

زایمان بی درد راهکارها و روش ها

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متخصص بیهوشی و مراقبت های ویژه
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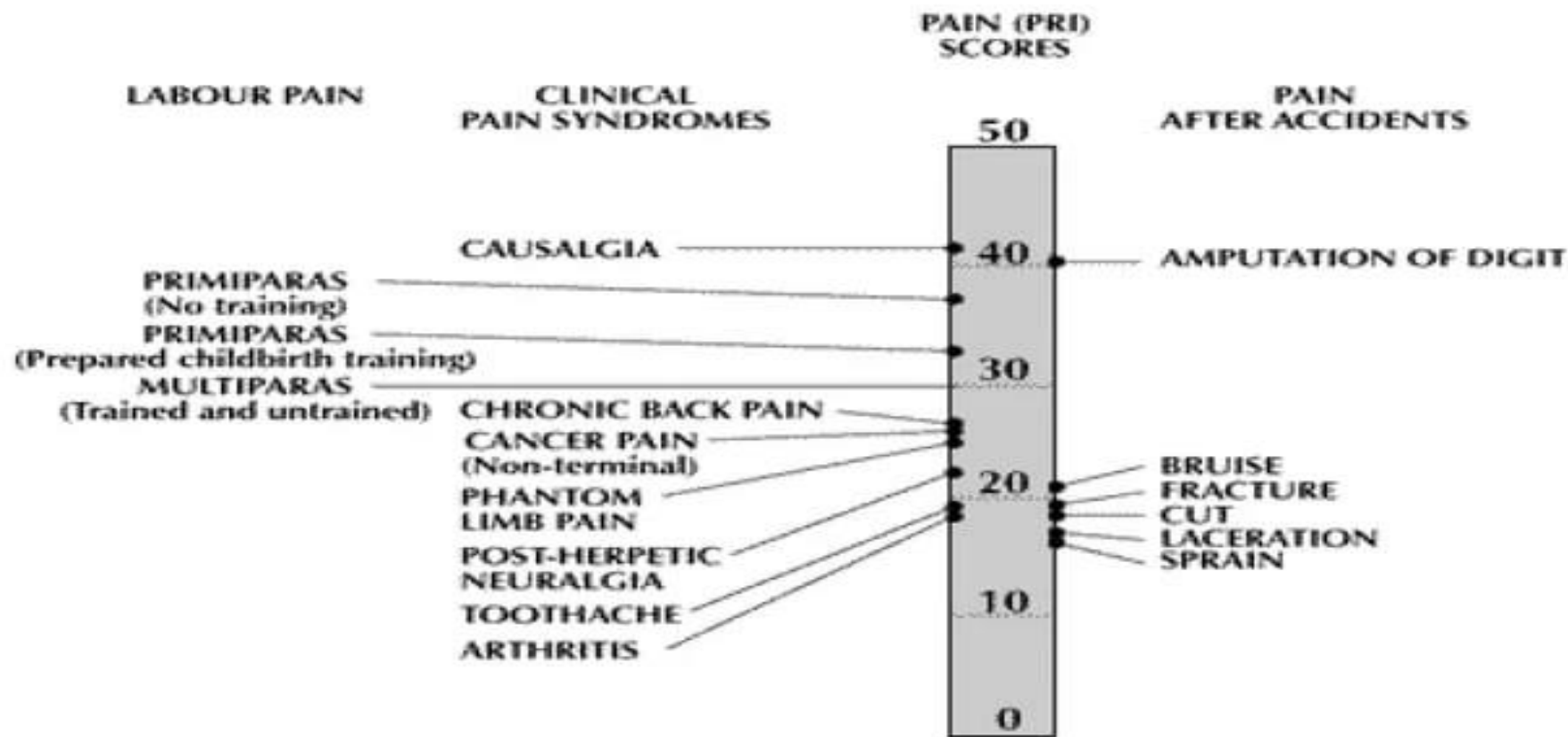
DEFINITION OF LABOUR

‘LABOUR can be defined as spontaneous painful uterine contractions associated with the effacement and dilatation of the cervix and the descent of the presenting part’.

labor pain is one of **the most intense pain** that a woman can experience.

- labor pain is one of the *most intense* pains that a woman can experience, and it is *typically worse than* a pain associated with a deep laceration.
- *60%* of primiparous women described the pain of uterine contraction as *unbearable, intolerable, extremely severe, or excruciating.*

Comparison of pain scores using the McGill Pain Questionnaire



As noted by the ASA and the ACOG



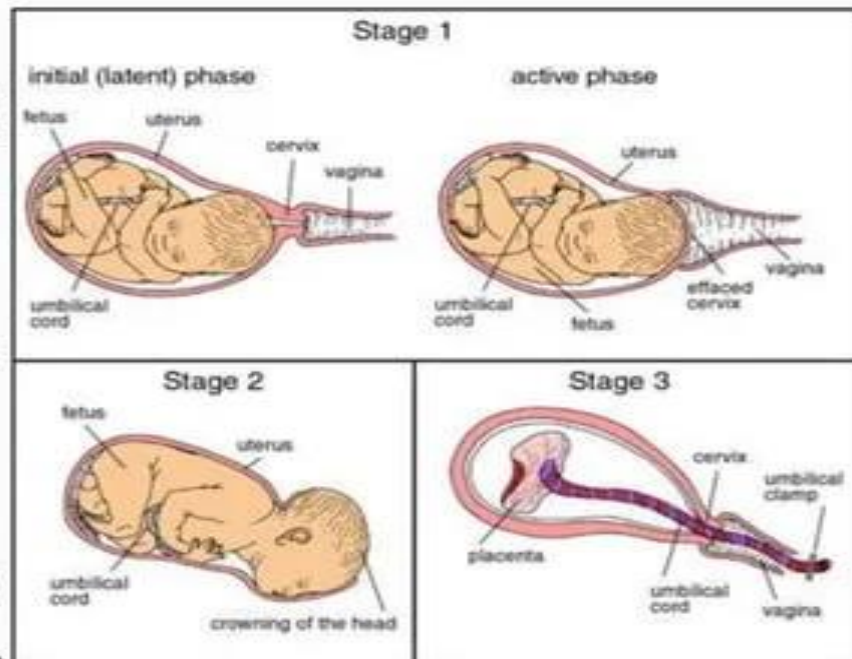
There is no other circumstance where it is considered acceptable for a person to experience severe pain, amenable to safe intervention.



Maternal request is a sufficient medical indication for pain relief during labor._

STAGES OF LABOUR

- I. From onset of regular uterine contractions to full dilation of cervix.
- II. From full cervical dilation to delivery of the fetus.
- III. From delivery of the fetus to delivery of the placenta.



Physiology of labor Pain

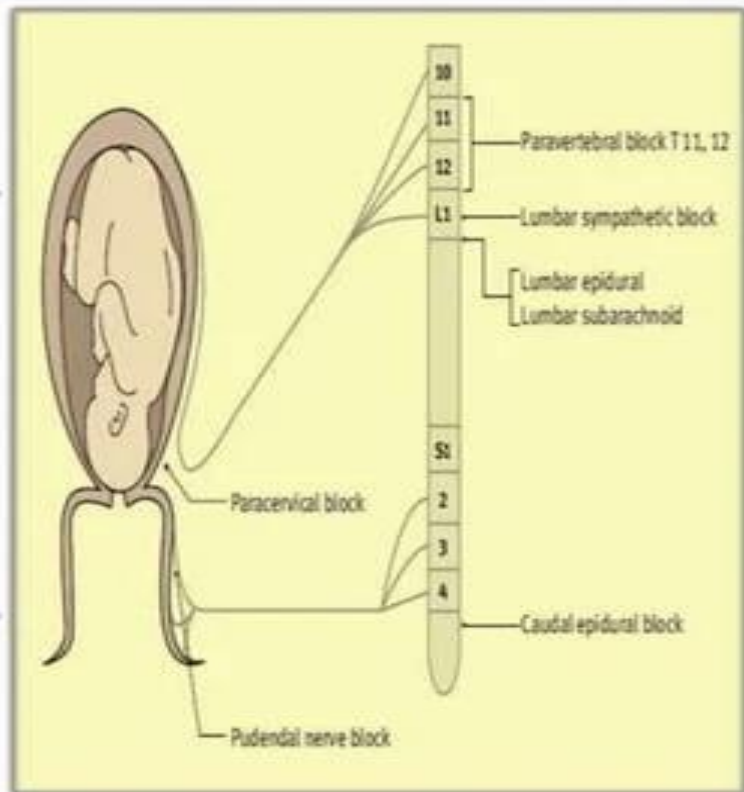


1st stage of labor Mostly visceral

- Dilation of the **cervix** and distention of the **lower uterine segment**.
- Dull, aching and poorly localized
- Slow conducting, visceral C fibers, enter spinal cord at T10 to L1

2nd stage of labor Mostly somatic

- Distention of the **pelvic floor, vagina and perineum**
- Sharp, severe and well localized
- Rapidly conducting A-delta fibers, enter spinal cord at S2 to S4



Pain pathways during labour

Visceral afferent pain fibers from the uterus, cervix, and upper vagina form the cervical plexus and enter the spinal cord at the T₁₀–L₁ levels. The visceral afferent fibers also enter the sympathetic chain at L₂ and L₃ levels.

lower vagina, vulva, and perineum. signals are conveyed via the S₂–S₄ spinal nerve roots that form the pudendal nerve

Mechanism of labour pain

1. Uterine contraction result in myometrial ischemia



Releases bradykinin, histamine, serotonin



pain

2. stretching and distention of lower uterine segment & cervix



stimulate mechanoreceptors



pain

Pain intensity:



