

Study on some predelivery immunoparameters in pregnant women in Al-Ramadi city



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ABSTRACT

Serum Protein plays major role to maintain balance of blood, so total protein may be elevated or decreased due to some pathological & physiological changes in human body during pregnancy period. On the other hand the serological diagnosis of antibodies level during pregnancy is usually based on the detection of IgG and IgM antibodies as markers for diagnosis. The aim of this study was to investigate some immunoparameters including IgM, IgG, and assay of TSP, TSA & TSG in pregnant women attending Maternity & Child Hospital in Ramadi City, West of Iraq. Sera of 50 pregnant women were collected & quantitative assays by Single Radial Immunodiffusion test (Mancini test) for detection of (IgM & IgG) concentration & spectrophotometric method for Total serum protein, Total serum Albumin & Total serum Globulin reader were achieved against these serum samples. Serum immunoglobulin (IgM & IgG) were measured in 50 pregnant women. (22) with natural delivery & (28) Cesarean delivery pregnant women. The mean IgG level was increased in pregnant women aged under 25 years, while IgM levels were markedly increased at (25-39) years. A total mean titer for IgG & IgM were found to be 1006.2071 ± 408.12282 & 48.8571 ± 28.81962 respectively. Total serum protein reports separate values for total protein, albumin & Globulin. Values of serum protein reflect high globulin concentration, while albumin concentration in pregnant women recorded significant differences. It is mean values for age group (15-24) & (25-39) years are $3.4479 \pm .72373$ & $3.0044 \pm .33212$ respectively. There was significant differences in albumin concentration through age group in pregnant women. Most values of serum routine liver function tests during normal pregnancy remain below the upper normal limits in no pregnant women. When liver disease is suspected & considered pathologic further should prompt evaluation. Furthermore, IgG concentration was predominantly increase in their level during pregnancy in association with transported IgG through placenta to the fetus during late pregnancy period.

Introduction:

The physiological & immunological activities in pregnant women undergo change during pregnancy to support fetal growth & development⁽¹⁾

Consequently, certain changes in values of liver function tests & immunoglobulin level occur during normal pregnancy, especially through predelivery period. Changes in the concentrations of serum proteins during pregnancy have been reported by many investigators. Albumin undergo decrease in concentration in comparing with globulin concentration⁽²⁾⁽³⁾.

On the other hand, quantitation of immunoglobulin (IgG, IgM) in serum provides useful information about the general health of individual, which is also an indicator of certain disease like immunodeficiency disease, so serological diagnosis using IgG & IgM antibody detecting predelivery serum albumin levels decrease becomes more accentuated as the pregnancy advances⁽⁴⁾⁽⁵⁾

The decrease in serum protein concentration is explained by hemodilution phenomenon. In contrast there is an increase in serum concentration of some proteins such as alpha 2- macroglobulin & alpha 1- antitrypsin⁽⁶⁾.

Serum immunoglobulin (IgG, IgM & IgA) can be measured during normal pregnancy, IgG & IgM

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level in normal primigravidae women had higher levels than multigravidae, however IgG level rose in late pregnancy ⁽⁷⁾

Materials & Methods:

1-Patients : this prospective study had been conducted between April 2009 and June 2010 at Maternity & Child Teaching Hospital in Ramadi City, West of Iraq. In this study fifty cases of pregnant women with signs of predelivery admitted the Maternity & Child Hospital in Ramadi was reported.

2-Blood samples: Fifty blood samples (5 ml) were collected, sera will separated & analysed for total protein , albumin, globuline, also IgG, IgM concentration detected .

3-Methods: Total protein, albumin & Globulin were estimated by Linear chemical S.L., (Spain), and quantitative assay by spectrophotometric method with spectrophotometer reader were achieved against serum samples. Their references values are (6.9-7.1g/l) for Total serum protein and (3.81-4.65g/l) for Total serum albumin & (1.7-2.2g/l) for Total serum Globulin respectively.

