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ESTIMATION OF PARATHYROID HORMONE, PROGESTERONE AND PROLACTIN, WITH SOME ELECTROLYTE IN SERA OF FIRST TRIMESTER IRAQI PREGNANT WOMEN

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ABSTRACT
Bio-physiological changes that occur in the unity of the mother and the placenta and fetus during pregnancy affects the function endocrine system and hormones, in turn, affects the metabolism and absorption of nutrients used to the mother and the fetus in this study highlighter on these changes that urges the public rates of some vital values in pregnant mother during the first trimester of pregnancy months. The study aimed to evaluate the level of serum parathyroid hormone (PTH), progesterone and prolactin hormones and some electrolyte levels in first trimester pregnant women attending maternity center in Baghdad medical city. A total of 30 pregnant in the first trimester compared with (30) apparently healthy control group were enrolled who attending gynecology department at medical city of Baghdad teaching hospital. Serum PTH, progesterone and prolactin hormones were measured using BioMerieux Mini Vidas. Model: Vidas 12, and electrolytes levels by using auto analyzer (Architect, C4000). Results showed a decreasing in the parathyroid hormone levels, increasing in the progesterone and prolactin levels in pregnant when compared with control, electrolytes levels showed increased in phosphate level and decreased in potassium level, while no significant effects on sodium, calcium and chloride levels. The current study demonstrate that there is an appositive association between prolactin and phosphate ion, appositive association between progesterone and chloride ,and appositive association between parathyroid hormone and potassium, while negative association between prolactin and potassium ,progesterone and calcium, potassium, and between PTH and phosphate .

KEYWORDS: Parathyroid hormone, Prolactin, electrolyte, pregnant women.

INTRODUCTION

Several bodily changes was happen during pregnancy may put women at least in passing at increased risk for muscle and bone disorders. This increase includes the body and weight changes in the allocation body weight addition insufficient the abdominal muscles. Furthermore, pregnant ladies have changed connective tissue work, including expanded fringe joint laxity, conceivably because of release of relaxin or different hormones. Pregnancy-related anthropometric changes may expand powerlessness of ladies to physical ergonomic anxieties many of physiological changes during pregnancy are mediated by hormones, and nutritional deficiencies are common during pregnancy in minerals and vitamins [1,2]. In pregnancy, placenta serves as an endocrine gland that secret many hormones like growth factors and many other molecules. The major hormones produced by the placenta are, human placentallactogen, human chorionic gonadotropin, progesterone and estrogen. However, the placenta also produces hormones like gonad and pituitary hormones (placental corticotropin, placental growth hormone and human chorionic thyrotropin,), hypothalamus like releasing hormones (corticotropin releasing hormone, human chorionicsomatostatin), gastrointestinal like hormones (vasoactive intestinal peptide , gastrin) and para thyroid hormone (PTH)[3,4]. The placental hormones aredecisive for many of the endocrine and metabolic changes during pregnancy. PTH mediates placental calcium transport and fetal bone growth. Progesterone is initially secreted by the corpus luteum in beginning of pregnancy and after primarily by the placenta. Progesterone maintains decidual secretory activities required for implantation and helps to maintain myometrial relaxation by acting on uterine smooth muscle to inhibit prostaglandin production. Progesterone acts on smooth muscle in other area of the body as well, especially in the gastrointestinal and renal system[5,6] .

Prolactin is released from the anterior pituitary. This hormone is responsible for the increase maturation of ducts and alveoli in the breasts and for initiation of lactation after birth. During pregnancy, there is a marked increase of prolactin secondary to the effects of angiotensin II, argininegonadotropin releasing hormone and vasopressin on pituitary gland. However the high estrogen levels throughout pregnancy inhibit initiation of lactation, this inhibition quickly disappears with removal of the placenta, the major source of estrogen during pregnancy[7]. The aim of the current present study was to measure the levels of PTH, progesterone, prolactin hormones and the level of electrolytes (PO_4, Ca, Na, K, Cl) and to investigate whether these hormones and electrolytes are altered in pregnant women than non-pregnant women. Also to investigate the correlation between the PTH, progesterone, prolactin hormones and electrolytes.

