Nursing Process as Related to Administration of Meds to Women and Newborns

Pharmacology
- Most experience with drugs and pharmacology is from an adult population focus – on the population between 13 and 65 y/o.
- Fetal and neonatal groups have special consideration – more likely adverse effects and toxicity.

Normal Physiologic Changes in Pregnancy…
• Increased blood volume, GFR, and cardiac output may contribute to lower circulating volumes of some drugs
• Decreased plasma albumin will increase the volume of distribution of protein bound drugs

Pregnancy
• Increased levels of estrogen and progesterone in pregnancy change how medications are
  – Absorbed
  – Metabolized
  – Eliminated

• Decreased gastric emptying time r/t effects progesterone may change the absorption of drugs, particular in third trimester, delaying onset of effect. You may see IV administration preferred.
• Nausea and vomiting may also affect drug absorption.
• Pregnancy-related increase in pH would affect the absorption of weak acids and bases.
Basic Principles

- Normal changes in a pregnant woman can/will impact pharmacokinetics of drugs.
- The nurse must be aware and anticipate that these changes may alter dosage and patient response to medication administration.

Drugs get to the fetus...

- Drugs leave the maternal circulation and primarily diffuse across the placenta to the fetal circulation
- For most drugs, fetal blood concentration = 50-100% of the maternal concentration!

Greatest Risk to Fetus

- The fetus is most vulnerable to drug-induced developmental defects during rapid cell proliferation.
- 2-8 weeks post conception, 35-70 days post LMP
- Later in gestation, problems are more functional or alter growth than structural defects seen early in pregnancy.
Certain Situations

- Require drug use; without would endanger mom and fetus:
  - hypertension, epilepsy, diabetes, infection

Pregnancy Safety Categories

- Category A – no risk to human fetus
- Category B – no risk to animal fetus; human info not available
- Category C – Adverse effects to animal fetus; human info not available
- Category D – possible human risk reported; however potential benefit vs risk may warrant use
- Category X – fetal abnormalities reported and positive evidence of fetal risk in humans. Should not be used in pregnancy.

Category A

- Thyroid hormones
- Vitamins at RDA doses
Category B
- Acetaminophen, tagamet, penicillin, insulin, clindamycin, acyclovir, ibuprofen 1st and 2nd trimesters,

Category C
- Pseudoephedrine, simethicone, clotrimazole, senna, prednisone, dextromethorphan, ASA, hydrocortisone in 2nd and 3rd trimesters

Category D
- Ibuprofen in 3rd trimester, hydrocortisone in 1st trimester, dilantin, tamoxifen, lithium
Category X

- Acetate, lovastatin, triazolam, medroxyprogesterone, Vit A > RDA

Risks in Breastfeeding

- Wide variety of drugs cross to breast milk:
  - Fat solubility, low molecular weight, non-ionized, high concentrations
  - Drug levels are usually lower than maternal circulation
  - Risk/Benefit Ratio case by case
  - Categories: “safe”→ “contraindicated”

Commonly Used Meds…

- … are utilized and managed differently in OB!
- Focus on what is different now that she’s pregnant and there is a fetus or newborn to consider!
- Prenatal→Fetus→Labor→PP→Breastfeed
Terbutaline (Brethine)

- Tocolytic
- Beta adrenergic agonist; works by relaxing smooth muscle as a result of stimulating beta2 receptors in smooth muscle
- Used to stop uterine contractions in preterm labor; buy time for steroids to hasten fetal lung maturity; <34 wks

Terbutaline, cont.
- Given initially subcu, 0.25mg q 20-30 minutes times 1-2 hours then converted to PO dosing 2.5-5mg q 4-6hr.
- S/E: tachycardia, palpitations, hypotension, SOB, nervousness, restlessness, HA, tremor, insomnia, angina, hyperglycemia
- Nsg implications: monitor apical pulse rate, do not give if >120bpm

