

**ETINOSA-OGBAHON OSASENAGA**

**18/MHS07/019**

**PHARMACOLOGY**

**PHS 212**

**Elucidate the Physiological adaptations of the female to pregnancy.**

### **Blood**

The blood volume increases by about 20% or about 1 L. This increase is mainly because of increase in plasma volume. It causes hemodilution. Because of great demand for iron by the fetus, the mother usually develops anemia. It can be rectified by proper prenatal care and iron replacement.

### **2. Cardiovascular System Cardiac output**

Generally, cardiac output increases by about 30% in the first trimester. After the 3rd month, cardiac output starts decreasing and reaches almost the normal level in the later stages of pregnancy.

### **Blood pressure**

Arterial blood pressure remains unchanged during the first trimester. During the second trimester, there is a slight decrease in blood pressure. It is due to the diversion of blood to uterine sinuses. And, hypertension develops if proper prenatal care is not taken.

### **Systemic Resistance**

Normal pregnancy is associated with a significant fall in systemic vascular resistance. As a result, the diastolic blood pressure drops as well as the systolic. However, the diastolic blood pressure drops more than the systolic leading to a widening of the pulse pressure. The mechanism for this change is not entirely clear. It has been speculated, however, that a significant portion of this decline is caused by the development of a low resistance circulation in the pregnant uterus. Estrogens, Prolactin, circulating prostaglandins PGE<sub>2</sub> and PGI<sub>2</sub> may be responsible for the vasodilatation that can cause a drop in the peripheral resistance. In addition, the profound dilatation of the skin vessels as a result of the increased maternal body heat dissipation may contribute to the drop in the systemic vascular resistance.

### **Pre-eclampsia**

Pre-eclampsia is the hypertensive disorder of pregnancy. It is otherwise known as toxemia of pregnancy. About 3% to 4% of the pregnant women suffer from this. It usually occurs during last trimester of pregnancy.

#### ***Cause for hypertension***

1. Release of vasoconstrictor substances from placenta
2. Hypersecretion of adrenal hormones and other hormones, which cause vasoconstriction
3. Development of autoimmune processes induced by the presence of placenta or fetus.

#### ***Other symptoms associated with hypertension***

1. Decreased blood flow to kidney and thickening of glomerular capillary membrane, leading to reduction in GFR and urinary output.
2. Retention of sodium and water.
3. Decreased urinary output along with retention of sodium and water results in increased extracellular fluid volume and edema.
4. Excretion of proteins through urine.

### **Eclampsia**

Eclampsia is the serious condition of pre-eclampsia characterized by severe vascular spasm, dangerous hypertension and convulsive muscular contractions almost like seizures. It occurs just before, during or immediately after delivery. It leads to death, if timely treatment is not given.

#### ***Features of eclampsia***

1. Spasm of blood vessels
2. Very severe hypertension
3. Renal failure
4. Liver failure
5. Heart failure
6. Convulsions
7. Coma.

#### ***Treatment for eclampsia***

Treatment should be immediate. It includes administration of quick acting vasodilator drugs or termination of pregnancy.

### **3. Respiratory System**

Overall activity of respiratory system increases slightly. Tidal volume, pulmonary ventilation and oxygen utilization are increased.

### **4. Excretory System**

Renal blood flow and GFR increase resulting in increase in urine formation. It is because of increase in fluid intake and the increased excretory products from fetus. The urine becomes diluted with the specific gravity of 1,025. In the first trimester, the frequency of micturition increases because of the pressure exerted by the uterus on bladder.

### **5. Digestive System**

During the initial stages of pregnancy, the morning sickness occurs in mother. It involves nausea, vomiting and giddiness. This is because of the hormonal imbalance. The motility of GI tract decreases by progesterone and constipation is common. Indigestion and hypo chlorhydria (decrease in the amount of hydrochloric acid in gastric juice) also occur.

### **6. Endocrine System**

#### **i. Anterior pituitary**

During pregnancy, the size of anterior pituitary increases by about 50%. And secretion of corticotropin, thyrotropin and prolactin increases. However, the secretion of FSH and LH decreases very much. It is because of negative feedback control by estrogen and progesterone, which are continuously secreted from corpus luteum initially and placenta later on.

## **ii. Adrenal cortex**

There is moderate increase in secretion of cortisol, which helps in the mobilization of amino acids from the mother's tissues to the fetus. Aldosterone secretion also increases. It reaches the maximum at the end of pregnancy. Along with estrogen and progesterone, aldosterone is responsible for the retention of water and sodium.

## **iii. Thyroid gland**

The size and the secretory activity of thyroid gland increase during pregnancy. The increased secretion of thyroxine helps in the preparation of mammary glands for lactation. It is also responsible for increase in basal metabolic rate.

## **iv. Parathyroid glands**

Parathyroid glands also show an increase in the size and secretory activity. Parathormone is responsible for maintenance of calcium level in mother's blood in spite of loss of large amount of calcium to fetus.

## **7. Nervous System**

There is general excitement of nervous system during pregnancy. It leads to the psychological imbalance such as change in the moods, excitement or depression in the early stages of pregnancy. During the later months of pregnancy, the woman becomes very much excited because of anticipation of delivery of the baby, labor pain, etc.

## **Skin changes**

A number of changes take place in the skin of pregnant women.

Mechanical stretching of the skin over the abdomen and breasts can lead to striae. The increased levels of estrogen and progesterone have also been implicated. Usually striae remain permanently with some change in color. Prevention may be achieved with moisturizing creams, especially those containing lanolin and other oily substances. It should be realized, however, that striae may develop despite any preventative measures.

Vascular spider nevi and palmar erythema happen also during pregnancy. There is no clear explanation for these changes, but they most likely represent the result of vasodilatation that happens in the skin during pregnancy. Chloasma and other pigmented lesions can happen as a result of increased melanocyte-stimulating hormone activity which in turn is a result of increased estrogen and progesterone levels. These lesions usually begin at about five to six months gestation. One way that these lesions may be prevented is by the use of screening agents and avoidance of direct sunlight. Skin pruritus affects a number of women and it may be related to increased retention of bile salts in the skin secondary to estrogen effects. Scratching of the skin can then lead to infected excoriations. Local measures with anti-pruritic creams and lotions usually are sufficient.