URINARY PORPHYRINS—A QUANTITATIVE ASSAY IN 25 NORMAL PERSONS BY SPECTRO-PHOTOMETRIC METHOD

FERDINAND HANDA AND RAJ KUMAR

Summary

A quantitative assay of urinary porphyrins was done in 25 normal persons by spectro-Photometric method of Rimington. Urinary Coproporphyrin varied from 16.2 ug to 103.56 ug./24 hours urine. Uroporphyrin varied from 0.00 to 12.74 ug./24 hours urine. Results were found to be statistically significant.

Copro and Uroporphyrins are regularly excreted in very small quantities in the urine of normal persons. Their excretion in abnormal quantities is indicative of disturbed porphyrin metabolism. But to give correct weight to the raised levels of urinary porphyrins in a case with disturbed porphyrin metabolism, it is essential to determine the base line of normal values of urinary porphyrins. Although, figures of normal values are available in European, normal values amongst Indians are still lacking. Hence, it was proposed to carry out this study.

Material and Methods

A quantitative assay of urinary porphyrins was undertaken in 25 healthy persons with normal liver function tests.

Rimington's[1] method with little modification (using ethyl acetate instead of cyclohexanone) has been used. Coproporphyrin and Uroporphyrin were extracted in 5% Hcl using different solvents and determined spectrophotometrically. Calculations were done according to the known formulae. Results are expressed in microgram in 24 hours urine.

Observations

Observations are tabulated below.

TABLE 1

Showing the age distribution of normal persons

Age in years	No. of persons
0— 5	4
6—10	3
11—15	2
16—20	3
21—25	3
26—30	3
31—35	1
36—40	1
41—45	—
46—50	3
51—55	1
56—60	1
Total	25

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Department of Dermatology & Venereology, Government Medical College & Rajendra Hospital, Patiala (Punjab)

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TABLE 2
Showing the sex distribution of normal persons

Male :	
Children	5
Adults	7
Females :	
Children	4
Adults	9
Total	25

TABLE 3
Showing the values of urinary porphyrins in normal persons

S. No.	Coproporphyrin ug./24 hrs.	Uroporphyrin ug /24 hrs.
1	16.28	0.00
2	40.55	0.00
3	44.93	2.47
4	42.48	3.79
5	19 46	0.00
6	21.51	2.45
7	46.24	3.18
8	36.94	5.12
9	42.59	0.00
10	36 04	0.00
11	61.51	0 00
12	21.01	0 00
13	67 33	8 44
14	49.71	5.12
15	66.29	0 00
16	87.38	8.78
17	55.16	5.44
18	44 04	12 18
19	103.56	12 4
20	40.30	6 84
21	40 59	0.00
22	47.26	4.33
23	31.82	1.31
24	37.74	0.00
25	42.69	7.17

Comments

There is a wide range of individual variations in the levels of different porphyrins normally present in the urine. In the series studied, the level of urinary coproporphyrin varied from 16.28 ug/24 hours urine to 103.56 ug. 24 hours urine. The level of uroporphyrin varied from 0.00 to 12.74 ug/24 hours urine. This wide range of variation in the normal levels of porphyrin makes it difficult to draw any conclusion from a single figure. Logically any conclusion cannot be made unless estimation for a given type of porphyrin in various media of the same individual are done. Review of the literature indicates that the presence of wide range of variation in the normal levels of different porphrins, and that this variation is not only found in the racial level, but also at the individual level. Thus extremely varying figures have been given by different authors from different countries. Accordingly the figures obtained from one study will agree with some authors and at the same time disagree with other authors. Our figures are lower than the European workers which can be explained due to racial factors, dietetic differences.

TABLE 4
Showing the ranges of normal levels of urinary Porphyrins.

Urinary Porphyrin	No. of cases	Means (± S.D.) or Range of Means		Ranges
Coproporphyrin	25	Mean	45.74	16.28—103.56
ug./24 hours		S.D. ±	19.99	
		S.E. ±	3.09	
		Tc	11.44	
		Table value	2.05	
Uroporphyrin	25	Mean	3.57	0.00— 12.74
ug./24 hours		S.D. ±	3.966	
		S.E. ±	.793	
		Tc	4.05	
		Table value	2.05	

TABLE 5

Showing normal levels of urinary porphyrins in various studies.

S. No.	Authors	Coproporphyrin (Normal range)	Uroporphyrin (Normal range)
1.	Zieve et al[2]	300.0 ug/24 hrs.	—
2.	Eales, L.[3]	46-163 ug/24 hrs.	6-20 ug/24 hrs.
3.	Cantarow[4]	106 ug/24 hrs.	10-20 ug/24 hrs.
4.	Robert A. Kyle et al[5]	200.0 ug/24 hrs.	20.0 ug/24 hrs.
5.	Birgitta Haeger[6]	0-175 ug/litre	0-15 ug/24 hrs.
6.	Duncan[7]	40-186 ug/24 hrs.	0-15 ug/24 hrs.
7.	Barnes[8]	200.0 ug/24 hrs.	25.00 ug/24 hrs.
8.	A. M. El. Mofty et al[9]	8.1-124 ug/litre	0-16.5 ug/litre
9.	Present study	16.28-103.56 ug/24 hrs.	0-12.74 ug/24 hrs.

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False :

EOG is a sensitive machine which measures the minute electrical potential difference between the cornea and the retina. EOG recording is influenced by many factors, both physiological and pathological. EOG should be considered only as a supplement diagnostic aid to routine ophthalmoscopic examination in patients on treatment with chloroquin. A single low potential record is not significant. A falling potential on serial testing can be considered to be an important sign indicating abnormality.

Ref : B. J. Ophth, 49 : 573, 1965.