

اسم المادة و الكورس

اسم المحاضرة ورقمها

Sawa University

جامعة ساوة الاهلية

College of health and medical techniques

كلية التقنيات الصحية والطبية

Department of Anesthesia

قسم تقنيات التخدير

3rd Stage cours 1

المرحلة الثالثة

محاضرة رقم 1+2

نظري

Lecture No. 1+2

Theoretical

استاذ المادة : Dr.Hasanein Ali

M.B.CH.B / F.I.C.M.S of Anes. And IC

INTRODUCTION

- **Regional anesthesia** is the use of local anesthetics to block sensations of pain from a specific area of the body, such as an arm or leg or the abdomen.
 - .allows a procedure to be done with a patient being conscious -
 - provide excellent operating conditions and prolonged postoperative pain -
 - .relief
 - The provision of pain relief that enables postoperative mobilization and -
 - .early feeding may accelerate rehabilitation and return of normal function

Relative indications

To avoid the dangers of general anesthesia, such as difficult tracheal - 1
.intubation

.Patients request - 2

.To provide high - quality postoperative pain relief - 3

As part of a postoperative rehabilitation program to enable early - 4
return to function

RELATIVE CONTRAINDICATIONS

1_ Uncooperative or restless patients.

2_ Some psychiatric patients.

PREPARATION BEFORE LOCAL ANESTHETIC INJECTION

.intravenous cannula - 1

.A tilting table or trolley - 2

Facilities of intermittent IPPV with oxygen - 3

4 - Patient monitoring, including ECG, noninvasive blood pressure, pulse oximetry and - tidal carbon dioxide.

5 - Suction equipment and catheters.

6 - Syringes or ampoules of tranquilizers (eg. midazolam), induction agents (e.g., Propofol), muscle relaxants (e.g., Suxamethonium), atropine, and pressor agents such as ephedrine.

.Crystalloid and colloid solutions for infusion - 7

⁵.Full resuscitation equipment and drugs, including a defibrillator - 8

MAJOR TYPES OF REGIONAL ANESTHESIA

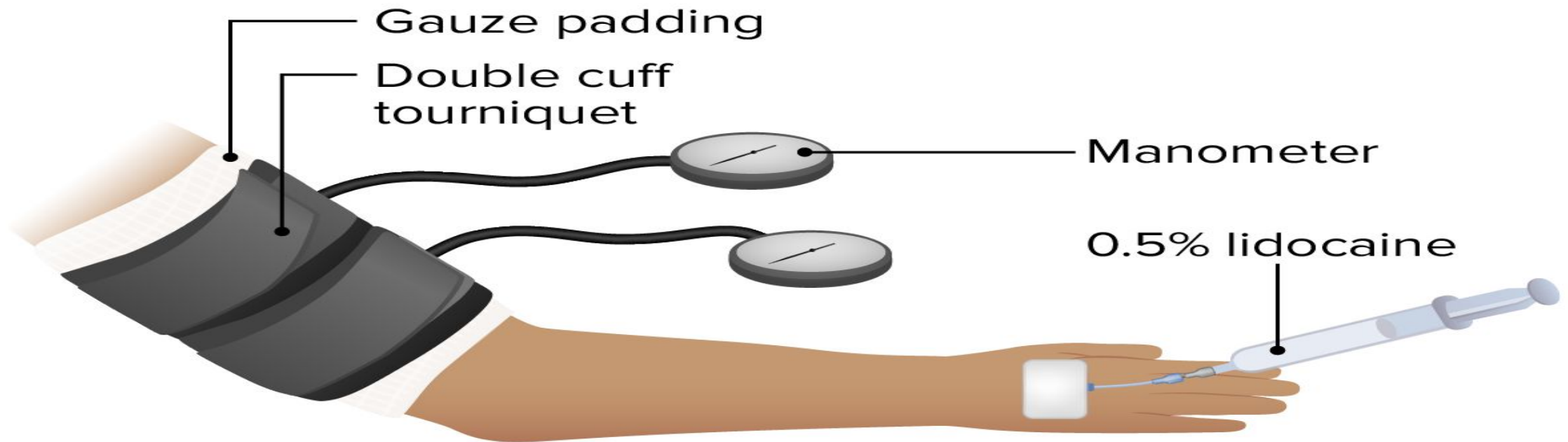
:Peripheral nerve blocks

A local anesthetic is injected near a specific nerve or bundle of nerves to block sensations of pain from the area of the body supplied by the nerve. Nerve blocks are most commonly used for surgery on the arms and hands, the legs and feet, the groin, or the face