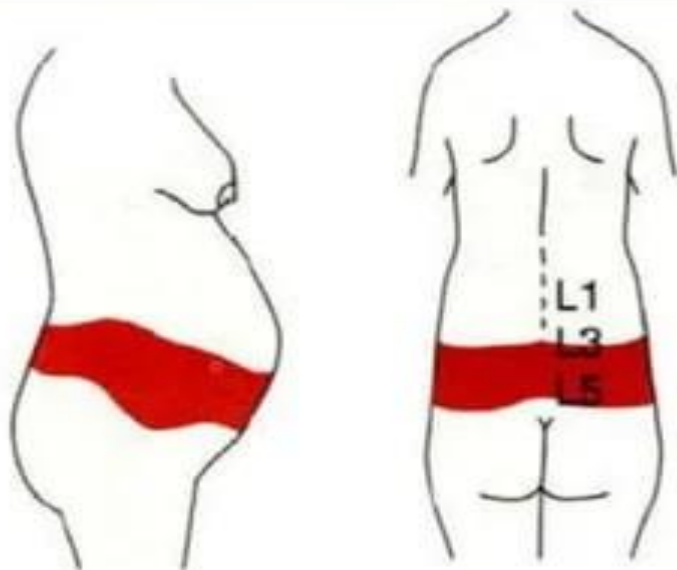
Mild



Moderate

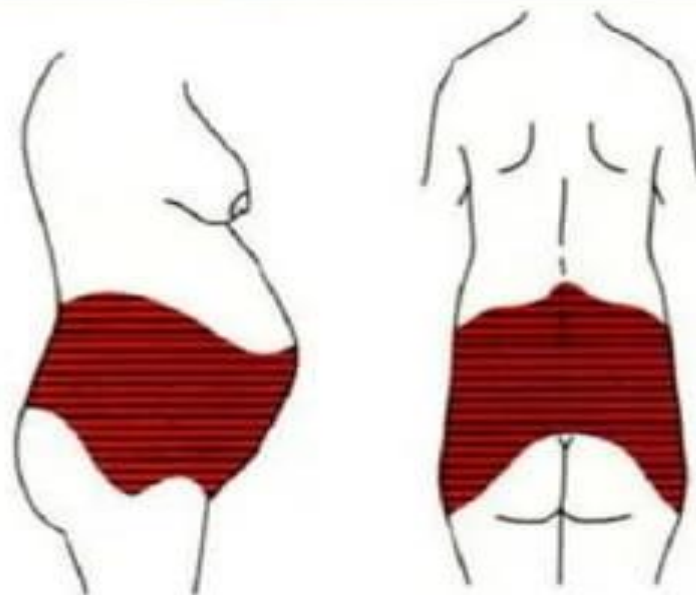


Severe



A

Early first stage



B

Late first stage

Pain intensity:



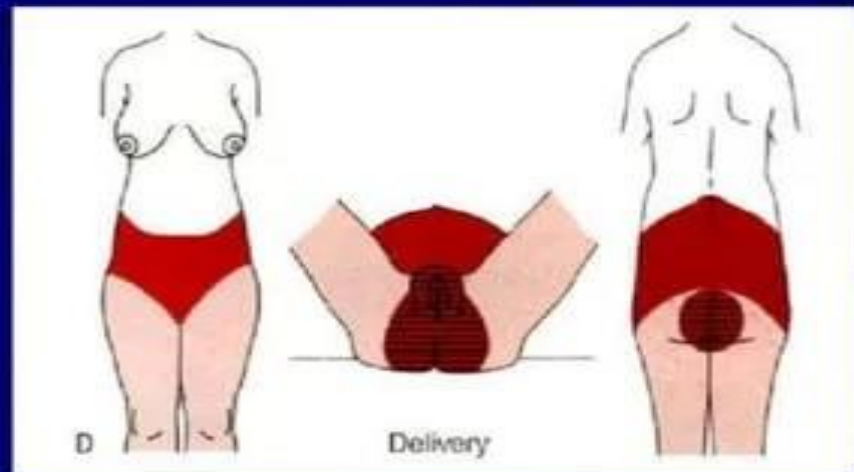
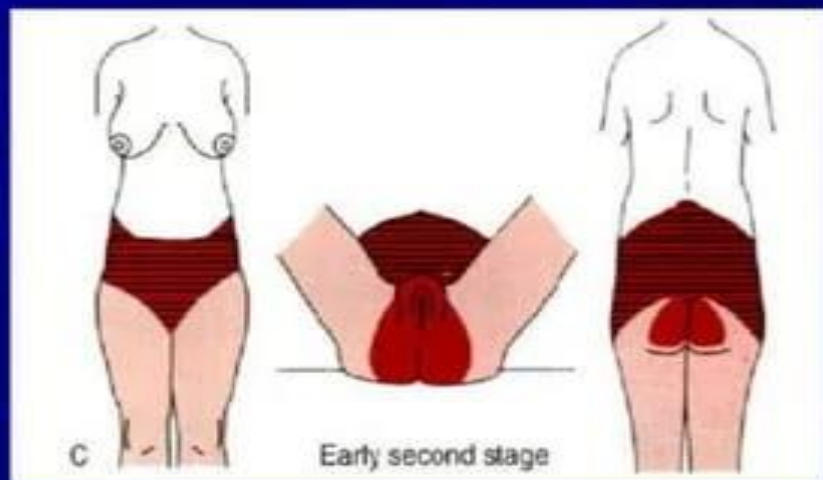
Mild



Moderate



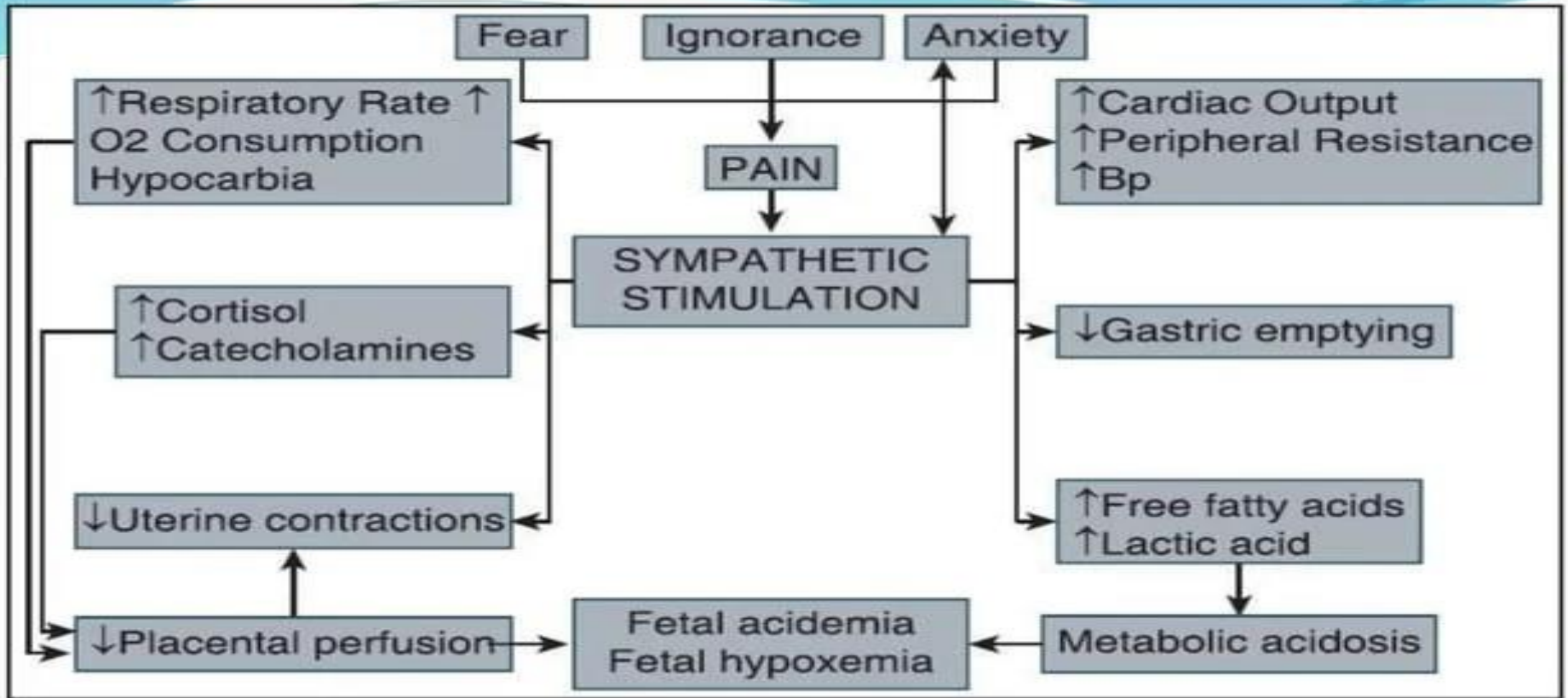
Severe



Adverse Sequelae of Labour Pain

Pain during labour provides a noxious and unpleasant stimulus which may prove deleterious to the mother and fetus. The adverse sequelae of which are





The ideal labor analgesic technique



is safe for both the mother and the infant

does not interfere with the progress of labor and delivery

provides flexibility in response to changing conditions

provides consistent pain relief

has a long enough duration of action

minimizes undesirable side effects (e.g., motor block)

minimizes ongoing demands on the anesthesia



METHODS OF PAIN **RELIEF IN LABOUR**

Analysis of 13 Cochrane Reviews

WHAT WORKS

Epidural, CSEA and IV PCA remifentanyl & Inhaled analgesia effectively manage pain in labour.

But may give rise to adverse effects.

WHAT MAY WORK

Immersion in water, acupuncture, Massage, local nerve blocks, non-opioid drugs & Relaxation (Yoga) may improve management of labour pain, with few adverse effects.

INSUFFICIENT EVIDENCE

Hypnosis, Biofeedback, Sterile water injection, Aromatherapy, TENS, “are more effective than placebo”.

Women receiving pethidine experienced adverse effects including drowsiness and nausea.

