

Original Research Article

Assessment of some biochemical markers in Pregnant Women in Iraq

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ABSTRACT

Corticotrophin-releasing hormone is secreted during pregnancy in maternal and fetal from the placenta. Increased levels of Corticotrophin-releasing hormone (CRH) related with increased of serum Cortisol. In addition adrenocorticotrophic hormone ACTH is usually changes during pregnancy and increase in late pregnancy and throw delivery. levels of C-reactive protein CRP related with adverse pregnancy outcomes, including preterm delivery. The present study was conducted to examine BMI, Hb, Red Blood Cells (RBC), Random Blood Sugar (RBS), creatinine, albumin and uric acid levels in pregnant women and examined the levels of h-CRP, adrenocorticotrophic hormone (ACTH) and Cortisol levels. The study appeared significantly decreased in each of Hb, RBC, Creatinine, albumin and non significantly decrease in random blood sugar (RBS) in pregnant women as compared with control groups, also there was significant increased in BMI and uric acid and non significantly increased in Age in pregnant women when compared with control groups. In addition of that, the result appeared significantly increased in each of ACTH, Cortisol in pregnant women as compared with control groups. But there was not significantly increased in level of h-CRP in pregnant women compared with control groups, in addition of that there is Positive significant correlations were observed between-CRP and ACTH, but there was negative correlation was found between h-CRP and Cortisol in pregnant women.

Keywords

h-CRP,
ACTH,
Cortisol,
Pregnancy

Introduction

Hypothalamus secreted Corticotrophin-releasing hormone and the pituitary gland in response released adrenocorticotrophic hormone (ACTH) that stimulates secretion of cortisol from the cortex of the adrenal gland. (Levine, A. et al; 2007), (Crown A et al ;2005). Increased levels of free cortisol in the end of pregnancy can be sensitivity resetting of Hypothalamic pituitary adrenal

axis (Scott E.M. et al; 1990).

Although, these functional changes throw pregnancy, the diurnal rhythm of cortisol is maintained with max levels at nearly 30-min post waking and decrease gradually throw the day to an early evening nadir (Allolio B. et al ; 1990, de Weerth, C. et al; 2005). On other hand, there is fact that

activity of Hypothalamic pituitary adrenal axis differs by parity status (Rasheed, F. 1993; Vleugels M. et al., 1986).

And the fetus is protected from increased maternal cortisol by the catabolic activity of enzyme placental 11 β -hydroxysteroid-dehydrogenase (Benediktsson, R. et al; 1997). In addition of that maternal free cortisol can be influence directly in growth of fetal and development (Seckl, J.R.et al., 2004). Through normal pregnancy, serum cortisol gradually elevated from the second quarter. Elevated of Cortisol levels can be elevated of estrógens and elevated secondarily of Cortisol binding protein. ACTH levels are increase gradually in the end of pregnancy and during delivery (Lindsay JR et al., 2005).

Through gestation the placenta can produce Corticotrophin-releasing hormone that released with circulation of maternal, although this fact there is implications in adrenocorticotrophic hormone regulation and secretion of cortisol are not well known. (Guilhaume B; et al; 1992).also normal pregnancy is related to suppression inadequate of adrenocorticotrophic hormone and cortisol through the overnight dexamethasone suppression test (Carr BR et al: 1981).

Originally discovered of C-reactive protein (CRP) was by Tillet and Francis in 1930 (Tillet WS et al; 1930). In addition of that, CRP consider as a marker of inflammatory that produced and secreted from liver under the stimulation control (Vigushin DM et al ; 1993). Also CRP has a role in the innate immunity system similar to immunoglobulin G (IgG). CRP considered as early marker of low grade inflammation and more utilities in the early detecting of pathophysiological process in pregnancy that can be predict adverse pregnancy outcome and try

therapies preventive well in time (Dhok, 2010).

Methods and Methods

Fifteen healthy subjects with age of (26.21 ± 4.33) and thirty pregnant women with age of (25.00 ± 1.08), (five ml of venous blood was drawn from each pregnant women and controls. Individual questions to controls and pregnant women included: age, levels of physical exercise, personal medical history, previous history of diabetes mellitus and high blood pressure. In all participants, height, body weight and BMI were measured using standard methods. Biochemical tests included ACTH, Cortisol that detected by competitive immunoluminometric assay where is the h-CRP detected by nyocard reader (2).