Bier's block(Intravenous regional anesthesia):

Bier's block is one of the peripheral nerve block techniques performed on the body extremities, it is ideally suited to operations of the distal arm or leg (i.e., below the elbow or knee), such as reduction of a radial or ulna fracture. IVRA is useful for only short surgical procedures; **performed in 40 minutes or less** (the length of operating time is limited by tourniquet pain, which usually develops after **40 to 60 minutes**

First of all, the target region exsanguinated to force blood out of the extremity followed by the application of pneumatic single or double tourniquet inflated 100mmHg above the patient's systolic blood pressure to safely stop blood flow. The anesthetic agent is intravenously introduced into the limb and allowed to diffuse into the surrounding tissue while tourniquets retain the agent within the desired area.



Two intravenous cannulas should be placed, one for venous cannulation distal to the tourniquet and one for cannulation in a non-targeted arm to allow access to the circulation if required in the event of complications.

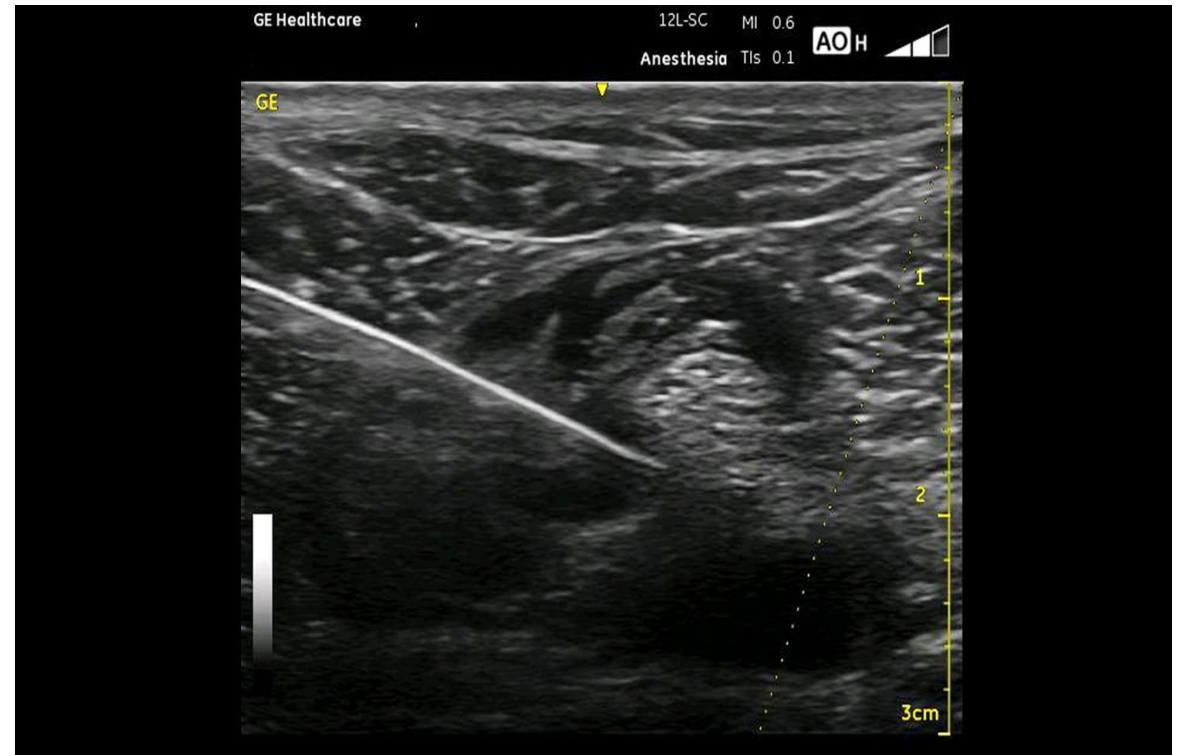
The dose required in Bier's block is about 3 – 4 mg/ kg of 0.5% plain solution (without adrenaline) of lidocaine or prilocaine, while bupivacaine should never be used due to its cardiotoxicity (leading to ventricular arrhythmias and death).