<u>Non pharmacological</u>	<u>Pharmacological</u>		
	<i>Inhalational</i>	<i>Systemic</i>	<i>Regional</i>
Psycho prophylaxis Lamaze technique Hypnosis TENS Acupuncture Hydrotherapy Aromatherapy Heat and cold Vertical position SWI Other means	Entonox Sevoflurane Desflurane isoflurane	Opioids Sedatives Ketamine Tramadol	Lumbar epidural Caudal epidural CSE Subarachnoid block Lumbar Sympathetic block Paracervical block Pudendal block



Non pharmacological

Child birth preparation: *Psychoprophylaxis[Dick Read]*

- This method focuses on teaching the mother conditioned reflexes to overcome the pain and fear of childbirth.
- It uses an education program, human support during labor, breathing techniques, relaxation techniques of voluntary muscles, a strong focus of attention, and specific activities to concentrate on during contractions to block pain.
- Presence of another woman during labor to support the expectant mother has a positive effect on outcomes, including the duration of labor.

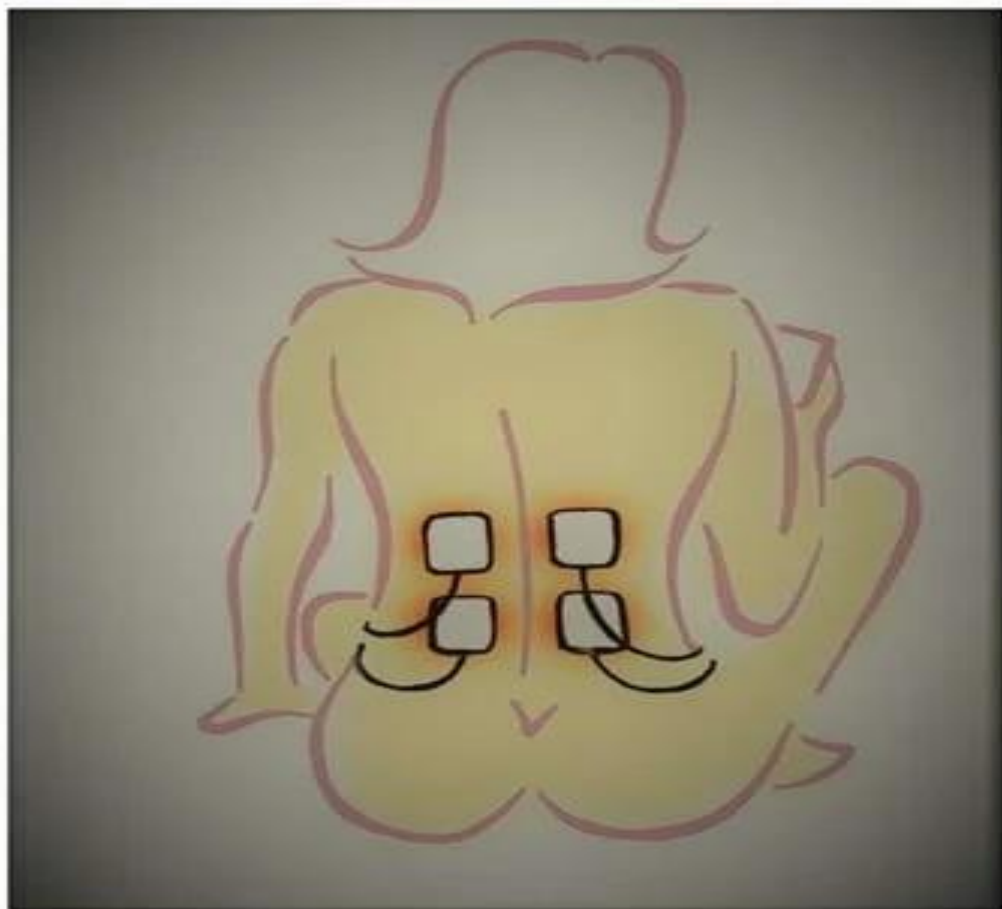
Lamaze technique

- The stated goal of Lamaze is to increase a mother's confidence ; help pregnant women in ways that both facilitate labor and promote comfort, including relaxation techniques, movement and massage.
- Take an organizing breath—a big sigh as soon as the contraction begins. ...f/by Rapid and shallow breathing
- Focus your attention

Transcutaneous Electrical Nerve Stimulation

- an electro-analgesia method.
- Reduce pain by nociceptive inhibition at a presynaptic level in the dorsal horn by limiting central transmission.
- Electrical stimulation preferentially activates low-threshold myelinated nerves.
- Afferent inhibition effects inhibit propagation of nociception along unmyelinated small c fibers by blocking impulses to target cells in the substantia gelatinosa of the dorsal horn.
- Gate Control Theory is a theory used to define how TENS affects the pain perception.

- Placement of electrode pads over the lower back region in the distribution of T10-L1 may provide some analgesia for parturients in early labor.
- more likely as an adjuvant therapy



Intradermal Water Injections

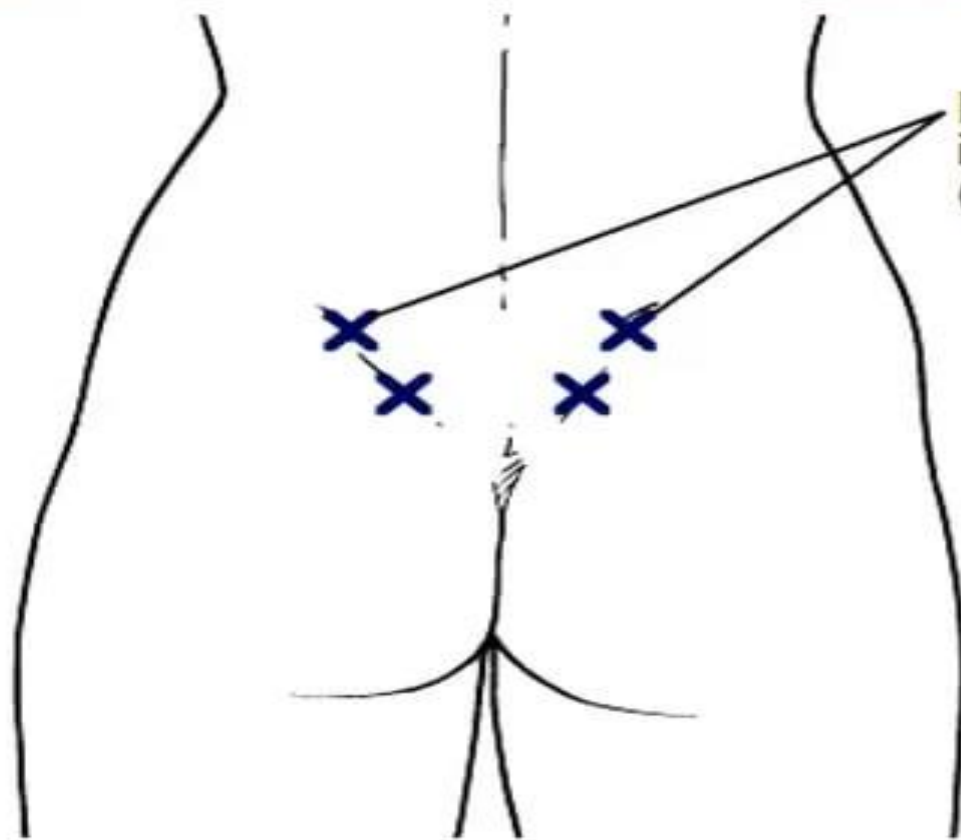
sterile water injections

an effective method for the relief of back pain in labour.

- Possible etiologies of low back pain in labor include a fetal occiput posterior position, persistent asynclitism, the woman's individual lumbopelvic characteristics, and referred pain from the uterus.

sterile water injections

- Intradermal water blocks consist of 4 intradermal injections of 0.05- to 0.1-mL sterile water (using a 1-mL syringe with a 25-gauge needle) to form 4 small blebs, 1 over each posterior superior iliac spine and 2 others placed 3 cm below and 1 cm medial to each of the first sites. Exact locations of these do not appear to be critical to its success^[31] (Figure 1)



Posterior superior
iliac spines
("dimples of Venus")

Advantages of SWI

- Often immediate effect.
- No effect on mother's state of consciousness.
- No effect on baby.
- Does not limit mobility.
- Does not adversely effect labour progress.
- A simple procedure that can be administered by your midwife.
- Can be repeated as needed.

Other

- Music
- Yoga
- Meditation
- Behavioral therapy
- Touch and Massage
- Relaxation - respiration techniques and dreaming
- Bradley method of natural childbirth [(also known as "husband-coached childbirth")]



Pharmacological

Inhaled Labour analgesia

- Subanaesthetic concentrations of inhalational anaesthetic agents
- Mother remains awake with protective laryngeal reflexes
- Can be self administered, but requires presence of a health care provider to ensure an adequate level of consciousness

ENTONOX

- The most commonly used agent for inhaled analgesia, which is a mixture of 50% nitrous oxide and 50% oxygen premixed in cylinder. The mixture is stable under most conditions, but at very low temperatures, the constituent gases separated.

Safest agent with no reported organ toxicity, does not depress uterine activity or prolong labour or has any detrimental effect on neonatal outcome



Fig. 2.—The "Entonox" apparatus.

Equipment for self administration of nitrous oxide and oxygen (Entonox) with a mouth piece (top) and a face mask (bottom)



Disadvantages include:

- drowsiness, disorientation and nausea may occur including brief episodes of loss of consciousness
- does not provide complete analgesia.

Nitrous Oxide

- **Most utilized gaseous anesthetic worldwide**
- **#1 utilized modality for labor analgesia worldwide**
- **UK- 60% of laboring women utilize N2O**
- **Australia- 50% utilization**
- **Norway- offered at 85% of birthing centers**
- **Finland- 48% utilization**
- **More common than regional anesthesia worldwide**

(Rooks, 2007; STAKES 2006)





ENTONOX = NITRONOX N_2O (50%) + O_2 (50%)

- Ultimately, 68.9% of women who used nitrous oxide switched to another pain management technique, with the majority (92%) opting for an epidural.

Annual meeting ANESTHESIOLOGY 2019. <https://www.asahq.org/annualmeeting>

- 31% who chose N_2O for analgesia did not convert to any other analgesic method.

Nodine et al. J Midwifery Women's Health. 2020

- The use of N_2O has increased across the United States since 2011.
- Moderately high satisfaction (7/10) with N_2O for pain management
- Despite inferior analgesic properties compared to epidural analgesia, N_2O is a safe alternative.

