

RAJI UMMI-SALMA ONIZE

18/ENG08/020

BIOMEDICAL ENGINEERING

ASSIGNMENT

ELUCIDATE THE PHYSIOLOGICAL ADAPTATIONS OF THE FEMALE TO PREGNANCY

ANSWER

Pregnancy is a unique period in a woman's lifetime. A number of anatomic, physiologic, biochemical and psychological changes take place.

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. Scular 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.

CHANGES IN THE GASTROINTESTINAL SYSTEM

Nausea and vomiting are the most frequent complaints involving the gastrointestinal system and usually happen in early pregnancy while heartburn happen primarily in late

pregnancy. The gums become hyperemic and edematous during pregnancy and tend to bleed. The muscular wall of the esophagus is relaxed and this may cause reflux, which in turn can lead to esophagitis and heartburn. The stomach and the intestines have decreased motility presumably due to the effect of progesterone on smooth muscle contractility. This causes an increase in the time that it takes for the stomach to empty. Reduced gastric secretion has also been documented and it could account for the improvement of peptic ulcers sometimes observed in pregnancy. Decreased motility of the large intestine may lead to constipation. The liver is affected significantly by pregnancy. Cholestatic jaundice is considered to be the result of estrogen effect on elimination of bilirubin by the liver. The effect of estrogens also, is to increase protein synthesis in the liver, which leads to increased production of fibrinogen and binding proteins. The liver enzymes are usually unaffected with the exception of alkaline phosphatase, which is increased at approximately two fold to four fold that is a result of a placental production. Pregnancy increases the size and decreases the motility of the gall bladder.

CARDIOVASCULAR CHANGES

Of all changes that happen in pregnancy, the single most important is the one involving the cardiovascular system. Adequate cardiovascular adaptation secures good placental development and thus appropriate fetal growth. In brief, the cardiovascular changes involve a substantial change in the blood volume, cardiac output, heart rate, systemic arterial blood pressure, systemic vascular resistance, oxygen consumption and alterations in regional blood flow of various organ systems.

HEART RATE DURING NORMAL PREGNANCY

The baseline heart rate increases by about 10 to 20 beats per minute. This increase starts early in pregnancy and gradually continues to go upward with the highest values achieved at term. In twin gestations, the rise of the heart rate is more pronounced and it can reach as much as 40 percent above the non-pregnant state. A change also from the supine position to the lateral position may cause the heart rate to drop slightly.

THE HEART

A number of changes happen to the heart and are unique to pregnancy. Increasing intra-abdominal contents displace the heart upward with some forward rotation. As a

result the anterior posterior diameter and the cardiothoracic ratio are increased. The overall dimensions of the heart are increased during pregnancy as a result of increased diastolic heart volume without any change in the ventricular wall thickness.

In summary,

The musculoskeletal system has a various physiological adaptation in the body due to the various hormonal changes in the body. The posture changes due to protruded abdomen, the abdominal muscles are stretched and the lumbar have a lordotic curvature. The upper and lower crossed syndrome happens in the neck and hip. The relaxin hormone leads to joint laxity in the body joints.

The cardiovascular system the heart rate increases, the cardiac output increases, the stroke volume increases due to the increased capillaries and arteries over the uterus.

The respiratory system the breath rate increases due to increase oxygen requirement of the body and the lung volume decreases due to protrusion of abdomen.

The urinary system leads to increase the frequent of urination due to the abdominal protrusion the urinary bladder is compressed by the uterus enlargement and in early pregnancy the urine contains HCG hormone takes place.

The gastrointestinal system leads to vomiting, nausea due to the HCG hormone peak.

The central nervous system due to hormonal balances the maternal women has mood swings, irritation, and anxiety.