17-Ketosteroids in Leprosy[1]

Usha D. Hardas and Ravindra G. Saoji[2]

Lepromatous leprosy being a systemic disease, involvement of the endocrine system is not surprising. Testes are most frequently involved (3). Gross involvement of adrenals is rare though small nodules are frequently seen in the zona fasciculata and zona reticularis and around medullary veins (10). Therefore, the probability exists of some degree of adrenal dysfunction which may result in low urinary 17-ketosteroid (17-KS) excretion.

Liver involvement is very common in lepromatous leprosy and specific changes have been reported in up to 40% of cases by Shivde and Junnarkar (13), and 90% by Camain *et al* (1). Deranged liver function has also been reported by various authors, e.g., Lundin and Rose (9); Verghese and Job (15). This might contribute to lowering the urinary 17-ketosteroid excretion.

The present study includes urinary 17-ketosteroid estimations in cases of lepromatous leprosy, and its correlation with liver damage.

MATERIALS AND METHODS

Twenty-nine cases of lepromatous leprosy are included in the study, consisting of 23 male and 6 female patients. These patients were well-established cases of lepromatous leprosy, between the age group of 20 to 50 years, and all under treatment. The duration of their illness ranged from 3 to 24 years. They had normal renal function and none were in reaction.

Of these 29 cases, 20 were from Dattapur Leprosy Center, Wardha, and 9 from the Medical College Hospital, Nagpur. All cases were examined and clinical findings were recorded as per proforma.

Urine samples for 17-ketosteroid estimations. A container containing 10 ml of concentrated hydrochloric acid as a preservative was given to the patient for collection of specimens (14). Twenty-four hour urine samples were collected with instructions to the patients to evacuate the bladder completely at 8:00 a.m. and discard this specimen, and then to collect all subsequent urine specimens in the container till 8:00 a.m. the following morning.

Total volume of the 24-hour collection was noted and a 25 ml aliquot taken for 17-ketosteroid estimation. Acidified urine sample was stored at 4°C until processed.

Liver biopsy. Liver biopsy was done utilizing the Vim Silverman biopsy needle by the method described by Sherlock (12). Biopsy material was fixed in 10% formol saline, sections were cut and stained by routine hematoxylin and eosin and by Fite's stain (5) for acid-fast bacilli.

Biochemical determinations. Urinary 17-KS were estimated by the method of Pilgaonkar and Raut (11) which is a modification of the method by Drekter *et al* (4). A standard curve of 17-KS was prepared in order to establish the correct technic and ascertain the reproducibility of results. However, a standard of 50 μg/ml was always run with each set of tests to avoid error due to aging of reagents. In place of the reagent blank, an extract blank consisting of 0.2 ml of extract + 0.2 ml of absolute alcohol + 0.2 ml of 2.5 N KOH in alcohol was used in order to correct the error due to the presence of nonketonic pigments in the extract. Alcoholic solutions of KOH and m-dinitrobenzene are unstable, hence were prepared fresh as and when required.

Liver function tests consisted of: Vandenberg reaction, serum bilirubin, icteric index, total serum proteins with A/G ratios, thymol turbidity, and serum glutamic pyruvic transaminase (SGPT).

Serum glutamic pyruvic transaminase was estimated by the method described in the *Clinical Methods Manual,* Spectronic 20 by Bausch and Lomb (2).

OBSERVATIONS AND DISCUSSION

Estimation of 17-KS in lepromatous leprosy has been reported by Grabstald and Swan (6), Kinnear *et al* (8), and Job (7).

Table 1 shows some salient clinical findings where only 10.3% of the cases showed gynecomastia and 20.6% of the cases showed testicular atrophy.

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[2] U. D. Hardas, M.B.B.S., M.Sc., M.D., D.Bact., Professor and Head, Microbiology Department, Medical College, Nagpur, India; R. G. Saoji, M.B.B.S., M.D., Pathologist, Nagpur, India.

