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PHYSICAL ADAPTATION OF THE FEMALE TO PREGNANCY

Pregnancy is a unique period in a womans lifetime .A number of anatomic,physiologic, biochemical and psychological changes takes place.These changes may easily be misinterpreted by the physicians who lack experience in regards to pregnancy effect on a womans body.One has to remember that nature doent waste any effort or energy ,in that respect all the physiological changes that happens during pregnancy,happen for a reason.

SKIN CHANGES

A number of changes takes place in the skin of a pregnant woman , mechanical stretching of the skin over the abdomen and breasts can lead to a striae. The increased level of estrogen and progesterone have also been implemented . Usually striae remain permanently with some change in color , prevention might be achieved with moisturizing creams, especially those containing lanolin and other oily substance.it should be realized, however that striae may develop despite any preventive measures.Vascular spider neva 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.

CHANGES IN THE GASTROINTESTINAL SYSTEM

Nausea and vomiting are the most frequent complaints involving the gastrointestinal system and usually happens in early pregnancy while heartburn happens primarily in late pregnancy.The gums becomes 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 the stomach to empty.Reduced gastric secretion has also been documented and could account for the improvement of peptic ulcers sometimes observed in pregnancy.Decreased motility of the large intestine may lead to constipation.

CARDIOVASCULAR CHANGES

Of all the 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.The cardiovascular changes involves a substantial change in the blood volume ,cardiac output, heart rate, systemic arterial blood pressure, systemic vascular resistance, oxygen consumptions and alterations in regional blood flow of various organ systems

BLOOD VOLUME: Significant increase in blood volume starts taking place in the first trimester and continue until the mid third trimester , at approximately the 32nd to the 34th week, beyond this point in gestation, the blood volume plateaus.The average absolute increase in blood volume during pregnancy is about 1600ml and in terms of percent change one should exect a 40 to 50 percent increase above pre pregnancy levels ,the increase in blood levels is achieved by a combination of increases in the plasma volumeand the RBC mass .The increase in blood volume with pregnancy appears to serve the essential physiologic needs of both the mother and fetus.it ensures adequate supplies required or normal fetal growth and oxygenation evenm under circumstances that affect maternal cardiac output.

HEART RATE DURING NORMAL PREGNANCY: The baseline heartrate increases by about 10 to 20 beats per minute, this increase starts during pregnancy and gradually continues to go upward with the highest values achieved at term. Some investigators , however suggested that the total number of increasehappens early in pregnancy and remains so through out the remainder gestation

THE HEART:A number of changes happens to the heart and are unique to pregnancy .increasing intra abdominal content displace the heart upwards 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, systolic ejection are common in pregnancy while diastolic murmurs are less frequent .the systolic murmurs are usually the result of the hyperdynamic circulation.

SYSTEMIC VASCULAR 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 the widening of the pulse pressure.the mechanism for the change is not entirely clear.

BLOOD FLOW CHANGES IN VARIOUS ORGANS SYSTEMS DURING PREGNANCY

The most profound changes in regional blood flow occur in the uterus with a 5 to 10 fold increase , this change starts early in pregnancy and conti nues until almost term.Approximately 20% of the maternal cardiac output prefuses thebuterine vessels (placental and non placental) . the kidney also demonstrates substantial increase of the regional blood flow as much as 30 to 80 percent and at the same time 50% increase in glomerular filteration is noted.The regional blood flow in the extremities also increases and more so in the hands and legs .

CARDIOCIRCULATORY CHANGED DURING PREGNANCY AND DELIVERY

During labor significant hemodynamic changes takes place , these changes can in part be explained by the effect of the uterine contractions , which may cause a significant increase of 300 to 500ml in central blood volume , and in part and in part by the effect of pain and anxiety on the cardiovascular system. It is important to note here that in the lateral position , cardiac output between contractions is higher than in the supine position and the increase during contraction is smaller.During labor (uterine contraction), both the systolic and diastolic blood pressure is increased . the elevation of the blood pressure can be as high as 35 mmHg in the systolic component and as high as 25 mmHg in the diastolic component .As labor process advances and the patient enters the second stage ,an incease in the diastolic blood ressure as high as 65 mmHg above the baseline can be observed , it is believed that since the peripheral resistance doesnot change or it changes only slightly during labor , the increase in blood pressure is attributed to the rise in cardiac output

PHYSIOLOGICAL RESPIRATORY CHANGES

Anatomic changes: Mucosa edema and hyperemia secondary to capillary engorgement are common findings in the nasopharynx and the tracheal bronchial tract, Infact majority of pregnant women have redness and swellings of the lungs that at times can produce changes in the voice.changes occurs in the chest circumference (6 to 7 cm ), vertical diameter (4 to 5 cm) and the substernal angle (from 70 to 105 degrees)

Pulmonary ventilation:During pregnancy the patients are in a state of hyperventilation ,the arterial CO2 declines and the maternal arterial blood pH remains unchanged by compensatory increase in renal excretion of bicarbonate , which decreases to 21 mEq/L from 27mEq/L. This hyperventilation of pregnancy seems to be related to the direc t action of progesterone on the respiratory center.

RENAL PHYSIOLOGICAL CHANGES

The changes in renal functions during pregnancy are profound and surpassed only by those of the cardiovascular system .

Anatomical changes:The kidney size increase slightly during normal pregnancy , however the more striking in structural changes are those of the ureters , calyces, and renal pelvis. These changes are readily seen as early as the third month of gestation and remain until approximately the fourth month postpartum.since these changes appear long before gravid uterus Is large enough to cause mechanical compression of the uteres , a hormonal effect is postulated.

CHANGES IN THE RERODUCTIVE SYSTEMS

Rhythmic tightenings of the uterus occurs as part of preparatory changes for labor, these are called BRAXTON HICKS CONTRACTIONS and since the advent of ultrasound, can be seen as early as eight to nine weeks .As the pregnancy advances these contractions becomes more frequent and they are and they are more likely to be felt by the patient , usually they happen every 5 to 20 minutes and sometimes may last as long as 30 minutes .

MUSCULAR SKELETAL AND NEUROLOGIC SYMPTOMS

A number of women may experience backache in the upper back , which is secondary to muscle tension from increasing breast size and discomfort.Most women however experience low back pain secondary to muscular fatigue and strain that is caused by the changes in the body balance from the growing uterus , several partients may experience pressure on the nerve roots that in turn may lead to muscular spasms and and pelvic joined pains secondary to bone ligaments relaxation from the sex hormones .Some women may also experience paresthesias that is numbness and tingling on the fingers and toes.