Monitor fetal heart rate, do not give if >180 bpm. Observe UC, blood pressure. Notify MD if maternal or fetal distress develop: severe tachycardia, palpitations, tremor, pulmonary edema, anxiety, headache.
- Monitor blood glucose; can also see hypoglycemia and hypokalemia (weakness, fatigue, arrhythmias)
- Tchg: asmt measures, signs PTL, activity restrictions
Betamethasone (Celestone)

- Glucocorticoid; stimulates fetal lung maturation by promoting release of enzymes that induce production of lung surfactant
- Given to prevent or reduce the severity of respiratory distress syndrome in preterm infants between 24 and 34 weeks gestation
- One of the long-acting corticosteroids

Betamethasone dosing…

- 12 mg IM X 2, 24 hours apart
- Most effective if given 24-48 hours before delivery.
- S/E: mat. infection, pulmonary edema, worsen PIH, DM
- Give in gluteal muscle (large muscle with predictable absorption)
- Should be given to any woman hospitalized @ 24-34 weeks unless has chorioamnionitis

Ampicillin

- Anti-infective; broader spectrum than penicillin; binds to bacterial cell wall
- Indicated for treatment of Group Beta Strep infection in pregnant women, or when cultures are not available. Given prophylactically to women with MVP (endocarditis prevention), or prior to CSection, or prolonged ROM
Ampicillin, cont…

- Dosage is 1gm q 4hr IVPB; (May see 2g loading dose)
- Readily crosses placenta; small amounts in breast milk
- S/E: diarrhea, nausea, vomiting; rash, anaphylaxis, superinfection
- To treat suspected sepsis in newborn or may be used if mom did not receive at least 2 doses before delivery

Cervical Ripening Agents…

- For induction of labor, a Bishop Score is calculated to estimate the likelihood of a successful induction…
  - Dilation closed 1-2 3-4 >5
  - Effacement 0-30% 40-50 60-70 >80
  - Station -3 -2 -1,0 +1
  - Consistency firm med soft
  - Position post mid ant

Dinoprostone (Cervidil)

- Prostaglandin E2; “ripen” the cervix, making it softer and causing it to begin to dilate and efface
- Used for preinduction cervical ripening before oxytocin induction
- Cervidil 10mg (kept frozen) insert placed in posterior fornix after patient voids; patient remains supine with left tilt for 2 hours after insertion
- Informed consent! Baseline assessment vitals, EFM strip, signs of labor. Patient stays on fetal monitor; vitals q 1-2 hrs
Cervidil, cont…

- S/E: headache, nausea, vomiting, diarrhea, fever, warm feeling in vagina, hypotension, uterine contractions, fetal distress/overstimulation of uterus
- Remove insert if hyperstimulation or fetal distress is seen; terbutaline antidote
- Remove insert at least 30 min – 1 hr before oxytocin induction is begun

Misoprostol (Cytotec)

- Prostaglandin E1; “ripen” the cervix making it softer and causing it to begin to efface and dilate; stimulates uterine contractions
- Used for preinduction ripening before oxytocin induction when Bishop score is <4 and to induce labor or abortion (fetal demise)

Misoprostol, cont…

- Dosage – oral tablet is placed into the posterior fornix. No use of lubricant. Dosages vary – 100-200mg tabs every 3-4 hours, somewhat titrated to effect. Remain supine 30min-1hr.
- Not as severe side effects as with cervidil, however same possibilities of nausea, vomiting, diarrhea, fever, ***hyperstimulation; terbutaline antidote
- Still need baseline vitals, uterine activity, EFM
Oxytocin (Pitocin)

- Posterior pituitary hormone (synthetic)
- Used for stimulation of uterine contractions – to induce labor, augment contractions, control uterine bleeding after expulsion of the placenta as well as in fetal stress test (OCT) or to promote letdown reflex in lactation (intranasal).
- MOST DANGEROUS DRUG used in OB