Table 2 shows a comparative statement of histopathologic diagnosis, serum glutamic pyruvic transaminase values, and urinary 17-KS.

It is seen that males showing definite leproma with positive lepra bacilli show distinct low values of 6.9 mg/24 hours as compared to 10.34 mg/24 hours in corresponding normals. Even in those showing no lepromas but only Virchow cells the 17-KS values were 7.1 mg/24 hours, indicating that irrespective of testicular atrophy or gynecomastia liver damage alone results in low 17-KS values. Such a marked difference from normals is not observed in females. This is probably due to the unaffected adrenals which alone contribute to 17-KS secretion in females; whereas slight testicular damage may affect 17-KS values in males.

However, there is a definite low range and low mean value in males as well as in females, when compared to normals.

Our findings are consistent with those of Grabstald and Swan ([6]), and Job ([7]). The mean values can be regarded as more reliable since almost four to five times more cases are included in this study.

TABLE 1. *Salient clinical findings in 29 lepromatous leprosy cases.*

Clinical findings	No. cases	%
Palpable liver	8	27.5
Spider angioma	2	6.8
Palmer erythema	8	27.5
Testicular atrophy	6	20.6
Gynecomastia	3	10.3

TABLE 2. *Correlation of urinary 17-ketosteroid values, SGPT values and histopathologic findings in lepromatous leprosy.*

Liver biopsy	No. cases	Sex	17-KS mg/24 hrs		SGPT units	
			Range	Mean	Range	Mean
(A) Lepromatous leproma	4	M	4.6-7.0	6.15	40-60	52.5
with AFB	2	F	3.6-4.8	4.2		
(B) Few Virchow cells or no specific change	4	M	6.6-8.0	7.1	25-60	37.5

TABLE 3. *17-ketosteroid values, SGPT values and A/G ratios in cases of lepromatous leprosy without liver biopsy.*

No. cases	Sex	17-KS mg/24 hrs		SGPT units		A/G ratio
		Range	Mean	Range	Mean	
15	M	5.0-9.8	7.02	15-110	40.6	Altered
4	F	4.6-6.6	5.6			

TABLE 4. *17-ketosteroid excretion in lepromatous leprosy.*

Author	No. cases	Sex	17-KS mg/24 hrs		
			Normal	Lepromatous leprosy	
			Mean	Range	Mean
Grabstald *et al.*	2	M	—	7.8-9.7	8.75
Job	6	M	8.5	3.3-6.0	4.1
Present study	23	M	10.34	4.6-9.8	6.9
	6	F	5.87	3.6-6.6	5.1

SUMMARY

Urinary 17-ketosteroids were estimated in 29 lepromatous leprosy cases. Correlation between 17-ketosteroid values, histopathologic findings, and serum S.G.P.T. values is discussed. Low values of 17-ketosteroids were associated with definite leproma in liver indicating the value of liver damage to 17-ketosteroids. This was more marked in males than in females.

RESUMEN

Se determinaron los 17 quetoesteroides urinarios en 29 casos lepromatosos. Se discute la correlación entre los valores de 17 quetoesteroides, los hallazgos histopatológicos y los valores séricos de SGPT. Los valores bajos de 17 quetoesteroides se asociaron con leproma del hígado, indicando los 17 quetoesteroides, el grado de daño hepático. Esto fué más marcado en hombres que en mujeres.

RÉSUMÉ

Chez 29 cas de lèpre lépromateuse, on a procédé à la détermination des 17-céto-stéroïdes urinaires. On discute ici de la corrélation entre les valeurs trouvées pour les 17-céto-stéroïdes, les observations histo-pathologiques et les taux de S.G.P.T. dans le sérum. Des taux faibles de 17-céto-stéroïdes étaient associés avec des lépromes hépatiques, ce qui mesure l'extension du dommage hépatique en relation avec les 17-céto-stéroïdes. Ceci étaient plus prononcés chez les hommes que chez les femmes.

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