

Regional Anesthesia

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Regional anesthesia - Uses

- Provide anesthesia for a surgical procedure
- Provide analgesia post-operatively or during labor and delivery
- Diagnosis or therapy for patients with chronic pain syndromes

Regional anesthesia - Definition

Rendering a specific area of the body, e.g. foot, arm, lower extremities, insensate to stimulus of surgery or other instrumentation

Advantages/Disadvantages of Regional and Local Anesthesia.

advantages

- patient remains conscious → إذا هو حايض على شيء
- maintain his own airway, avoid complication of intubation.
- aspiration of gastric contents unlikely
- smooth recovery requiring less skilled nursing care as compared to general anesthesia

Disadvantages:

- patient may prefer to be asleep
- practice and skill is required for the best results [nerve block]
- some blocks require up to 30 minutes or more to be fully effective
- analgesia may not always be totally patient may require additional analgesics, IV sedation, or a light general anesthetic

advantages

- postoperative analgesia
 - reduction in surgical stress → in general anesthesia inflammatory process
 - earlier discharge for outpatients
 - less expense
- healing faster
Postop.

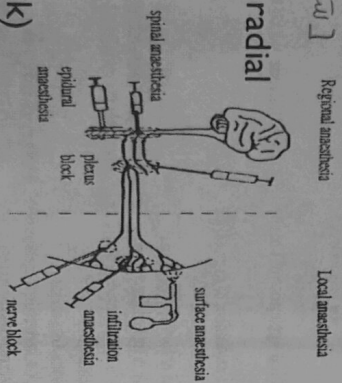
Disadvantages:

- toxicity may occur if the local anesthetic is given intravenously or if an overdose is injected
- some operations are unsuitable for local anesthetics, e.g., thoracotomies

Regional anesthesia - types

- Topical محلي
- Local/Field infiltration [تخدير موضعي]
- Peripheral (named) nerve, e.g. radial nerve block
- Plexus - brachial, lumbar
- Central neuraxial - epidural, spinal, caudal
- Intravenous block ("Bier" block)

Fig. 13.2.1 Different types of local and regional anesthetic techniques



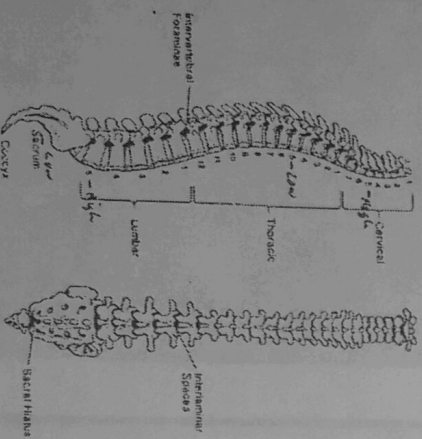
vein system is local & has circulation
 proximal vein is double tunica & is soft tissue at 2-5 mm blood in it by diffusion

Spinal Anatomy

33 Vertebrae

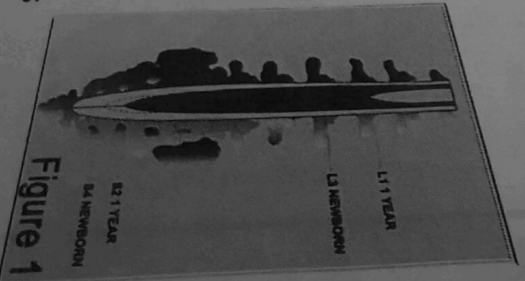
- 7 Cervical
- 12 Thoracic
- 5 Lumbar [L3-S1]
- 5 Sacral
- 4 Coccygeal
- High Points: C5 & L5
- Low Points: T5 & S2

epidural space
 1mm

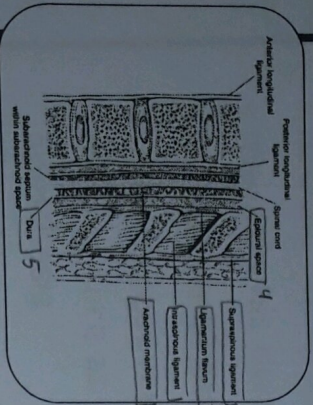


Spinal Cord

- Adult
 - Begins: Foramen Magnum
 - Ends: L1
- Newborn
 - Begins: Foramen Magnum
 - Ends: L3
- Terminal End: Conus Medullaris
- Filum Terminale: Anchors in sacral region
- Cauda Equina: Nerve group of lower dural sac



