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PROTEIN-BOUND IODINE OF THE BLOOD SERUM IN LEPROSY

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The protein-bound iodine of the blood serum has acquired clinical importance in recent years because of the development of chemical methods for the detection and quantitative estimation of minute quantities of organic iodine in the blood. Its determination is of value because its concentration usually parallels that of the circulating thyroid hormone. In chronic infections with fever, and in chronic pulmonary and cardiac disease, the elevation of the basal metabolic rate may suggest the existence of thyrotoxicosis, but the amount of serum protein-bound iodine is usually within the normal range.

It has long been known that the administration of iodides to lepromatous patients may cause marked exacerbations of the disease (2). Some workers (1, 4), especially Muir, have in the past advocated its use as a provocative with the idea that the reactions would be beneficial, but this view has been generally abandoned.

Serious consideration was given to the question of iodine metabolism in leprosy since, to our knowledge, no previous study of protein-bound iodine (PBI) has been made on patients with this disease. A cooperative investigation of the matter was undertaken in two laboratories, in this hospital and in Washington.

MATERIAL AND METHODS

A group of 120 patients with leprosy, comprising 96 of the lepromatous and 24 of the tuberculoid types, were selected, together with 14 nonpatient controls. Care was taken to avoid patients who were on antithyroid drugs, mercurial diuretics, or cortisone preparations, or who may have had organic dyes for roentgenologic visualization. Of the patients, 91 were receiving sulfone therapy, 5 were getting the Marianum vaccine, and 24 had not received any kind of treatment.

Venous blood was drawn in the postabsorptive state, using precautionary methods in collecting the blood and in the preparation of all glassware since the presence of mercury or iodine in any form, or Nessler's or Hayem's solutions, interferes with the test. The separated sera were sent by air to Washington and were received there within 24 hours. They were stored at a temperature of 4-6°C. Not more than six days elapsed from the collection of the specimens to the completion of all of the tests. The chemical analysis was performed by the method described by Leffler (3), based on the chloric acid method of Zak *et al.* (6) as modified by O'Neal and Simms (5). The only departure from Leffler's technique was in the amount of saline used: sulfuric acid 10N with 100 mgm. NaCl per cc. was employed, 0.5 cc. being used in each test. By this method the normal PBI serum levels range from 4.0 to 8.0 micrograms per

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100 cubic centimeters. In normal individuals these levels tend to remain relatively constant.

RESULTS

The distribution of the different levels of PBI is shown graphically in Text-fig. 1. Of the 120 patients 98, or 81.7 per cent, were found to have within the normal range of 4.0 to 8.0/ μ gm./cc. The range levels correlated with the stage of activity of the disease is shown in Table 1.

TABLE 1.—Serum protein-bound iodine and the stage of activity of 120 leprosy cases, tuberculoid and lepromatous; in μ gm./100 cc.

Type of leprosy	No. of cases	Protein-bound iodine levels						
		3.0-3.9	4.0-4.9	5.0-5.9	6.0-6.9	7.0-7.9	8.0-8.9	9.0-9.9
Lepromatous, active	70	10	14	14	18	11	2	1
Lepromatous, quiescent	26	1	5	4	9	4	3	0
Tuberculoid, active	4	2	0	2	0	0	0	0
Tuberculoid, quiescent	20	2	4	6	5	2	0	1
Total	120	15	23	26	32	17	5	2
Controls	14	0	6	4	4	0	0	0

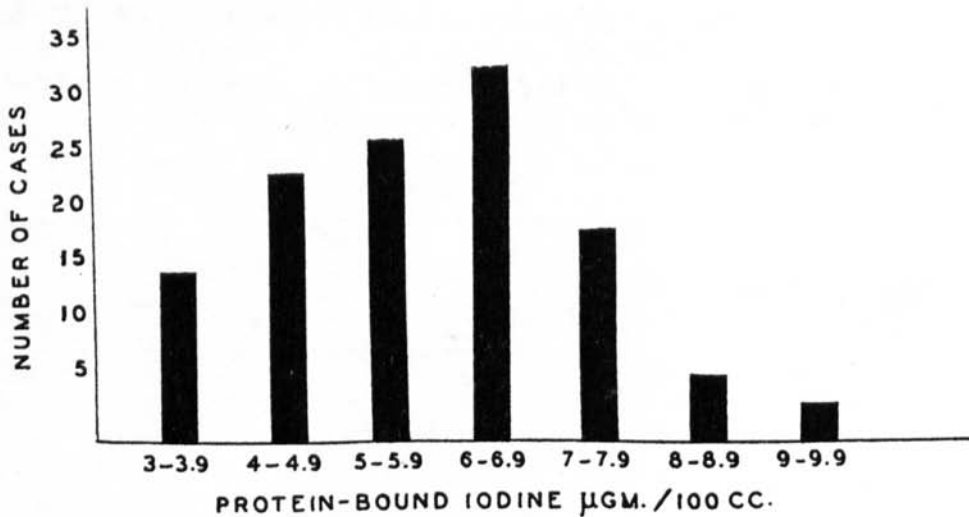
Elevated PBI serum levels were found in 7 patients, 6 of the lepromatous type, in 3 of whom the disease was active while in the other 3 it was quiescent, and in 1 tuberculoid patient whose disease was quiescent. The last-mentioned patient had a basal metabolic rate +15, which is within the normal range. Low PBI levels were seen in 15 of the 120 patients. Of these 15 patients, 11 were lepromatous (10 active and 1 quiescent), and 4 were tuberculoid (2 active and 2 quiescent).

Of the 91 patients on sulfone therapy, 7 had low PBI serum levels, and 7 had elevated levels. Of the 24 patients who had not been treated, 6 had low PBI levels. In 3 of these 6 patients a clinical diagnosis of amyloidosis had been made; the other 3 had been recently admitted to the institution. Of the 5 patients on Marianum vaccine, 2 had low PBI levels.

SUMMARY

Serum protein-bound iodine determinations were performed on sera from 120 patients with leprosy, of whom 96 had the lepromatous and 24 the tuberculoid type of the disease. As controls, 14 nonpatients were similarly examined.

Of the 120 patients, 98, or 81.7 per cent, showed protein-bound iodine levels within the normal range. Elevated levels were found in 6 lepro-



TEXT-FIG. 1. Numbers of patients and range of serum levels of protein-bound iodine in 120 cases of leprosy.

matous patients and in 1 tuberculoid patient. Low levels were found in 11 lepromatous and in 4 tuberculoid patients.

Abnormal values were found in 14 of the 91 patients on sulfone therapy, 7 having elevated PBI levels and 7 low levels.

RESUMEN

Se ejecutaron determinaciones del yodo proteo-fijo en los sueros de 120 leprosos, 96 de los cuales tenían la forma lepromatosa y 24 la forma tuberculoidea de la dolencia. Como testigos, se examinó en forma semejante a 14 sujetos que no estaban enfermos.

De los 120 enfermos, 98, o sea 81.7 por ciento, revelaron concentraciones de yodo fijado en proteína que quedaban dentro de límites normales. Se observaron concentraciones elevadas en 6 lepromatosos y 1 tuberculoideo. Hubo concentraciones bajas en 11 lepromatosos y 4 tuberculoideos.

Se descubrieron valores anormales en 14 de los 91 enfermos que recibían la sulfonoterapia, teniendo 7 concentraciones elevadas de YPF y 7 concentraciones bajas.

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