Contraindications:

- 1 - Crush injury to the limb, IVRA may provoke further tissue damage secondary to hypoxia
- 2 - Reynold's disease (intermittent arteriolar vasospasm of the distal limbs).
- 3 - Sickle cell anemia.
- 4 - Scleroderma.

Ultrasound guided regional anesthesia (USGRA)

Meaning the use of ultrasound to guide the injection of local anesthetic near specific nerve or plexus.



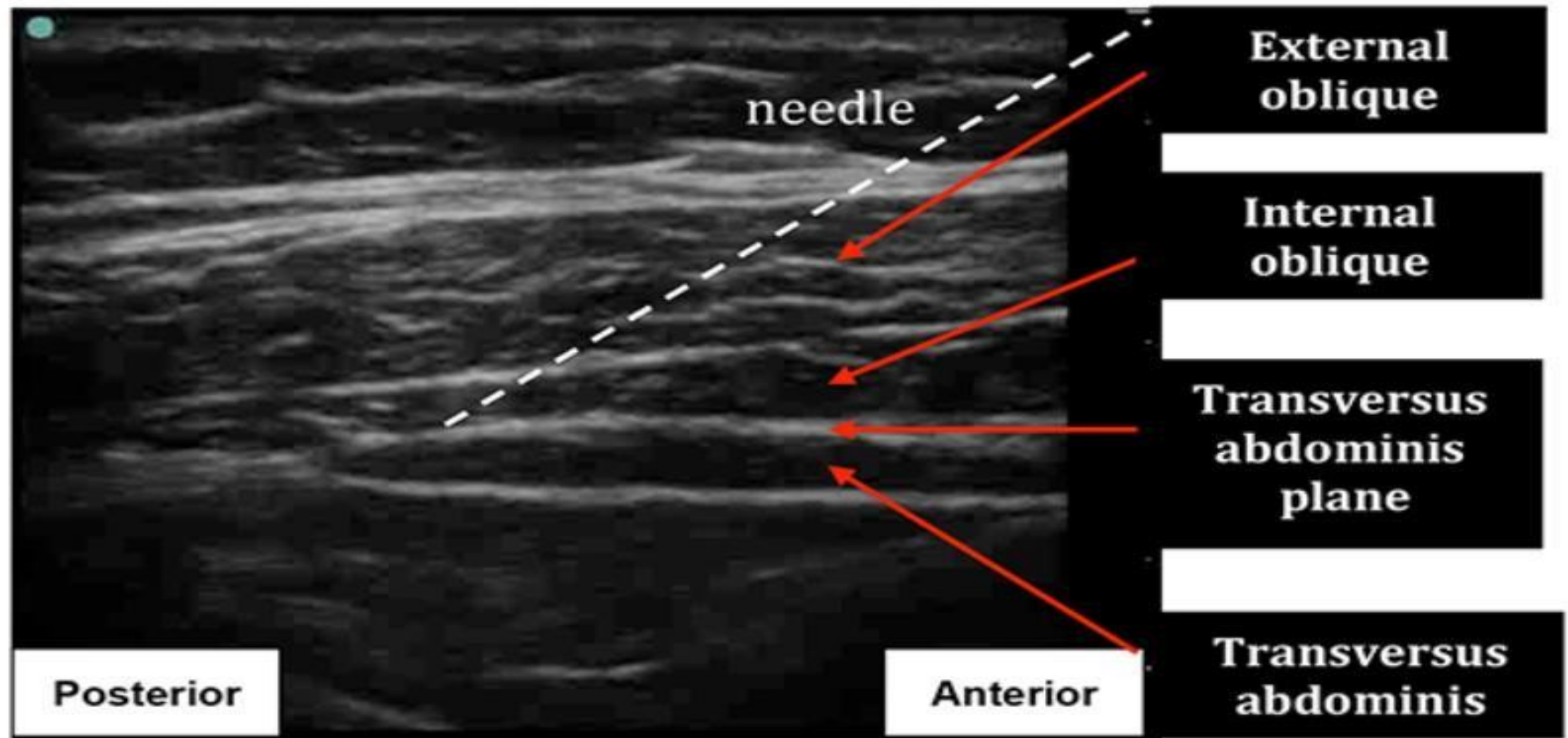
THE TRANSVERSUS ABDOMINIS PLANE (TAP) BLOCK :