Sagittal Sections



Tachy needle

- Supraspinous Ligament
 - Outer most layer
- Intraspinous Ligament
 - Middle layer
- Ligamentum Flavum
 - Inner most layer

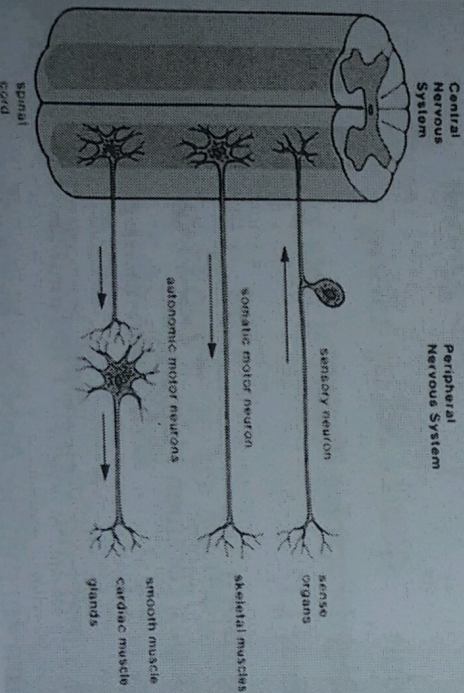
resistance $\propto$ layer δ

↳ Epidural space

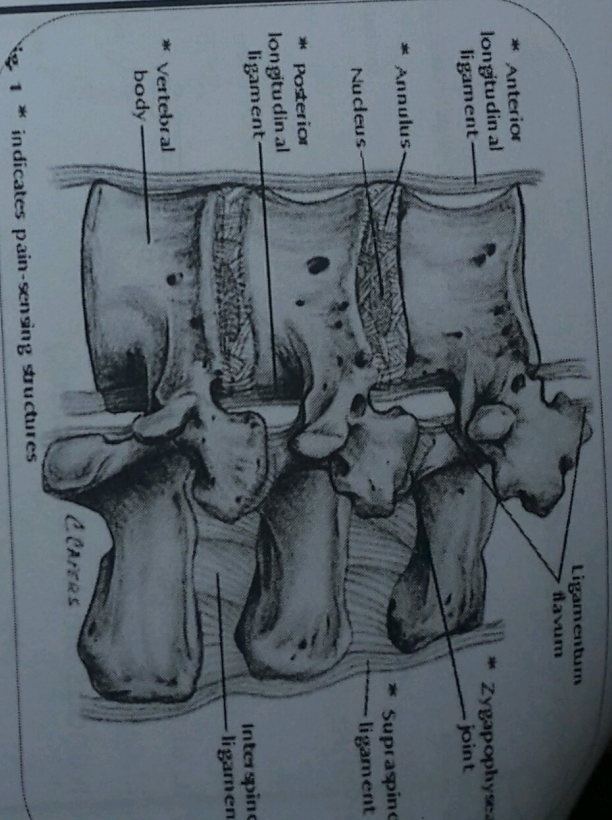
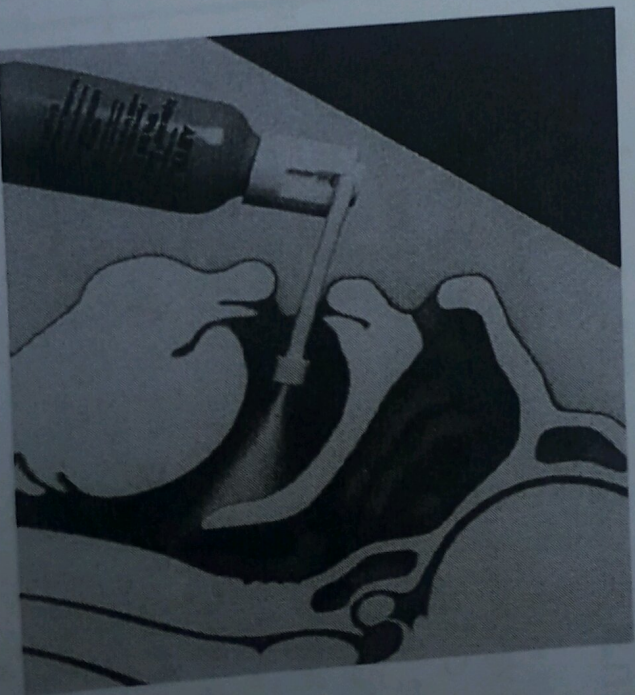
لوبلي epidural
لوقف عندها anesthetic

