

Study the effect of age on HCG test in pregnant women

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Abstract:

This study comes to determine the effect of age gender on HCG levels in pregnant women. Fifty-four pregnant women divided into two groups according to age, group1 age range (15 – 30) years, group 2 (31 – 45) years. Pregnant test (β – HCG) applied upon urine sample in laboratory of AL-Sadre educational hospital in AL-Najaf City. The result revealed a highly significant effect ($P < 0.05$) of age in this hormone.

دراسة تأثير العمر على اختبار هرمون القند المشيمي البشري لدى النساء الحوامل

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الخلاصة:

تبحث هذه الدراسة تأثير العمر على مستويات هرمون HCG عند النساء الحوامل. وتضمنت الدراسة أربعة وخمسون عينة إدرار أرسلت إلى مختبر التحليلات المرضية في مستشفى الصدر التعليمي في مدينة النجف الاشراف لغرض تشخيص حالات الحمل عن طريق فحص الحمل . قسمت النساء إلى مجموعتين اعتماداً على الفئات العمرية المجموعة الأولى تتراوح أعمارهن بين (15 – 30) سنة والمجموعة الثانية من (31 – 45) سنة و بعد إجراء الاختبارات الإحصائية ظهر أن للعمر تأثير معنوي ($P < 0.05$) على مستوى هذا الهرمون.

Introduction:

The earliest test for pregnancy is a rosette inhibition assay for early pregnancy factor (EPF). (EPF) detects in blood within 48 hours of fertilization⁽¹⁾. Most chemical test for pregnancy looks for presence of β - subunit of Human Chorionic Gonada tropin Hormone (HCG) in the blood or urine ⁽²⁾.

HCG is a heterodimoric glyco-protein hormone produced in abundance by outer cell of placenta (placental syncytiotrophoblast) following ovum fertilization ⁽³⁾, and

detect in urine or blood after implantation, which occur six to twelve days conception⁽²⁾. Quantitative blood serum beta test can detect HCG level as low as 1 mIU/ml , while urine test have published detection threshold between 20-100 mIU / ml depending on the brand⁽⁴⁾.

HCG is preferentially secreted in maternal circulation. Fetal circulation also contains low levels of HCG that developed probably from fetal kidney, liver, anterior pituitary

gland. In addition, the fetal has access to HCG present in exocoelomic and amniotic fluids, known to stimulate fetal adrenal and testicular steroidogenesis and is thought to play a role in growth & differentiation of fetal tissues⁽³⁾.

HCG has a many roles and clinical significant includes:

- To maintain progesterone production by corpus luteum in same to LH.
- To maintain endometrium for first trimester.
- To stimulate fetal gonad development & androgen synthesis by the fetal testes⁽⁵⁾.
- To stimulate secretion of estrogen & development of placenta⁽⁶⁾
- Patients with an increased HCG- β levels in CSF considered similar to pure germinomas⁽⁷⁾.
- It is marker for differentiation process of cytotrophoblast cells to syncytiotrophoblast and it found in serum & urine of patients with malignant trophoblastic disease⁽⁸⁾.
- HCG increased prostaglandin E concentration (which elevated sperm velocity & count)⁽⁹⁾.

The chemical properties of HCG is heterodimeric glycoprotein composed from alpha and β - subunits which highly cross - linked internally by disulfide bond that seen to stabilize the tertiary structure required for the non-covalent association of the subunits to generate hormone activity⁽¹⁰⁾. The β - subunit is distinguished among the other members of the family of

glycoprotein hormone by the presence of serine - O - linked oligosaccharide units in the last 25 amino acids , this carboxyl terminal peptide influence the intracellular behavior of subunit and it is important for maintain the biological half life of HCG⁽¹¹⁾. In nonpregnant women HCG levels are normally undetectable , while in about 85% of normal pregnancy the level will double every 48 - 72 hours⁽⁵⁾.

Materials and methods:

This study performed in AL-Sadre educational hospital in AL-Najaf city during the period from July 2009 to November 2009. Fifty-four suspected pregnant women classified into two groups according to their ages:

Group 1: includes 34 women with age range (15 - 30) years and the mean age ($23.3 \pm SD 4.6$).

Group 2: includes 20 women with age range (31 - 45) years and the mean age ($34.3 \pm SD 3$).

Urine sample collected in clean containers then centrifuged all samples. β - HCG detected by using agglutination test for β - HCG (pregnancy test by Randox Company). Applied this test by putting one drop of urine and one drop of reagent mix for 1 min. then read the results. The revealed results were analyzed statistically by use ANOVA test (SPSS Program).

