

# **OBSTETRICS ANALGESIA AND ANESTHESIA**

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# Outline

- ⌘ Introduction
- ⌘ General principles
- ⌘ Analgesia for labor and delivery
- ⌘ Anesthesia for cesarean delivery
- ⌘ Postpartum analgesia

# Introduction

- ⌘ Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage
- ⌘ **Anesthesia** is the provision of a combination of **amnesia**, **analgesia** (pain control), and **muscle relaxation**
  - ⌘ **Analgesia** is simply pain control
  - ⌘ **Amnesia** refers to the lack of memory of the intraoperative and preoperative experience
  - ⌘ **Neuromuscular blockade** is a technique keeping the patient relaxed

# Intro...

- ⌘ **Obstetric anesthesia** refers to peripartum anesthetic and analgesic activities performed:
  - ⌘ During labor
  - ⌘ Vaginal delivery
  - ⌘ Cesarean delivery
  - ⌘ Removal of retained placenta
  - ⌘ Postpartal tubal ligation

# OBSTETRIC ANESTHESIA...

- ⌘ Care of two patients(maternal & fetal)
- ⌘ Physiological changes of pregnancy
- ⌘ Un prepared patient (full stomach)
- ⌘ Presence of high risk maternal conditions (PIH, DM, APH, Cardiac disease)

# Indication

✧ Woman request

## ⌘ **Maternal responses to labor pain**

- ⌘ Hypocarbia

- ⌘ Increase oxygen consumption

- ⌘ Increases in cardiac output and vascular resistance

- ⌘ Release of stress hormones

- ⌘ Elevation in circulating **catecholamines**

## ⌘ **Effective analgesia eliminates these responses**

# Analgesia for labor and delivery

- ⌘ **Non-medication**
- ⌘ **Inhalational**
- ⌘ **Parenteral/systemic**
- ⌘ **Regional**



# Non medication

- ✧ **Breathing exercises**
- ✧ **Acupuncture**
- ✧ **White Noise/ Music**
- ✧ **Massage/ walking**
- ✧ **Water bath**

# Inhalational

## **Nitrous Oxide(50:50)**

- ⌘ Has a rapid onset and offset
- ⌘ Provides analgesia during episodic contractions
- ⌘ Pain control is less effective
- ⌘ Inhaled 30 seconds prior to start of a contraction

# Parenteral Agents

## Meperidine/Pethidine

- ⌘ Most common opioid used for pain relief during labor
- ⌘ Dose
  - ⌘ IM -50 to 100 mg, Q 2 to 4 hours
  - ⌘ IV -25 to 50 mg every 1 to 2 hours
- ⌘ Analgesia is maximal 30 to 45 minutes (IM)
  - ⌘ IV-5 to 10 minutes
- ⌘ Half life **3 hour** in mother, **23 hr** in newborn
- ⌘ Neonatal sedation- 3 percent of newborns.

# Parental...

## Butorphanol

- ⌘ Synthetic opioid
- ⌘ Dose: 1- to 2 mg IV
- ⌘ Neonatal respiratory depression : < with meperidine
- ⌘ Associated with transient sinusoidal fetal heart rate patterns
- ⌘ **Antagonizes the narcotic effects of meperidine**

# Parental...

## Nalbuphine

- ⌘ Mixed opioid receptor agonist–antagonist analgesic
- ⌘ **Dose** : 10 to 20 mg IM, IV SC, Q 4 to 6 hrs
- ⌘ Small doses of nalbuphine may also be used to treat **pruritus** associated with neuraxial opioids

# Parental...

## Fentanyl

- ⌘ Short-acting and potent synthetic opioid
- ⌘ **1000** × more potent than meperidine
- ⌘ **Dose** : 50 to 100 µg IV every hour
- ⌘ **Disadvantage**
  - ⌘ Short duration of action

# Parental...

## Remifentanyl

- ⌘ Extremely rapid onset of action  $\approx 3.5$  minutes
- ⌘ Readily crosses the placenta, and quickly metabolized or redistributed within fetus
- ⌘ Single boluses with periodic uterine contraction pattern
- ⌘ **Infusions cause maternal apnea**
  - ⌘ Only trained personnel should administer

# Parental...

## Efficacy and Safety of Parenteral Agents

### ⌘ Mother

- ⌘ Respiratory depression
- ⌘ Nausea/Vomiting
- ⌘ Delayed gastric emptying
- ⌘ Orthostatic hypotension
- ⌘ Pruritus

