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Analgesia and Anesthesia in Gynecology and Obstetrics



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HISTORY

- Chewing of coca plant leaves mixed with guana and starch – an active alkaloid is formed which has an anesthetic effect in contact with wound (Inca tribe) – forerunner of local anesthesia
- 1540. Paracelsus: diethyl-eter (forerunner of ether and inhalation anesthesia)
- 1665. intravenous injection of opium – headstone for intravenous anesthesia

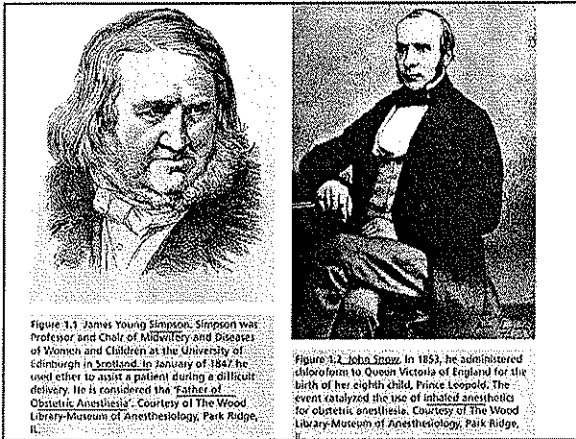
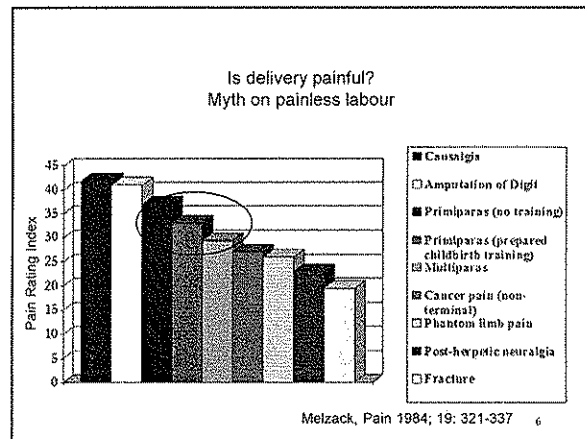
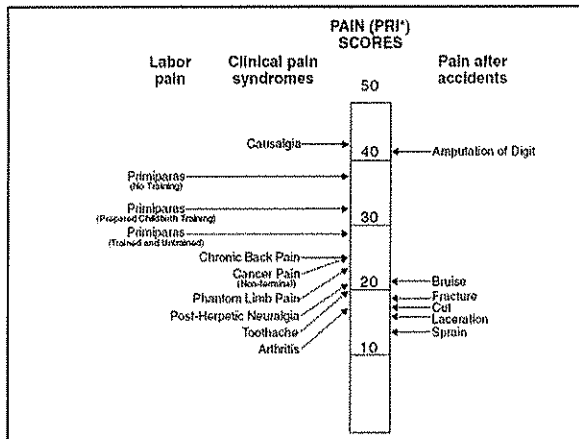


Figure 1.1 James Young Simpson. Simpson was Professor and Chair of Midwifery and Diseases of Women and Children at the University of Edinburgh in Scotland. In January of 1847, he used ether to assist a patient during a difficult delivery. He is considered the "Father of Obstetric Anesthesia". Courtesy of The Wood Library-Museum of Anesthesiology, Park Ridge, IL.

Figure 1.2 John Snow. In 1853, he administered chloroform to Queen Victoria of England for the birth of her eighth child, Prince Leopold. The event catalyzed the use of inhaled anesthetics for obstetric anesthesia. Courtesy of The Wood Library-Museum of Anesthesiology, Park Ridge, IL.



Figure 1.3 Grantly Dick-Read. In 1933 he published his first book, *Natural Childbirth*. Dick-Read, a British obstetrician, did not believe labor and delivery were inherently painful; he believed society was responsible for labor pain, causing women to fear childbirth. This fear produced tension, which in turn produced pain. Courtesy of The Wellcome Trust, London, UK.