Statistical analysis

Data was analysis by using a statistical package of SPSS (Statistical Packages of Social Sciences- version 18). The level of significance considered when P-value was less than 0.05.

Results and Discussion

Age was non significantly increased in pregnant women as compared with control groups. On other hand significant increased in BMI of pregnant women when compared to control groups as shown in Table (1).

In addition of that there was significant decreased in each of Hb, RBC, Creatinine, albumin and non significant decrease in random blood sugar (RBS) in pregnant women as compared with control groups, also there was significant increased in uric acid when compared with control groups as shown in Table (2).

The study appeared non significantly increased in hs-CRP in pregnant women as compared to control groups also there was significantly increased in each of ACTH and Cortisol levels in pregnant women when compared to control groups as shown in Table (3), Figure (1,2,3).

The result in the current study appeared that the increased of cortisol level in the early in pregnancy compared with non pregnancy women (Barker DJP, 1998). The fetal/placenta corticotrophin-releasing hormone (CRH) response as increased in maternal cortisol. (Kofman O ; 2002), (Raison CL et al; 2003). These facts appeared of cortisol ability to stimulate of vivo placental CRH (Curt A. ;2006).

Hypothalamic pituitary adrenal axis is dramatically altered throw pregnancy because expresses the genes for CRH (hCRH mRNA) by the placenta (Petraglia F; et al; 1996).

Consistent with other studies found that levels of maternal CRH elevated over the course of pregnancy, with elevated greatest occurring in the third trimester (King BR et al; 2001a) levels of ACTH throw pregnancy reach maximal levels during delivery and labor (Lindsay JR et al; 2005). also in the study of Carr found ACTH levels increased in pregnancy as Compared with control (non-pregnant women) (Carr BR et al; 1981).

Table.1 Clinical characteristics of the study groups

Parameters Mean ± St	Controls	pregnant women	P.value
Age	24.21 ± 4.33	25.80 ± 6.08	0.11
BMI (Kg/m ²)	22.40 ± 3.36	25.00 ± 1.88	0.05*
*Significant using spss for two independent means at significance * (P≤ 0.05)			

Table.2 Comparison between biochemical parameters of controls and patients subjects

parameters	Control	Pregnant (1-4 months)	Pregnant (5-9 months)	p. value
Hb	12.5± 7.90	11.5 ±0.55	10.74± 1.08	0.03*
RBC	5.1 ± 1.2	3.20 ± 0.83	3.20 ± 0.18	0.047*
RBS	102.2 ± 9.95	89 ± 5.72	88.4 ± 5.2	0.075
Creatinine	0.92 ± 0.08	0.60 ± 0.18	0.60 ± 0.16	0.01**
Albumin	4.70 ± 0.34	3.58 ± 0.37	3.55 ± 0.33	0.004*
Uric acid	2.62 ± 0.53	2.86 ± 0.62	4.22 ± 0.25	0.005**
*Significant using spss for two independent means at significance * (P≤ 0.05)** (P≤ 0.01)				

Table.3 Comparison between h-crp , ACTH and Cortisol of controls and patients subjects

parameter Mean ± St	Controls	Pregnant women (1-4 months of pregnancy)	Pregnant women (4-9 months of pregnancy)	P. value
h-crp (mg/L ¹⁻³)	3.61± 0.55	9.60 ±8.70	8.00± 6.70	0.212
ACTH (pg/ml)	4.65 ± 0.60	16.14± 6.95	15.90 ±6.76	0.021*
Cortisol (ng/ml)	76.34 ± 16.23	124.22 ± 15.129	123.30 ± 10.03	0.000**

*Significant using spss for two independent means at significance * (P≤ 0.05),
** (P≤ 0.01)

Table.4 Correlation betweenh-CRP with other Biochemical parameters of pregnant women

		ACTH	Cortisol
h-CRP	Correlation	0.896	- 0.511
	p.value	0.04	0.1

Significant correlation using significance at * (P≤ 0.05)