### ⌘ Fetus /newborn

- ⌘ Respiratory depression → Naloxone

### ⌘ Labor

- ⌘ No effect on duration of labor and mode of delivery



# REGIONAL ANALGESIA

## **I. Neuraxial blocks**

∞ Spinal

∞ Epidural

∞ Combined spinal-epidural techniques

## **II. Pudendal**

## **III. Para cervical**

# Pain Relief Principles

## ⌘ 1<sup>st</sup> stage of labor

⌘ Visceral afferent sympathetic nerves from T10 -L1

## ⌘ 2<sup>nd</sup> stage of labor

⌘ Pudendal nerve

⌘ Vaginal delivery block from **T10 to S5 dermatomes**

⌘ Cesarean delivery block extending from **T4 to the S1 dermatomes is desired**

# NEURAXIAL ANALGESIA

- ✧ **Most common methods used for pain relief during labor and delivery**
- ✧ **Establish a sensory block to desired dermatome**
- ✧ **They are almost exclusively used in conjunction with neuraxial opioids**
- ✧ **The major advantages**
  - ✧ **Rapid onset of pain relief**
  - ✧ **Decrease in shivering**
  - ✧ **Less dense motor blockade.**

⌘ **Analgesic options include**

⌘ **Continuous epidural analgesia**

⌘ **Continuous spinal analgesia**

⌘ **Combined spinal-epidural**

⌘ **Analgesia is induced by**

⌘ **Absorption into the vascular system (supraspinal)**

⌘ **Actions on dorsal horns**

⌘ **Direct spread in the cerebrospinal fluid to the brainstem**

## ⌘ **Advantages of neuraxial labor analgesia**

- ⌘ Superior **pain relief**
- ⌘ Reduction of circulating **catecholamines**
- ⌘ Attenuation of the **hypertensive response** to labor pain
- ⌘ Possible improvement in **placental blood flow**
- ⌘ Avoidance of general anesthesia

# Spinal (Subarachnoid) Block

⌘ Injection of a local anesthetic into the subarachnoid space

⌘ **Advantages :**

⌘ **Rapid** analgesia onset

⌘ **Short** duration of action

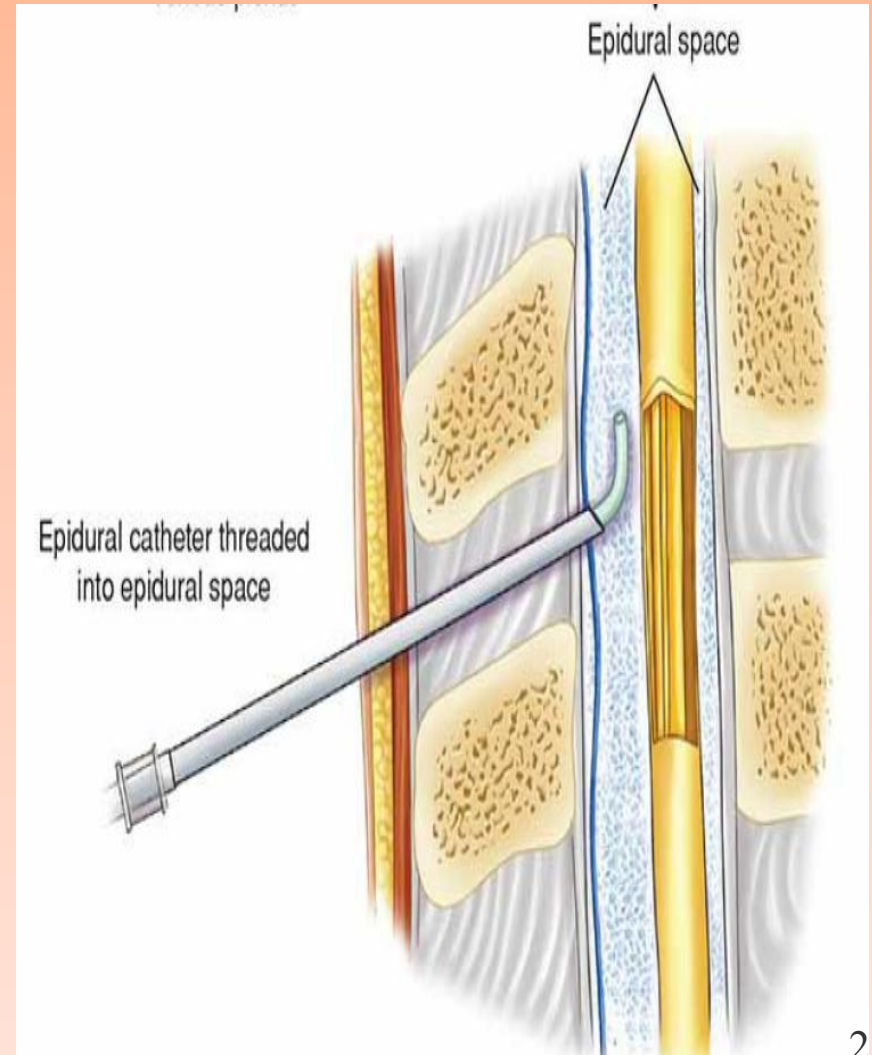
⌘ **High success rate**

⌘ The subarachnoid space during pregnancy is smaller due to internal vertebral venous plexus engorgement.

⌘ Dose of LA is decreased by 30%

# Epidural Analgesia

- ∞ Injection of a local anesthetic agent into the epidural or peridural space
- ∞ Indwelling catheter is placed for subsequent agent boluses or infusion via a volumetric pump



# Epidural...

## Continuous Lumbar Epidural Block

- ⌘ The effective spread of anesthetic depends on
  - ⌘ Catheter tip location—can migrate during labor
  - ⌘ Dose, concentration, and volume of anesthetic agent
  - ⌘ Maternal position (head-down, horizontal, or head-up)
- ⌘ Challenge
  - ⌘ Individual variations in **anatomy**
  - ⌘ Presence of **synechiae**



# Combined Spinal–Epidural Analgesia

- ⌘ An introducer needle is first placed in the epidural space
- ⌘ A small-gauge spinal needle is then introduced through the epidural needle into the subarachnoid space—this is called the *needle-through-needle technique*
- ⌘ A single bolus of an opioid, sometimes in combination with a local anesthetic, is injected into the subarachnoid space
- ⌘ The spinal needle is withdrawn, and an epidural catheter is then placed through the introducer needle

# Combined...

- ⌘ A subarachnoid opioid bolus results in the rapid onset of profound pain relief with no motor blockade
- ⌘ Advantage
  - ⌘ **Faster onset** (2 to 5 min) than epidural analgesia (15 to 20 min)
  - ⌘ Greater **uniformity** in sensory blockade
  - ⌘ Improved **sacral dermatome** coverage

# Complications of neuraxial analgesia

## ⌘ Common

- ⌘ Hypotension
- ⌘ Fever
- ⌘ Postdural puncture headache
- ⌘ Break through pain

## ⌘ Rare

- ⌘ Intravascular injection
- ⌘ Neurologic injury

# Complications ...

## Hypotension

### cause

- ⌘ **Vasodilatation** from sympathetic blockade
- ⌘ Obstructed venous return due to **uterine compression** of the great vessels.

### Treatment

- ⌘ Uterine displacement by left lateral patient positioning
- ⌘ Intravenous crystalloid hydration
- ⌘ Intravenous bolus injections of **ephedrine or phenylephrine**

# Complication...

## High or Total Spinal Blockade

- ⌘ An **excessive dose** of local anesthetic
- ⌘ Inadvertent injection into the subdural or subarachnoid space
- ⌘ Management
  - ⌘ Immediate action to prevent cardiac arrest
    - ⌘ **Displace** uterus laterally
    - ⌘ **Intubation** for effective ventilation
    - ⌘ **Crystalloids** and vasopressor

# Complication...

## Postdural Puncture Headache

- ⌘ **Leakage** of CSF from puncture site → creates **traction** on pain-sensitive CNS structures → vasodilatation in response to loss of CSF—the Monro-Kellie doctrine
- ⌘ **Prevention**
  - ⌘ Small-gauge spinal needle
  - ⌘ Avoiding multiple punctures
- ⌘ **Treatment**
  - ⌘ Fluid administration
  - ⌘ Bed rest (flat supine position )
  - ⌘ Caffeine

# Complication...

## *Epidural blood patch*

- ⌘ Is considered the gold standard for treatment
- ⌘ 10 to 20 mL of autologous blood obtained aseptically by venipuncture is injected into the epidural space
- ⌘ Relief is immediate and complications are uncommon
- ⌘ If headache is not improved consider
  - ⌘ Superior sagittal sinus thrombosis
  - ⌘ Pneumocephalus
  - ⌘ Hematomas

# Complication...

## Bladder Dysfunction

- ⌘ Bladder emptying impaired for several hours after delivery

## Arachnoiditis and Meningitis

- ⌘ Rare due aseptic techniques

## Maternal Fever(epidural)

- ⌘ *Dysregulation of body temperature*



# Complication...

## Back Pain

- ⌘ Back pain after delivery was common with epidural analgesia

## Miscellaneous Complications

- ⌘ A spinal or epidural hematoma
- ⌘ Epidural abscesses
- ⌘ The plastic epidural catheter can be sheared off

# Complication...

## Cesarean Delivery Rates

✂ Did not increase cesarean delivery rates

# Complication...

## Severe Preeclampsia-Eclampsia.

- ⌘ Maternal and neonatal outcomes did not differ

### ⌘ **Potential concerns**

- ⌘ Hypotension vs. hypertension

- ⌘ Pulmonary edema following infusion of large volumes of crystalloid

- ⌘ Judicious prehydration—usually with 500 to 1000 mL of crystalloid

# Contraindications to Neuraxial Analgesia

## ⌘ Absolute

- ⌘ Maternal coagulopathy
- ⌘ Thrombocytopenia
- ⌘ Heparin within 12 hours
- ⌘ Maternal bacterimia
- ⌘ Infection over needle insertion site
- ⌘ Intracranial mass

## Relative

- ⌘ Aortic stenosis or pulmonary hypertension

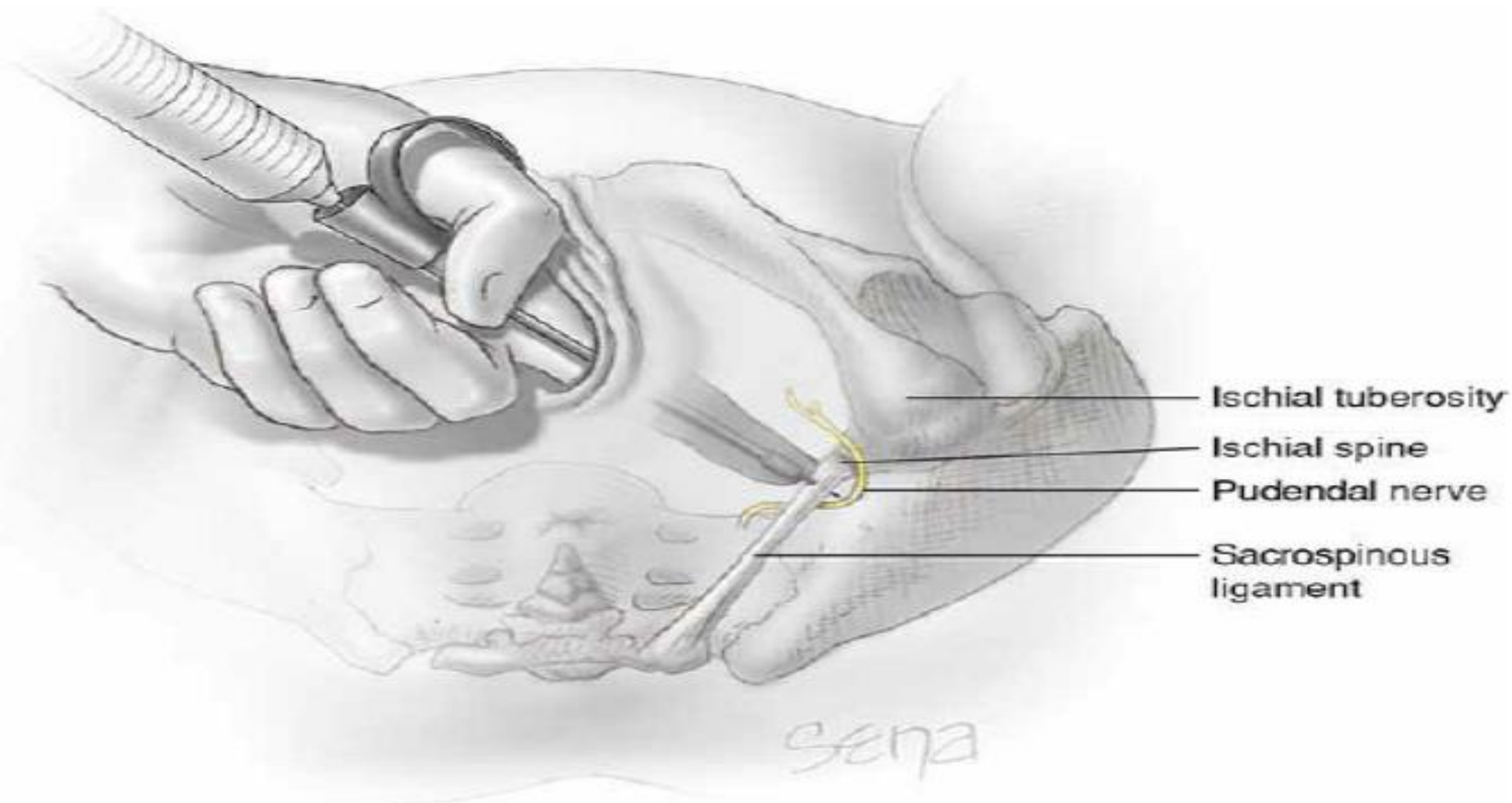
# Thrombocytopenia

- ⌘ The level at which epidural bleeding *might develop* is *unknown*
- ⌘ Platelet counts of 80,000 to 100,000/ $\mu$ L may be candidates for regional analgesia.
- ⌘ Counts between 50,000 and 80,000 require an individualized decision on risks and benefits

# Other regional blocks

## Pudendal Block

- ✧ Provide sensory innervation to the **perineum, anus, vulva, and clitoris.**
- ✧ **Transvaginal or transperineal approach**
- ✧ **Onset-** 3 to 4 minutes of injection
- ✧ Does not provide adequate analgesia for **extensive obstetrical manipulation**



**FIGURE 25-2** Local infiltration of the pudendal nerve. Transvaginal technique showing the needle extended beyond the needle guard and passing through the sacrospinous ligament to reach the pudendal nerve.

## Complications

- ⌘ Impede the urge to **push** during the second stage of labor
- ⌘ Infection
- ⌘ Failure
- ⌘ Systemic toxicity
- ⌘ Ischiorectal or vaginal hematoma (coagulopathy)
- ⌘ Fetal injection of local anesthetic



## Paracervical Block

- ✧ Provides satisfactory pain relief **during first-stage labor**(from cervical dilatation)
- ✧ 5 to 10 mL of lidocaine (1 to 2 %) is injected **into the cervix laterally at 2, 5,8 and 10 o'clock**
- ✧ Relatively short acting and have to be **repeated** during labor

Injection site  
for tenaculum  
(12 o'clock)

Injection sites  
(2, 4, 8, 10 o'clock)



## Complications

- ⌘ Fetal bradycardia (15 percent )
  - ⌘ Drug-induced arterial vasospasm as a cause of fetal bradycardia
  - ⌘ Not used in situations of potential fetal compromise
- ⌘ Hematoma
- ⌘ Infection

# ANESTHESIA CONSIDERATIONS FOR OPERATIVE DELIVERY

- ⌘ Higher concentration local anesthetic through an indwelling epidural catheter
- ⌘ Pudendal nerve block

# ANESTHESIA FOR CESAREAN DELIVERY

- ⌘ **Spinal anesthesia**
- ⌘ **Epidural anesthesia**
- ⌘ **Combined spinal epidural anesthesia**
- ⌘ **Local infiltration**
- ⌘ **General anesthesia**

# ANESTHESIA FOR C/S...

## Cesarean Delivery

⌘ Depending on maternal size :

- ⌘ 10 to 12 mg of bupivacaine in a hyperbaric solution or
- ⌘ 50 to 75 mg of lidocaine hyperbaric solution

# ANESTHESIA FOR C/S...

## SPINAL ANESTHESIA

- ⌘ Quicker and easier to place
- ⌘ Allows adequate operating conditions in a shorter time,
- ⌘ Provides a denser block
- ⌘ More cost effective
- ⌘ Less likely to fail (failure rate < 1%).
- ⌘ Hyperbaric bupivacaine 10 to 15 mg is frequently used to achieve an adequate (T4) block level.

# ANESTHESIA FOR C/S...

## Epidural anesthesia

- ⌘ Use 3% 2-chloroprocaine to attain a T4 level in a newly placed catheter
- ⌘ May take **10 minutes**
- ⌘ Volumes required 10 - 20 Ml
- ⌘ Should be given in divided doses to ensure that catheter has not migrated into intravascular or intrathecal space



# ANESTHESIA FOR C/S...

## COMBINED SPINAL EPIDURAL ANESTHESIA

⌘ Allows rapid onset of a dense reliable block

⌘ Disadvantages

⌘ Presence of untested catheter

⌘ Misplaced

⌘ Nonfunctioning epidural.

# ANESTHESIA FOR C/S...

## LOCAL INFILTRATION

- ⌘ To augment an inadequate or “**patchy**” regional block
- ⌘ To save life of a fetus in the absence of anesthesia support
- ⌘ Technique 1
  - ⌘ Skin, subcutaneous, muscle, and rectus sheath layers are infiltrated along proposed incision
  - ⌘ Up to a total of 70 mL of 0.5-percent lidocaine with 1:200,000 epinephrine is prepared for infiltration
- ⌘ Technique 2
  - ⌘ **Field block-** 10th, 11th, and 12th **intercostal nerves** and ilioinguinal and genitofemoral nerves
  - ⌘ At level of external inguinal ring—b/n iliac crest and sub costal margin

# GENERAL ANESTHESIA

- ✧ Trained personnel with specialized instrument are mandatory
- ✧ Indication
  - ✧ Fetal bradycardia
  - ✧ Maternal hemorrhage
  - ✧ Coagulopathy
  - ✧ Uterine rupture
  - ✧ Maternal trauma
- ✧ Advantage
  - ✧ Rapid and reliable
  - ✧ Allows for controlled airway ventilation
  - ✧ Improved hemodynamic stability

# GENERAL ANESTHESIA...

## **Fasting**

- ✧ Recommendations are that modest amounts of clear liquids such as water, clear tea, black coffee, carbonated beverages, and pulp-free fruit juices be allowed in uncomplicated laboring women
- ✧ Clear liquids: 2 hrs
- ✧ Foods : 6 hrs
- ✧ Fatty or solid foods : 8hrs

# GENERAL ANESTHESIA...

## STAGES OF ANESTHESIA

1. **Stage of analgesia**—analgesia without amnesia
2. **Stage of excitement**—Amnesic
  - ⌘ Respiration is irregular
  - ⌘ vomiting may occur if the patient is stimulated
3. **Stage of surgical anesthesia**
  - ⌘ Regular respiration
  - ⌘ Complete cessation of spontaneous respiration (apnea)
4. **Stage of medullary depression**
  - ⌘ Depression of the vasomotor center in medulla and respiratory center

# GENERAL ANESTHESIA...

## ⌘ Patient Preparation—preanesthetic

- ⌘ Anti-acid administration
- ⌘ Lateral uterine displacement
- ⌘ Pre-oxygenation

## ⌘ Induction and intubation

- ⌘ Induction agents: propofol, etomidate, ketamine
- ⌘ Muscle relaxant—succinylcholine , Rocuronium
- ⌘ Cricoids pressure—*Sellick maneuver*
- ⌘ Intubation—check ventilation

## ⌘ Maintenance

## ⌘ Recovery

# GENERAL ANESTHESIA...

## Inhalational Anesthetics

- ✧ After endotracheal tube secured, anesthesia is maintained with a **halogenated agent** mixed with air or nitrous oxide.
- ✧ The most commonly used inhalational anesthetics
  - ✧ Desflurane
  - ✧ Sevoflurane
  - ✧ Isofluran

# GENERAL ANESTHESIA...

## **Extubation**

- ⌘ After a woman is conscious and follow commands
- ⌘ Maintaining oxygen saturation with spontaneous respiration
- ⌘ Emptying stomach via a NG tube



# Complication of GA

## Failed Intubation

- ✧ Occurs in 1 of every 400 pregnant women

- ✧ Risks

  - ✧ A history of prior difficult intubation

  - ✧ Edema may develop intrapartum

  - ✧ Morbid obesity

- ✧ **Management**

  - ✧ Awake intubation or regional analgesia

  - ✧ Surgery may proceed with mask ventilation

  - ✧ Woman may be allowed to awake

  - ✧ Cricothyrotomy

# Complication of GA

## Aspiration

- ⌘ Massive gastric acidic inhalation

## Pathophysiology

- ⌘ pH is  $<2.5$
- ⌘ Right mainstem bronchus
- ⌘ Right lower lobe is most often involved
- ⌘ In severe cases-bilateral widespread involvement

## ⌘ Treatment

- ⌘ Depend on severity
- ⌘ Clear airways
- ⌘ Antibiotics

# POSTPARTUM ANALGESIA

## ⌘ Goals

- ⌘ Maximizing patient satisfaction
- ⌘ Minimizing side effects
- ⌘ Aiding functional capacity
- ⌘ Preventing prolonged hospital stays

## ⌘ Option

- ⌘ Paracetamol
- ⌘ NSAIDS
- ⌘ Opioids
- ⌘ TAP block

THANK  
YOU !!!