

Obstetric Analgesia & Anesthesia



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Objectives

- Describe the physiology of labor and factors effecting the perception of pain.
- Identify the goals for OB anesthesia & analgesia.
- Discuss the various analgesic and anesthetic approaches to providing labor comfort.
- Review the potential complications of obstetric anesthesia and nursing's responsibilities when responding.

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Normal Physiologic Changes in Pregnancy

- Increased sensitivity to medications
- Edema of the upper airway, risk for airway obstruction
- Changes in pulmonary function and an increased oxygen requirement
- Increased risk for pulmonary aspiration of gastric contents d/t growing uterus
- Potential for aorta-caval compression

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Goals for Obstetric Analgesia & Anesthesia

- Alleviation of pain
- Does not significantly interfere with the normal progress of labor
- Is not associated with undo risk to mom
- The effects cause minimal fetal/neonatal depression
- Allows for early interaction between mom & baby
- Provides a safe condition for the type of delivery required

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Theories of Pain and Pain Control

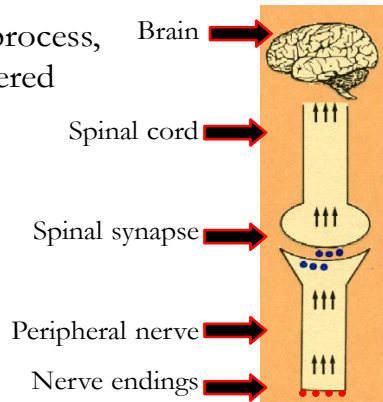
- Specificity
 - Specific pain system that carries messages from pain receptors to the brain
- Gate Control
 - Local physical stimulation can balance the stimuli by blocking pain signals from reaching the brain
- Endogenous Pain Control
 - The body's natural pain suppression system, dependent on endorphins

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Affecting Pain in Labor

During the L&D process, pain may be altered at the:



Pue:1987

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Factors Affecting Pain Perception

- Cultural aspects
 - Influences expression, perception & inference of pain
- Personal significance
 - Self concept is aligned with how an individual regards pain
- Fatigue & Sleep deprivation
 - A tired individual has less energy, less ability to focus
- Attention & Distractions
 - Preoccupation lessens pain perception

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Physiology of Labor Pain

- 1st Stage of Labor
 - 0-10 cm dilated & effacement of cervix
 - Uterine ischemia during contractions
 - Pain pathway - joins the sympathetic chain (T10 - L1)
- 2nd Stage of Labor
 - Stretching, tearing of vagina & perineum
 - Urge to bear down
 - Pressure by the presenting part on adjacent structures
 - Distention of the vagina & perineum
 - Pain pathway - transmitted by the pudendal nerves (S 2-4)

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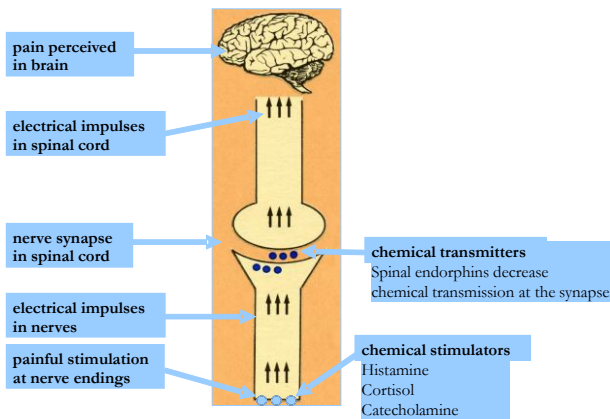
Factors Affecting Pain During Childbirth

- Anatomical
 - Size & shape of pelvis
 - Size & shape of head
- Physiological
 - Uterine contractions
 - Increase in catecholamines
 - Endorphin levels
- Psychological
 - Personal expectations, interpretations, personal nature
 - Fear, anxiety
 - Knowledge level

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Pain Pathway

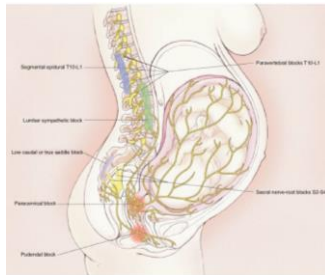


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Visceral & Somatic Nerves

- Labor pain transmission is both visceral & somatic
- Painful impulses from lower uterine segment and cervix travel via visceral nerves and enter the spinal cord at T10 – L1
- Somatic impulses from the vagina and perineum travel via the pudendal nerve and enter the spinal cord at S2-S4



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Dermatomes

Williams Obstetrics - 22nd Ed. (2005)

