

Physiology Of Labor

- Onset of Labor. “They” are not really sure what causes this mechanism to occur, though they do understand the process of labor. A complex interplay between fetal, maternal and endocrine function.
- Labor usually begins between 38th and 42nd week of gestation.
- Hypothesis
 - Progesterone withdrawal hypothesis:
 - Prostaglandin hypothesis (it is used to induce labor)
 - Corticotropin-releasing hormone hypothesis (CRH increases throughout pregnancy, with a sharp increase at term. CRH also stimulates synthesis of prostaglandins).
- Challis & Colleagues theory of labor (see pic)
 - Phase 0: Most of pregnancy
 - Phase 1: Starting to have some contractility. Estrogen is being released (5% of pregnancy)
 - Phase 2: Progesterone, oxytocin and prostaglandins cause uterus to contract (0.2% of time of pregnancy)
 - Phase 3: Involution...uterus going back to normal state. Oxytocin involved here.

Signs of Labor

- Premonitory signs are signs that woman is going into labor. Baby drops down into pelvic inlet (engagement) and the uterus moves downward. This means the fundus isn't pressing on the diaphragm and mom can now breathe easier. Braxton Hicks contractions occur in this phase and they can become uncomfortable. The cervix becomes more soft (ripening). Mom also loses mucus plug (onset of labor is usually 24-48 hours after loss of plug) with a “bloody show” meaning it's pink-tinged. Some women also will have a sudden burst of energy 24-48 hours prior.
 - Other signs of impending labor are: weight loss of 1-3 lb, increased backache and sacroiliac pressure, GI upset.

True Labor	False Labor
-Contractions produce progressive dilation and effacement -Pain usually starts in back and radiates to abdomen -Pain not relieved by ambulation or rest -Contractions occur regularly and increase in frequency, duration and intensity	-No progressive dilation or effacement -Irregular -Perceived as hardening or “balling up” without discomfort, or discomfort mainly felt in lower abdomen and groin -Pain relieved by walking, changing position, resting, taking a hot bath or shower

Maternal Response to Labor

- Cardiovascular System: Cardiac output goes up...when uterus contracts the blood there goes back into her circulation which increases CO. Also increases her blood pressure.
- Blood Pressure
 - First Stage: increases by 35/25 mm Hg
 - Second Stage: increase diastolic by 65 mm Hg
 - Position changes d/t compression on vena cava (drops BP).
- Fluid & Electrolyte Balance d/t sweating a lot and hyperventilation.
- Respiratory System: increased RR to meet increased oxygen demands
- Renal System: GFR goes up d/t increased CO. Peeing more!
- Gastrointestinal System: want to have mom on a clear liquid diet in case they need surgery. Pregnant women have prolonged gastric emptying.
- Immune System & Other Blood Values: WBCs go up to 25-30K; Blood glucose drops as well b/c they are using it as a source of energy;

Fetal Physiologic Adaptation to Labor

- Fetal Heart Rate: changes d/t stress of labor. Look at the variability of the HR...the PNS and SNS going back and forth. If the baby is stressed, the back-and-forth (variability) starts to change and flatten out...VERY IMPORTANT! Inadequate blood flow and mom's position can affect the HR.
- Fetal Circulation: not sure what happens here.

- Fetal Respirations: Chemoreceptors in carotid body can affect fetal respirations. If under stress, babies will take breath in utero and take in meconium and up with pneumonia.

Factors Affecting Labor

5 P's: passageway, passenger, physiologic force, position of mother, psychosocial

Passageway

- Bony boundaries of pelvis are absolute...baby will either fit or he won't.
- Composed of bony pelvis, soft tissue & cervix, pelvic floor, & vagina canal & introitus
- 4 different types of pelvis (see pg 218): Gynecoid (50%) Android (23%), Anthropoid (24%), and Platypelloid (3%)...platypelloid often deliver with baby face up.
- Bony pelvis
 - False Pelvis (no obstetrical interest...baby just descends through here)
 - True Pelvis (divided into planes): inlet, cavity, outlet (see pictures)
- Pelvic Floor
 - Pelvic soft tissues are considered part of uterine segment. The upper segment is the contractile part of the uterus. What happens during contraction is it shortens and elongates...it pulls lower uterine segment up.
 - Muscles of the pelvic floor draw rectum and vagina upward and forward with each contraction. As the fetal head descends to the pelvic floor, the perineal thickness decreases from 5cm to 1cm. The anus everts! Also, pretty sure the pelvic floor muscles cause baby's head to turn the direction(s) it needs to be in.

