STUDY OF 25-HYDROXY VITAMIN D_3 , CALCIUM, PHOSPHORUS IN NORMAL SUBJECTS AND PATIENTS WITH CALCULI

Pages with reference to book, From 198 To 199

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Abstract

Serum 25-OH-Vitamin D3 , Phosphorus, Calcium, 24 hours Urinary Calcium and phosphorus were measured in 10 patients with calculi and 7 normal subjects. No difference in concentration of serum 25-OH-Vitamin D3, Calcium, phosphorus, 24 hours urinary calcium and phosphorus was found between stone formers and normal subjects (JPMA 37 : 194, 1987).

INTRODUCTION

Serum and urinary parameters have been measured in the past in patients suffering from stone disease in an attempt to correlate these with stone formation.[1,11] Among these serum Vitamin D3 calcium, phosphorus, urinary volume, urinary calcium and phosphorus have been studied. Some investigations have shown high levels of urinary calcium in patients with calculi compared to normal subjects,[4,6,9] whereas others have shown no correlation. [13] Gray et al[4] found that serum phosphorus and 25-OH-Vitamin D3 were significantly lower in stone formers than in normal controls. In other studies serum 25-OH-Vitamin D3 levels were higher in patients with hypercalciuric calculi than in those with normocalciuric calculi patients. [2,8] This study was performed to evaluate 25-OH-Vitamin D3 levels in patients with normocalciuric calculi in our population.

MATERIAL AND METHODS

Seven normal subjects with no past history of urinary stone disease and ten patients with renal calculi were studied.

History and physical examination were recorded in all the cases. Investigations included a complete haematological and biochemical profile, x-rays of kidney, ureter and urinary bladder (KUB) or intravenous pyelography (WP). Fasting serum 25-OH-Vitamin D3 calcium and phosphorus were measured. 24 hour urine samples were collected for calcium and phosphorus. Phosphorus was determined by the method of Delsal et al[12] calcium by Bio-Merieux Kit Cat. No (61041) and 25-OH-Vitamin D3, by Euro-Diagnostics Kit (Code No. B. Vit. 1) using beta-counter.

RESULTS

The average age of normi controls was 26 years. Biochemical profile was normal. Radiological examination was negative for calculi.

The mean age of patients with calculi was[34] years. Symptoms included haematuria, dysuria and lumbar pain in. majority of patients. Radiological examination showed renal calculi in all patients. Levels of serum 25-OH-Vitamin D3 and serum and urinary calcium and phosphorus are shown in Table-I.

TABLE
Biochemical Profile in Patients and Controls.

	Normal Subjects Mean ± S.E. (No. of Subjects)	Stone Formers Mean ± S.E. (No. of Subjects)
Serum Calcium (mg/dl)	9.4 ± 0.16 (7)	9.2 ± 0.07 (10)
Serum Phosphorus (mg/dl)	4.0 ± 0.26 (7)	3.63 ± 0.25 (10)
Serum 25-OH-Vit.D_3 (ng/ml)	47.7 ± 2.48 (7)	42.6 ± 39.6 (10)
Urine Volume (ml)	1210 ± 248 (7)	1579 ± 184 (10)
Urine Phosphorus (gm/d)	0.50 ± 0.52 (7)	0.39 ± 0.03 (10)
Urine Calcium (mg/d)	127 ± 21.40 (7)	143 ± 22 (10)

NOTE – P value in all above cases was insignificant.

There was no significant difference in values between patients and normal controls.

DISCUSSION

Apart from low volume there may be other changes in urinary composition which increase the risk of developing calculus disease. When British troops moved from England to Aden they doubled their urinary calcium excretion.[13] Increased exposure to ultraviolet rays resulting in increase in Vitamin D3 production could have consequently resulted in higher absorption of calcium from diet and its excretion in urine. The seasonal incidence of urolithiasis observed in hot countries may also be due to this mechanism[13]. Of all stone fonning substances, calcium oxalate and calcium phosphate salts are potentially the most insoluble under the ionic conditions present in urine. The saturation of urine with these salts, particularly calcium oxalate, approximates the point of spontaneous precipitation even in normal urine, probably indicating these salts as the commonest constituents of urinary stones.

However, our study of the different levels of calcium, phosphorus and 25-OH-Vitamin D3 in serum and also urinary calcium and phosphorus revealed no significant difference between normal subjects and patients with calculi. 25-OH-Vita-min D3 levels were normal in both groups. Other studies[2,8] have conveyed similar results, (e.g) Baggio et al and Ryall et al[1,3] Coen et a1[8] also observed that although 25-OH-Vitamin D3 levels were higher in hypercalciuric stone formers, yet normal in patient with normocalciuric calculi.

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