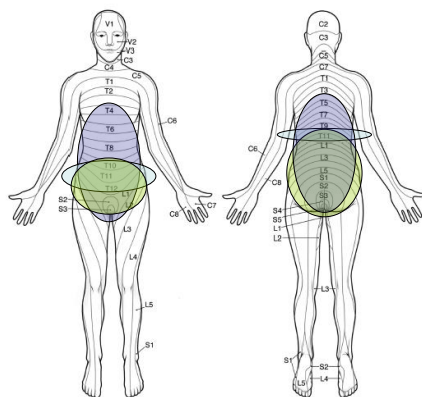
Early 1st stage of labor refers pain to T10-L1

- Contracting of the uterus
- Dilation of the cervix
- Sympathetic Nerves

Late 1st stage and 2nd stage of labor refers pain to T10-S4

- Contracting of the uterus
- Dilation of the cervix
- Stretching of the outlet
- Sympathetic Nerves
- Pudendal Nerves

C-Section refers pain to T4 - S4



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Non-Pharmacological Methods of Modifying Pain

- Relaxation Techniques
- Complementary Care
 - Touch
 - ♦ Acupressure, effleurage, healing touch, water therapy, TENS, acupuncture, intradermal sterile water injections
 - Smell
 - ♦ Aromatherapy
 - Hearing
 - ♦ Music, focal sound
- Positioning for comfort



Better Birthing with Hypnosis



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Pharmacological Methods of Modifying Pain - Analgesia

- Sedatives to induce *therapeutic rest*
 - Barbiturates (no longer used), Ambien - shorter half-life
- Inhalation Analgesia
 - Nitrous oxide more common outside U.S.
- Narcotics (e.g. Demerol, Fentanyl, Stadol, Nubain)
 - All cross placenta and cause maternal S/E
 - Difference is in dose and half-life
- Analgesic Potentiators
 - Phenergan* (latest research states should not be used routinely with opioids d/t increase in potential for respiratory depression and hypotension)
- Narcan
 - Narcotic Antidote

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Analgesic Agents

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TABLE 19-2. Parenteral Agents for Labor Pain

Agent	Usual Dose	Frequency	Onset	Neonatal Half-Life
Meperidine	25-50 mg (IV)	1-2 hr	5 min	13-22.4 hr
	50-100 mg (IM)	2-4 hr	30-45 min	63 hr for active metabolites
Fentanyl	50-100 µg (IV)	1 hr	1 min	5.3 hr
Nalbuphine	10 mg (IV or IM)	3 hr	2-3 min (IV)	4.1 hr
			15 min (IM)	
Butorphanol	1-2 mg (IV or IM)	4 hr	1-2 min (IV)	Not known
			10-30 min (IM)	
Morphine	2-5 mg (IV)	4 hr	5 min	7.1 hr
	10 mg (IM)		30-40 min	

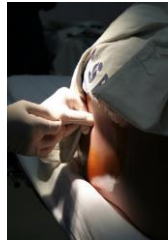
IM = intramuscularly; IV = intravenously.

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Pharmacological Methods of Modifying Pain - Anesthesia

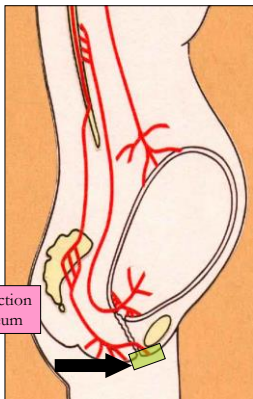
- Local
- Neuraxial (Regional)
 - Epidural/PCEA
 - Spinal
- General



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Local Anesthesia



- Stops chemical transmission at nerve ending
- Stops impulses on nerves
- Minimal numbness
- No weakness

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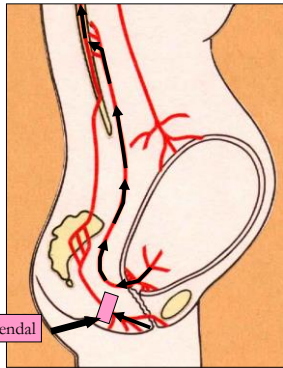
Local Anesthesia

- Advantages
 - Rapid onset, lasts $\frac{1}{2}$ - 1 hour, good for vaginal delivery & episiotomy repair, done by OB/CNM
- Disadvantages
 - Does not help with UC's, forceps/vacuum or uterine exploration

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Pudendal Anesthesia



- Stops impulses on pudendal nerve
- No weakness
- Some numbness
- Does not stop contraction pain

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Pudendal Procedure

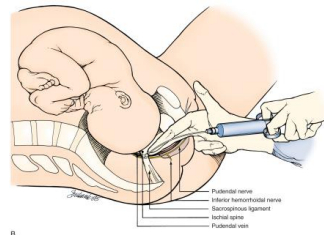
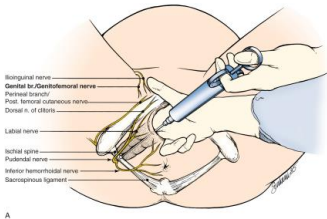


Figure 16-11 A and B, Anatomy of the pudendal nerve and techniques of pudendal block.

