

## COLLOIDAL GOLD REACTION IN THE SPINAL FLUID IN LEPROSY

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In most cases the diagnosis of leprosy with paralysis is not difficult, but in a few inactive neural cases (the so-called burnt-out cases) the differential diagnosis between syphilitic and leprotic paralysis may present some difficulties. In fact, we have had several patients with peripheral paralysis of one or two extremities who were referred to the medical clinics of this hospital with the diagnosis of leprosy who turned out to be suffering from neurosyphilis. Because the serological tests for syphilis in cases of leprosy are of doubtful value, we decided to investigate the colloidal gold reaction in the spinal fluid of leprosy patients, with the hope that a diagnostic aid for distinguishing between syphilitic and leprotic paralysis might be found. Our hope was not fulfilled. The colloidal gold reaction proved to be positive in cases of leprosy without coincident syphilitic infection, and therefore this test cannot be used for the purpose in mind. In spite of the incomplete data on the individual cases and the negative answer to our original question, we think that a short report of our findings may be of some phenomenological value.

Unfortunately, we were not able to make histological examinations in all of these cases, and therefore we cannot attempt to give a histological classification. Furthermore, it is very difficult to classify clinically the cases which we see according to the South American scheme or the classification adopted by Muir (3), because a large proportion would fall in the category of the "uncharacteristic" type (the "indeterminate form" of the Havana Congress). In addition, it seems that transition from one type to another occurs quite frequently, and the chief leprologist of our leprosarium, Dr. J. L. Maxwell (2), has the impression that the development of leprosy here in Chekiang is rather similar to that seen among Chinese in Malaya as described by Ryrie (4). In this present paper we definitely do not wish to enter into any controversy about classification; we

TABLE 1.—Results of spinal fluid and other examinations in fifteen male patients with leprosy.

Case No.	Age	Leprosy		Acid-fast bacilli				Blood Kahn test	Spinal Fluid				
		Duration (years)	Classification	Nasal mucosa	Skin	Ear-lobes	Cell count		Kahn test	Pandy test	Ross Jones	Colloidal gold curve Numbers	Character
1	25	7	L2N1	2+	1+	2+	4+	3	1+	trace	neg.	2, 2, 2, 3, 3, 0, 1, 1, 0, 0	Syphilitic
2	17	6	L3N1	1+	2+	1+	4+	2	neg.	trace	neg.	3, 4, 4, 4, 2, 2, 1, 1, 0, 0	Syphilitic
3	23	9	L3N1	1+	3+	3+	4+	1	neg.	trace	neg.	3, 4, 4, 4, 3, 2, 2, 1, 1, 0, 0	Syphilitic
4	14	5	N2	neg.	neg.	neg.	neg.	3	neg.	trace	trace	2, 2, 3, 4, 3, 4, 2, 1, 1, 1, 0	Syphilitic
5	23	2	L1N1	neg.	1+	neg.	2+	1	1+	trace	trace	2, 3, 3, 4, 3, 2, 1, 0, 0, 1, 0	Syphilitic
6	28	2	N1	neg.	neg.	neg.	3+	3	1+	trace	trace	4, 4, 4, 4, 3, 4, 3, 4, 3, 2	Syphilitic
7	31	3½	L1N1	1+	1+	1+	neg.	6	neg.	trace	trace	3, 4, 4, 4, 4, 3, 2, 2, 1, 0, 0	Syphilitic
8	30	15	L1N3	1+	±	1+	neg.	2	4+	trace	trace	3, 3, 3, 3, 4, 3, 1, 0, 0, 0, 0	Syphilitic
9	35	6	L2N2	±	neg.	neg.	neg.	9	neg.	trace	trace	2, 2, 2, 3, 4, 4, 2, 1, 0, 1, 1	Syphilitic
10	33	7	L2N1	2+	1+	2+	3+	3	neg.	trace	trace	5, 5, 5, 4, 4, 4, 2, 2, 1, 1, 0	Paralytic
11	23	11	L2N3	1+	3+	2+	3+	25	4+	1+	trace	5, 5, 4, 3, 1, 1, 0, 0, 0, 0, 1	Paralytic
12	35	1½	N2	neg.	neg.	neg.	4+	9	neg.	trace	neg.	1, 1, 1, 2, 2, 1, 1, 1, 0, 0, 0	Normal
13	24	2	L1N2	±	1+	2+	4+	2	1+	trace	neg.	2, 2, 2, 2, 0, 0, 0, 1, 1, 1, 0	Normal
14	24	11	N3	neg.	neg.	neg.	4+	17	1+	trace	trace	1, 1, 1, 2, 2, 2, 1, 0, 0, 0, 0	Normal
15	43	20	L3N2	3+	2+	3+	1+	3	neg.	trace	trace	1, 2, 2, 2, 2, 1, 0, 0, 0, 0, 0	Normal

