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MATRIC NUMBER: 18/MHS02/092

LEVEL: 200LVL

DEPARTMENT: NURSING SCIENCE

COURSE: PHS 212 (PHYSIOLOGY)

### **QUESTIONS**

Elucidate the physiological adaptations of the female to pregnancy

### **ANSWERS**

#### **THE PHYSIOLOGICAL ADAPTATIONS ARE:**

##### 1. 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.

###### **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. Hyper secretion 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 hypochlorhydria (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.