is a local anaesthetic block used to provide analgesia to the anterior and lateral abdominal wall.

It blocking to the mid/lower thoracic and upper lumbar spinal nerves as they travelled in the fascial plane between the transversus Abdominis and internal oblique muscles.

Used to provide analgesia for lower abdominal surgery like:

- **Hernia repair**
- **Open appendicectomy**
- **Caesarian section**
- **Total abdominal hysterectomy**



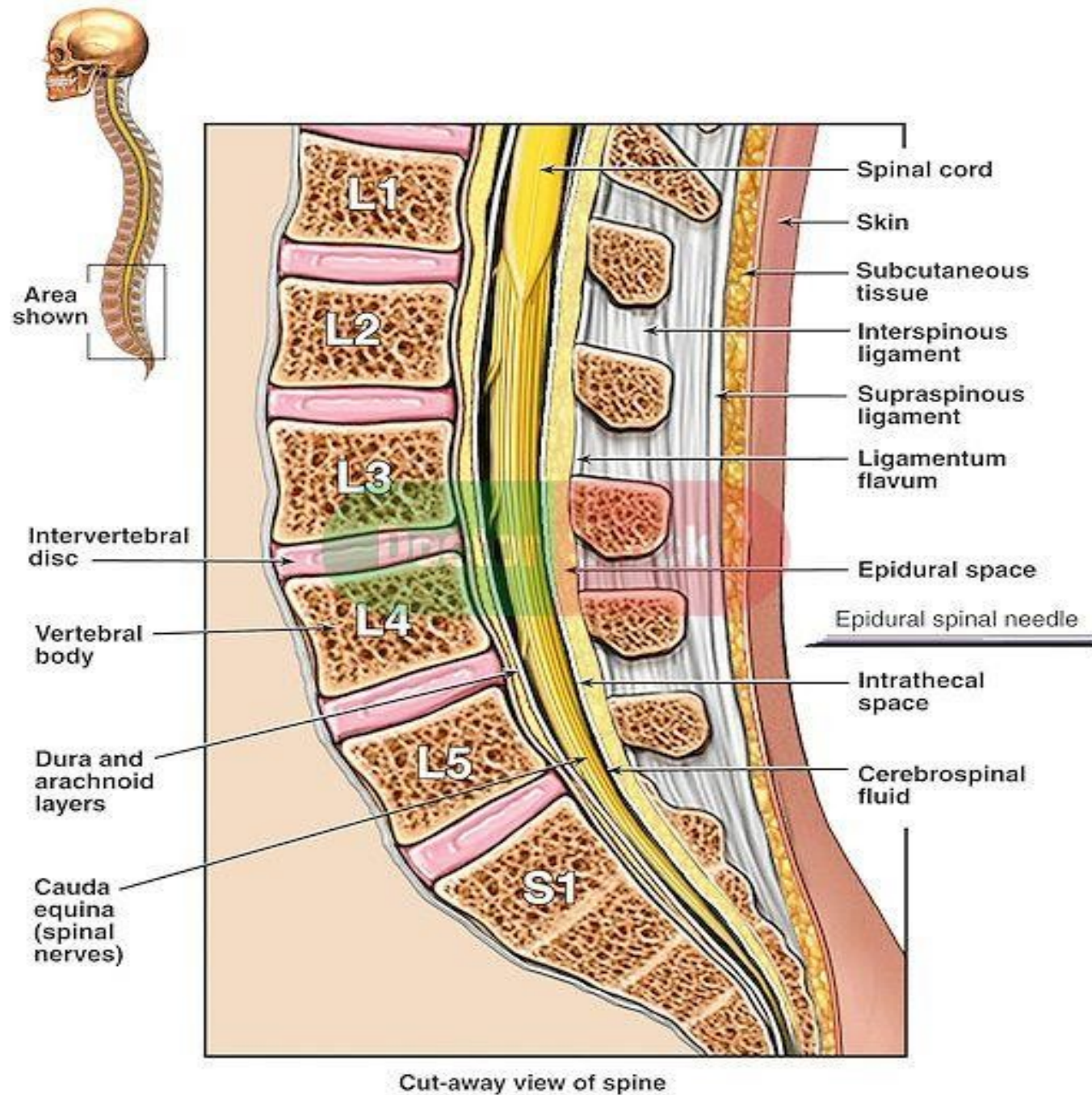
SPINAL ANESTHESIA :

