

## Serum Levels of Ceruloplasmin as an Index of the Clinical Evolution in Schizophrenic Patients

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Ceruloplasmin estimations were made in the sera of normal people and schizophrenic patients. The results obtained suggest that ceruloplasmin in plasma is increased in acute and chronic schizophrenia as compared with normal subjects, and that ceruloplasmin concentration in plasma can be used as an index of the clinical evolution of schizophrenic patients.

The concentration of ceruloplasmin in sera is altered in several organic diseases (2, 5, 7-10). Changes in ceruloplasmin concentrations in sera have been described also in mental diseases (1, 3).

We have attempted to correlate the variations of the concentrations of ceruloplasmin in sera and the clinical evolution of the acute access of schizophrenia.

### Materials and Methods

Ceruloplasmin assay was done by the method described by RAVIN (6).

*Normal samples.* Blood was obtained from medical students, from the «blood bank», and from patients treated in a dental clinic with no apparent organic disease.

*Schizophrenia «admission patients».* Patients brought to the Hospital de la Vir-

gen in whom the diagnosis of acute access of schizophrenia was made.

*Schizophrenia «Discharge patients».* Schizophrenic patients who were discharged from the Hospital after treatment \* for acute access of schizophrenia and in whom the symptomatology had remitted.

*Chronic schizophrenia.* Patients with schizophrenia who have been several years in the Hospital de la Virgen. From these patients were taken two samples of blood with a interval of two months. All these determinations were made by double blind method, where the person who did the estimation didn't know the patient who provided the sample of blood.

\* The treatment was heterogeneous: chlorpromazine, chlorperazine, perphenazine, electroshock, etc.

Table I. *Ceruloplasmin levels in schizophrenic patients and normal subjects.*

Data showing mean values and standard deviation in the different groups. There is a significant difference between normal people and chronic schizophrenic patients ( $P < 0.05$ ). No differences were observed between normals and «acute schizophrenia» when discharged from Hospital nor between chronic schizophrenia and admission in acute schizophrenia.

	Ceruloplasmin Levels (O.D. Units)				
	Normals	Chronic Schizophrenia		Acute Schizophrenia	
		Controls	2 months after	Admission	Discharge
N.º patients	51	41	51	45	45
Mean values with S.D.	$2.94 \pm 0.37$	$3.95 \pm 0.39$	$3.91 \pm 0.36$	$4.12 \pm 0.81$	$2.97 \pm 0.47$

### Results

Results with the mean values and standard deviation are shown in table I.

There is always a lower ceruloplasmin concentrations when the patient is discharged from Hospital except in two patients. It is worthwhile to mention that these two patients came back to the psychiatric Hospital 3 days after leaving with a renewal of their symptomatology.

### Discussion

From our results seems clear that ceruloplasmin is increased in schizophrenia in agreement with HEATH (3), and also that when the symptoms of the acute access of schizophrenia subside ceruloplasmin approaches normal levels. This is not due to dietetic or other ambiental conditions at the Hospital, because this change is not seen in the chronic patients during similar period of time, neither diminishes ceruloplasmin when the patient is not discharged due to the persistence of his symptomatology.

We have no explanation to offer for the changes on the blood levels of ceruloplasmin in this disease. We do not believe that the determination of the serum level of ceruloplasmin can be used for the diagnosis of schizophrenia due to the large range found in normal persons (2, 4) and its variations in many patholo-

gical conditions. Nevertheless, we suggest that the measurement of the serum levels ceruloplasmin in the same patient of schizophrenia may be use as an objective index of the evolution of his disease. There are not many objective indices for the evolution of mental disease.

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### Resumen

Se realizaron valoraciones de ceruloplasmina en sueros de personas normales y pacientes esquizofrénicos.

Los resultados obtenidos sugieren que la ceruloplasmina en plasma está aumentada en la esquizofrenia crónica, así como en los brotes agudos de esquizofrenia en comparación con los sujetos normales, y que las concentraciones plasmáticas de ceruloplasmina pueden ser utilizadas como un índice de evolución clínica en los pacientes esquizofrénicos.

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