3. Potential space
بِفَاحٍ لَو
سُورَةُ

↳ dura mater — loss of meninges
↳ subarachnoid — clear CSF etc.
↳ pia mater — spinal meninges



Typical Block



Epidural Space

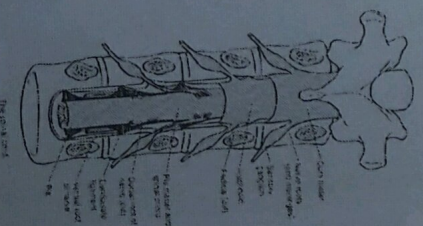
الفضاء فوق الجافية *

- Space that surrounds the spinal meninges
 - Potential space
- Ligamentum Flavum
 - Binds epidural space posteriorly
- Widest at Level L2 (5-6mm)
- Narrowest at Level C5 (1-1.5mm)

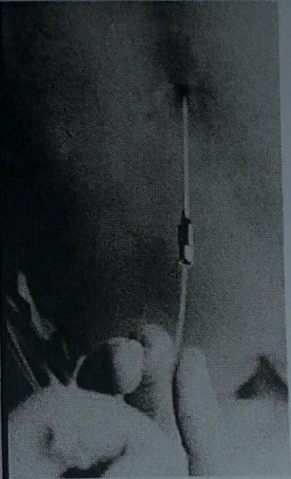
- Nerves
- vessels [arteries]
- connective tissue
- Fat tissue

Spinal Meninges

- Dura Mater
 - Outer most layer
 - Fibrous
- Arachnoid
 - Middle layer
 - Non-vascular
- Pia Mater
 - Inner most layer
 - Highly vascular
- Sub Arachnoid Space
 - Lies between the arachnoid and pia



Epidural Block



complication: block of Autonomic - sensor-motor

Cardiovascular Effects

Blockade of Sympathetic Preganglionic Neurons

- Send signals to both arteries and veins
- Predominant action is venodilation
- Reduces:
 - Venous return
 - Stroke volume
 - Cardiac output
 - Blood pressure
- T1-T4 Blockade
- Causes unopposed vagal stimulation
 - Bradycardia
 - Associated with decrease venous return & cardioaccelerator fibers blockade
 - Decreased venous return to right atrium causes decreased stretch receptor response

Respiratory System

Healthy Patients

- Appropriate spinal blockade has little effect on ventilation

High Spinal → *عالية spinal*

- Decrease functional residual capacity (FRC)
- Paralysis of abdominal muscles
- Intercostal muscle paralysis interferes with coughing and clearing secretions
- Apnea is due to hypoperfusion of respiratory center
- Resp. failure → *أزمة* Intubation or assisted ventilation.