The intensity of pain during labour depends on:

- ❖ Parity
- ❖ Individual pain tolerance
- ❖ Weight and position of fetus
- ❖ Strength of uterine contractions
- ❖ Experience from previous deliveries
- ❖ Preparation of the pregnant woman



The experienced pain intensity is a result of the interaction of neurophysiological, psychological and socio-cultural factors

PREPARATION FOR ANESTHESIA

Pre-operative measures:

1. Clinical examination by an anesthesiologist, allergies? Jewellery, teeth...
2. Laboratory tests (blood, urine, time of bleeding and coagulation, ECG, lung X ray, pregnancy test...)
3. Patient must be dieting for at least 6 hours prior to surgery
4. Preoperative prophylaxis (antibiotic)
5. Shaving, toilette, enema...
6. Intravenous path and infusion of cristaloid fluid

THROMBOPROPHYLAXIS

- ! Discontinue oral contraceptives 4 weeks prior to surgery
- ! Leg bandage
- ! Low molecular heparine (e.g. Clivarin, Clexan ... / 7 days)
- ! Early postoperative movement – raising from bed
- ! Physiotherapy
- ! Elevated limb position, bandage

Thromboembolism – risk factors

- ! Medical history of previous thrombophlebitis or emboly
- ! Genetic affinity to hypercoagulation
- ! Irradiation
- ! Obesity
- ! Peripheral circulation issues
- ! Feet edema
- ! Oral contraceptives
- ! Congestive heart disease
- ! Duži boravak u bolnici

Relative Risk and Actual Incidence of Venous Thromboembolism

Population	Relative Risk	Incidence per 100,000 per year
Young women 20" general population	1	4.8%*
Pregnant women	12	4.6%*20
High-dose oral contraceptives	6.6%*10	2.6%*50
Low-dose oral contraceptives	2.6%*	1.2%*10
Leiden mutation carrier	4.4%*	2.1%*10
Leiden carrier and oral contraceptives	25	1.2%*150
Leiden mutation 40" hospitalized	80	2.2%*100

ASA-American Society of Anesthesiologist ASA scale

ASA I - healthy

ASA II - mild systemic disease

ASA III - serious systemic disease with functional impairment

ASA IV - serious systemic disease - constant life - threatening condition

ASA V - A moribund person who is not expected to survive without the operation

upto 40 years

Preoperative analysis: Blood type, Rh factor, TBC, Time of bleeding, PT, aPTT, INR, SE, urine and with these results, the anesthesiologists exam. Tests should not be older than 15 days.

40 - 60 years.

Preoperative analysis: Blood type, Rh, TBC, PT, aPTT, INR, SE, Glucose in blood, urine, urea, creatinine, electrolytes, ECG and with these results, the anesthesiologists exam. Tests should not be older than 15 days.

above 60 years.

Preoperative analysis: BT, Rh, TBC, aPTT, PT, INR, SE, blood glucose, urine, urea, creatinine, electrolytes, ECG, lung X ray, and with all the results an internist examination followed by anesthesiologist exam. Tests should not be older than 15 days.

ANALGESIA / ANESTHESIA

❖ **Analgesia** = administration of drugs or combining drugs in order to block the transmission of painful stimuli.

❖ **Anesthesia** has 4 components:

- ❖ Analgesia
- ❖ Sedation and retrograde amnesia
- ❖ Muscle relaxation
- ❖ Blocking the neurovegetative response

Table 6.1: Alternative methods of labor analgesia

Nonpharmacological

- Childbirth education
- Psychoprophylaxis
- Hypnosis
- TENS/acupuncture/water blocks
- Physical therapies (water baths, massage)

Pharmacological

- Inhaled analgesics - nitrous oxide (N₂O), isoflurane/desflurane in N₂O
- Opioid analgesics - IM, IV or PCA: meperidine, morphine, diamorphine, fentanyl, remifentanyl, meptazinol, nalbuphine
- Nonopioid analgesics - ketamine/tramadol

Non-neuraxial regional analgesia

- Paracervical plexus block
- Lumbar sympathetic block
- Pudendal nerve block



Analgesia and anesthesia in Gynecology and Obstetrics

The goal:

- ! (unconsciousness)
- ! Remove pain
- ! Remove reflexes
- ! Muscle relaxation
- ! - especially of the bowels

To avoid:

- ! Aspiration of gastric contents
- ! Respiratory depression in newborn
- ! Fetal hypoxia
- ! Hypotension (Vena cava sy)
- ! Uterus atony

TYPES OF ANESTHESIA

> GENERAL

> REGIONAL

- EPIDURAL
- SPINAL
- COMBINED
- NEURAL BLOCK
- LOCAL

> SEDATION

GENERAL

Affects the brain – patient loses conscience – the patient is completely unaware of all senses in the whole body

Anesthetics are administered into the blood stream or through respiration through the lungs (GET, LM, GIV, MASK, COMBINATION)

they prevent pain and relax muscles in order to achieve ideal conditions for the surgery

complications: mouth or throat pain, impaired speech, oral cavity and teeth injury, consciousness during anesthesia, nausea, vomiting, blood vessels damage, aspiration of gastric content or pneumonia.