A local anesthetic is injected in the subarachnoid space near the spinal cord and major nerves that enter the spinal cord to block sensations of pain from an entire region of the body below the level of injection, such as the lower abdomen, the hips, or the legs

The spinal cord usually ends at the level of L1 in adults and L3 in children

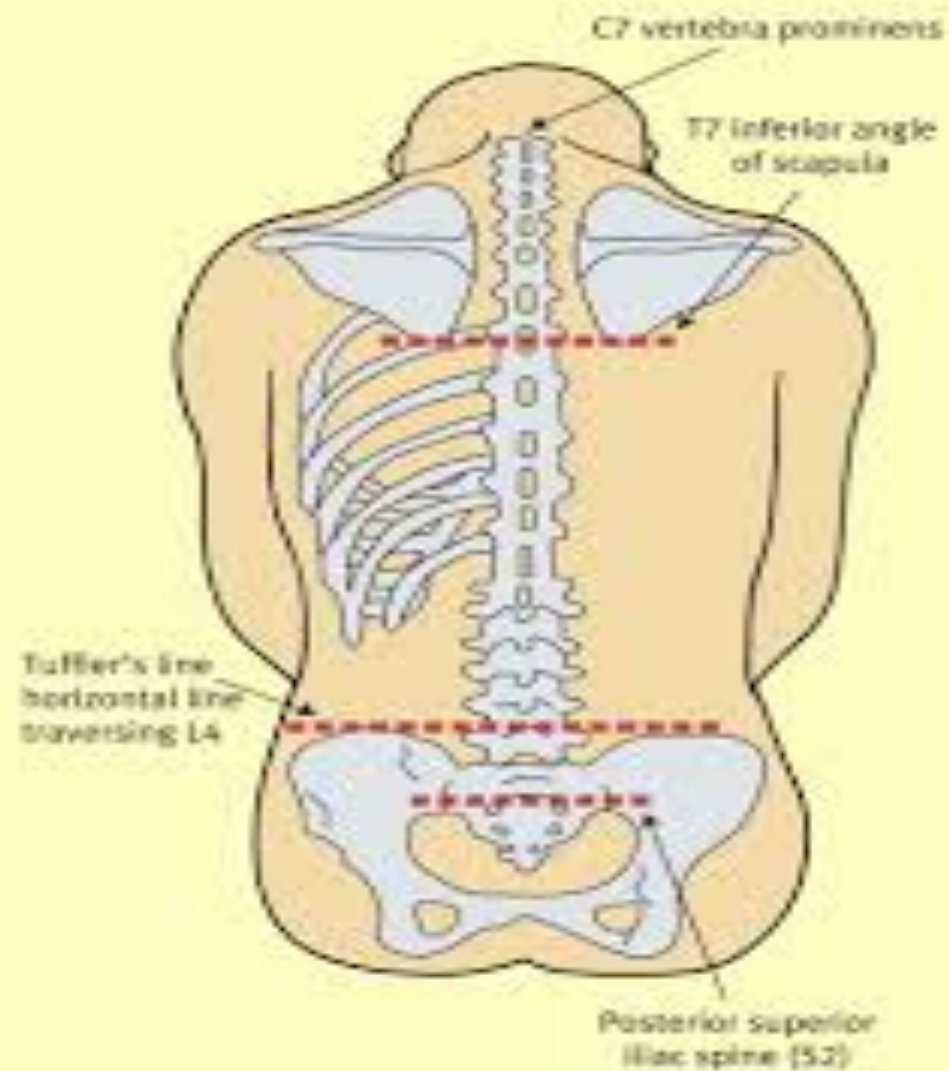
An important landmark to remember is that a line joining the top of the iliac crests is at L4 to L4/5

