4. Title: Study of urinary hydroxyproline excretion in infants of hyper and hypo—endemic areas.

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Background

There is fairly good evidence to support the suggestion that urinary hydroxy—proline arises from the breakdown of collagen[1]. A reduction in the amount of insoluble collagen in the malnourished infant could result in a decrease in urinary hydroxyproline excretion[2,3].

Urolithiasis has been produced in weanling rats fed a diet low in protein and is prevented by increasing the protein intake with ceither casein or soybean protein[4]. A previous study showed that total inorganic sulfate and the free inorganic sulfate in the urine were lower in samples obtained from village boys up to 1 year of age than in city subjects of a similar age range. These findings may indicate a lower sulfur—containing amino acids intake among the village infants. It therefore, seemed worthwhile to the protein nutritional status of infants and young children residents of Ubol city with a comparable group of village subjects.

Objectives

To compare the urinary hydroxyproline and creatinine excretions in newborn and infant of hyper—endemic area (villages) with those of hypo—endemic area (city and Bangkok).

Description

Urine samples collected for urinary mucosubstances determination were also used for this study. The detailed information regarding subjects, method of collection, 24—hour volume and pH, have been previously described. The hydroxyproline determination was performed using the method described by Prockop and Udenfriend[5]. The urinary creatinine was determined using the standard automated technic.

Progress

Table I and II show the mean urinary creatinine and hydroxyproline excretions in different age groups and locations. The hydroxyproline excretion in Ubol newborn and infants (1—6 months) is higher than in subjects from Bangkok when expressed per mg. creatinine. This is probably due to the low creatinine excretion in Ubol subjects as compared to Bangkok subjects. The Village and city subjects appeared to excrete more total hydroxyproline than the Bangkok group; however, no statistically significant difference could be demonstrated. It is also of considerable interest to note that total hydroxyproline excretion is similar in all age groups except in the newborn, 1 to 15 day old.

Urine hydroxyproline is increased in growing children and in patients with acromegaly and decreases when growth stops, as noted in adults and treated acromegalic patients. It was also demonstrated that the amount of urine hydroxyproline is influenced considerably by diet; the excretion increased when the

subjects were fed gelatin—rich foods. Since our subjects received a regular diet which is somewhat different from that ingested by Ubol and Bangkok subjects, the present data may not necessarily indicate a similar nutritional status among these infants.

Urine creatinine excretion is mainly related to a muscle mass, especially in growing children and patients recovering from malnutrition[3]. Our creatinine excretion data from Bangkok infants (under 7 month old) are slightly higher than from those in Ubol. This observation may reflect a better nutritional status of Bangkok infants than those in Ubol. However, further studies are required before any definite conclusions can be reached.

REFERENCES

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Table I
Mean Urinary Creatinine Excretion in Different Age Groups and Location

Location	No.	1-15 days	No.	16-30 days	No.	1-6 months	No.	7-12 months
Mg%								
Villages	10	21.9±4.4	14	9.8±0.8	46	15.6±1.1	14	28.5±3.4
City	12	10.4±0.9	17	10.3±0.7	38	15.6±2.8	17	26.9±4.4
Bangkok	20	18.1±2.8	3	9.3±1.7	21	17.0±3.1	19	22.8±3.0
Mg/24 hrs								
Villages	10	14.5±2.4	14	21.7±1.8	46	33.9±1.8	14	56.0±5.9
City	12	14.6±2.2	17	21.3±1.4	38	32.5±2.3	17	44.9±4.2
Bangkok	20	22.5±2.8	3	29.5±8.4	21	42.5±5.3	19	41.3±6.1

Table II
Mean Hydroxproline Excretion in Different Age Group and Location

Location	No.	1-15 days	No,	16-30 days	No.	1-6 months	No.	7-12 months
Mg%								
Villages	10	10.72+ 2.10[cy]	14	8.45±1.11[y]	45	8.07± 0.96	16	7.88 ±0.87
City	10	5.83 ±0.66	18	8.06±0.83[o]	38	7.71±0.86[o]	15	7.58± 1.27
Bangkok	16	5.47±0.96	3	5.12±0.96	21	5.30±0.53	16	6.48±1.07
Mg/24 hours								
Villages	10	7.19 ±1.48	14	19.02± 2.65	45	17.25±1.48	16	15.04±0.96
City	10	8.03±1.29	18	16.23±1.42	38	17.19±1.24	15	16.98± 2.73
Bangkok	16	6.95±1.18	3	15.33±3.15	21	16.11±1.96	16	11.35±2.01
Mg/mg creatinine								
Villages	10	0.504+0.073[y]	14	0.910 ±0.111	45	0.545± 0.053[z]	16	0.269 ±0.027
City	10	0.601±00.77[m]	18	0.771+ 0.056	38	0.581± 0.050[o]	15	0.401±0.113
Bangkok	16	0.293±0.045	3	0.630±0.240	21	0.411±0.054	16	0.250±0.022

Probability Value	Village with City	Village with Bangkok	City with Bangkok
P < 0.01	a	w	m
0.01 < P < 0.02	b	x	n
0.02 < P < 0.05	c	y	o
0.05 < P < 0.10	d	z	p