Epidural:
20cc
spinal:
4cc

* Autonomic block:

Hypotension

Peripheral vasodilatation

• Treatment

- Best way to treat is physiologic not pharmacologic
- Primary Treatment
 - Increase the cardiac preload
 - Large IV fluid bolus within 30 minutes prior to spinal placement, minimum 1 liter of crystalloids
- Secondary Treatment Pharmacologic
 - Ephedrine is more effective than Phenylephrine

tx: Vaso constrictor: Ephedrine

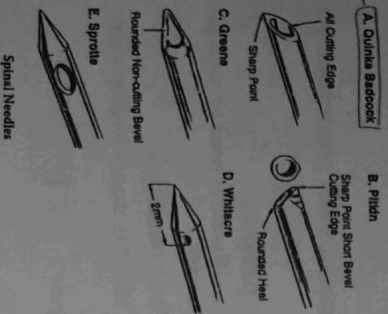
Spinal Anesthesia

• Indications;

- Full stomach → Lower abd. surgery to avoid aspiration
- Anatomic distortions of upper airway
↳ difficult intubation
- TURP surgery
- Obstetrical surgery
- Decreased post-operative pain
ألم ما بعد الجراحة

pelvis

Spinal Technique



Spinal Needles

- Preparation & Monitoring
 - EKG
 - NBP
 - Pulse Oximeter
- Patient Positioning
 - Lateral decubitus
 - Sitting
 - Prone (hypobaric technique)

Post. spinal puncture headache incidence > in young females
leak of CSF after puncture

Spinal Technique

- Midline Approach
 - Skin
 - Subcutaneous tissue
 - Supraspinous ligament
 - Interspinous ligament
 - Ligamentum flavum
 - Epidural space
 - Dura mater
 - Arachnoid mater
- Paramedian or Lateral Approach
 - Same as midline excluding supraspinous & interspinous ligaments

Position

• Sitting position

Sit straight first
Chin on chest
Arms resting on knees
Footstool/table to support feet
Back curving like banana or shrimp

• Lateral position

Shoulders perpendicular to bed
Positioned with hips on edge of
Knee chest position and back cu



a The patient in a sitting position demonstrating alignment of vertebrae and b in the lateral position showing alignment of the vertebrae.

Approach

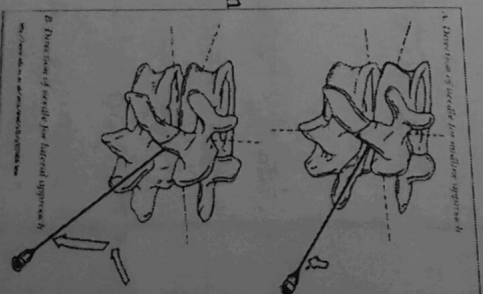
• Median approach

- Most common
- Needle or introducer is placed midline
- Perpendicular to spinous processes
- Slightly cephalad

• Paramedian approach

- For pts who cannot adequately flex
- Needle placed laterally (1.5cm)
- Needle aimed medially and slightly cephalad

Skin, SC tissue, rectus muscle.



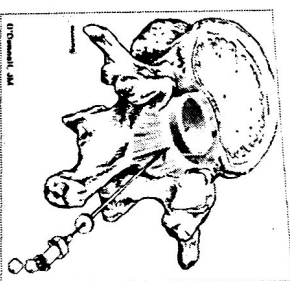
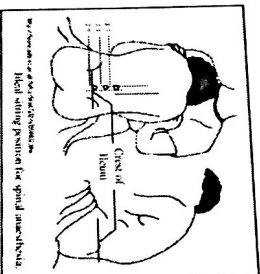
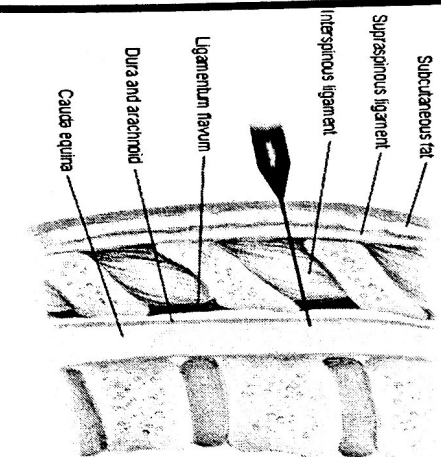
Contraindications