Results:

Regarding the age distribution in our samples , the women where classified into two groups has shown in table 1, which elucidated that the age ranged from (15-45) years old

Table-1 Statistical data concerning laboratory test results for pregnant women

AGE GROUPS	No.	%	Age mean \pm SD (years)	Mean Mess period \pm SE (days)	Mean difference \pm SE	P
Group 1	34	68 %	23.3 \pm 4.6	8.79 \pm 0.4	1.9 \pm 0.8	0.002
Group 2	20	32 %	34.3 \pm 3	10.6 \pm 0.8	-1.9 \pm 0.8	0.005

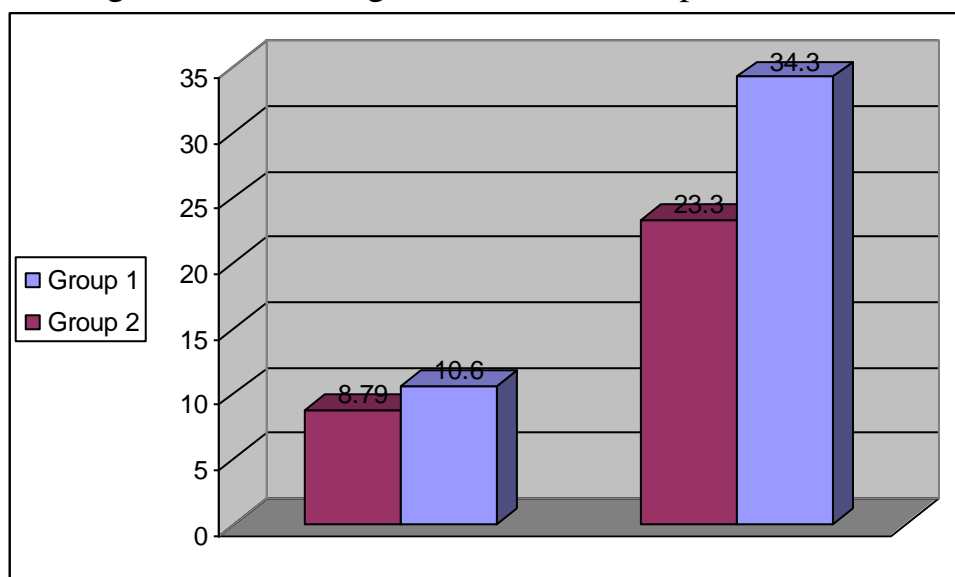
The age groups include:

Group 1: the total number of group was (34), the age range (15-30) years, mean age (23 \pm SD 4.6) consist about (68 %) from all sample.

The mean number of days after menses disappear which required giving positive pregnancy test (HCG appear) was (8.79 \pm SE 0.4).

Group 2: the total number of group (20) about (32%) from all women samples and the age range (31-45) years old, mean age (34 \pm SD 3), the mean number of days after menses disappear need for give positive result was (10.6 \pm SE 0.8), table 1, fig1.

Fig. 1 show mean age and time of HCG positive results



The mean difference between two age group about the days after mess period which required for appear HCG in sample was (1.9 \pm SE 0.8) (P < 0.05), table-1.

Discussion:

Detection of HCG in serum or urine samples is one of more common method to discovered the

pregnancy in very early stage, because this reason , the detection called (pregnancy test). Our study

done because the timing of test applying is variable between the women to another, due to this we study which factors may be effect on this state.

The age of women is one of these factors ovarian steroid secretion capacity starts to decline as early as around the age of 30 years old, whether an age related decreased in HCG level⁽¹²⁾. In addition, age related decreased in ovarian follicle numbers and decay in oocyte quality dictate the occurrence of natural loss of fecundity and ultimately menopause^(5 & 6).

For this reason, the human fertility starts to decline markedly around the age of 35 years⁽¹³⁾. Positive results of pregnancy test depend on the concentration of HCG in serum or urine. Thus when an elevation in HCG concentration occur, the reagent using to detect this hormone give positive results, within few days after miss period. Nevertheless, when the concentration was in low level the results revealed negative result due to sensitivity of reagent about 0.5 IU / ml, in this cases the women recommend to repeat test after few days later to increase amount of hormone.

Elevation or lowing of HCG level in sample may be due to many causes other than age. Test

performed too early in the pregnancy, before there is a significant HCG level may give false negative results, while blood or protein in urine may cause false positive results. In addition, urine

HCG test may give false negative result in very dilute urine, women should not drink large amount of fluid before collecting a urine sample or recommended the women to take early morning urine sample.

Certain drugs such as diuretic and promethazin (anti – histamine) may also lead to false negative results (decrease HCG level). Other drugs such as anti-convulsion, anti-parkinson, hypnotic and tranquilizers cause false positive results (increase HCG level)⁽¹⁴⁾.

Maternal serum HCG (MSHCG) is higher than when the fetus is a female than when it male⁽¹⁵⁾. In other word, fetal gender has been to have a significant effect on MSHCG and it was initially demonstrate that in third trimester⁽¹⁶⁾. Thus, because a fetal gender related differences in MSHCG could be demonstrate as early as week 3 post fertilization. The differences may be attributing to placental factors and not the effect of the fetal hypothalamic -hypophyseal -gonadad axis⁽¹⁷⁾.

Progesterone production by the corpus luteum is a process vital for reproduction. In human, placental HCG stimulated the secretion of progesterone. These is some evidence that opening of Ca^{+2} activated K^{+} channel, the BK(Ca) channel by iberiotoxin attention HCG induced progesterone secretion⁽¹⁸⁾. Both FSH induced maturation in vitro and HCG – induced in vivo were reduced by the diabetic conditions⁽¹⁹⁾.

Our study give an evidence for influence of age on the HCG level in sample, the mean difference between

two groups was ($1.9 \pm \text{SE } 0.8$) with highly significant value ($P < 0.05$).

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