2. Title: "Study of Urinary Constituents"

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Objectives

To study the urinary excretion of calcium, phosphate, magnesium, uric acid, creatinine, sodium, potassium and chloride in infants living in villages as compared to Ubol city.

Description

A portion of urine samples, collected for uromucosubstances study as previously described, were analyzed for the urinary constituents. Uric acid, inorganic phosphate, calcium, sodium, potassium, Chloride and creatinine were determined by the automated technics[1]. The fluorometric method described by Schachter[2] was used for magnesium determination.

Progress

The results are shown in Table I and II. It is noted that the village infants excrete significantly lower urinary phosphate ($P < 0.01$) than the city when is expressed on the basis of mg. creatinine and the excretion becomes less significantly lower ($P=0.05$) when it is expressed on the basis of 24-hour volume. On the contrary, the urinary calcium concentration (per mg. creatinine) is probably higher ($P=0.05$) in the village than the city infants but there is no difference when it is expressed on the basis of 24-hour excretion. No significant difference in uric acid and creatinine excretion is observed in these two groups.

Coburn and Packett[3] demonstrated that a low-phosphorus (0.16%) and normal calcium (0.56%) diet produced a high incidence (80%) of mild urolithiasis (mainly calcium oxalate) in weanling male rats. Calculi were produced in young rats by 9 weeks. Mature rats, receiving the diet for a 40-week period, did not develop stones. Both the low phosphorus level and the high calcium: phosphorus ratio were essential for stone formation in weanling rats. Van Reen[4] also showed that rats fed on calculogenic diet (low protein) resulting in citrate lithiasis excreted large quantities of calcium and citric acid but small amounts of phosphate. We have no information regarding detailed dietary intake in these infants. However, neither glutinous rice nor human milk are a good source of calcium and phosporus. Also, early rice supplementation in infant feedings in Ubol village might reduce the milk intake which will further alter the calcium, phosphorus and protein intake. Further metabolic studies will be required before any conclusion can be drawn.

(1) Technicon Auoanalyzer, Chaimcey, N.Y., U.S.A.
(2) Schachter, D.: The Fluorometric Estimation of Magnesium is Serum and in Urine: J. of Lab. & Chin. Med. 54: 763-768, 1959
(3) Coburn, S.P. and L.V. Pakett, Jr. of Nutr. 76:385 (April) 1962
(4) Van Reen, R. et al: J. of Nutrition 69:397 (Dec) 1959

Table I

Urinary Constituents in Newborn and Infants
(mg/mg Creatinine)

	Subject		Ubol City		P
	Subject	mg/mg Creatinine	Subject	mg/mg Creatinine	
Uric Acid	36	1.24 ± 0.1	33	1.18 ± 0.9	< 0.5
Phosphorus	21	0.39 ± 0.097	32	1.24 ± 0.25	< 0.01
Calcium	23	0.299 ± 0.059	11	0.163 ± 0.034	0.05

Table II

Urinary Constituents in Newborn and Infants
(mg/24 hr urine)

	Villages		Ubol City		P
	Subject	24-hr excretion (mg)	Subject	24-hr excretion (mg)	
Creatinine	36	38.7±3.3	33	34.5±3.0	< 0.5
Uric Acid	36	38.2±3.3	33	43.6±3.1	0.2
Phosphorus	21	18.9±4.7	32	51.4±15.4	0.05
Calcium	35	8.115± 1.0	33	6.657±0.8	< 0.20