Figure.1 Mean value of ACTH levels of controls and patients subjects

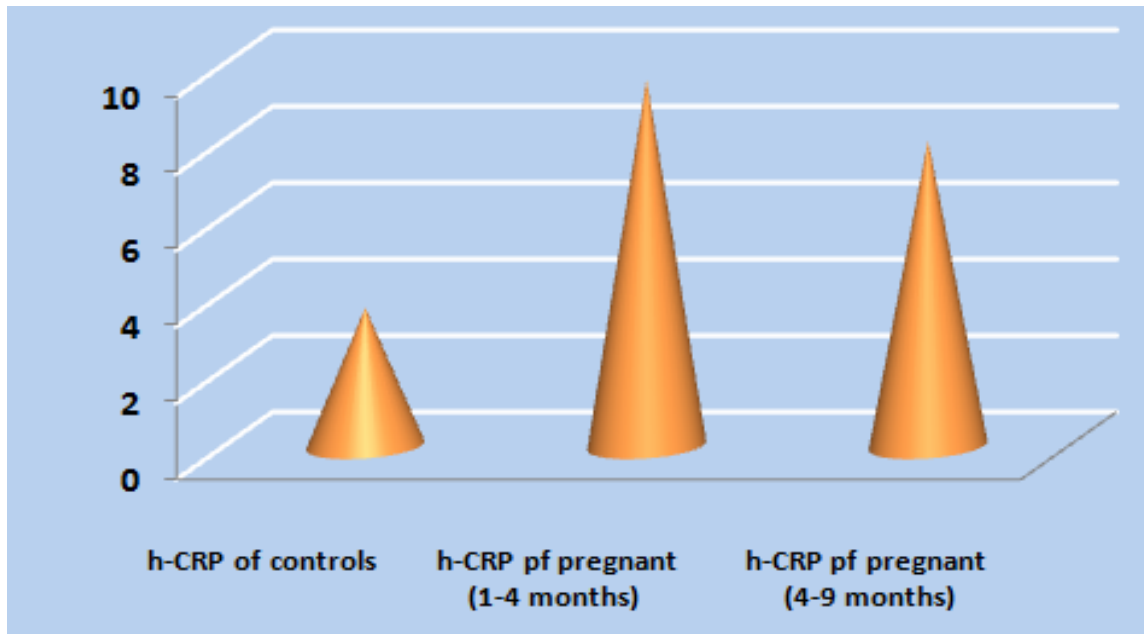


Figure.2 Mean value of ACTH levels of controls and patients subjects

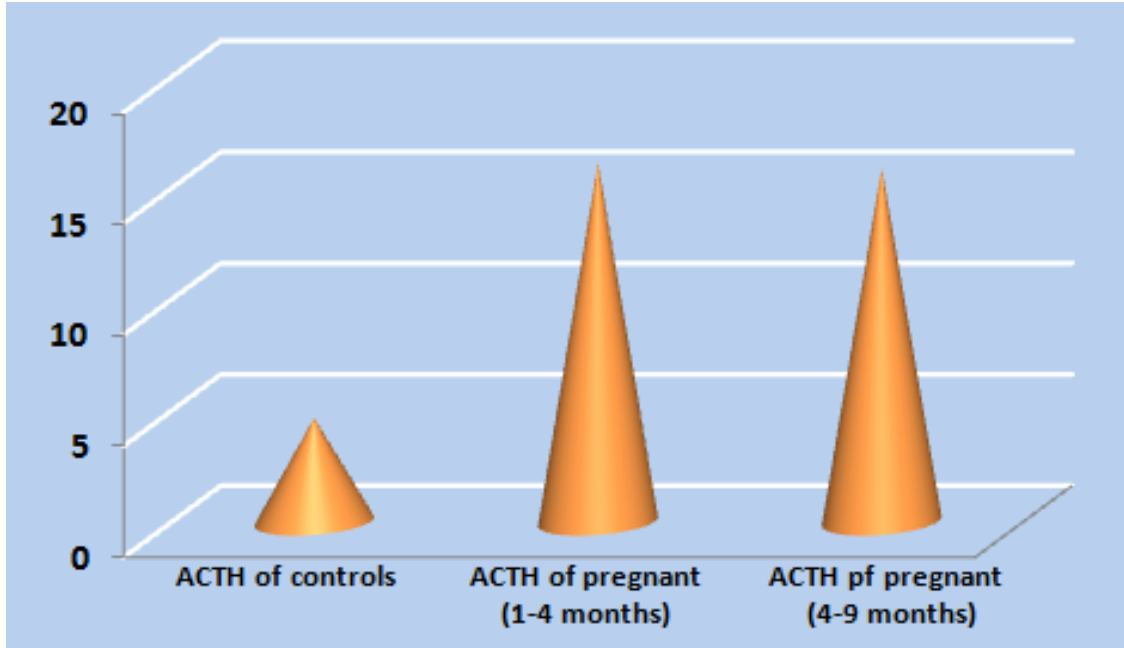
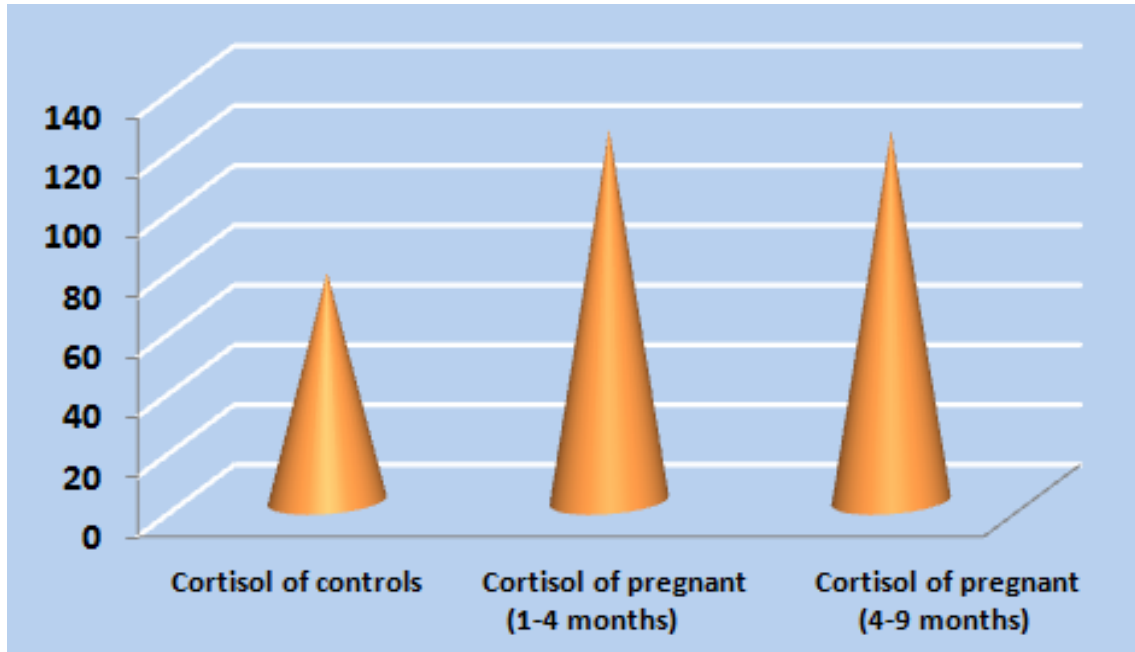


Figure.3 Mean value of Cortisol levels of controls and patients subjects



The causes for increased ACTH during pregnancy in addition of include release of CRH and placental synthesis, there is desensitization of pituitary to cortisol feedback. The high levels of placental corticotrophin-releasing hormone in blood throw half latter of pregnancy are the main cause of increase cortisol throw pregnancy (Magiakou MA et al; 1996). C-reactive protein (CRP) is studied as an inflammatory marker.(Vigushin DM et al; 1993), increased CRP levels measured during pregnancy related to outcomes adverse for examples intrauterine growth retardation and preeclampsia (Pitiphat W et al. ; 2005). That inflammatory changes Increased throw pregnancy can be stimuli occurring at different phases of pregnancy (Waranuch P; et al, 2005). Positive significant correlations were observed between h-CRP and ACTH, but there was negative correlation was found between h-CRP and cortisol (Table. 4).

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