Different medications are given in combinations in order to achieve the wanted effect, increase the patient safety and comfort and minimize the side-effects.

REGIONAL

Anesthesia of specific body part

injecting the anesthetic around the nerve which innervates the area of the body that undergoes the intervention

Anesthetics will temporarily stop regional and local nerves from transmitting signals towards the brain.

Since brain is not affected, the patient will stay awake but will not feel any pain. Often times, medications for relaxation and anxiety are administered. They can make patient sleepy or even fall asleep during the procedure, so patients often don't remember the operation.

Lesser side-effects in comparison to general anesthesia (sore throat, nausea, vomiting, dysorientation). Regional anesthesia enables a painless state which may last for several hours after operation.

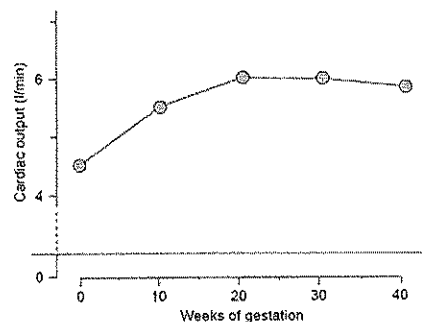
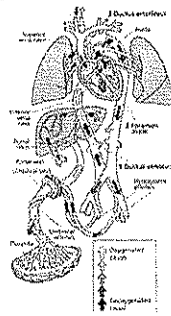
TYPES OF REGIONAL ANESTHESIA