¹² Sympathetic paralysis ---> Sensory block ---> Motor nerve block





Vertebral levels of posterior spinal landmarks



INDICATION

Surgeries of lower limbs, perineum, pelvis, abdomen ?

? Urological surgery

mild Cardiac disease ?

Liver disease ?

Obstetric anaesthesia ?

Full stomach ?

Anatomic distortions of upper airway ?

TURP surgery ?

ADVANTAGES

- **Faster Recovery**
- **Less Grogginess**
- **Early Return to Oral Intake**
- **Less Nausea and Vomiting**
- **No Airway Manipulation**
- **Lungs and Heart**
- **Thrombo-embolism**
- **Superior Postoperative Pain Relief**
- **Early Ambulation**
- **Patient awake**

TECHNIQUE

It is done in a similar way. But the local anesthetic is injected using a much smaller needle, directly into the cerebrospinal fluid that surrounds the spinal cord. The site in which the needle should be inserted in is between the third and fourth lumbar vertebrae. The area numbed first with a local anesthetic. Then the needle is guided into the spinal canal, and the anesthetic is injected. This is usually done without the use of a catheter. Spinal anesthesia numbs the body below and sometimes above the site of the injection. The person may not be able to move his or her legs until the anesthetic wears off



Factors Effecting Distribution

Site of injection ?

Shape of spinal column ?

Patient height ?

Angulation of needle ?

Volume of CSF ?

Characteristics of local anesthetic ?

Density ?

Specific gravity ?

Dose ?

Volume ?

¹⁹ Patient position (during & after) ?

Cardiovascular Effects

Blockade of Sympathetic Neurons ☐

hypotension ☐significant venodilation☐----

:Reduces

Venous return ☐

Stroke volume ☐

Cardiac output ☐

Blood pressure ☐

T1-T4 Blockade ☐

Causes unopposed vagal stimulation ☐

20 Bradycardia ☐

Hypotension Treatment

: 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 ☐

Respiratory System:

Appropriate spinal blockade has little effect on ventilation [?]

High Spinal [?]

Decrease functional residual capacity (FRC) [?]

Paralysis of abdominal muscles [?]

Intercostal muscle paralysis interferes with coughing and clearing [?]
secretions

Apnea is due to hypo perfusion of respiratory center [?]

COMPLICATIONS

Immediate complications *

Hypotension -

.Bradycardia and Cardiac arrest -

.High and Total spinal block leading to respiratory arrest -

.Epidural hematoma, Bleeding -

Late complications *

Post dural puncture headache (PDPH)-

Backache-

Nausea -

Focal neurological deficit -

Bacterial meningitis -

23 Sixth Cranial nerve palsy - -

Urinary retention - -

Post dural puncture headache (PDPH)

More common in women ages 13-40 [?]

Larger needle size increase severity [?]

Onset typically occurs first- or second-day post-op [?]

:Treatment

Bed rest (remain lying flat in bed as this relieves pain) [?]

Fluids (drink freely or IV fluid to maintain hydration) [?]

Simple **analgesia** such as paracetamol, or aspirin or codeine may be [?]
.helpful

Caffeine containing drink [?]

Blood patch [?]

BLOOD PATCH

:Blood Patch

Increase pressure of CSF by placing blood in epidural space [?]

May do no more than two [?]

success with first patch 95% [?]

Second patch may be done 24 hours after first [?]