Passenger (Fetus)

- Fetal Head
 - Fontanelles (more on this in newborn lecture) Mostly we feel for frontal and posterior ones.
 - Sutures allow for skull bones to overlap (.5 to 1 cm) and allows for baby to be molded to pelvis and be delivered. Usually these are toward the back...can feel a ridge.
- Fetal Head Diameters: want pelvic inlet to be at least 10 cm b/c the optimal position puts the largest diameter of the baby's head at 9.5 cm, but if baby is coming in face up, you're looking at a diameter of 13.5 cm. So this is why position is so important.
 - Submentobregmatic 9.5 cm
 - Suboccipitobregmatic 9.5 cm (preferred position!)
 - Occipitofrontal 11.75 cm
 - Occipitomenal 13.5 cm
 - Biparietal 9.25 cm
 - Bitemporal 8 cm
- Fetal Attitude refers to the relation of the fetal body parts to one another.
 - Normal is "general flexion": head is flexed so chin is on chest with legs flexed at knees and thighs on abdomen
 - Changes in fetal attitude cause the baby to present larger diameters of its head to the pelvis
 - Presentations:
 - A: Vertex Presentation; presenting part is occiput; fetal head is completely flexed onto chest; smallest diameter of head presents to maternal pelvis (MOST COMMON!)
 - B: Sinciput Presentation; head is partially flexed; occipitofrontal diameter presents (11.75 cm); top of head is presenting part (AKA MILITARY)
 - C: Brow Presentation; head is partially extended; occipitomenal diameter is presented (13.5 cm)
 - D: Face Presentation; fetal head is hyperextended; submentobregmatic diameter presents (9.5 cm?)
 - Breech: frank, full and single footling shown in picture. Also double footling and kneeling.
 - Shoulder presentation
- Fetal Lie
 - Relationship of long axis (spine) of the fetus to long axis of mother (transverse and longitudinal). All of the above presentations occur with longitudinal lie except for shoulder presentation, which occurs with transverse lie.
- Station & Engagement

- Station refers to the relationship of the presenting part to an imaginary line drawn between the ischial spines of the maternal pelvis. In a normal pelvis, the space between the ischial spines is the narrowest diameter and designate “zero station.” -5 at inlet, +4 at outlet
- Engagement of the presenting part occurs when the largest diameter of that part reaches or passes through the pelvic inlet. It can be determined by vaginal examination...in primagravidas, engagement usually occurs 2 weeks prior to term; in multiparas this may happen several weeks before or during labor. The presenting part is “ballotable” when it is freely movable in the inlet.
- Fetal Position refers to the relationship of the landmark on the presenting fetal part to the anterior, posterior or sides of the maternal pelvis. Recall that the occiput is the landmark in vertex and military position; the mentum is the landmark for face presentations.
 - Three notations are used to describe fetal position (see pg 583)
 - 1st -denotes location of presenting part (R or L side of maternal pelvis)
 - 2nd -denotes specific presenting part (O = occiput, M = mentum, S = sacrum, A = acromion process)
 - 3rd- denotes location of presenting part (A = anterior, P = posterior, T = transverse)
 - Ex: Right Occiput Anterior (ROA) is preferred I think.
 - EX: Right Occiput Posterior (ROP) = born face up...difficult birth.

Physiologic Forces of Labor

- Primary force
 - Uterine muscular contractions need to be good enough (strength of contraction and timing) to bring baby down to where it needs to be. The upper portion is the contractile element that pulls cervix up. (see picture)
 - Bearing down aids in expulsion of fetus and placenta
 - Uterine contractions have a wavelike pattern; you want them to be at least 60 seconds in duration.
- Secondary force
 - Use of abdominal muscles to push
- There are two portions of the uterus. Upper portion is the contractile segment. Here the uterine segment shortens and longitudinal traction leads to effacement of the cervix. The uterus elongates while the lower portion remains passive.

Cervical Effacement & Dilation

- Effacement is the taking up (or drawing up) of the internal os and the cervical canal into the uterine side walls. The cervix changes from a long, thick structure to a tissue-thin structure. In primagravidas, effacement usually precedes dilatation.
- As the uterus elongates, the longitudinal muscle fibers are pulled upward over the presenting part. This action and the hydrostatic pressure of the fetal membranes cause cervical dilation going from < 1cm to ~ 10cm. When the cervix is completely dilated and retracted it can no longer be palpated.