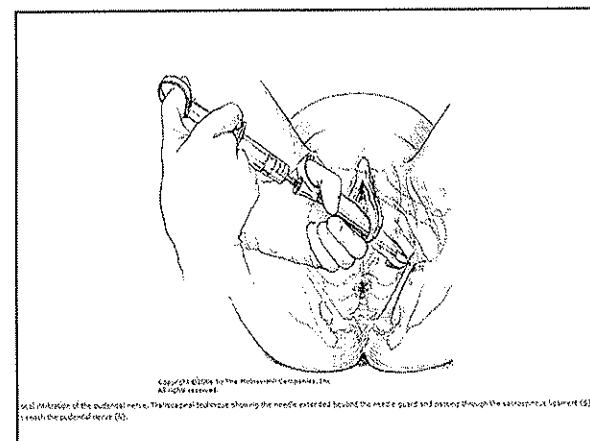
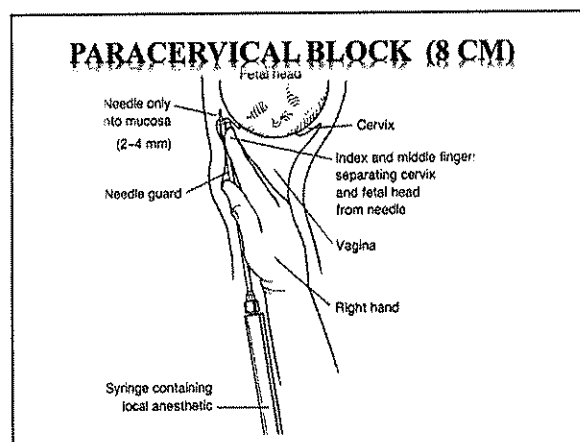
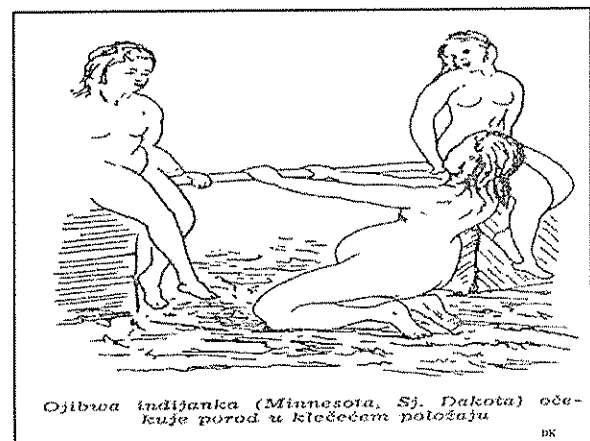
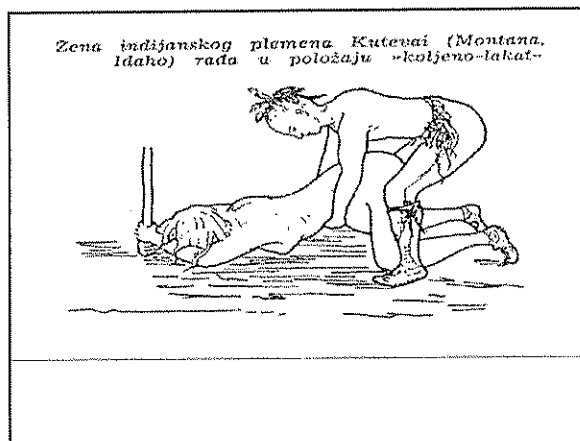
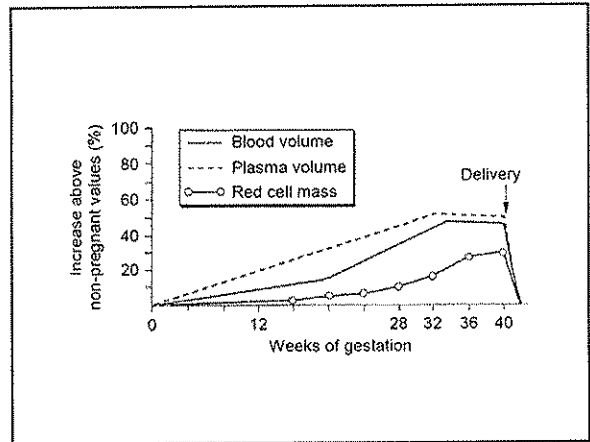
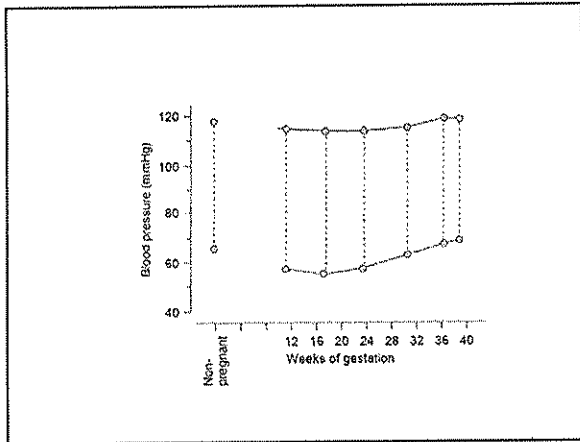
1. Spinal – in planned and urgent cesarean sections – fast effective with small dose of anesthetics – medications are injected in cerebrospinal fluid. Painful signals from spinal nerves are blocked before reaching the brain! - in 2-4 % of patients there's a headache after this type of anesthesia
2. Epidural- "pain free delivery" for labour pain – in case of a C-section, it can be intensified with by a stronger anesthetic solution.
in epidural anesthesia, the higher dose of local anesthetic is required than in spinal. It also takes a longer time for it to become effective – movement is preserved – in continuous epidural anesthesia a catheter is implanted.
3. Combined spinal-epidural (CSE)
4. Regional block = anesthesia of a group of nerves. Anesthetic is injected around nerves which supply the area of procedure. It blocks pain signal transmission towards brain.
5. Local- anesthesia of a specific area on which the procedure will be performed.
It is normally administered by the surgeon.
If necessary, the anesthesiologist may administer intravenously medications which relax the patient, which is then called monitored anesthesiologist care or potentiated local anesthesia

SEDATION

he state of reduced consciousness which is achieved by administering drugs that affect the central nervous system.