only mention these facts to explain why we use the Cairo classification.

The method of Borowskaja (1) was selected for the colloidal gold reaction. In the laboratory of this hospital sensitive results are obtained with this method, and controls run together with the spinal fluids of the leprosy patients gave satisfactory results.

The following symbols were adopted in describing the results of bacteriological examinations (Ziehl-Neelsen stain) of the nasal mucosa, the skin and the ear lobe: 1+, only a few acid-fast bacilli (less than 10 bacilli in 100 fields); 2+, numerous bacilli; 3+, a few bacilli in every field with bundles and globus formation; 4+, many bacilli in every field with bundles and globus formation.

Fifteen patients with leprosy were tested in this series. The results of these tests are given in Table 1.

#### RESULTS

Only 4 of these 15 patients gave normal spinal fluid colloidal gold curves, 9 of them gave syphilitic and 2 of them characteristic paralytic curves. Not a single one had clinical signs of neurosyphilis, and only one gave a history of a gonorrheal infection.

The serodiagnostic methods for syphilis in patients with leprosy are of doubtful value, but it is interesting that 3 of our patients (Nos. 4, 7 and 9) who gave negative Kahn tests with blood serum and spinal fluid nevertheless showed pathological colloidal gold curves. There seems to be no relation between the form, duration or activity of the disease and the changes in the spinal fluid.

#### COMMENT

These findings are offered as a purely phenomenological report; we are not able to give any reason for the observed changes in the spinal fluid of patients with leprosy. The absence of clinical signs of neurosyphilis, and the fact that in some of these patients the serodiagnostic test for syphilis was negative, make it most probable that these pathological colloidal gold curves in the spinal fluid are due to leprosy itself. In the literature of leprosy very little has been reported about physico-chemical changes of the spinal fluid. The present series suggests that it is possible that further work in this line might bring valuable results.

## SUMMARY

The colloidal gold curve in the spinal fluid of 15 patients with leprosy was determined. Only 4 of these patients gave normal curves, 9 of them gave syphilitic curves, and 2 gave paralytic curves. There seems to be no relationship between pathological colloidal gold curves in these patients and a possible previous syphilitic infection. Most probably these pathological curves are due to leprosy itself. The mechanism of these changes is not understood.

## RESÚMEN

La reacción del oro coloidal en el líquido céfalo raquídeo de 15 pacientes con lepra, fué investigada por los autores. Sólo 4 de éstos pacientes reaccionaron normalmente, 9 de ellos tuvieron reacciones del tipo sífilítico, y en 2 la reacción fué del tipo paralítico. Parece no haber relación entre las reacciones patológicas de éstos pacientes a la prueba del oro coloidal y una posible infección luética anterior. Con toda probabilidad las reacciones patológicas que fueron obtenidas se debieron a la condición de lepra en sí. El mecanismo de los resultados obtenidos no se sabe hasta la fecha.

## REFERENCES

1. BOROWSKAJA. Cited in M. Klopstock and A. Kowarski: *Praktikum der klinischen, chemischen, mikroskopischen und bakteriologischen Untersuchungsmethoden*, 12th ed. X, Berlin, 1938, p. 478.
2. MAXWELL, J. L. Personal communication.
3. MUIR, E. *Manual of Leprosy*. Edinburgh: E. & S. Livingstone Ltd., 1948, p. 26.
4. RYRIE, G. A. Regional differences in leprosy. *Leprosy among Chinese in Malaya*. *Lep. Rev.* **19** (1948) 4-11.