Broughton et al. Nitrous Oxide for Labor Analgesia: What We Know to Date. Ochsner J.





Volatile Halogenated Agents

- The usual range of concentrations of volatile inhalational agents administered with oxygen :
 - Desflurane 0.2%
 - Enflurane 0.25-1.25%
 - Isoflurane 0.2-0.25%
 - Sevoflurane 0.8% (Sevox)- Sevoflurane is a volatile inhalational agent commonly used during general anaesthesia. Because of its short onset and offset of action, it appears to be the best-suited inhalational agent for labour analgesia and can be administered as patient-controlled inhalation analgesia. It is used in the concentration of 0.8% with oxygen and needs specialized equipment.
- PCIA uses SEVOX .

Inhalational Analgesia



Advantages:

- Easy to administer (no needles or PDPH)
- Satisfactory analgesia variable
- Minimal neonatal depression



Disadvantages:

- Decreased uterine contractility (except N₂O)
- Risk of unconsciousness and aspiration
- Difficulties with scavenging in labor rooms
- unpleasant smell and high cost



Systemic Analgesics

- 
- Most common method used for labour analgesia
 - Common agents:
 - Opioids
 - Sedatives and Tranquilisers used as adjuncts to opioids
 - Ketamine
 - Prolonged depressant effect on the neonate - cause of concern

Systemic Opioids



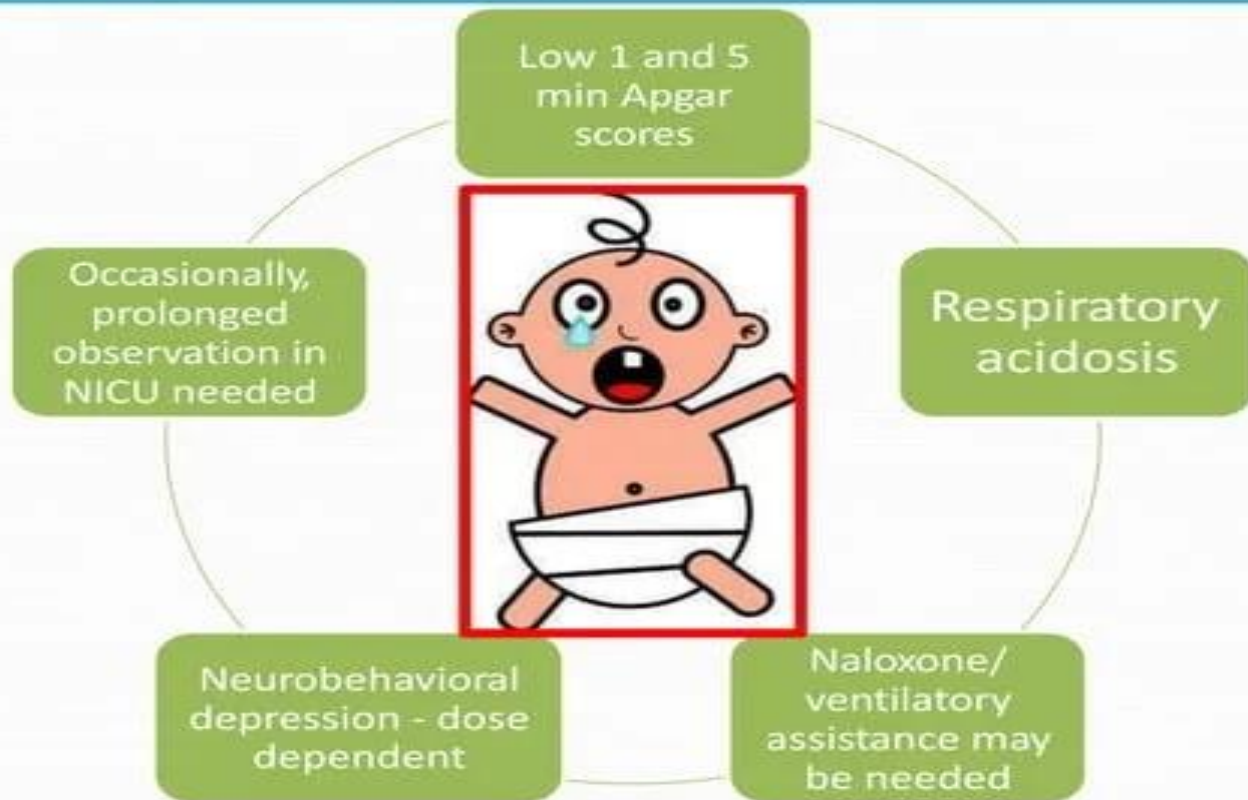
Advantages

- Easy administration
- Inexpensive
- No needles
- Avoids complications of regional block
- Does not require skilled personnel
- Few serious maternal complications

Disadvantages

- Placental transfer
- Inadequate pain relief
- Maternal sedation
- Nausea, vomiting, gastric stasis
- Fetal heart rate effects: Loss of beat-to-beat variability, Sinusoidal rhythm
- Dose-related maternal / neonatal depression
- Newborn neurobehavioral depression

Potential Fetal/Neonatal Effects



Opioids for Systemic Labour Analgesia

Drug	Usual dose	Onset	Duration(hr)	Comments
Meperidine or pethidine (most commonly used opioid)	25-50mg IV 50-100mg IM	5-10min IV 40-45min IM	2-3	Nausea,vomiting Immediate and long term fetal effects
Morphine	2-5mg IV 5-10mg IM	3-5min IV 20-40min IM	3-4	More neonatal respiratory depression
Diamorphine	5-7.5mg IV/IM	5-10min IM	90 min	Morphine pro drug more euphoria, less nausea than with morphine
Fentanyl (short half life,rapidly acting so suitable for prolong use in labour .	25-50 µg IV 100 µg IM	2-3min IV 10min IM	30-60min	Usually administered as an infusion or by PCA Accumulates during an infusion <u>less neonatal depression than with meperidine</u>

Meperidine (pethidine) is the most frequently used opioid for labour analgesia

Drug	Dose	Onset	Duration (hr)	Comments
Nalbuphine	10-20mg IV/IM	2-3min IV 15min IM/SC	3-6	Opoid agonist/antagonist Ceiling effect on respiratory depression Lower neonatal neurobehavioral scores More sedation
Butorphanol	1-2mg IV/IM	5-10min IV 10-30min IM	3-4	Opoid agonist/antagonist Ceiling effect on respiratory depression
Meptazinol	100mg IM	15min IM	2-3	Partial opoid agonist Less sedation and respiratory depression than with other opoids.
Pentazocine	20-40mg IV/IM	2-3 min IV 5-20min IM/SQ	2-3	Opoid agonist/ antagonist Psychomimetic effects
Tramadol	50-100 mg IV/IM	10 min IM	2-3	Less efficacy than with meperidine More side effects than meperidine

IV-PCA Fentanyl during Labor

- Loading dose -50-100 μ g
- No background infusion
- 10-12.5 μ g bolus
- 8-10 min lockout
- 4 hour limit - 300 mcg
- Pulse oximeter when large doses



Remifentanil IV-PCA

No basal infusion,

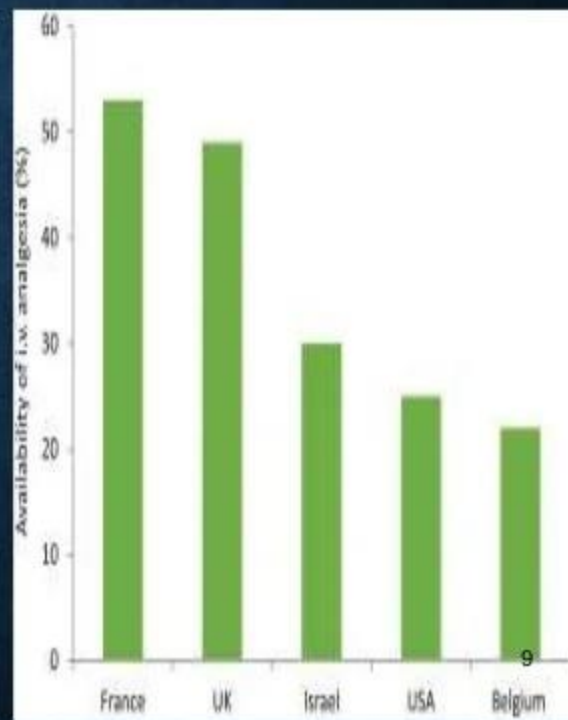
A typical dose of remifentanil is 40 µg bolus with a 2 min lockout.

- 10,000 cases have been evaluated (2009-2019):
 - Better than Nitrous
 - Almost equal to Fentanyl (better in 1st h)
 - Inferior to Epidural
 - Excessive sedation to mother
 - Safe to fetus due to less placental transfer

