

SERUM CALCIUM LEVEL IN NORMAL AND HYPERTENSIVE PREGNANT WOMEN AT WOMEN AND CHILDREN HOSPITAL ABBOTTABAD

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SUMMARY :

We have studied ionized serum calcium, total calcium, phosphorus, total protein and albumin in 20 normal pregnant women, 37 moderate and severe pregnancy induced hypertensive women and 9 pregnant women with chronic hypertension. The total serum calcium was significantly reduced in moderate and severe pregnancy induced hypertension and chronic hypertension ($P < 0.05$ and 0.0001 respectively) while ionized calcium was also significantly reduced in pregnancy induced hypertension and chronic hypertension patients as compared to the normotensive pregnant women. ($P < 0.001$ and $P < 0.0001$ respectively). Total protein and albumin was less in hypertensive group as compared to normotensive. Serum phosphate was increased in hypertensive group.

It was observed that total calcium and ionized calcium among these hypertensive groups were decreased which support conclusion of other epidemiologic studies of hypertension in non pregnant patients and pregnant patients that abnormal calcium metabolism contributes to the genesis of hypertension.^{1,2}

INTRODUCTION

The normal plasma calcium concentration is between 2.2-2.55 mmol/l.³ In the serum the calcium is distributed into three forms, a non-diffusible, protein-bound calcium, diffusible calcium complexes, and diffusible ionic calcium (Ca^{+2}). It circulate in plasma in two main forms. The albumin bound fraction is little less than half of the total which is inactive while remaining plasma calcium is free ionized (Ca^{+2}) and is the physiologically important fractions.

An increase in the level of free ionized calcium is required for the contraction of cardiac and vascular smooth muscle cells: In addition to this calcium is needed for the formation and conduction of the impulse in the sinoatrial and atrioventricular nodes of heart. In this way calcium is important in the pathogenesis of hypertension by affecting membrane fluxes and intracellular concentration.⁴

The relationship of serum calcium and hypertension is controversial. Many studies

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have been done in this regard. Experimental support for this hypothesis is the reported increase in blood pressure in pregnant female rats fed a calcium deprived diet compared with a group of rats fed a normal calcium diet.⁵ Recently, serum ionized calcium concentration have been demonstrated to be reduced in non pregnant hypertensive patients but similar data in pregnant hypertensive patients were lacking.⁶ The present study was designed to identify potential differences in calcium levels among women with normal pregnancies, women with pregnancy induced hypertension and pregnant women with chronic hypertension.

MATERIAL AND METHODS :

66 pregnant women from DHQ Hospital Abbottabad were selected from April, 1987 to November, 1988 for this study. All the information such as age, height, weight, gestational period, blood pressure, personal history, laboratory investigations were recorded on prescribed proformas. Body mass index (BMI), was used as an index of obesity which is defined as an index of obesity which is defined as $\frac{\text{weight (Kg)}}{\text{Height (m)}^2}$

BMI-0 when values are 20-24.9

BMI-1 when values are 25-29.5

BMI-II when values are 30-40

BMI-III when values are 40+

Blood pressure was measured in the supine position with mercury sphygmomanometer. Three readings were taken at interval of 10 minutes. Total serum calcium and phosphorus were determined by using Boehringer Mannheim Kit.⁷⁻⁸ Total serum protein was measured by Biuret reaction⁹ and albumin by Bromocresol-green method.¹⁰ Ionized calcium was calculated by using following formula :

$$\text{Percentage of calcium in ionized form} = \frac{100 \times \{6 - (P/3C)\}}{P + 6}$$

P stand for total protein. C stand for total calcium.

Statistical significance was evaluated by student's T test with a value <0.05 considered significant.

RESULTS

The mean age of all pregnant women was 26.9 years. Forty one percent belonged to rural area. Forty five percent women belonged to low socio-economic group, their family income was less than Rs. 1500/- per month. All cases had a habit of light activity. All the normotensive and hypertensive group pregnant women were in 3rd trimester.

Of the total 66 selected pregnant women 20 were normotensive. 39 were suffering