PHYSIOLOGY OF PREGNANCY





PUDENDAL BLOCK (n. pudendus)-
 first you find the spina ischiadica;
 injection of 10-15 ccm. xylocaina or
 analgocaina on both sides- relaxation of
 perineal muscles and the anesthesia of
 perineal skin after a few minutes-
 delivery with insignificant pain, toxicity
 unknown

CESAREAN SECTION

- ! The most common obstetric operation.
- ! The rates grow
- ! Type: GET / epidural

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EPIDURAL

- ! THE POPULAR WISH OF WOMEN IN LABOR TO BE AWAKE
- ! NO FEAR OF ASPIRATION
- ! NO EFFECTS OF ANESTHETICS ON FETUS
- ! SMALLER BLOOD LOSS
- ! POSSIBILITY OF ANALGESIA EVEN AFTER DELIVERY

Table 5.1. Contraindications to regional anesthesia

Absolute	Relative*
Patient refusal or the inability to cooperate	Mild coagulopathy (i.e. isolated decreased platelet count)
Localized infection at the insertion site	Severe maternal cardiac disease such as Eisenmenger's syndrome or aortic stenosis (see Chapter 13)
Sepsis	Neurological disease (spina bifida) (see Chapter 13)
Severe coagulopathy	Severe fetal depression
Uncorrected hypovolemia	

*The risk of a complication occurring must be weighed against the benefits of the regional anesthetic on a case-by-case basis.

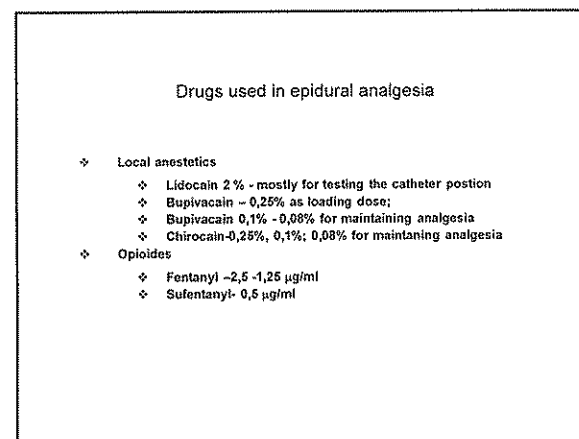
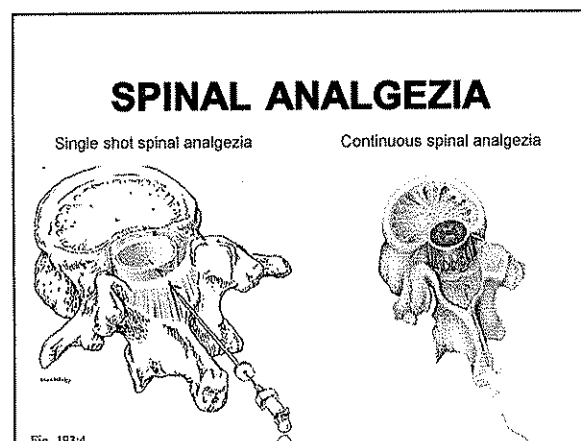
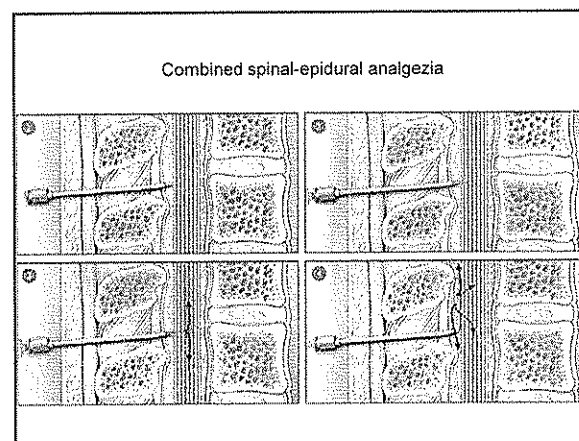
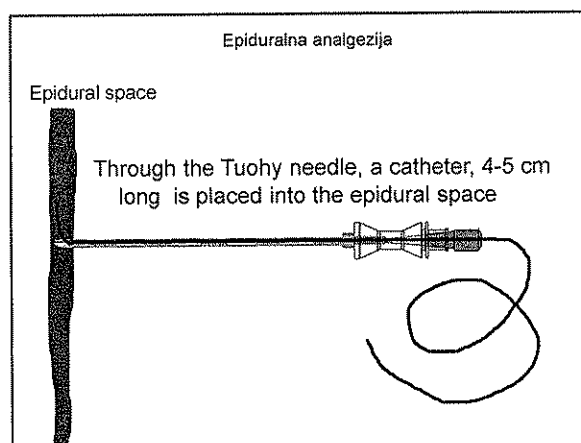
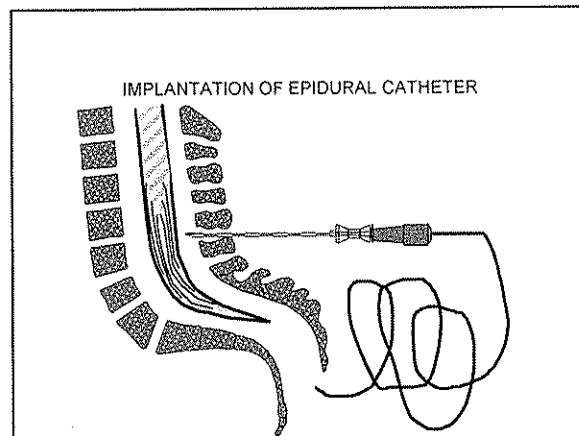
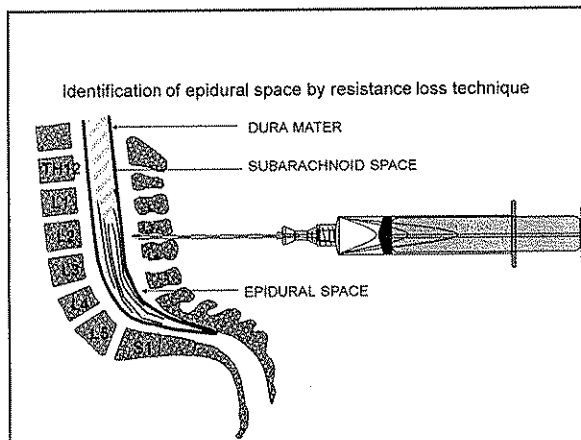
Table 5.5. Solutions for various epidural analgesia maintenance techniques