- Relative contraindications
- Hypovolemia *can be replaced*
- Preexisting neurologic disorders
- Chronic back pain
- Localized infection peripheral to regional site
- Patients taking ASA, NSAID

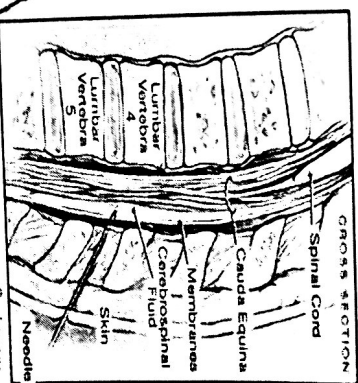
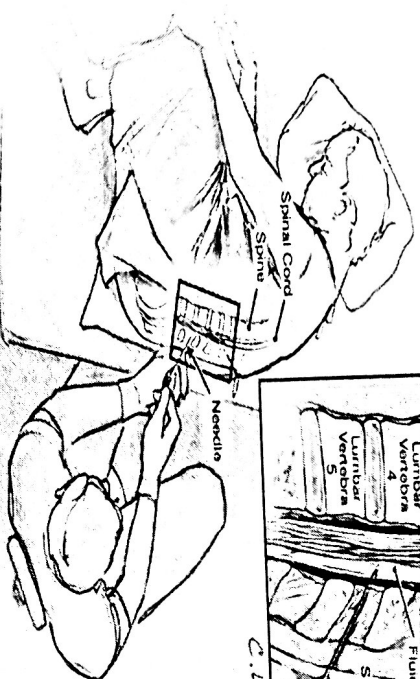
Technique

- Anatomic landmark identified
- Superior iliac crests at L4 level
- Spine is palpated
- A sterile field established
- Skin wheel with LA
- Introducer inserted and spinal needle passed
- CSF presence
- LA injection

Procedure



Lumbar Puncture
TOP VIEW



C. Lynn

Spinal Anesthesia

Complications

- Failed block
- Back pain (most common)
- Spinal headache
- More common in women ages 13-40
- Larger needle size increase severity
- Onset typically occurs first or second day post-op
- Treatment:
 - Bed rest
 - Fluids ↑ production of CSF
 - Caffeine
 - Blood patch

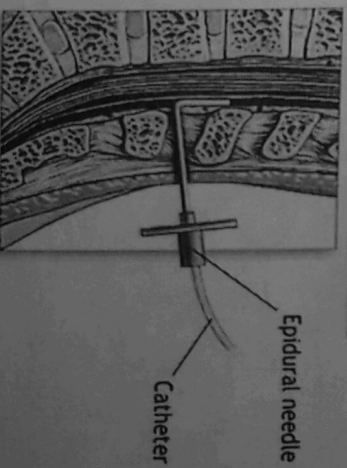
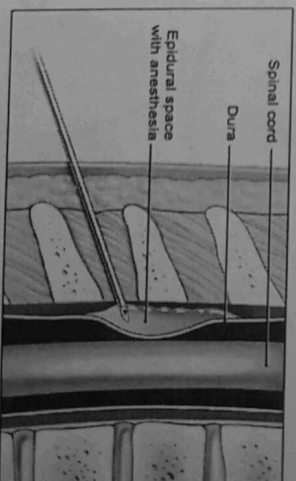
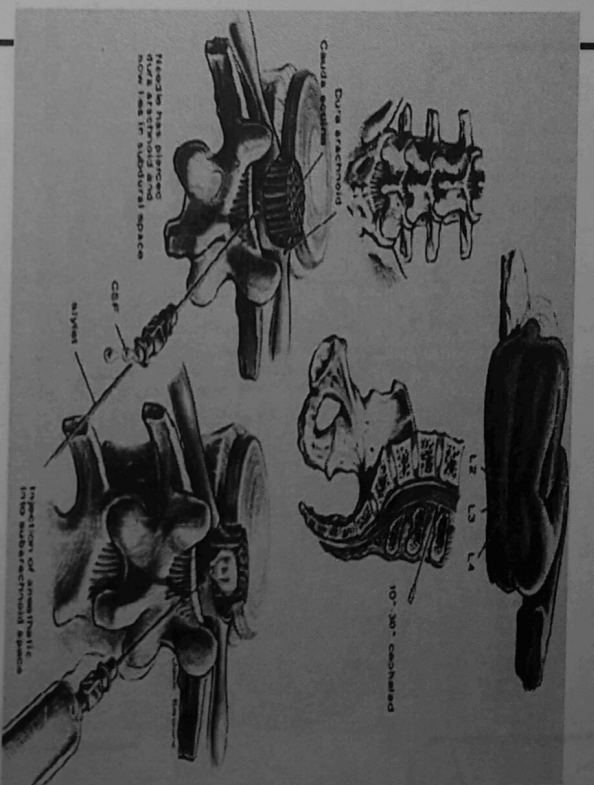
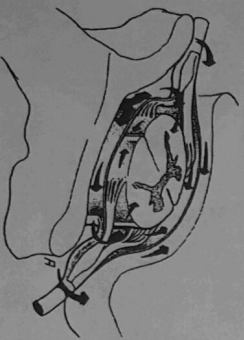
NPB 1/1
عقب الجراح

