

LETTER TO THE EDITOR

CIRCADIAN VARIATION OF PLASMA 17- HYDROXYCORTICOSTEROID (17- OHCS) IN CAVITARY AND NON-CAVITARY PULMONARY TUBERCULOSIS

( Received on November 26, 1990 )

Plasma 17- OHCS level is elevated in acute cases of pulmonary tuberculosis, with marked increase with advancement of disease (1). Circadian variations in circulating 17- OHCS in patients with pulmonary tuberculosis has not been done. It was therefore, decided to study these changes in tuberculous patients.

Twenty five patients of pulmonary tuberculosis (35-60 years), and ten clinically healthy volunteers of comparable age group, were included in the study. All the subjects were synchronized with diurnal activity from 0600 to 2100 hrs and nocturnal rest for 1 week. Meals were served at 0630, 1300 and 2030 hrs and the participants had their normal fluid intake. No drugs were used by the subjects that would affect corticosteroid kinetics. Blood samples were collected at 8 hrs intervals during the 24 hrs period, beginning at 0800 hrs and plasma 17-OHCS measured (2). The subjects were divided in different groups; healthy subjects forming group I while patients formed group

II and group III on the basis of presence or absence of cavity respectively. Students 't' test for paired samples was used to evaluate the differences between values recorded at each corresponding time ( $P < 0.05$  was taken as significant). Further single and mean cosiner procedures (3) were used for both detection and characterisation of circadian rhythm.

A definite rhythm in the concentration of plasma 17- OHCS was observed in healthy volunteers. Plasma 17-OHCS was maximum as 0800 hr, which declined gradually reaching minimum at 0000 hr. These findings are comparable with the observations of other investigators (4-5). Plasma 17-OHCS levels were found to be elevated in both groups of tubercular patients. These findings are similar to the findings of Srivastava et al (4). Circadian patterns of plasma 17-OHCS were deranged in four patients of cavitary and two patients of non-cavitary disease (Tables I and II). There is thus no relationship observed in

TABLE I: Values ( $\mu\text{g}/100\text{ ml}$ ) of Plasma 17-OHCS (Mean  $\pm$  S.E.) in Healthy Controls (Group I) and patients (Group II & III) at different time intervals during 24 hr period.

S.No.	Subjects/Group	Time intervals		
		0800	1600	0000
1.	Controls/Group I	18.79 $\pm$ 1.27	12.95 $\pm$ 0.73	7.74 $\pm$ 0.56
2.	Patients/Group II (Cavitary with normal rhythm)	24.93 $\pm$ 1.47 P1 <0.01	18.16 $\pm$ 1.29 <0.01	9.8 $\pm$ 0.96 >0.05
3.	Patients/Group III (Cavitary with Disturbed Rhythm)	20.45 $\pm$ 2.63 P2 >0.05	18.10 $\pm$ 1.48 <0.01	24.77 $\pm$ 3.6 <0.01
4.	Patients/Group III (Non-Cavitary with Normal Rhythm)	22.36 $\pm$ 6.75 P3 >0.05	17.88 $\pm$ 1.42 >0.05	9.36 $\pm$ 2.04 >0.05
5.	Patients/Group III (Non-Cavitary with Disturbed Rhythm)	18.15 + 1.25 P4 < 0.01	20.65 + 1.33 >0.05	9.61 + 1.80 >0.05

P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub> & P<sub>4</sub> are the corresponding values when compared with controls.

TABLE II

PATIENTS			
	(Group I)	(Group II)	(Group III)
Mesor	13.870	17.438	16.617
Amplitude	6.731	9.112	8.032
Acrophase	-147.87	-154.60	-160.76
IRS	0952	1019	1043
F	63.28	42.40	24.33
(DF)	(2,27)	(2,36)	(2,15)
P	<0.001	<0.001	<0.001

*Comparison of over all rhythm*

	Group I	Vs	Group II	and	Group I	Vs	Group III
F =	6.840		P <0.001		F = 4.743		P <0.01
DF =	(3,63)				DF = (4,42)		

the circadian rhythms of plasma 17-OHCS with the presence or the absence of cavity, in cases of pulmonary tuberculosis. Circadian periodicity of adrenocorticoids has been found to be absent in certain altered states of unconsciousness, like delirium coma, semicoma and Cushing's syndrome (7-9).

The normal circadian rhythms of plasma 17-OHCS in patients, as observed in the present study, are mainly due to individual difference in suscepti-

bility to the patho-physiological stress of the disease. The patients with altered rhythms might not be able to bear the additional stress of more severe infection. On the other hand, the patients with normal rhythms may still have strong internally active anatomical neurochemical and neurophysiological factors capable of regulating a normal adrenocortical rhythm and providing increased corticosteroid production against such stress. However, this possibility needs further confirmation.

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## REFERENCES

1. Srivastava RML, Mukherjee PK, Bhargava KP, Khanna BK. Study of plasma cortisol of pulmonary tuberculosis. *Ind J Tub* 1980; 27 : 3-6.
2. Peterson RE, Karrer A, Guerra SL. Evaluation of the silber-porter procedure for determination of plasma hydrocortisone. *Anal Chem* 1957; 29: 144.

3. Halberg F, Johnson EA, Nelson W, Sothorn R. Autorhythmetry procedures for physiologic self measurements and their analysis. *Physiol Tchr* 1972; 1: 1-11.
4. Krieger DT. Factors influencing the circadian periodicity of plasma corticosteroid levels. *Chronobiologia* 1974; 1-195.
5. Halberg F, Cornelissen G, Tarquini B, Benvenuti M, Cagnoni M. Timing of medical diagnosis and treatment. Clinico-circadian quantification of suppression by dexamethasone of the adrenal cortical cycle in healthymen. *Chronobiologia* 1984; 11: 43.
6. Brahul P, Kaiser E, Oertel GW. Plasma steroids and tuberculosis. *Am Rev Resp Dis* 1963 ; 87: 808.
7. Doe RR, Vennes JA, Flink EB. Diurnal variation of 17-OHCS Sodium Potassium, Magnesium and Creatinine in normal subjects and in cases of treated adrenal insufficiency and Cushing's Syndrome. *J Clin Endocrinol* 1960 ; 2: 253-271.
8. Glass AR, Zavakil III AP, Halberg F, Cornelissen G, Schaaf M. Circadian rhythm of serum cortisol in Cushing's Disease. *J Clin Endocrinol Metab* 1984; 59: 161-165.
9. Eik-Nes K, Clark LD. Diurnal variation of plasma 17-Hydroxycorticosteroids in subjects suffering from brain damage. *J Clin Endocrinol Metab* 1958; 18: 764-768.
10. Halberg F. Some physiological and clinical aspects of 24-hour periodicity. *J Lancet* 1953; 73 : 20-32.
11. Halberg F. Organisms as circadian systems, temporal analysis of their physiologic and pathogenic responses including injury and death. In Walter Read Army Institute of Research Symposium, Medical aspects of stress in the Military climates. Washington DC. 1964; pp:1.
12. Pincus GA. A diurnal rhythm in the excretion of urinary ketosteroids by youngmen. *J Clin Endocrinol* 1943; 3: 195.

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