	0.1	44—70	55.3*	3.15	4.3—7.7	5.9**	0.51

**P<0.05 *PP<0.001

pathway TRH become less available and as such TSH fails to exert its influence over the thyroid in production of T_3, T_4. Macswany (1978) has shown that the response of TSH to TRH in cases of schizophrenics were below par. Similar findings were observed in depressives by Prange *et al.* (1971). Anyway some of the previous workers like Dewhurst (1969) did find as in our study higher thyroid hormone in their studies in mania.

CONCLUSION

On the basis of the findings of our study we may conclude that major psychiatric disorders namely schizophrenia and affective psychoses do have demonstrable changes in their thyroid functions. This is most markedly observed in the depressive and more, so in females. We feel that we must explore the possible role of hypothalamus especially the neuroendocrine system in preventing these types of psychological disorders and the possible role of thyroid hormone in the therapy of these disorders.

REFERENCES

Berger, F. M. (1954). J. Pharmac. Exp. Ther., 112, 413.

Cade, J. F. J. (1964). A significant increased in Plasma Magnesium Levels in Schizophrenic and Depressive states. Med. J. Aust. I, 195.

Dewhurst, K. E. (1969). Observations on the Blood Concentration of Thyrotrophic Hormone (T. S. H.) in Schizophrenia and the Affective states. Brit. J. Psychiat., 115, 1003.

Gjessing, R. (1938). Somatology of Periodic Catatonia in Biochemistry, Schizophrenia and affective illness. J. Mental Sci., 84, 608.

Holander, *et al.* (1975). Immuno assay of Human plasma T.S.H. In: current topics in Thyroid Research, New York & London: Academic Press Inc.

Kraepelin, E. (1921). Depressive Insanity and Paranoia. G. M. Robertson. (Ed) Edinburgh. Livingstone.

Kuhn, R. (1958). The treatment of Depressive States with G 22355 (Imipramine Hydrochloride). Amer J. Psychiat., 115, 459.

Macsweeney,, David. (1978). Thyro-endorcrine pathology, obstetric morbidity and Schizophrenia : Survey of a hundred families with a Schizophrenia proband. Psychological Medicine, 8, 151.

Mott, F. (1919). British Med., II, 655.

Prange, A. Jr. *et al.* (1969). Enhancement of Iuri. priamine activity by Thyroid Hormone. Am. J. Psychiat., 126, 457.

Prange, A. Jr. *et al.* (1970). Enhancement, of Imipramine by Thyroid stimulating hormone clinical and Theoretical implication. Am. J. Psychiat., 127.

Prange, A. Jr. *et al.* (1972). Effects of Thyrotropin Releasing Hormone in Depression. Lancet, 2, 999.

Slater, E. & Roth, M (1969). Mayer Gross, Slater and Roth : Clinical Psychiatry (Eds.) Slater, E. & M. Roth, 3rd Ed., 188, 273, Bailliere, Tindall and Cassel Ltd. London: