ORIGINAL RESEARCH PAPER

Ayurveda

LITERARY REVIEW OF HAEMATOLOGICAL CHANGES OCCURRING IN PREGNANCY

KEY WORDS: Pregnancy, Haematological changes.

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ABSTRACT

During normal pregnancy virtually every organ system undergoes anatomical and functional changes. Many pathophysiological changes begin to occur after fertilisation, and continue throughout the gestation and occur in response to physiological stimuli provided by the foetus. The anatomical, physiological, biological and haematological adaptations in a female that can alter appreciably the criteria for diagnosis and treatment of diseases. The understanding of these adaptations to pregnancy remain a major goal of obstetrics. To understand the disease process that can threaten woman during pregnancy and puerperium this knowledge is essential. In the present study mostly haematological variations seen in pregnant woman will be discussed. Immunological changes resulting in increased Oestrogen, Progesterone which locally enhance reproductive tract immunity, to protect the foetus are usually found. The blood volume of maternal blood is seen to be increased markedly. Haemoglobin concentration and haematocrit decreases. Increased granulocyte count, increased ESR values are noted .Platelet count decreases due to the haemodilution. Newer and younger platelets appear in circulation indicating increased platelet consumption. Such changes occur in the body to help healthy life of foetus and mother. Among the many changes seen, haematological changes occurring in pregnancy remain the main focus of study as it is heavily prevalent in the society today.

INTRODUCTION

The anatomical, physiological, biological and haematological adaptations to pregnancy are found. Many of these remarkable changes begin soon after fertilization and continue throughout the gestation. Most of which occur in response to physiological stimuli provided by the fetus.

The understanding of these adaptations to pregnancy remains a major goal of Obstetrics and without such knowledge it is impossible to understand the disease process that can threaten women during pregnancy and puerperium.

Many of these physiological adaptations could be perceived as abnormal in the non-pregnant women, during normal pregnancy virtually every organ systemsundergoes anatomical and functional changes that can alter appreciably the criteria for diagnosis and treatment of disease.

AIM

To study Hematological changes in pregnancy.

To study the achievement of healthy life of baby (fetus) and the pregnant mother.

OBJECTIVE :

To study Hematological adaptation occuring during pregnancy.

To elaborate the physiological adaptation which cannot be misinterpreted as pathological.

CONCEPTUAL REVIEW OF LITERATURE

Pregnancy is the natural phase in life of every woman. During pregnant stage the anatomical, physiological, biochemical adaptation are found.

In pregnancy many hematological changes occur in a woman's body.

1.Blood Volume:

The maternal blood volume increases markedly during pregnancy , the volume starts to increase from 6 weeks, expands at very near term about 40 -45% above their no pregnant level.

Hypervolemia occurring during pregnancy has several functions.

1. To meet demand of enlarged uterus with its greatly hypertrophied vascular system.
2. Blood volume increase both in plasma, erythrocyte. Moderate erythroid hyperplasia is present in bone marrow and reticulocyte count is elevated slightly during normal pregnancy.
3. To protect deleterious effect of impaired venous returns in supine and erect position.

2.Haemoglobin concentration :

Hemoglobin concentration and hematocrit decreases during normal pregnancy, whole blood viscosity decreases. Hemoglobin below 11.0 g/dl considered abnormal and usually is due to iron deficiency rather than hypervolemia of pregnancy.

3.Iron metabolism :

A normal erythrocyte contains 1.1mg iron in 1ml of its sample. Total iron required in normal woman 2.0 – 2.5 gm. Around 300mg Iron is stored in them. whereas, normal pregnant women require 1000 mg iron per day. The amount of iron absorbed from diet, together with that mobilized from store is usually insufficient to meet the maternal demand imposed by pregnancy. The absence of supplemental iron leading to the decrease in hemoglobin concentration and hematocrit fall are appreciable as the maternal blood volume physiolo gically increases in pregnancy. If nonaneamic pregnant woman is not given supplemental iron, Sr. Iron and Sr. Ferritin concentration declines. During second half of pregnancy, iron required is 6-7 mg /day. Desired increase in maternal erythrocyte volume and hemoglobin mass will not develop unless exogenous iron is made available in adequate amount. Therefore, Pregnant ladies are taken on supplemental iron prior to the beginning of 2nd trimester of pregnancy.

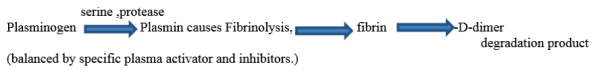
4.Leucocyte Function

In 3rd trimester percentage of granulocyte and CD8, T lymphocyte are significantly increased and CD4 and T lymphocyte, monocyte decreases. Circulating leukocyte count undergoes significant phenotypic changes. Leukocyte alkaline phosphatase is increased. Concentration of C-

reactive proteins- an acute phase serum reactant rises rapidly to 1000 folds to trauma and inflammation. ESR increased in normal pregnancy because elevated plasma globulin and Fibrinogen, so this test cannot be used to diagnosed inflammation during pregnancy.

5. Platelet Count

The average platelet count decreases slightly from 2.50lakh to 2.13 to 1.16 lakhs. Platelet width and volume increase. Decreased platelet concentration are due to Haemodilution, but also likely represent increased platelet consumption, leading to greater proportion of younger and larger platelets. Coagulation Cascade in activated state includes concentration of all clotting factors with increased levels of high molecular weight fibrinogen complex . Increase in plasma volume markedly augment production of the procoagulant . D- dimer serum concentration increases with gestational age .



6. Immunological function

Pregnancy has been assumed as that associated with suppression of humoral immunity and cell mediated immunity, to accommodate foreign semiallogenetic fetal graft. In cervical mucus increased level of IgG and IgA . Interleukin-1 B, found in cervical mucus is ten folds greater than in nonpregnant woman . Immunological changes due to increase in Oestrogen, Progesterone occurs, thus, enhanced reproductive tract immunity to protect fetus .Some polymorph nuclear leukocyte chemotaxis and adherence function are depressed in beginning in second trimester and continue through pregnancy . Relaxin impairs neutrophil activation, which possibly decrease leukocyte function of pregnant woman .This leads to increased susceptibility to certain infections.

7. Regulatory protein -

Total increase in protein level from normal level is 180 gm to 230 gm. Due to Haemodilution the plasma, proteins fall from 7 to 6 gm%, this leads to decreased colloidal osmotic tension which diminished viscosity of blood. Normal albumin: globulin ratio 1.7:1 diminished to 1:1 in this condition.

DISCUSSION

Major haemotological changes occur, maternal blood volume increased from 6 weeks to near term upto 40 - 45% to their non-pregnant stage, to meet the demands of enlargement of the uterus and greatly hypertrophied vascular system.

Heamoglobin concentration and hematocrit decreases , viscocity of blood decreases.

Sr.Iron, Sr. Ferritin concentration decline during second trimester of pregnancy , as stored iron is used to meet maternal demands imposed by pregnancy .

Leukocyte count i.e % of granulocyte, CD 8 and T lymphocyte count increase during 3 rd trimester of pregnancy.

Platelet count of pregnant woman slightly lower than in healthy nonpregnant women i.e mild thrombocytopenia ,decreased platelet count are due to Haemodilution, increased platelet consumption leading to greater proportion of younger and larger platelets.

Immunological changes result in increase in estrogen and progesterone, this helps to enhance the local reproductive tract immunity to protect the fetus .

CONCLUSION –

Haematolocal changes occur in pregnant women to prepare the body cope up with new grown fetus, by causing an increase in blood volume. consumption of iron from the stored iron and outside supplements ,suppression of cell mediated and humoral immunity to accommodate the foreign semiallogenes fetal graft inside the womb .Increased secretion of estrogen and progestrerone to enhances the local reproductive tract immunity to protect the feotus .

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