Oxytocin, cont…

- Acts: to stimulate uterine smooth muscle, producing uterine contractions similar to those in spontaneous labor
- Stimulates mammary gland smooth muscle
- Vasopressor and antiduretic effects
- Contraindications: CPD, prolapsed cord, transverse lie, nonreassuring FHR, previa, classical C/S scar, breech, nonengaged, polyhydramnios…

Oxytocin, cont…

- Side Effects: tumultuous labor, tetanic contractions and their sequelae; water intoxication, coma, seizure, hypotension, hyponatremia; Fetal: Asphyxia, IVH, Death
- Administration: ALWAYS given IVPB, never mainlined!! Given in milliunits, usually started at 0.5-2 milliunits/minute
• Administration: increase infusion by 2 milliunits every 15-30 minutes until a contraction pattern is established. Maximum dose is 20 milliunits/minute…
• Assess character, frequency, duration, resting time and tone of UC every 15 min.
• Continuous fetal heart rate monitoring is required; evaluation & documentation q15”

• If UC less than 2 minutes apart, lasting longer than 60-90 seconds, or if significant change in FHR, TURN OFF PITOCIN!!
• If fetus in distress: turn on left side, administer Terbutaline, administer oxygen, increase IV fluid, call MD
• Each institution has protocol for induction. Usual concentration is 15-20units of pitocin in 1000ml lactated ringer’s.

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Pharmacologic Management
• Sedatives – barbiturates should be seldom used.
• Systemic analgesia – cross the blood-brain barrier and the placental barrier thru fetal blood-brain barrier. Effects on fetus are pronounced resp. depression, decreased alertness, delayed sucking. TIMING!!
Butorphanol (Stadol)
• Opioid agonist/antagonist; Indicated for moderate to severe pain, as in labor or postop CSection
• Action: binds to opioid receptor sites in spinal cord & brain, alters perception and response to painful stimuli while producing generalized CNS depression.
• Has partial antagonist properties.
• Dose: 1-2mg IV q2-3h in labor, q3-4 postop

Butorphanol, cont…
• Crosses placenta and enters breast milk, so what would you expect at delivery?? Postop C/S who breastfeeds??
• Side Effects: Fetus: ** decreased FHR Variability, Newborn: CNS depression, MOM: Confusion, dysphoria, hallucinations, sedation, nausea, constipation, urinary retention… so what are the nursing implications??

Fentanyl
• Opioid analgesic
• Very potent; short acting agonist
• IV Onset within 2 minutes, peak in 3-5 min, and duration only 30 minutes. Great to manage severe pain quickly, good if S/E occur because gone quickly. DANGEROUS in inexperienced hands.
• Fetal consideration: Decreased variability
Fentanyl Epidurals

- Most epidurals used in this area are a combination of fentanyl with a local/nerve block agent such as bupivacaine (Marcaine).
- May see other concentrations of fentanyl or may see long-acting morphine used in some institutions (Duramorph).
- Some anesthetic agents will effect the FHR, causing decreased variability, esp Ropivacaine.

Epidural Anesthesia

- Pain is relieved by injecting a combination local anesthetic with opioid into the epidural (peridural) space outside the spinal column.
- The injection is between L4 and L5 (at waist line, at iliac spines)
- Most effective and most common pharmacologic pain relief method for labor.

Nursing Management

- Informed Consent – understands risks
- Before epidural is initiated, the patient is hydrated using 500-2000ml Lactated Ringer’s solution for volume expansion.
- Marked hypotension is possible as a result of sympathetic blockade with local agents (true for spinal or epidural)
Nursing Management

• Before epidural is initiated, the patient is connected to blood pressure, (EKG), pulse oximeter and continuous EFM.
• Woman may be placed in sitting position with legs hanging off side of bed or in a side-lying fetal position, curled into a ball. Either position facilitates widening of space between spinous processes for insertion.