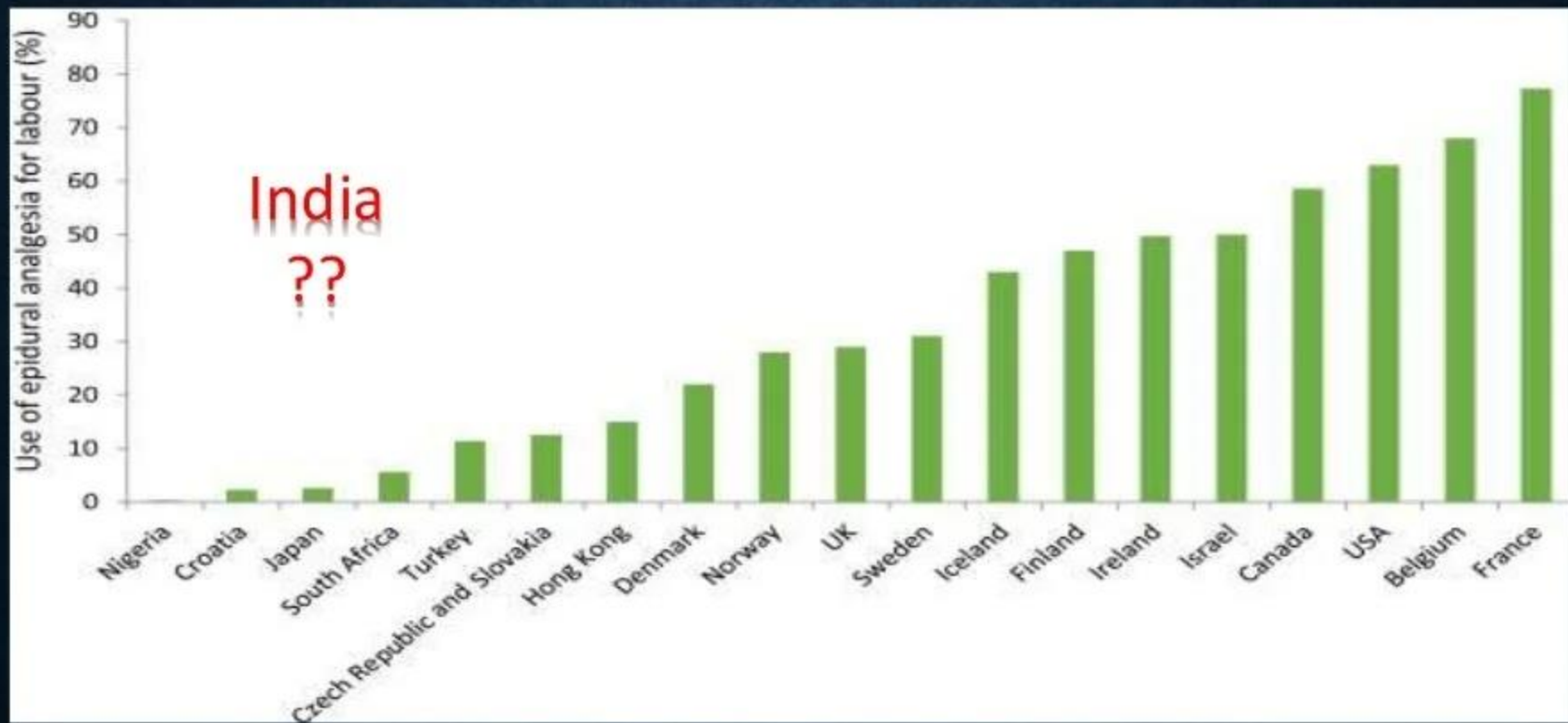
Ronel et al. Non-regional analgesia for labour: remifentanil in obstetrics. BJA 2019.

RemiPCA SAFE Network. The Swiss remifentanil PCA network.

<https://www.remipca.org/php/en/index.php> (accessed 14 August 2019).



Gold standard: Lumbar Epidural



Opioid Antagonists

- For reversing neonatal effects of maternal opioid administration
 - naloxone : 0.1 mg/kg intravenously
 - best to administer naloxone to new born
 - no benefit of maternal administration during labour or just before delivery
- For reversing maternal respiratory depression
 - reverses analgesic action

Sedatives And Tranquilisers

- To allay anxiety
 - To promote sleep in early labour
 - To aid in treatment of hypertension
 - As an antiemetic
-
- Along with systemic opioids
 - They are used infrequently now

Sedatives And Tranquilisers

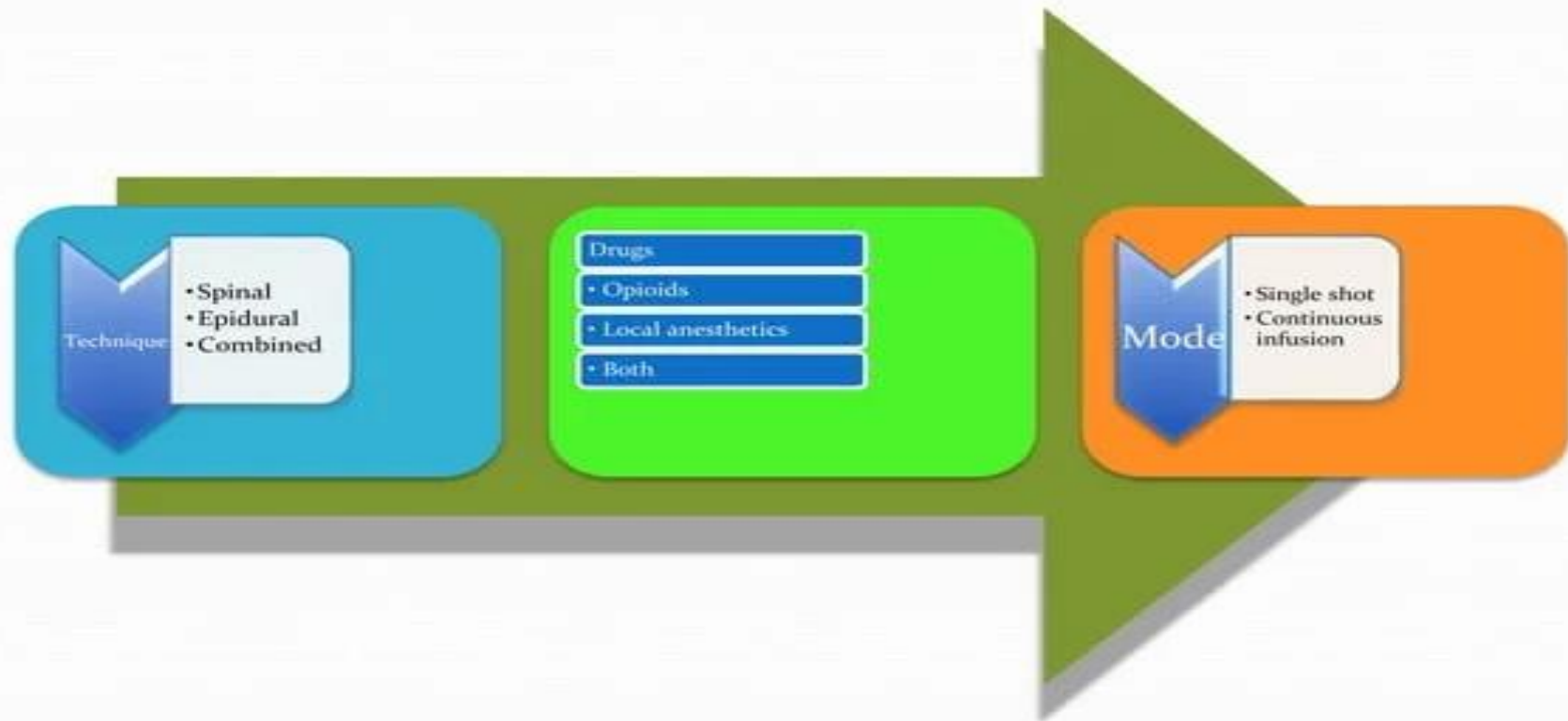
DRUG	DOSE	COMMENTS
Barbiturates		Only sedation, no analgesia Neonatal depression
Phenothiazines	25-50 mg i/m	Sedation, mild respiratory stimulant, Reduce nausea and vomiting, unacceptable hypotension. No neonatal depression
BZD : Diazepam (long acting) Not used	5-10 mg i/v	Fetal concentrations exceed maternal >30 mg : Neonatal hypotonicity (Floppy infant), <i>prolonged neonatal respiratory depression</i> , cleft lip
Lorazepam	2 mg	Amnesia, respiratory depression
Midazolam	1-2 mg	Amnesia, depressed newborns, neonatal hypotonia

The amnestic properties of benzodiazepines make them undesirable agents for parturients because they usually want to remember the experience of delivery.

Ketamine

- Low-dose intravenous ketamine is a powerful analgesic.
- Subanaesthetic doses 0.25 mg/kg
- Bolus dose : 10-15 mg every 2-5 mins to a total of 1 mg/kg or 100 mg in 30 mins
- Dose > 2 mg/kg → psychomimetic effects and increased uterine tone, low apgar scores and abnormal neonatal muscle tone
- Indication – imminent vaginal delivery
 - patchy epidural analgesia
 - an incomplete neuraxial blockade for cesarean section.
- It is cheap and satisfactory alternative
- Must maintain continuous verbal contact with patient. It is critical that the patient remain awake and able to protect her airway.
 - Best avoided in pre eclamptics.
 - Its cause hypertension, tachycardia & emergence reactions.

Neuraxial Blocks



Neuraxial Blocks

Advantages

Most effective & Least depressant

Great versatility in strength & Duration

Reduces maternal Catecholamines

Improved Uteroplacental perfusion



Low dose LA – NO Effect on Uterine activity

Low dose opioids – NO neonatal depression

Neuraxial Blocks



Specific Fetal Advantages

- Uterine perfusion maintained
- Does not affect Apgar scores, acid-base status
- Neurobehavioral effects absent
- LA toxicity - *extremely rare*



Specific Maternal Advantages

- Blunts Haemodynamic response in :
 - Hypertensive disorders
 - Cardiac disease
 - Asthma
 - Diabetics
- Avoids depressant effects of opioids in :
 - Prolonged labor
 - Prematurity
 - Multiple gestation
 - Breach delivery

Contraindications to neuroaxial blocks



ABSOLUTE

- Patients refusal
- Inability to cooperate
- Increased intracranial pressure
- Infection at the site
- Frank coagulopathy
- Hypovolemic shock



RELATIVE

- Systemic infection
- Preexisting neurological deficiency
- Mild coagulation abnormalities
- Relative hypovolemia
- Poor communication

Spinal Anelgesia



Involves intrathecal injection of opioids, Local anesthetics or more commonly a mixture of both.

Has the benefit of having the most rapid onset of analgesia.

The most common modality used for labor the saddle block provides profound perineal analgesia with minimal hemodynamic side effects.