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Pudendal Anesthesia

- Advantages
 - Rapid onset, lasts 1 hour, good for vaginal delivery, episiotomy repair, can only be performed by OB
- Disadvantages
 - Does not help with UC's, forceps/vacuum, uterine exploration, variable degrees of success

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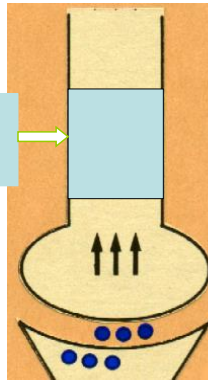


Neuraxial Anesthesia

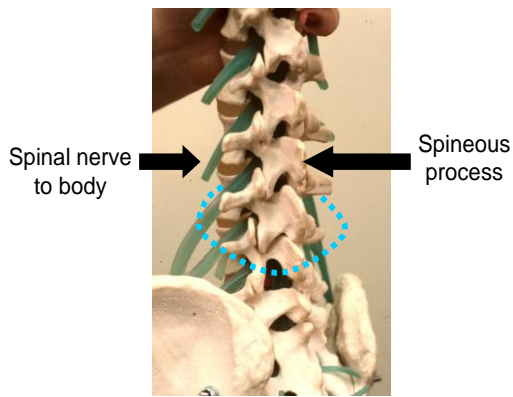
Pain may be altered at the spinal cord by:

- Epidural/PCEA
- Spinal
- Spinal/Epidural

Electrical impulses decreased or stopped



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Epidural

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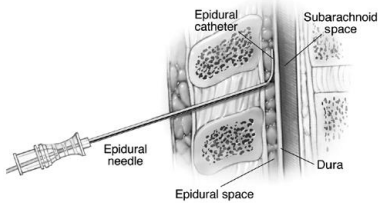


Figure 19-4. Introduction of a catheter into the epidural space through a Tuohy needle. (Redrawn from Sharma and Leveno, 2003, with permission.)



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Spinal

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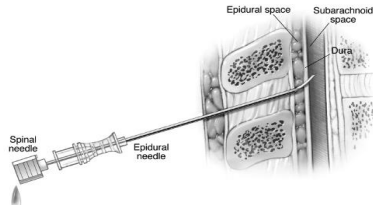


Figure 19-6. Combined spinal-epidural block, needle-through-needle technique. An extra-long spinal needle is introduced through a regular Tuohy needle into the subarachnoid space. (Redrawn from Sharma and Levino, 2003, with permission.)

- Stops or decreases impulses at spinal cord
- Numbness
- Variable weakness

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Epidural & Spinal Anesthesia

- Advantages
 - Fairly rapid onset, reliable & effective, lasts for hours, can be used for labor, vaginal delivery, forceps, episiotomy repair, can be extended for C/S, PPTL
- Disadvantages
 - May cause hypotension & 2° fetal bradycardia, inability to lift legs, may prolong 2nd stage, may experience dural puncture headache, back pain, allergic reaction to anesthetic, paralysis/nerve injury

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General Anesthesia

- Not indicated for vaginal delivery
- Used for C/S in emergent situations or where regional anesthesia is contraindicated
- Balanced general anesthesia (a combination of various agents including barbiturates, inhalation agents, opioids, and muscle relaxants) is preferred for obstetric applications as opposed to high concentrations of potent inhalation agents alone

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Contraindications to Analgesia & Anesthesia

- Patient refusal
- Coagulation disorder
- Some back surgeries
- Local infection at injection site
- Maternal hypotension & shock
- Non-reassuring fetal heart rate

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Complications of Analgesia & Regional Anesthesia

- Local
 - Shivering, hypotension, increase in maternal temperature
- With Narcotics
 - Respiratory depression, urinary retention, nausea/vomiting, sedation, pruritus
- Procedural
 - Backache, dura puncture, headache, unilateral block, migration of catheter

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Nursing Responsibilities

- Assessment
 - Maternal VS, Fetal monitoring, Labor status, Response to pain
- Plan
 - Informed consent, med education, option to “change their mind”
- Interventions
 - Administration of medication, promote maternal/fetal well-being
- Evaluation
 - Determine patient response & desire to continue with method
- Policy Development & Standards
 - ACOG/AWHONN/ASA/SOAP
 - Community Standard
 - Hospital P & P