MATERIALS & METHODS

The study was carried out in Baghdad teaching hospital in Baghdad medical city between (Oct-2016 to Dec.- 2016). Thirty pregnant women in first trimester aged from (25-

35) years and thirty non pregnant females as control were participated in the study were randomly chosen. Five milliliter of blood were obtained from each subjects by vein puncture collected by using disposable syringes, placed in sterile tubes ,then centrifuged and divided into two aliquots, (2ml) in plain tube for Elisa technique, and (3ml) in evacuated plastic tubes for routine work. All hormonal analysis was performed at the clinical chemistry laboratory at nursing home hospital. Serum specimens from each woman were assayed in the same laboratory run. Samples were analyzed for parathyroid hormone, progesterone, prolactin hormones by BioMerieux Mini - Vidas. Model: Vidas 12 . Serum electrolyte (Ca, PO_4, Cl, Na, K) were measured by auto analyzer ARCHITECT c4000.

RESULTS

TABLE 1: The levels of hormones in control and first trimester pregnant women

Group	Mean ± SD		
	PTH/Pmol/L	Progesterone ng/ml	Prolactin ng/ml
Control (30)	3.016 ± 1.14	0.735 ± 0.33	22.30 ± 1.91
Pregnant(30)	0.754 ± 0.21	30.23 ± 16.68	70.59 ± 19.78
LSD value	0.419 **	9.750 **	7.264 **
** (P<0.01).			

TABLE 1: shows the levels of (PTH, Progesterone, Prolactin) hormones in pregnant women compared with control group. The levels of PTH decreased significantly (p<0.01) in pregnant women compared with control, while Progesterone and Prolactin hormones which increased significantly (p<0.01) in pregnant women compared with control.

TABLE 2: The levels of PO4,Ca,Cl ,K and Na in control and first trimester pregnant women

Group	Mean ± SD				
	PO_4 mg/dl	Ca mg/dl	Cl mmol/l	Na mmol/l	K mmol/l
Control (30)	2.890 ± 0.38	9.07 ± 0.46	102.23 ± 8.94	139.96 ± 12.61	4.21 ± 0.53
Pregnant(30)	3.912 ± 1.30	9.06 ± 1.66	106.22 ± 14.06	144.09 ± 11.38	3.087 ± 0.63
LSD value	0.496 **	0.631 NS	6.061 NS	6.152 NS	0.298 **
** (P<0.01), NS: Non-significant					

(Table 2) show the levels of PO4 increased significantly (p<0.01) in pregnant women in comparison with control, the levesl of K decreased significantly (p<0.01) in pregnant women compared with the control, and non-significant difference in (Ca, Cl, Na).

TABLE 3: The age and Body mass index (BMI) in control and first trimester pregnant women

Group	Mean ± SD	
	Age (year)	BMI(K/h2)
Control (30)	29.96 ± 6.44	26.89 ± 2.72
Pregnancy(30)	30.42 ± 5.59	30.96 ± 4.26
LSD value	3.086 NS	1.839 **
** (P<0.01) , NS: Non-significant.		

TABLE 3: shows the comparison between control and pregnant women in age and body mass index (BMI). (BMI) increased significantly (p<0.01) in pregnant women when compared with control while no significant difference in age (year).

TABLE 4. Correlation coefficient between level of hormones and other Parameters

Parameters	Correlation coefficient (r)		
	PTH	Progesterone	Prolactin
Age	-0.12 NS	-0.01 NS	-0.02 NS
BMI kg/m^2	-0.44 **	0.15 NS	0.25 *
PO_4mmol/l	-0.36 **	0.09 NS	0.37 **
Ca mg/dl	0.06 NS	-0.23 *	0.11 NS
Clmmol/l	-0.13 NS	0.28 *	0.23 *
Nammol/l	-0.04 NS	0.15 NS	0.14 NS
K mmol/l	0.61 **	-0.39 **	-0.62 **
* (P<0.05), ** (P<0.01), NS: Non-significant.			