Local Anesthetic agents



Lignocaine

- Rapid onset
- Dense motor block
- Risk for cumulative toxicity

Bupivacaine (0.0625%)

- Good sensory block
- Minimal motor block
- No adverse effects on labor

Ropivacaine

- Lower toxicity
- Less motor block
- Less potent

Levobupivacaine

- Lower toxicity than Bupivacaine

Spinal Analgesia [Single shot spinal]

- Not very effective in laboring women.
- has a finite duration, and multiple injections result in an increased risk of PDPH.
- Single subarachnoid injection of an opioid may be appropriate.
- A saddle block is administered to achieve blockade of the sacral spinal segments; a small dose of a hyperbaric local anesthetic solution is adequate for this purpose.
- *Placement of a catheter in the subarachnoid space is not recommended by US FDA*

- *Continuous spinal analgesia [with microcatheter]*

- requires use of large gauge needle
- unacceptably high incidence of post dural puncture
headache, cauda equina syndrome
- not practical in most parturients
- Obsolete b/c of possible causation of catheters with cauda equina syndrome.

Continuous Spinal Analgesia



Used by some centers in Europe, however it is restricted by FDA regulations in the US.

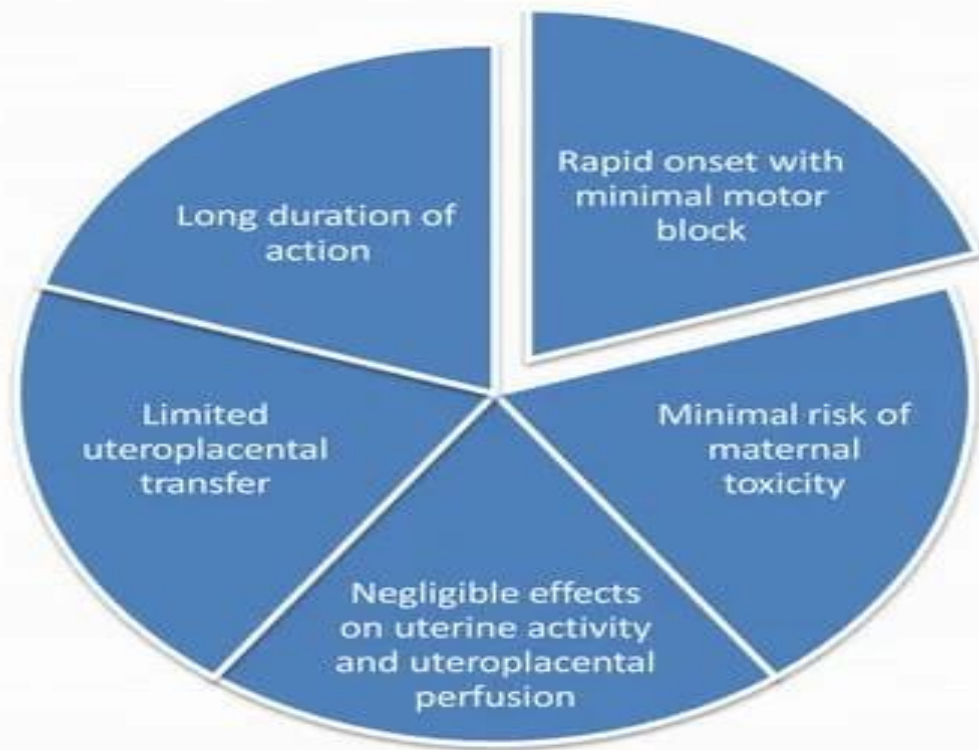


Uses 28 or 32-G catheters for 22 or 26-G spinal needles.



Risks include development of cauda Equina Syndrome, hypotension and nerve injury.

Choice Of Local Anesthetic



Intrathecal opioids



- Large doses required if used alone

- Synergize with local anesthetics

- Speed onset of analgesia

- Improve quality of analgesia

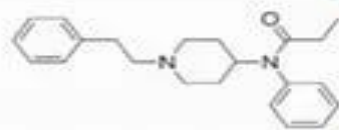
- Permit use of very dilute LA solutions

- Help relieve persistent perineal pain and unblocked segments

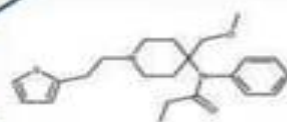
Intrathecal Opioid: Regimen

Drug	Dose
Morphine	0.25–0.3 mg
Fentanyl	15–30 µg
Sufentanil	5–10µg
Meperidine	10 mg

Choice of Intrathecal opioids



Fentanyl &
Sufentanyl



- Both have rapid onset(5 min) and few side effects.
- Sufentanil is slightly more effective
- No significant fetal drug accumulation
- No serious adverse neonatal effects

Complications of Neuraxial Opioid

- **Pruritus**
- **Neurotoxicity**
- **Sensory Changes**
- **Hypotension**
- **Nausea and Vomiting**
- **Respiratory Depression**
- **Delayed Gastric Emptying**
- **Recrudescence of Herpes Simplex Viral Infection**
- **Postdural Puncture Headache**

- *Fetal Effects of Opioid*

- **respiratory depression**
- **fetal bradycardia**

These side effects can be controlled via

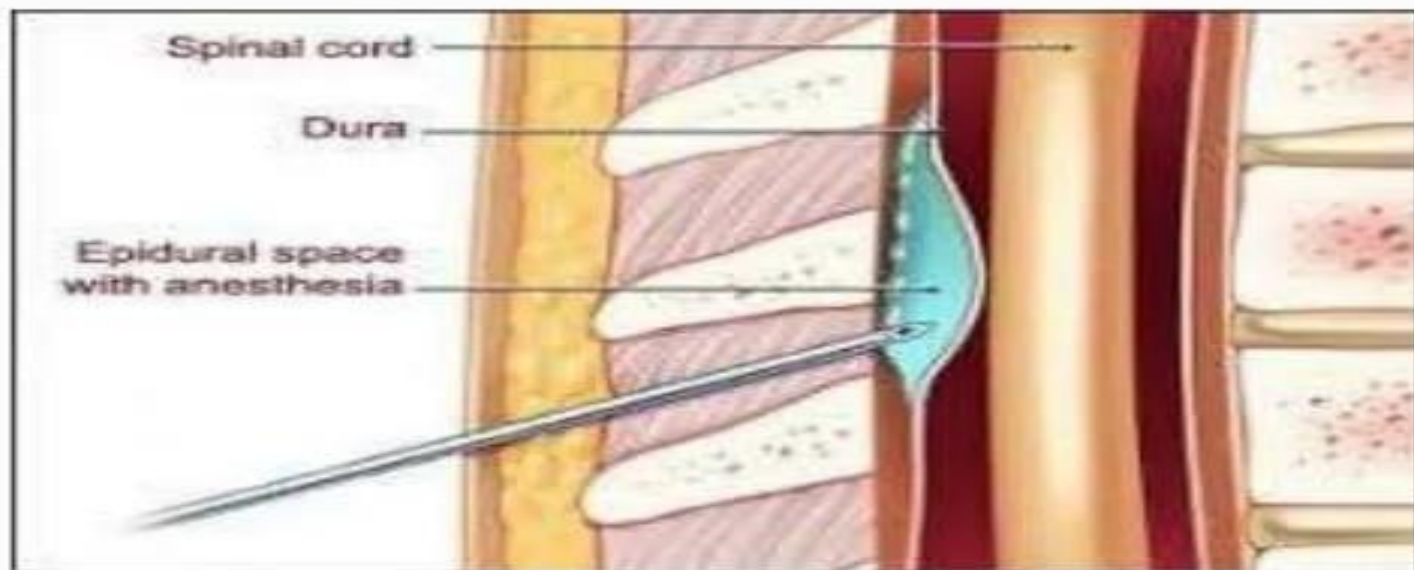
- Using the least effective doses
- Mixing opioids with local anesthetics

Indication for pure opioid

High risk pts who may not tolerate the functional sympathectomy a/w SA / EA-

- Hypovolemia
- Moderate to severe aortic stenosis
- TOF
- Eisenmenger's syndrome
- Pulmonary hypertension

Epidural Analgesia



Epidural Analgesia



- Mainstay for many years
- Only therapy providing complete analgesia for both stages by allowing cephalad and caudad spread of LA

$T_{10}-L_1 \swarrow \searrow$
 S_2-S_4

Most commonly: Mid-lumbar midline placement

- T10-L1 segments need to be blocked to relieve pain of uterine contractions and cervical dilatation.
- S2-S4 segments need to be blocked to relieve pain of vaginal and perineal distension



Epidural Analgesia



Indication

- **medical**- pt. with hypertensive disorder, asthma, diabetes and cardiac and intracranial neurovascular disease.
- **obstetric**-prolonged labour, oxytocin augmentation of labour & any factors that place the parturient at high risk for caesarean section
- **Fetal**-prematurity, breech presentation & multiple gestation

Contraindications

- Patient refusal or inability to cooperate
- Increased intracranial pressure secondary to a mass lesion
- Skin or soft tissue infection at the site of needle placement
- Frank coagulopathy
- Uncorrected maternal hypovolemia (e.g., hemorrhage)
- Inadequate training in or experience with the technique

cont..

- 
- No CTG tracing or inadequate CTG tracing e.g. loss of contact
 - Declined by the woman
 - Inadequate midwifery staffing levels.
- &
- Otherwise similar as for other epidurals

Epidural technique

- Prepare , position ,hydrate 500 ml of RL
 - Insert catheter – initiate dosage dilute local anaesthetics in 5 ml increments with lipid soluble opioid
 - TEST dose
 - Assess levels , monitor vitals
-
- **When ??**

- *Commonly accepted criteria for placement:*

1. No fetal distress
2. Good regular contractions 3-4 min apart & lasting about 1 min.
3. Adequate cervical dilatation i.e. 3-4cm
4. Engagement of the fetal head.

- 
5. Early epidural analgesia (e.g., before 5 cm cervical dilation) may interfere with uterine contractions and slow the progress of labor.
- If a patient in early labor requests epidural analgesia, first administer either a spinal or epidural opioid alone or an epidural opioid combined with a very dilute solution of LA

Patient evaluation and preparation for neuraxial analgesia

- Appropriate maternal & fetal monitoring to be in place before starting the procedure.
- Informed consent
- Medical and obstetric history
- Evaluate airway
- Targetted clinical examination
- Back examination
- Obstetric plan and fetal well being noted
- Emergency equipment and resuscitative drugs
- Intravenous line secured(18G) and correction of hypovolemia

- 
- ✓ **Blood pressure** every 1 to 2 minutes for 15 minutes after giving a bolus of local anesthetic;
 - ✓ Continuous **maternal heart rate** monitoring during induction of anesthesia;
 - ✓ Continuous **fetal heart rate** monitoring; and
 - ✓ Continual **verbal communication**.
 - **Pre-hydration** with 500 mL of Ringer's lactate solution.