Technique	Concentration and dosing schedule
Intermittent bolus	0.1%-0.25% bupivacaine + fentanyl 3 µg/ml + Epi 1:200,000 10 ml (5 × 5 ml) Boluses as needed
Continuous infusion	0.044%-0.125% bupivacaine + fentanyl 1.5-2 µg ml ⁻¹ at 8-14 ml/h
PCEA with basal infusion	0.0625%-0.125% bupivacaine + fentanyl 2 µg ml ⁻¹ at the following settings: Basal rate: 8-12 ml/h Bolus dose: 5 ml Lockout: 10 min Hourly limit: 30 ml
PCEA without a basal infusion	0.125% bupivacaine + fentanyl 2 µg/ml at the following settings: Bolus dose: 8 ml Lockout: 15 min Hourly limit: None

Table 5.6. Complications and side effects associated with epidural analgesia*

Complication or side effect	Incidence
Backache at insertion site	75%
Inadequate labor analgesia	25%
Hypotension	Varies with dose
Motor block	Varies with dose
Urinary retention	Varies with dose
Require replacement	10%
Fetal bradycardia	8%
Intravenous cannulation	6%
Dural puncture	2%
Post dural puncture headache	1%
Spinal catheter	<1%
Subdural catheter	Rare (1:1000)
High spinal block	Rare (1:10 000)
Permanent neurologic injury	Extremely rare (<1:10 000)
Epidural hematoma	Extremely rare (<1:100 000)
Epidural abscess	Extremely rare (<1:100 000)
Death	Extremely rare (<1:100 000)

*The listed incidence for each complication or side effect is an average value obtained from numerous sources within the literature (see also Chapter 19).



Medication protocol

- ❖ Lidocain 2%- 3ml test dose for catheter position
- ❖ Bupivacain 0,25% + Fentanyl 2,5 µg/ml-
- ❖ 8-10 ml solution (pre-condition is VAS score < 3)
- ❖ Bupivacain (Chirocain) 0.1% + Fentanyl 1,25 µg/ml-8 ml/h
- ❖ PCEA: Bupivacain (Chirocain) 0.1% + Fentanyl 1,25 µg/ml-8 ml/h

- ❖ bazal infusion 8ml/h
- ❖ Bolus dose 5ml/h
- ❖ Lock out interval 15min

The newest prospective studies show that epidural analgesia is:

- ❖ The most effective method for treating labour pain but:
- ❖ Prolongs the first delivery stage (upto 1 hour)
- ❖ Longer second delivery stage (< 1 hour)
- ❖ Higher frequency of instrumentally completed deliveries
- ❖ Raise of temperature in mother >38°C when delivery is prolonged
 - ❖ Antipyretics- not indicated in chorioamnionitis
 - ❖ Not linked to increase in neonatal sepsis

IMPLANTATION OF EPIDURAL CATHETER

- ✓ Preparation and toilette based on rules of asepsis
- ✓ Local anesthetic (infiltration)
- ✓ The hanging drop technique (by entering with the needle into the epidural space and compression of dura, negative pressure is created that sucks the hanging drop from the point of the needle, and by the resistance loss technique the pressure on the syringe suddenly drops. The fluid or air are easily injected and then we take out the mandrain from the epidural needle and place the catheter)

Monitoring of women in labour

- ✓ Monitor (blood pressure, heart beat, number of respirations, oxygenation)
- ✓ Controlling the catheter position
- ✓ Verbal communication (paresthesiae, paresis of one or both legs, breathing trouble)
- ✓ Controlling the site of injection (infection)

COMPLICATIONS

- ✓ Most commonly, misplaced catheter
- ✓ Pain in the place of injection
- ✓ Punction of dura (postpunction headache)
- ✓ Peripheral neuropathy
- ✓ Catheter in spinal place
- ✓ Infection of the injection site
- ✓ Urine retention
- ✓ Hemaoma, abscess, death...

Medical indications for regional anesstesia

- ❖ Hypertensive disease
- ❖ Preeclampsia (he pre-condition are normal hematology tests and coagulation)
- ❖ Dystocia
- ❖ Diabetes with or without complications
- ❖ Pulmonary disease
- ❖ Heart disease (except severe aortal stenosis)

Medical indications for regional anesthesia

- ❖ Conditions in which pushing during labour may lead to aggravation of existing diseases- diabetic retinopathy, high myopia, intracranial pathology!
- ❖ Preterm birth
- ❖ Multifetal pregnancy
- ❖ Young, scared and non-cooperable mother
- ❖ Women with increased risk of cesarean section (previous cesarean section, scars on the uterus)???

INDICATIONS: ASA I ACOG
(American Society of Anesthesiologists,
American College of Obstetricians and Gynecologists)

Any women in labour, if asking for analgesia in any phase of delivery and cervical dilation is a candidate for epidural or regional anesthesia

Techniques of regional anesthesia/analgesia

- ❖ Epidural analgesia
 - ❖ Continuous epidural analgesia
 - ❖ PCEA (Patient controlled epidural analgesia)
- ❖ Spinal analgesia
 - ❖ Single shot spinal analgesia
 - ❖ Continuous spinal analgesia
- ❖ Combined spinal-epidural analgesia

Table 19-6: Technique for Labor Epidural Analgesia

1. Informed consent is obtained, and the contraindications are ruled out.
2. Monitoring includes the following:
 - Blood pressure every 1-2 minutes 15 min after giving a bolus of local anesthetic.
 - Continuous maternal heart rate monitoring during analgesia induction.
 - Continuous fetal heart rate monitoring.
 - Continuous verbal communication.
3. Induction with 100 to 200 mL of lactated Ringer solution.
4. The woman assumes a lateral decubitus or sitting position.
5. The epidural space is identified with a loss-of-resistance technique.
6. The epidural catheter is threaded 2-5 cm into the epidural space.
7. A test dose of 3 mL of 1.5% bupivacaine with 1:200,000 epinephrine or 2 mL of 0.2% bupivacaine with 1:200,000 epinephrine is injected after a brief aspiration and after a 30-second wait to assess the chance of confirming tetracycline that results from their pain with tetracycline film formation injection of the test dose.
8. If the test dose is negative, one or two 3-mL doses of 0.2% bupivacaine are injected to achieve a sustained sensory block.
9. After 15-20 min, the block is assessed for loss of sensation to cold or pinprick. If no block is achieved, the catheter is replaced. If the block is asymmetrical, the epidural catheter is repositioned 0.5-1.0 cm and an additional 2-5 mL of 0.2% bupivacaine is injected. If the block remains inadequate, the catheter is replaced.
10. The sensory blockade is the basis for the level of analgesia for labor analgesia.
11. Subsequently, maternal blood pressure is recorded every 2-15 min. The fetal heart rate is monitored continuously.
12. The level of analgesia and intensity of motor block are assessed at 15-min intervals.