IgG & IgM concentration measured by Mancini test (Single Radial Immunodiffusion test) ⁽⁸⁾ (Linear kit) also, so Endoplates of SRID test kit were used for the quantitative determination of human serum immunoglobulin as follows:

1. Endoplates and serum were removed from the refrigerator and left at 37°C in an inverted position.
2. The plate was removed from ziplock bag to remove any droplets of moisture.
3. 5 µl of the serum were applied into wells in the plates.
4. The lid closed firmly, plates were incubated at 25°C. IgG plates were incubated for 48 hr, while IgM plates incubated for 72 hr.
5. Areas of precipitations rings were measured within 0.1 mm with a suitable oculometer and immunoglobulin concentrations were calculated according to reference table.

4-Biometry: Data from patients were compared using independent student's "t" test. Values were expressed as mean ± SD. Statistical analysis was done using the SPSS. The mean differences is significant at the 0.05 level to indicate statistical significance ⁽⁹⁾

Results:

A total of 50 serum sample were collected from pregnant women (22) (44%) with natural delivery, while, (28) (56%) with cesarean delivery their age range from (15 – 50) years. Our results showed that maximum concentration of total serum protein was 6.5 g/l at (15-24) age group as well as Total serum albumin & total serum Globulin (3.4 & 3.22) respectively in the same age group (**Table 1**). Results showed that total serum albumin recorded high significant differences $P < 0.05$ was found between age groups (15-24) years (0.44 ± 0.14) and (25-32) years (0.44 ± 0.14), while no significant differences was recorded between the age groups for both TSP & TSG in pregnant women.

IgG titer show highly significant differences $P < 0.05$ level among the age groups (15-25), (25-32) & (40-50) years (1006.20 ± 408.12 mg/dl), (793.45 ± 286.13) & (445.00 ± 315.51 mg/dl) respectively.

While, IgG titer show no significantly differences among these age groups (11.31 ± 16.15), (11.31 ± 16.51) & (1.707 ± 38.45) (**Figure 2**) (**Table 2**).

Table 1 "Comparison for means of some biochemical parameters for TSP, TSA & TSG among pregnant women regarding age group"

Age groups	T.S.P	T.S.A	T.S.G
15-24	6.5	3.4	3.2
25-39	6.1	3.0	3.1
40-50	6.0	2.9	3.1





Figure 2 "Endplates of Single Radial Immunodiffusion test For IgG & IgM quantitation"

Table 2 " Means of IgM & IgG among pregnant women according to age group"

Age groups	IgM titer mg/dl	IgG titer mg/dl
15-24	48.9	1006.2
25-39	60.2	793.5
40-50	47.2	445.0

Discussion:

Liver function tests are essential in the management of liver disease during pregnancy. Routine liver function tests usually include total serum protein, total serum albumin and conjugated bilirubin, alkaline phosphate & prothrombin time may be used to confirm the hepatobiliary origin of increased or decreased in the level of this tests ⁽¹⁰⁾

Human blood contains two major types of proteins, albumin and globulins. Albumin helps to keep the blood from leaking out of blood vessels. It is also helps carry medicines & important substances through the blood. Globulins are made in the liver and in the immune system, it has many different functions. Some globulin proteins transport metals through the circulatory system others help fight infection ⁽¹¹⁾

In this research, we review the liver related immunological & biochemical changes occur during normal pregnancy, with emphasis on liver function tests that are used for the management of pregnant women.

The major measured serum proteins are albumin & globulins. Atypical blood measurements, the total protein albumin & globulin ratio. With regard to our results total serum albumin show significant differences and show increase in their level among tested age groups. High albumin levels may be caused by sever dehydration, while low levels may be caused by number of things including: malnutrition, kidney or liver disease, an autoimmune disease and uncontrolled diabetes. Our results recorded high level in globulin concentration among age groups in pregnant woman.

High globulin level may be caused by blood disease like leukemia, an autoimmune disease, kidney or liver disease also tuberculosis ⁽¹²⁾

On the other hand, the amounts of albumin and globulin also are compared (albumin/globulin ratio). Normally, there is a little more albumin than globulin & the ratio is greater than 1. In spite of that globulin value reported high concentration in our results, so a ratio less than 1 or much greater than 1 can give clues about problems in the body, this results is in agreement with that recorded by Jerremy, E. et al ⁽¹³⁾

Serum immunoglobulins including IgG and IgM are important immunoparameters can be depended in our tests during pregnancy period. IgG the most abundant class in serum constitutes about 80% of the total serum immunoglobulin, it has four classes IgG1, IgG2, IgG3 and IgG4. IgG1, IgG3 and IgG4 readily cross the placenta and play an important role in protecting the developing fetus, while IgM accounts for 5% to 10% of the total serum immunoglobulin, It is the first immunoglobulin to be synthesized by the neonate but because of it is large size IgM dose not diffuse well and therefore it is found in very low concentrations in the intercellular tissue fluids ⁽¹⁴⁾

It is well documented that IgG concentration will increase during pregnancy period with high level especially during the final trimester of pregnancy. With regarded to our results IgG titer show highly significant differences among tested age groups with high level of concentration in comparison to IgM titer which show no significant differences and recorded normal values among tested sera. In further support of possibility are the facts the innate immune system is activated in normal pregnancy and pregnancy associated with various metabolic activates, this result is in agreement with the result recorded by Sack,. et al⁽¹⁵⁾.

There are many studies shows that there is a significant correlation between IgG, IgM and pregnancy, like individuals with symptoms suggestive of parvovirus B19 infection in such cases IgG titer was determined and recorded positive pool in those pregnant women ⁽¹⁶⁾

Another new vidia system is a fully automated system based on antigen bound to magnetic microparticles which allows a fast measurement of Toxoplasma gondii specific immunoglobulin M levels. In this recorded study the vidia system revealed excellent sensitivity (100%) for both IgG and IgM

assays and good specificity (99.25%) for IgG and (100%) for IgM assays ⁽¹⁷⁾

The absence of IgG antibodies before or early in pregnancy allows the identification of women at risk of acquiring infection and the presence of IgG allows the identification of immune compromised patients at risk for the reactivation of a latent infection ⁽¹⁸⁾

Regarding to other study our study show that the titer of anti-D IgG showed an increasing trend with pregnancy progresses, the screening and titer detection of anti-D IgG in RhD negative pregnant women are valuable in the predication and treatment of hemolytic disease of newborn (HDN) ⁽¹⁹⁾

However, in healthy and infection pregnant women decline more rapidly than IgG antibodies and frequently the first class of antibodies detected after primary infection, moreover , they may persist for months or years after infection ^{(20) (21)}

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دراسة بعض المعايير المناعية للنساء الحوامل قبل الولادة في مدينة الرمادي

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الخلاصة

أجريت هذه الدراسة لمعرفة بعض العوامل المناعية في النساء الحوامل قبل الولادة وتضمنت جمع 50 عينة مصل من نساء حوامل دخلوا إلى ردهة النسائية في مستشفى النسائية والأطفال التعليمي في مدينة الرمادي في الشهر التاسع من الحمل وقد خضعت تلك العينات إلى مجموعة من الفحوصات المناعية متضمنة التقدير الكمي لتراكيز الأجسام المضادة المناعية IgG و IgM في تلك العينات بطريقة الانتشار المناعي المنفرد وكذلك فحص كلا من مصل البروتين واللبومين والكلوبيولين في تلك العينات. أظهرت النتائج بأن معدل تراكيز الأجسام المضادة للنوع IgG قد سجلت زيادة في مصل النساء الحوامل من عمر 25-39 سنة كما كانت هناك فروق معنوية واضحة في نسبة واللبومين بين تلك الفئات العمرية من جهة أخرى سجل الكلوبيولين الكلي زيادة واضحة عن النسب الطبيعية في مصل النساء في جميع الفئات العمرية 15-25 و 25-39 .