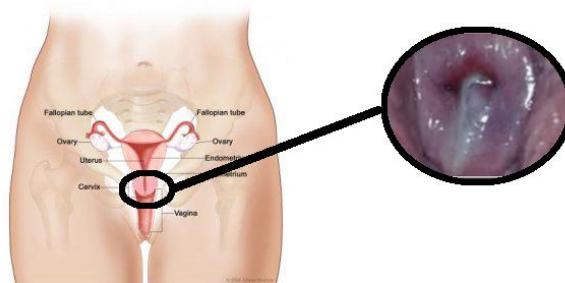


Unit II – Problem 1 – Physiology: Maternal Changes In Pregnancy



- Notice that the placenta will start to produce progesterone (which is required for maintenance of pregnancy) at the end of 3rd month of pregnancy. Before that, the source of progesterone is from corpus luteum (which doesn't degenerate if fertilization occurs).
- **Human Placental Lactogen (hPL):**
 - Also known as human chorionic somatomamotropin.
 - It creates a state of insulin resistance in the mother (reducing glucose use in the mother) and hence hyperglycemia.
 - The peak of its secretion is toward the late period of pregnancy (thus screening for GDM is usually done at 24-28 weeks of gestation when hPL and other diabetogenic hormones from the placenta reach their peak).
 - In addition, hPL results in the release of more amino acids and prepares mammary glands for lactation.
- **Braxton-Hicks contractions (what are the characteristics which will help you to differentiate it from labor pain?):**
 - It is painless, asymmetrical, irregular, sporadic and lasting for a short period of time.
- **Chadwick's sign:**
 - This is a bluish discoloration of the vulva and the cervix.



Chadwick's Sign is the discoloration of the cervix, vagina and labia while pregnant

- **Weight gain in pregnancy:**
 - **Normally, there is a total weight gain of 12-13 kg:**
 - ✓ 4.5 kg: fetus, placenta and amniotic fluid.
 - ✓ 4 kg: blood and tissue fluid.
 - ✓ 1.5 kg: uterus and breasts.
 - ✓ 3 kg: fat stores.
- **Metabolism will increase by 15% during pregnancy:**
 - There will be an increased nutritional need for iron, folic acid, zinc, calcium, proteins and vitamins.
 - The female will be in a positive nitrogen balance.
 - Free fatty acids will increase.
 - Insulin sensitivity will be reduced.
- **Cardiovascular changes:**
 - Blood volume will increase by 50% (from 5 L to 7.5 L of blood). This increase in volume results in physiologic dilution/anemia of the blood.
 - Blood pressure will be reduced: both systolic and diastolic pressures (with diastolic pressure being reduced more). Notice that central venous pressure will not change in pregnancy but femoral venous pressure will increase which might result in varicosities that are noticed with pregnancy.
 - Cardiac output is increased and it is normal to have systolic ejection murmur in pregnancy.



- **Hematologic changes:**

- Pregnancy is considered to be a hypercoagulable state (in which there is increased risk of DVT and thromboembolism that can lead to maternal death after delivery).
- Iron-deficiency anemia is very common (simply due to increased demand). This is prevented with 325 mg ferrous sulfate tablets that are taken orally 3 times a day.

- **Renal changes:**

- Kidneys will increase in size.
- There will be increased renal plasma flow and GFR (resulting in reduced creatinine in the serum).
- Bladder capacity will be reduced due to the compression by the distended uterus.
- Progesterone will cause urine stasis in ureters which predisposes the female to UTIs.

- **Pulmonary changes:**

- The only entity which will increase is the tidal volume.
- There will be mild respiratory alkalosis due to hyperventilation that causes washout of CO₂.

- **Skin changes:**

- Hyperpigmentation (due to increased estrogen and MSH). Examples include: vascular spiders and linea nigra.
- Abdomen is also characterized by stria gravidarum (purplish stretch marks).

- **Gastrointestinal changes:**

- Morning sickness (hyperemesis gravidarum): due to β -hCG.
- Constipation (why?) → because progesterone will cause GI smooth muscle relaxation.

- **Lactation:**

- Breast development is mediated through: estrogen and progesterone.
- Milk production is mediated through: prolactin.
 - ✓ Notice that lactation will produce amenorrhea and can be considered as a reliable contraceptive method (for 6 months) because prolactin inhibits the secretion of GnRH from hypothalamus and hence no production of FSH and LH from the anterior pituitary gland (there will be no ovulation).
 - ✓ Prolactin secretion is inhibited by dopamine.