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Anesthetic Emergencies

- Narcotic Respiratory Depression
- Toxicity
- High Block
- Pulmonary Aspiration
- Difficult/Failed intubation
- Hypotension
- Aorta -Cava Compression
- Hypovolemia
- Malignant Hyperthermia
- Cardiovascular instability/collapse

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Narcotic Respiratory Depression Prevention & Treatment

- Do not give narcotics for
 - Restlessness (early sign of hypoxia)
 - Anxiety
 - Insomnia
- Do not give narcotics if the patient
 - Has a respiratory rate < 12
 - Is overly drowsy
- Post - operative
 - Know what was given in the O.R., especially if long-acting narcotics were used
- Treatment
 - If respirations <10 or appear inadequate
 - ◆ Arouse patient
 - ◆ Encourage breathing
 - ◆ Give O₂ by mask, ventilate if necessary
 - ◆ Notify Anesthesia provider
 - ◆ Give Narcan

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Local Toxicity

- Mild
 - S/E - Tinnitus, metallic taste, restlessness, blurred vision, dizziness
 - TX - Increase HOB, O₂ increase IV, call physician
- Moderate
 - S/E - N/V, incoherent speech, convulsions, ↑ BP, HR, RR
 - TX - O₂ call physician, increase IV, protect airway, crash cart available, may require intubation, versed/valium
- Severe
 - S/E - Bradycardia, hypotension, apnea, arrest
 - TX - Check VS/ ECG, call code, intubate, vasopressors

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High Block

- Diagnosis - Labored breathing, hypotension
- May occur in L & D, O.R.
- May occur within 5 minutes with a high/unintentional spinal
- May occur within 20 minutes with high epidural (during C/S dosing)
- May occur anytime if catheter migrates into CSF, or inadvertent subdural injection

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High Block – Initial Treatment

- Raise the head of the bed
- Give oxygen by mask, ventilate if necessary
- Treat hypotension if indicated
- Get help to the room



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Pulmonary Aspiration

- Stomach contents get into lungs
- Signs & symptoms (any or all)
 - Hypoxia
 - Pulmonary edema
 - Bronchospasm
 - Laryngospasm
 - Cough



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Pulmonary Aspiration - Prevention

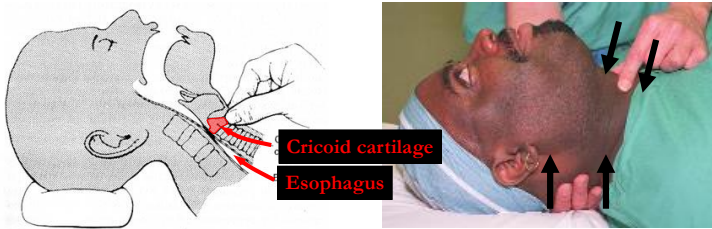
- Scheduled C/S:
 - No solids for 8 hours, clear liquids for 4 hours
- For all C/S:
 - 30mL sodium citrate* 1/2 - 1 hour before surgery
- For patients with high aspiration risk (obese, history of gastric reflux)
 - H₂ Blocker (cimetidine) night before & on admission
 - Reglan on admission
- For all general anesthetics
 - Rapid sequence induction & intubation with cricoid pressure
 - Awake extubation

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Cricoid Pressure

Cricoid pressure during rapid sequence induction and intubation for general anesthesia



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Difficult/Failed Intubation

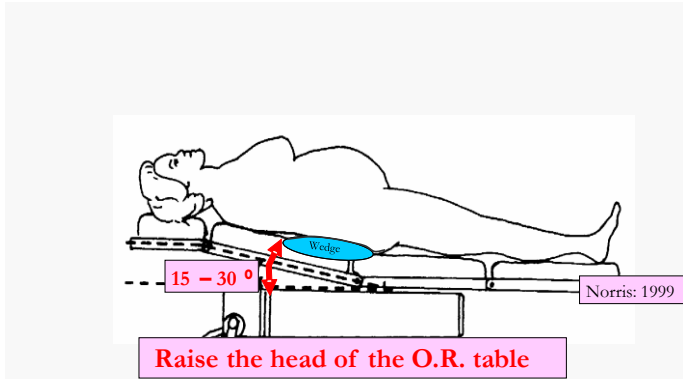
More common in obstetrics due to

- Anatomical changes
 - Upper airway edema & fragility
 - Obese patients
 - Short neck, large breasts
- Emergency conditions

