Reproduction (Pregnancy & Delivery)

1. Fertilization & Development
2. Signs and symptoms of pregnancy
   Complications
3. Nutrition, pre-natal care
4. Labor & Delivery

Day 7: implantation begins, trophoblast cells in contact w/endometrium secrete enzymes that erode an area large enough for the tiny embryo

- Embryo works its way into connective & vascular tissues, all further development takes place within the endometrium
**Extraembryonic Membranes**
- Chorion – develops into fetal half of placenta
- Yolk sac – first site of blood cell formation
- Allantois – blood vessels become umbilical blood vessels
- Amnion – contains fluids to cushion & protect embryo

**Placenta – connection to mom**
- Develops from the chorion & uterine tissue, acts as a transfer vehicle & synthesis center
- Placental provides nutrients and oxygen for fetus via diffusion across the placental barrier into the bloodstream of the fetus & removes wastes which mom excretes
- Acts as an endocrine organ, secreting estrogens and progesterone to maintain pregnancy
- Umbilical cord develops & connects the embryo to the placenta
  - Has 2 umbilical arteries & 1 umbilical vein
  - Connected to network of capillaries within the chorionic villi
- Produces human chorionic gonadotropin (hCG), to signal the corpus luteum to release large amounts of progesterone and estrogens

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**Fetal surface**
- Amnion (partially removed)
- Umbilical cord
- Placenta in cross-section at umbilical cord

**After 1st two months:**
- Embryo is a Fetus
- All organs continue to develop
- Muscles develop, embryo can move
- Brain begins regulating function of some organs
Terms & definitions

- Embryo – fertilization to 8 weeks
- Fetus – 8 weeks to birth
- Pregnancy divided into trimesters:
  - First trimester – 12 weeks
  - Second trimester – 12 to 24 weeks
  - Third trimester – 24 weeks to delivery
- Preivable – infant delivered prior to 24 weeks
- Preterm – from 24 to 37 weeks
- Term – 37 to 42 weeks, postterm - > 42 weeks

II. Signs of pregnancy

A. Symptoms
For a woman who has regular menstrual cycles and is sexually active, a period delayed by more than a few days to a week is suggestive of pregnancy
- "morning sickness" – nausea and vomiting
- Breast swelling and tenderness, fatigue
- BBT of 98.8 – 99.8 for 3 weeks post ovulation
- OTC urine pregnancy tests & hospital serum assays tests for the beta subunit of hCG
- Confirmation by ultrasound which may show the gestational sac as early as 5 weeks
- Cervical & uterine changes
- Due date calculation (Nagle’s rule) = subtract 3 months from the LMP and add 7 days
- If ovulation date is known, the date can be calculated by adding 266 days

B. Maternal changes during pregnancy

- Cardiovascular – cardiac output increases 30 to 50%
- Pulmonary – tidal volume increases 30 to 40%
- Gastrointestinal – nausea & vomiting occur in > 70% of all pregnancies.
  - Due to elevated estrogen, progesterone and hCG levels
  - Should resolve by 16 weeks gestation
  - Stomach has prolonged gastric emptying times, which can cause reflux
  - Enlarged bowel leads to increased water absorption and constipation
- Renal – kidneys increase and ureters dilate increasing urinary frequency, edema occurs in 25% of pregnant women
- Hematology – plasma volume increases by 50%, hypercoagulability
- Musculoskeletal
  - change in center of gravity can lead to a shift in posture and lower back strain
  - Relaxation of joints to increase size of pelvic cavity may cause discomfort
- Dermatologic – spider angiomata, hyperpigmentation of nipples, stretch marks
Changes in uterine size over duration of pregnancy:

Uterus increases ~2,000 to accommodate the developing fetus, growth accomplished by growth of smooth muscle cells, & elongation of blood vessels. Braxton Hicks contractions – beginning in 1st trimester, painless irregular contractions of uterus.

Female breast & Lactation

- During pregnancy the breasts enlarge as the ducts and alveoli increase in # and size
- Prolactin production suppressed during pregnancy by estrogen and progesterone feedback
- Once delivered, prolactin secretion occurs & the breasts produce colostrum (thick fluid high in protein and antibodies)
- Suckling child stimulated continued milk production

III. Complications

a) PIH – pregnancy induced hypertension
b) Gestational diabetes
c) Ectopic pregnancy – implants outside uterine cavity (1/100 pregnancies)
d) Spontaneous abortion (miscarriage)
1/6 pregnancies

e) Placenta previa

IV. Nutrition & prenatal care

BUILDING A BABY!!!
- Vitamins & Minerals, supplements & food
- Protein
- Iron
- Folic Acid
- What to avoid...
  - Tobacco
  - Alcohol/drugs
  - Caffeine
  - OTC drugs
- Excessive weight gain (40-50 lb)

V. Labor and Delivery

Labor = contractions that cause cervical change in either effacement or dilation
- "false labor" = irregular contractions that yield little or no cervical change

Stages
1. Onset of labor until effacement and dilation of cervix is complete
2. Full dilation until delivery
3. After delivery, ends with delivery of placenta

Cervical examination
- Dilation – how open the cervix is at the internal os
- Closed = 0 cm, fully dilated = 10 cm
- Labor may be induced via prostaglandins, oxytocic agents, mechanical dilation or artificial rupture of membranes
- Only if fetus is in stress, not desire of mom
Cesarean Section
-23% of births
0.01% maternal mortality (higher than for vaginal delivery)
Recovery time is greater

Why C-section:
1) Failure to progress to labor
2) Pelvis too small, uterus doesn’t generate enough pressure during contractions or presentation is breech
3) Placenta previa or cord prolapse
4) Active herpes lesions
5) Prior uterine surgery
6) Obstructions of birth canal (fibroids)

B. Childbirth Pain Relief Options
- Systemic analgesics
- Regional Blocks
- Non-drug relief options