Table 4 shows correlation coefficient between the level of hormones and other parameters which show significant difference between PTH and BMI, PO4 and K in pregnant women (p<0.01). Also progesterone level show significant difference with Ca, CL and K (P< 0.01) in pregnant women. Prolactin hormone show significant difference with PO_4 and K (P< 0.01) and with BMI, CL (P<0.05).

DISCUSSION

Changes in the endocrine system itself occur during pregnancy. The pituitary gland enlarges by 135% compared with its non-pregnant size. In fact pregnancy couldn't occur without the interaction of the follicle-stimulating hormone (FSH), pituitary hormones, and Luteinizing hormone (LH) [7]. Prolactin levels increase progressively during pregnancy. Although this hormone is not necessary for successful completion of pregnancy, it is crucial for the initiation of lactation[1].

Immunoradiometric assays demonstrate a decrease in parathyroid hormone (PTH) during pregnancy that is balanced by increased PTH related protein (PTHrp) production by the fetus and placenta[9]. In studies women's, from Europe and North America, the level of serum parathyroid hormones (PTH), is a low shoulders when measured with two-site examinations of sounds. During the first three months but constantly expanding into the normal range by the mid-term. In contrast, the value of PTH never repressing in Women's Studies from Asia, Gambia, possibly reflecting the reduced of the amount of calcium and vitamin D in this population[10,11].

Parathyroid hormones belong to calcitropic hormones group that had role in calcium metabolism. In general PTH decrease in early pregnancy, levels are highest in the first trimester then declining mid pregnancy and rising at the last term. Calcium and phosphate stable throughout pregnancy. The numerous studies of calcitropic hormones have been reviewed[12]. Thyroid hormone enhances the increased mobilization of calcium from the bones, in response to a less than circulation of calcium concentration levels. Initially, it was considered pregnancy as a state of hyper-physiologist pregnancy was also correlated with an increase in the concentration of PTH [13]. More recent studies, using more specific tests, defied this concept and Ozkrt and either no significant increase of PTH with pregnancy or decrease in PTH hormone relative to control non-pregnant. In general dietary intake of calcium studies have not been addressed, and the development of vitamin D or other factors that could theoretically impact on secretion of PTH [14].

Regulation of calcium is closely related to magnesium, phosphate, PTH, Vit. D and calcitonin levels. Any alteration in one is likely to alter the others. Increases in serum ionized calcium suppress PTH levels; whereas decreases in serum ionized calcium stimulates the release of PTH. Maternal calcium homeostasis changes during pregnancy. Total serum calcium falls primarily related to the fall albumin, reaching its lowest at 28-32 weeks[7,5].

Phosphorus is readily available in wide variety of foods. The pregnant women normally have no trouble obtaining sufficient amounts of this nutrient. It is worth mentioning that intake of excessive amounts of

phosphorus can inhibit calcium absorption. However, calcium metabolism requires a normal amount of phosphorus of to build strong bones [15,16]. The kidneys play an important role in the regulation of sodium and water content in the body which is the primary determinant of volume homeostasis. The filtered load of sodium increases from non-pregnant levels. Sodium balance is mediated by factors that permit sodium excretion versus those that leads sodium retention. Factors promoting sodium excretion during pregnancy include increased GFR, increased atrial natriuretic factor, decreased plasma albumin, and elevated progesterone and prostaglandin levels [17, 18, 19].

In conclusion significant physical, metabolic and structural changes occur from conception until weeks into the postpartum period. Although understanding of these changes facilitates assessment of normal pregnancy progression, recognition of variations from normal may result in early identification of risk factors and potential complications. Prompt management can be initiated to help ensure optimal outcomes for both mother and fetus.

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