Intravenous hydration

- Lactated Ringer's solution
- Co-loading preferable to pre-loading to prevent hypotension

Maternal positioning

Lateral position :

- Advantages
- orthostatic hypotension less likely
 - continuous FHR monitoring

Disadvantage - concealed aortocaval compression

Sitting position : Preferred in obese

NEVER SUPINE. AVOID AORTOCAVAL COMPRESSION AT ALL TIMES



Sitting up

Positions for an epidural



Lying on side

Administration Techniques

- Intermittent bolus

- additional therapeutic bolus doses of local anaesthetic

- when analgesia begins to wear.

- disadvantage : pain relief constantly interrupted by periods of regression of analgesia

- Continuous infusion (with catheter)

- maintenance of stable level of analgesia, less frequent

- need for bolus doses, maternal haemodynamic stability

- disadvantage : administration of larger dose of local anaesthetic

Epidural Test Dose

- Purpose is to help identify unintentional cannulation of a vein or the subarachnoid space.
- Epidural test dose: Placement of an epidural catheter and administration of a standard lidocaine 45 mg/epinephrine 15 µg.

Epidural Test Dose

- Early recognition of malpositioned epidural cathete.
- **Intravenous test dose** : epinephrine 15 μ g(3 ml of 1:2 lakh solution)
 - Increase in Heart rate of 20 beats per min within 45 seconds*
 - Increase in Systolic blood pressure 15-25 mm Hg*
- **Intrathecal test dose**
 - easy identification of subarachnoid placement
 - without causing high/total spinal anaesthesia and haemodynamic compromise
 - Lignocaine used 45-60 mg or Bupivacaine 7.5 mg
 - Positive intrathecal test dose - *motor blockade within 3-5 mins*
 - *sensory blockade within 2-3 mins*

Concerns About Epinephrine Containing Test Dose

Controversial

- Intravenous epinephrine – transient decline in uterine blood flow
- Lacks sensitivity and specificity
- Exaggerated response in hypertensives
- Adverse effects on fetal well being

Initial bolus options: Epidural route

Can be given with

- LA alone
- Opioid alone
- LA + Opioid (synergistic)

- 1) Bupivacaine 0.125-0.25% ,
Ropivacaine 0.1-0.2%,
Lidocaine 1%,
Chloroprocaine 2% (10-15 ml)
 - 2) Fentanyl (50-100 μg in 10 ml saline),
Sufentanyl 10- 25 μg in 10 ml saline
 - 3) Bupivacaine 0.0625-0.125% + Fentanyl 50 μg /
Sufentanyl 10 μg
- Opioid alone- moderate analgesia in early labor but higher dose needed so significant side effects; inadequate analgesia for second stage.
 - LA acts synergistically with the opioid, so lower doses of both drugs can be used.

Subsequent analgesia: Options

- Intermittently repeat epidural bolus : 8 - 12 ml bupivacaine 0.0625 - 0.125 %
- Continuous infusion :-
 - Bupivacaine 0.0625 - 0.125 % solution at 8 - 15 ml / hour
 - Ropivacaine 0.5 - 0.2 % solution at 8 - 15 ml / hour
 - Fentanyl 1 - 4 μg / ml
 - Sufentanyl 0.03 - 0.05 μg / ml
- PCEA
 - Bupivacaine 0.125-0.25 % + Fentanyl 2 μg / ml
 - 4 ml bolus dose
 - Background infusion rate 4-8 ml / hr
 - Hourly limit 15-20 ml
 - lockout interval 10 - 20 mins

- *Patient controlled epidural analgesia(PCEA)*
and Computer controlled PCEA pumps

Advantages over bolus/continuous infusion:

- better patient satisfaction, less breakthrough pain
- reduced consumption of local anaesthetics
- optimal analgesia with minimal side effects
- less incidence of motor blockade
- stable haemodynamics
- less need for anaesthesia provider intervention

Epidural (was) is “Gold Standard”

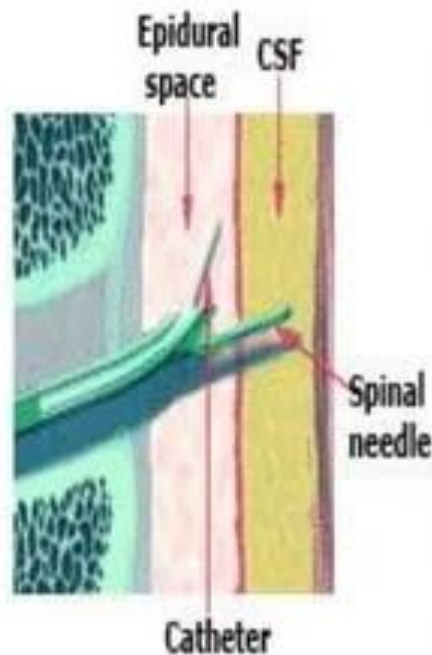
- High dose epidural Vs Low-dose epidural (walking epidural)
- Bupivacaine or levobupivacaine 0.0625 % or ropivacaine 0.1 % plus a small dose of fentanyl ($2\mu\text{g/ml}$) or Sufentanyl are used
- Early Vs Late epidural...(2014---2019) No effect
- Indian context....

Combined spinal epidural(CSE)

- Increasingly popular
- Most common technique: NTN technique (needle through needle) in mid lumbar interspinous space
 - Indications :
 - late labor
 - parous female with rapid progress of labor
 - Severe pain
 - 2nd stage fetal distress
 - Unsatisfactory previous epidurall
- Not used in: - morbid obesity
- difficult airway

rapid, reliable onset of profound analgesia from spinal injection and longer duration of analgesia of epidural technique.

The anatomy of the combined spinal and epidural



COMBINED SPINAL EPIDURAL

Needle” through “Needle”



“ Back “ eye”

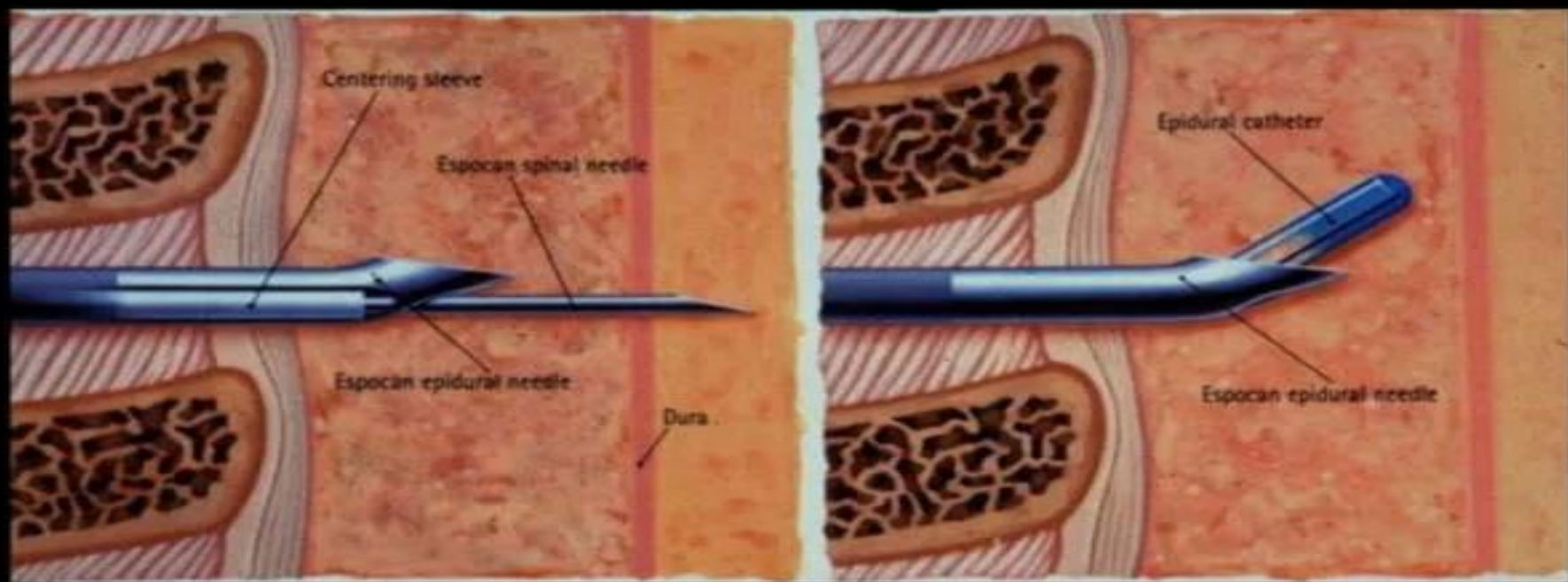


- *Needle” through “Needle” technique is the best*
- *Can be placed in lateral or sitting position*
- *Walking Epidural possible*

Combined Spinal Epidural Analgesia (CSE) For Labor And Delivery



Needle-through-needle technique





Drugs for Initiation of Combined Spinal-Epidural Analgesia

Drug(s)	Opioid dose (μ g)	Bupivacaine dose (mg)
Fentanyl	15-25	-
Sufentanil	5-7.5	-
Bupivacaine-fentanyl	10-15	1.25-2.5
Bupivacaine-sufentanil	1-2.5	1.25-2.5
Bupivacaine-Fentanyl Morphine	Fentanyl 12.5-25 Morphine 200-250	2.0-2.5

6. Combined Spinal epidural (CSE)

❑ Idea:

Reduction of some of the disadvantages of spinal & epidural anaesthesia, while preserving their advantages

❑ Advantages

- ✓ Rapid onset of analgesia.
- ✓ Reliable, fewer failed, or patchy blocks.
- ✓ Effective sacral analgesia in advanced labor.
- ✓ Less motor block.
- ✓ Better patient satisfaction.
- ✓ Faster cervical dilatation.