LP > 5 days, dizziness
350ml / 24hr
venous blood level
نفسه

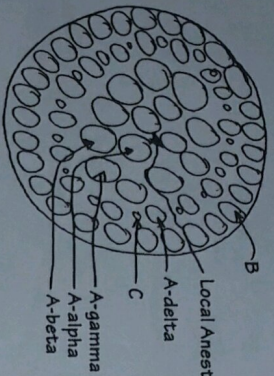
تحت الجلد
epidural space
نفسه

Epidural Anatomy

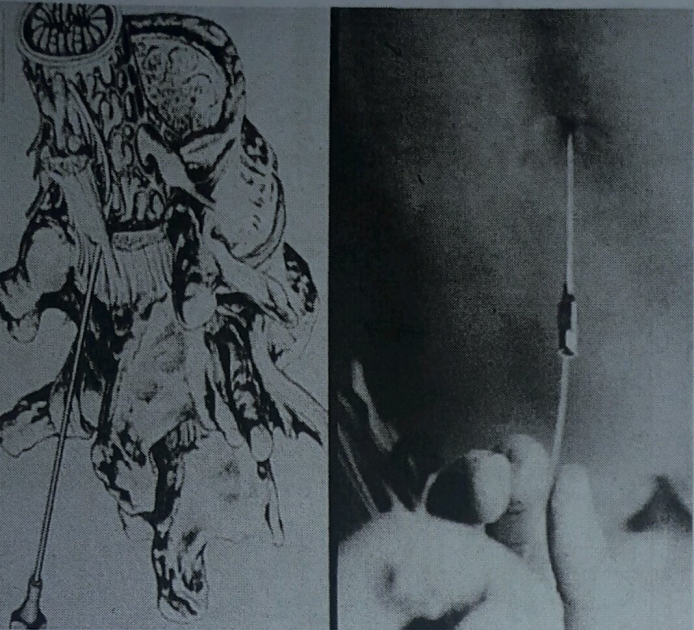
- Safest point of entry is midline lumbar
- Spread of epidural anesthesia parallels spinal anesthesia
- Nerve rootlets
- Nerve roots
- Spinal cord



Epidural Anesthesia



- Order of Blockade
 - B fibers
 - C & A delta fibers
 - Pain
 - Temperature
 - Proprioception
 - A gamma fibers
 - A beta fibers
 - A alpha fibers



Epidural Anesthesia

- Test Dose: 1.5% Lido with Epi 1:200,000
 - Tachycardia (increase >30bpm over resting HR)
 - High blood pressure
 - Light headedness
 - Metallic taste in mouth
 - Ring in ears
 - Facial numbness
 - Note: if beta blocked will only see increase in BP not HR
- Bolus Dose: Preferred Local of Choice
 - 10 milliliters for labor pain
 - 20-30 milliliters for C-section

*day tap
~ 5-10 min
20-30*