Nursing Care

• Monitor B/P
• Assist with positioning
• Maintain IV patency
• Continue Hydration
• Assess FHR
• Explain all procedures
• Assess for full bladder

Naloxone (Narcan)

• Narcotic antagonist
• Acts by competing for opioid receptor sites and blocks or reverses because stronger affinity for sites; used when nature of respiratory depression is not known
• Both neonatal and adult strengths; crosses placenta
• Rapid absorption and distribution to tissues
Narcan, cont…

- Can precipitate withdrawal in opioid dependent patient. Will increase pain level once opioid is free. Caution with cardiac pt.
- Larger doses required for agonist-antagonists.
- Shorter duration than most opioids… it will “wear off” before the opioid, so repeated doses required to prevent recurrence.

Narcan, cont…

- Dose: Adult 0.4mg/ml IV
- Neonate 0.02mg/kg IV
- Dilute 1ml in 10ml saline, give in 0.1ml increments, about 1ml/min, titrating to effect/response
- Expect to give repeated doses. Narcan is a pure antagonist; will not reverse respiratory depression from other drugs.

A word about “co-drugs”

- Phenergan, Vistaril
- p. 450… says will “augment or potentiate” opioids.
- This is NOT the case!
- Will sedate, decrease anxiety but can also decrease analgesic effects, esp w/Demerol
Methylergonovine (Methergine)
- Ergot preparation, oxytocic
- Used to prevent and treat postpartum/post-abortoin hemorrhage caused by uterine atony or subinvolution
- Directly stimulates uterine and vascular smooth muscle
- Not like pitocin, it produces ONE sustained contraction.

Methergine
- Well absorbed by oral or IM, fast acting
- S/E: hypertension, sensitivity, nausea, vomiting. Excessive vasoconstriction if given with vasopressors or nicotine.
- Dose: 0.2mg PO or IM q2-4hr
- Nsg Implications: monitor BP, HR, uterine response frequently. DO NOT give if >140/90. If ineffective monitor calcium level as decreased effectiveness is seen with hypocalcemia. Pad counts.

Prostaglandin F2 (Hemabate)
- Like other prostaglandins, causes uterine contraction, but this one is sustained like methergine
- S/E: Headache, nausea, vomiting, fever
- Contraindicated in asthma
- Dose: 0.25mg IM or intra-myometrially q15-90 min up to 3 doses.
Vitamin K (Phytonadione)

- Trade: AQUAephyton
- Used to prevent hemorrhagic disease of the newborn
- Provides Vitamin K to promote hepatic formation of clotting factors – Vitamin K usually comes from intestinal flora, which the newborn doesn't have.

Vitamin K, cont…

- Dose: 0.5mg-1mg IM
- Administration: give within 1-2hrs of birth; wear gloves
- 25ga, 5/8” needle
- Vastus lateralis
- 90 degree angle
- S/E: pain @ site (rub to lessen), erythema

Erythromycin ointment (Ilotycin)

- Antibiotic; bacteriostatic and bacteriocidal
- Prophylaxis against gonorrhea and chlamydia to prevent ophthalmia neonatorum
- Eye prophylaxis is mandatory in all 50 states
- Dose: 1-2cm ribbon in lower conjunctival sac
- Administration: within 1 hr of birth
- S/E: chemical conjunctivitis
Magnesium Sulfate

- SPELL OUT NAME
- Anticonvulsant – drug of choice for prevention and treatment of seizures caused by PIH/preeclampsia/eclampsia
- Acts by interfering with release of acetylcholine at synapses → decreases neuromuscular irritability, decreases CNS irritability (so increases seizure threshold)

Mag...