Mechanism of Labor

- Cardinal Movements
 - Descent- of presenting part through pelvis. Depends on 4 forces: pressure exerted by amniotic fluid, direct pressure on fundus of uterus, contractions of abdominal muscles, extension and straightening of fetal body
 - Internal Rotation & Extension: muscles in pelvic floor cause head to rotate around so that the back of head toward pubic bone. Baby is born occiput first, then face and chin.
 - Cardinal Movements picture
A-Flexion, B-Descent, c-Internal Rotation,
D-Extension, E-External Rotation

Stages of Labor

- First stage of labor: from contraction to full dilatation...has three stages
 - Latent phase: Begins at the onset of regular contractions which increase in frequency, duration and intensity. Mild contractions last 20-40 seconds at a frequency of 3-60 minutes; IUPC (intrauterine pressure) = 25 to 50 mm Hg; nullipara will be in this phase for 8.6 hours, multiparas for 5.3 hours
 - Active phase: anxiety increases in this stage; contractions intensify and the cervix dilates from 4-7 cm as fetal descent progresses.

- Transition phase: significant anxiety in this phase as contractions become more frequent, longer and more intense; total duration for nullipara is 3 hours and 1 hour for multiparas; cervical dilation slows and the rate of fetal descent increases (nulliparas 1cm/hr, multipara 2cm/hr). This is the stage where women get irate and scream things like "Get it out of me!"
- Second stage of labor: from full dilation until birth of fetus
 - Length of time: nulliparas = 50 min; multiparas = 20 min; epidural may increase this stage to 3 hours
 - Three phases here also: latent phase, descent and transition
- Third stage of labor: delivery of fetus and placenta
 - Length of time: 3-5 minutes, but could be up to one hour
 - Placenta separation occurs with 3rd or 4th uterine contraction after birth of fetus (picture: top is maternal side; bottom is fetal side)
 - Risk of hemorrhage increases as length of 3rd stage increases...the stage can increase d/t use of oxytocin!
- Fourth Stage of Labor
 - Period of recovery, put baby on mom's chest if possible. If not possible, dad can do skin-to-skin.
 - Possible hemorrhage is a risk at this time
 - Duration: approximately 2 hours
 - Period of observation
- Psychosocial Considerations
 - Mental & physical preparation: pain perception, expression of pain, factors that influence pain
 - Sociocultural values and belief
 - Previous childbirth experience
 - Support from significant other
 - Emotional status

Theories of Pain Management in Childbirth

- Fear Tension Pain Cycle
 - This theory states that if we can anticipate and practice then we are less fearful of labor. The fear of labor causes a release of catecholamines leading to more anxiety and inability to handle pain...so, by educating pts they are better able to manage the process of labor.
- Nonpharmacologic management of labor (most women get epidurals...around 75%). The medication used in the epidural crosses over to the baby...the longer you have the epidural, the more dysfunction you'll have with baby especially with breastfeeding (don't latch on). Alleviation of pain is essential and nonpharmacologic methods are simple, safe and inexpensive with a variety of methods available.
- Pharmacologic management of labor needs to be implemented before pain is severe.
 - Epidurals...pt has to be less than a certain cm dilated (depends on if first delivery or not). Usually can't get an epidural if you are close to delivering baby then you could possibly deliver while sitting up for epidural. I guess this is a bad thing? Have to be in active labor in order to get epidural. If you get it too early it can slow down or even stop the labor process. For a first timer, could do up until 8 cm, but on a multipara that would be too late.
 - Narcotics are given during the beginning of the contraction to decrease how much gets to the baby...it doesn't really help the pain it just takes the anxiety away and enables mom to sleep and/or relax.
- Pain in Labor
 - Two types of pain: visceral and somatic
 - First stage of labor is primarily visceral pain d/t contractions and dilatation
 - Second stage is primarily pressure of baby on perineum
- Positioning in Labor
 - Affects adaptation to labor
 - position changes = relieves fatigue, increases comfort and promotes circulation
 - Upright position
 - promotes gravity
 - uterine contractions stronger and efficient
 - results in shorter labors
 - beneficial to cardiac output

- Squatting
 - Enlarges pelvic outlet by 28%; Induces slight separation of lower symphysis pubis, resulting in enlarged outlet
 - Increased efficiency and effectiveness
 - Requires less forceful pushing
- Sitting
 - Increases pelvic diameter but not as much as squatting
 - May increase edema of perineum and perineal blood loss
 - Continuous pressure on lower buttock leads to venous congestion and dependent edema
- Kneeling
 - Assists with rotation of fetus to posterior position
 - Coccyx is freely mobile, maximizing pelvic diameter
 - Tiring for patient