- **Drawback:**

- delayed verification of functioning catheter
- dural puncture(postdural puncture headache,
post partum neuraxial infection)
- possible higher risk of fetal bradycardia
- decreased uterine blood flow



Advantages

- Make ambulation possible [WALKING EPIDURAL]
- Reduce Epidural complication like-Patchy Block
 - poor sacral spread
- Reduce Motor Block
- SA Block onset immediately
- Same catheter use for Operative anaesthesia.

Ambulatory Epidural/Walking epidural

- Also Called **Minimal Motor Block Epidural**
- low dose CSE opioid analgesia because motor function maintained and the ability to walk not impaired
- Any neuraxial analgesia technique allowing safe ambulation
- Decreases deep venous thrombosis
- Relation between upright position and shorter duration of labour

Criteria for Ambulation

- No medical and obstetric contraindications
- Maternal desire to ambulate
- Ambulate only when Spinal anesthesia with opioid
- Ability to perform sustained straight leg raising test more than 10 sec.
- <10% decrease in BP when Supine to sitting position

Side Effects Of Neuraxial Analgesia

- Hypotension
- Pruritus
- Nausea and vomiting
- Fever
- Shivering
- Urinary retention
- Delayed gastric emptying

Complications Of Neuraxial Analgesia

1) Inadequate analgesia

Total failure	Catheter in wrong place
	Given too late in labour
Partial failure	Unilateral block
	Missed segment
	Inadequate dose/concentration
	Low backache
	Full bladder
	Rectal pain
	Pathological pain: uterine rupture
	Failure to give top-ups

- II) Unintentional dural puncture
- III) Respiratory depression
- VI) Extensive neuroblockade
- IV) Intravascular injection of drug
- V) High/ Total spinal anaesthesia

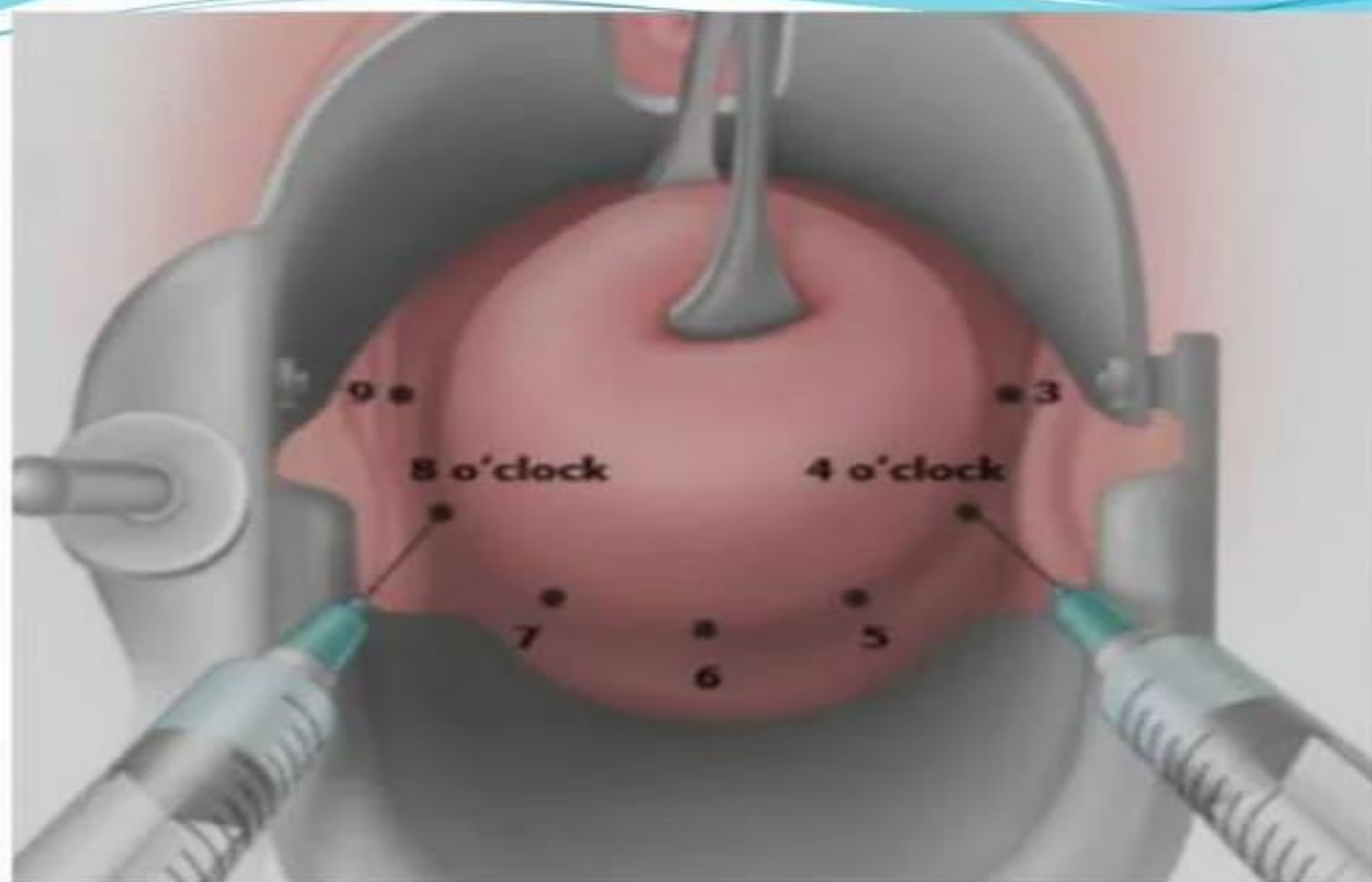


Recent Technological Advances In Neuraxial Analgesia

- Ultrasound imaging of the spine to identify the epidural space especially in women with difficult lumbo-sacral anatomy and in those who are obese
- Patient controlled epidural analgesia regimes

Paracervical block

- Goal- block transmission through paracervical ganglion which lies immediately lateral and posterior to the cervicouterine junction.
- Good For 1st stage of labor not for second
- 5-10 ml of local anaesthetic injected through a needle introduced into left or right lateral vaginal fornix, near the cervix, at 4 o'clock and 8 o'clock position

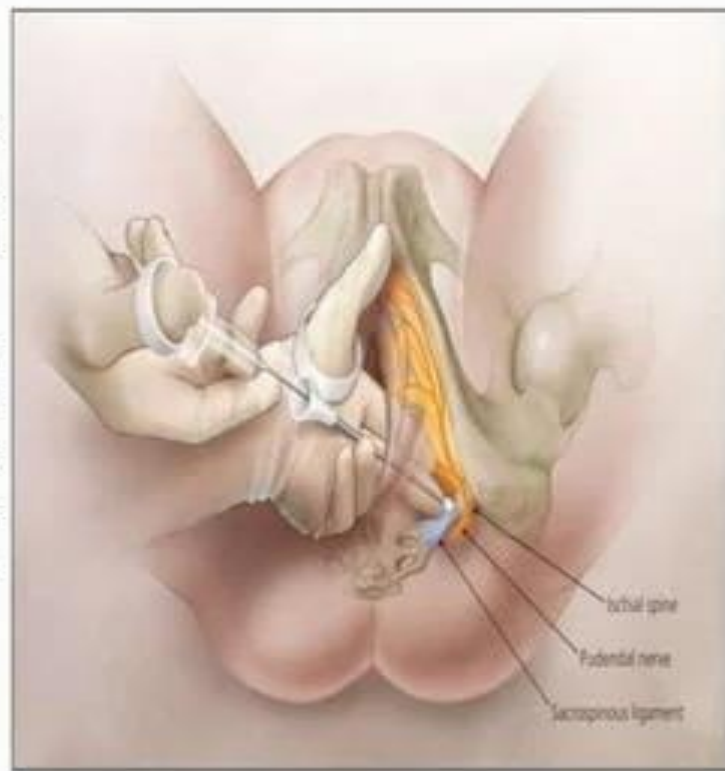


Complication:

- Profound Fetal tachycardia
- LAST
- Postpartum neuropathy
- Infection

Pudendal nerve block

- Lithotomy position
- Goal : to block the pudendal nerve distal to its formation by anterior divisions of S2-S4 but proximal to its division into terminal branches.
- needle introduced through vaginal mucosa and sacrospinous ligament, just medial and posterior to ischial spine. Pudendal artery lies in close proximity to pudendal nerve, must aspirate before and during injection of local anaesthetic
- Timing : immediately before delivery
- Repeated on both sides



- Advantages: easy to administer, not a/w maternal hypotension/ fetal distress and satisfactory for Vaginal delivery and forceps Delivery
- Disadvantage: incomplete analgesia at the time of delivery, since pain of uterine contraction is unaffected.
- Maternal complications :
 - laceration of vaginal mucosa
 - systemic local anaesthetic toxicity
 - vaginal, ischiorectal or retroperitoneal hematoma
 - subgluteal abscess

● Lumbar sympathetic block

- sitting position
- analgesia during first stage of labor only
- analgesia comparable to paracervical block
- less risk of fetal bradycardia

Progress in Concept of Labor Pain Relief

- “Childbirth without pain” was a concept introduced by Lamaze
- “Childbirth without fear” introduced Dick-Read
- The concept is to improve the experience of labor & childbirth:
 1. Encouraging women to believe they can cope with the pain
 2. Husband in the delivery room (reducing anxiety levels)
 3. Education of women to expect pain during labor may reduce the need for labor analgesia
- **Antenatal classes**

Take Home Message

- Every laboring mother needs labor analgesia and should be provided.
- DO not wait for modern gadgets to start labor analgesia.
- Optimize the available resources and knowledge.
- Epidural is Gold Standard but “only when” it matches with requirements of mother, baby, anaesthetist and surgeon.
- We should work for improving the overall laboring experience rather only pain relief
- We should use multi-dimensional scores for assessment
- We have to up-breat ourselves (lots of scope) with advancement to provide standard of care



باتشکر از
توجه شما