- Also slight action: decrease cardiac conduction and relaxes smooth muscle so can see decreased BP, increased renal flow, tocolysis
- Dose: 4gm loading dose (up to 6 gm) in 100ml over 30 minutes; IVPB!! PUMP!!
- Then 2gm/hr IVPB continuously

Assessment: because is a CNS depressant and because it doesn’t bind with fat or protein in the body there are SERIOUS side effects!
- 1. respiratory depression – must assess hourly for full minute, more often if see a downward trend
- 2. reflexes – DTR Must assess patellar and or brachial at least hourly
• 3. urine output – hourly, on urimeter
  must see 30ml/hr output or will see
  toxicity develop
• 4. LOC - will change
• 5. serum magnesium levels – after loading
  dose, then daily.
  Therapeutic = 4-8 mg/dl

• Toxicity – nausea, warmth, slurred
  speech… decreased respirations, loss of
  reflexes (i.e. gag, cough), DEATH
• Antidote – CALCIUM GLUCONATE…
  1gm over 3 minutes (10ml) SLOW or can
  cause bradycardia, arrhythmias, ventricular
  fibrillation
• Nsg Assessment – watch BP, Pulse, Resp
  closely during loading dose

• Assessment, cont… BP, pulse, resp q15 -30
  minutes during therapy
• Calls for 1:1 nursing, at bedside
• Its duration is relatively short, so continuous
  infusion is required
• Fetus – loss of accelerations, decreased
  variability
• INFANT! – serum levels are approximately equal
  to mom’s - Anticipate respiratory depression and
  hyporeflexia; antidote or partial exchange?
**Hydralazine (Apresoline)**

- Antihypertensive, vasodilator acting directly on arteriolar smooth muscle
- May be given if Magnesium sulfate is not enough to lower blood pressure. Has been used safely in pregnancy for treatment of moderate to severe PIH. CAUTION! Can lower BP too fast or too low to perfuse fetus
- Crosses placenta, small amt in breast milk

**Labetalol (Normodyne)**

- Antihypertensive beta blocker blocks stimulation of beta adrenergic receptor sites
- May see used in PIH when mag and apresoline are not effective
- Can see additive hypotension when used with other meds… CAUTION
- S/E: fatigue, weakness, orthostatic hypotension, arrhythmias, bradycardia, pulmonary edema, CHF

**Dose:** 5mg q 15-20 minutes IV SLOWLY; limited doses; can drop a BP QUICKLY!
- S/E: tachycardia, sodium retention, arrhythmias. Additive hypotension if given with other antihypertensive.
- Admin: undiluted. Use quickly can change color once contacts metal needle. Compatible with IV fluids.
Labetalol, cont…

- FETUS/newborn: bradycardia, hypotension, hypoglycemia, respiratory depression
- Assessment – monitor blood pressure and pulse q5-15 minutes, HR, supine position, wedged left, auscultate lungs, assess edema, dyspnea
- Can alter liver function tests, BUN, K, BS
- Glucagon has been used to treat bradycardia and hypotension

Labetalol, cont…

- Dose: 20mg q 10 min IV over 2 minutes. Check apical pulse; hold if <50
- These patients are too sick to get out of bed, but stranger things happen… dizziness, orthostatic hypotension, drowsiness, found on floor…
- Diabetic? Monitor blood glucose

Oxycodone (Percocet)

- Oxycodone/acetaminophen combination, CNS and PNS acting meds
- Well absorbed from GI tract, enters breast milk
- Half life 2-3 hours, duration 3-6 hours
- S/E: confusion, sedation, constipation
- Dose: 2.5mg-10mg oxycodone, 325mg APAP
Rho(D) Immune Globulin (RhoGam)

- Immunosuppressant globulin
- Acts to suppress immune response in non-sensitized women with Rh-negative blood who receive Rh-positive blood cells because of fetomaternal hemorrhage, transfusion, or accident – protects future pregnancies
- Suppresses antibody formation after birth, miscarriage/pregnancy termination, abdominal trauma, ectopic pregnancy, amniocentesis, version, or chorionic villi sampling

RhoGam, cont...

- Dose: 300mcg, one vial, given IM, within 72 hours of procedure, accident, or delivery
- Cord blood is typed - if infant is Rh Positive Coombs’ test is negative (mother is not already sensitized) & Mom’s type checked
- Blood product (made from human plasma) so verification procedures must be followed, lot numbers checked, patient monitored for reaction