Settings for Childbirth

- Hospitals: Easy access, care for complicated births, higher costs, visitor limitation, LDR, LDRP, or traditional
- Free-standing birth centers: Homelike setting, lower costs, birth attended by midwife, nurses, & doulas, delay of emergency care
- Home: Control over persons attending, low-technology birth, most MD's won't do, delay in emergency services

When To Go To The Hospital

- Contractions
 - First baby – 5 minutes apart for 1 hour
 - Second – 10 minutes apart for 1 hour
- Ruptured membranes (water breaks)
- Bleeding other than bloody show
- Decreased fetal movements
- Any other concern

Admission Assessment

- Fetal Condition
 - FHR (fetal heart rate_
 - Is fetus active or is there decreased fetal movement?
 - Fundal height
 - Leopolds: how many, presentation, position, lie
 - ROM (Rupture of Membranes)
 - Time
 - Amniotic fluid
 - Clear or color, odor, amount
 - Check with nitrazine paper – blue-green, dk blue or ferning
- Maternal Condition
 - Status of labor
 - Impending birth (SVE)
 - Basic admit information including vital signs
 - Plans for pain control
 - Assess birth expectations
 - Birth plan
 - Support people – who present for delivery
 - Permits & Paperwork
 - Laboratory tests – H/H, type & hold, urine protein & ketones
 - IV – LR @125/hr or TKO or Saline Lock
 - Orient family
 - Anesthesia consult if needed

- Shave/prep – only for C/S prep
- Support System
- Other children
- Need for community resources
- Ass in private about: drinking, drugs, smoking, history of STDs, domestic violence, history of depression

Fetal Monitoring (see slides...I think some info is missing here)

- Intermittent allows for greater movement
 - Report FHR outside normal limits or slowed rate after contraction ends
- Continuous electronic monitoring allows more data but restricts mom's movement. Can be internal or external.

Contractions (stuff to make note of)

- Regular or Irregular
- Frequency (how fast)
- Duration (how long)
- Intensity (how hard)

Nursing Care in First Stage of Labor

- Identify goals and discuss birthing plan
- Identify concerns
- Allow for sounds of labor and birth
- Position changes
- Personal comfort measures and reduce anxiety
- Provide information
- Supportive relaxation techniques and breathing techniques
- Other comfort measures

Nursing Care in Second Stage of Labor

- Comfort Measures
- Cool wet cloth, Dry gown if able
- Birthing positions
- Recumbent, Left Lateral, Squatting, Semi-Fowler's, Sitting, Hands & Knees
- Cleansing of Perineum
- Support
- Assisting with Birth

Nursing Care in Third Stage

- Assist with Post Delivery Care: Birthing bed positioning, patient positioning, mother-infant bonding, breastfeeding
- Infant assessment & Medications
 - Establish time of birth and airway, Maintain body temperature, Apgar score 1 min and 5 min, Examine body for anomalies and trauma, Umbilical cord for number of vessels, Assessment of head for trauma, Place identification bands, measure, weight, & footprints, Eye care and Vitamin K

Nursing Care in Fourth Stage

- Prevent hemorrhage from Uterine atony
- Meet fluid and nutrient needs
- Prevent bladder distention
- Assist mother in transition
- Facilitate parent-child attachment
- Maintain physical comfort

Post delivery assessment

- Assess fundus/lochia q 15 mins
- Assess vital signs q. 15 mins

- Assess bladder distention
- Assist with breast feeding
- Teach personal hygiene (bottle/peri pads)
- Administer pain medication
- Admit to postpartum after 2 hours (VS stable)

Signs of Potential Complications during Labor

- Intrauterine pressure > 80mm Hg or resting tone > 20 mm Hg
- Contractions lasting > 90 sec
- Contractions Occurring < 2 min apart
- Contraction interval < 30 sec
- Fetal bradycardia, tachycardia, persistently decreased variability, or late or severe variable decelerations
- Appearance of meconium-stained or bloody fluid from the vagina
- Arrest in progress of cervical dilation or effacement, descent of the fetus, or both
- Maternal temperature of > 38
- Foul-smelling vaginal discharge
- Persistent bright or dark-red vaginal bleeding

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