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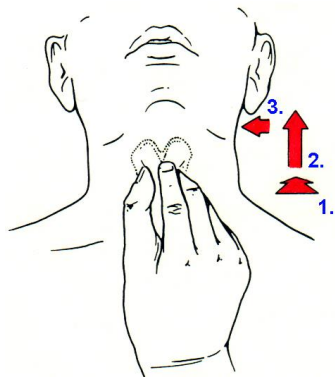


Positioning the obese patient





Helping With A Difficult Intubation



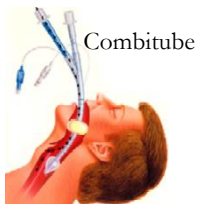
If improved visualization of the vocal cords is needed, apply cricoid pressure using the "BURP" procedure

- 1. **B**ackwards,
- 2. **U**pwards, and
- 3. **R**ight of the **P**atient



Intubation Aids

Trans-tracheal jet ventilator





Hypotension

Symptoms:

- (Maternal) - ↓ BP, dizziness, N/V, tachycardia
- (Fetal) - new onset of bradycardia &/or decelerations

Prevention:

- hydration during labor, pre-load before regional anesthesia, positioning

Treatment:

- L tilt, elevate legs if possible, IV fluid bolus (500cc LR or NS), O₂ by mask

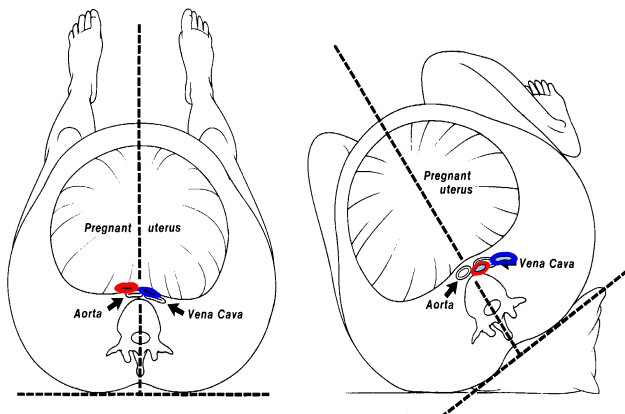
Medications:

- 10-20 mg Ephedrine, if ephedrine unsuccessful, anesthesia provider may order epinephrine or phenylephrine

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Hypotension From Aorto-caval Compression



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Hypovolemia

Caused by :

- Hemorrhage
- Dehydration
 - ♦ Spontaneous (illness, fever)
 - ♦ Medical treatment (fluid restriction)

Stimulated by :

- Regional anesthesia
 - ♦ Vasodilatation
 - ♦ Worsened by a-c compression

Preparation:

- 2 units O- blood
- 16g IV needle
- Pre-hydrate before spinal/epidural 15-20 minutes before starting procedure

Treatment:

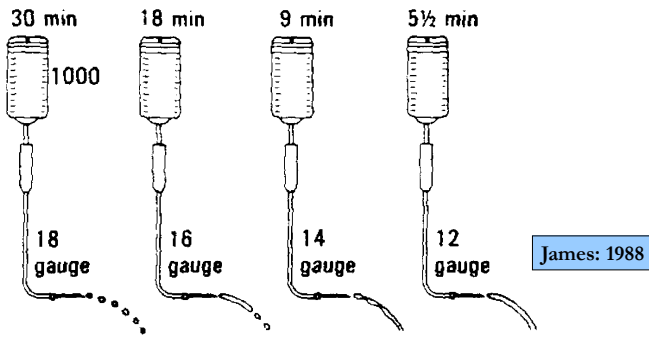
- IV bolus
- 2nd IV access/ ?CVP
- Pressure infusers/warm fluid
- Vasopressors if necessary

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IV Infusion Rates

GRAVITY



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Malignant Hyperthermia

- Fulminant hypermetabolic crisis (1: 15,000)
- Symptoms - Tachycardia, tachypnea, cyanosis, high fever
- Causes - Genetic disorder resulting from cellular defect in the storage/release of Ca⁺ & triggered by certain anesthetic agents
- TX - early identification, cooling measures (IV iced saline, lavage body cavities with iced solution, pack surgical wound with ice), IV Dantrium, cardiac arrhythmias managed with procainamide)

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Cardiovascular Instability

- Causes - Hypoxia, hypotension, local anesthetic toxicity, AFE, trauma, chronic medical/cardiac conditions
- TX - ACLS (same as for non-pregnant), uterine displacement, immediate delivery (most important factor in the successful resuscitation of mother in a cardiac arrest)
- How to help - CPR/ACLS, know the location of crash cart, know how to call a code, know how to facilitate an emergency C/S

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