EPIDURAL (EXTRADURAL) ANESTHESIA

:Epidural space

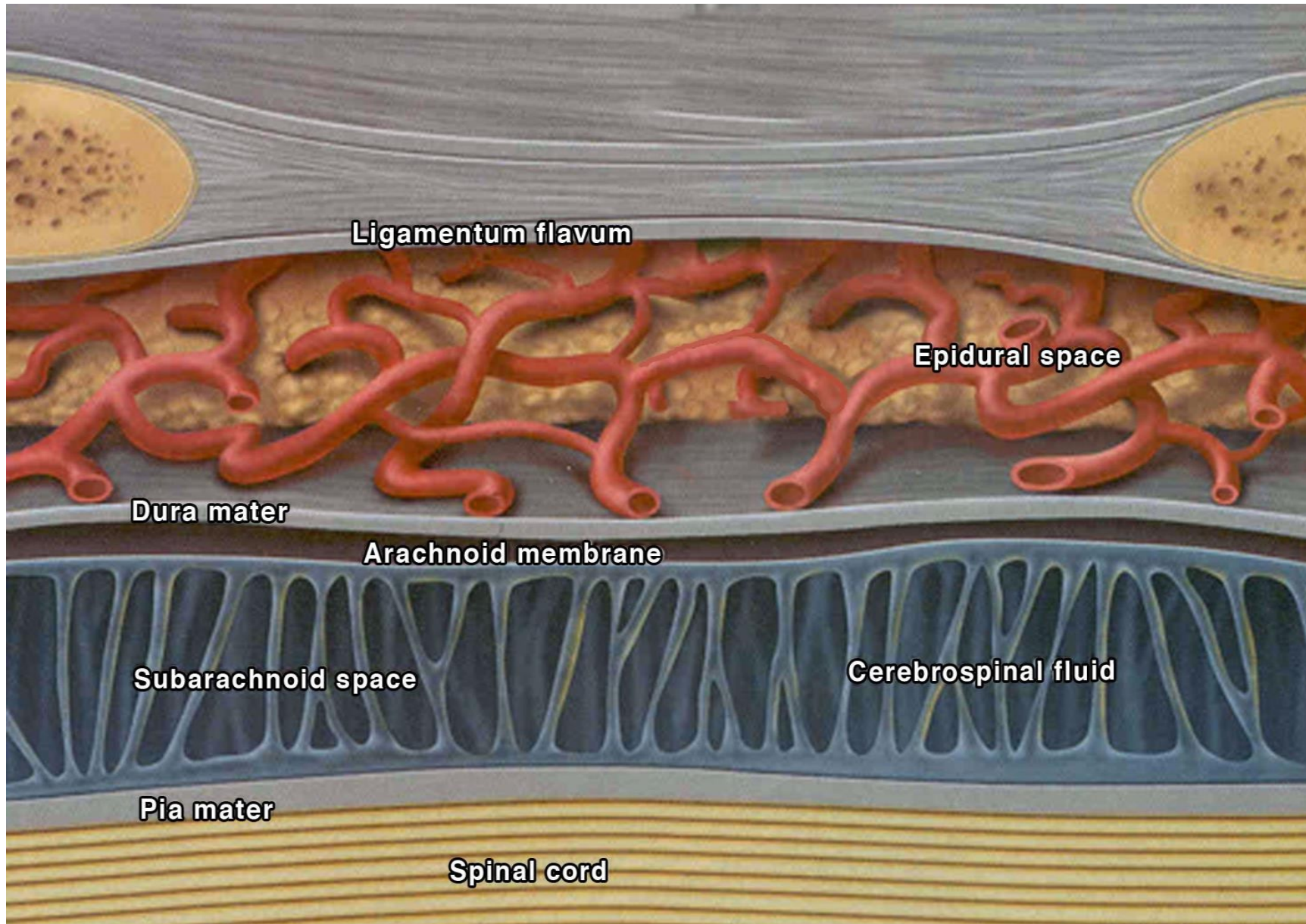
Potential space between the dura mater and ligament flavum Made up of -
vasculature, nerves, fat and lymphatic

.Extends from foramen magnum to the sacrococcygeal ligament -

Widest at Level L2 (5-6mm) -

Narrowest at Level C5 -

Local anaesthetic solutions are deposited in the peridural space between the dura mater and the periosteum lining the vertebral canal. The injected local
.anaesthetic solution produces analgesia by blocking spinal nerve roots

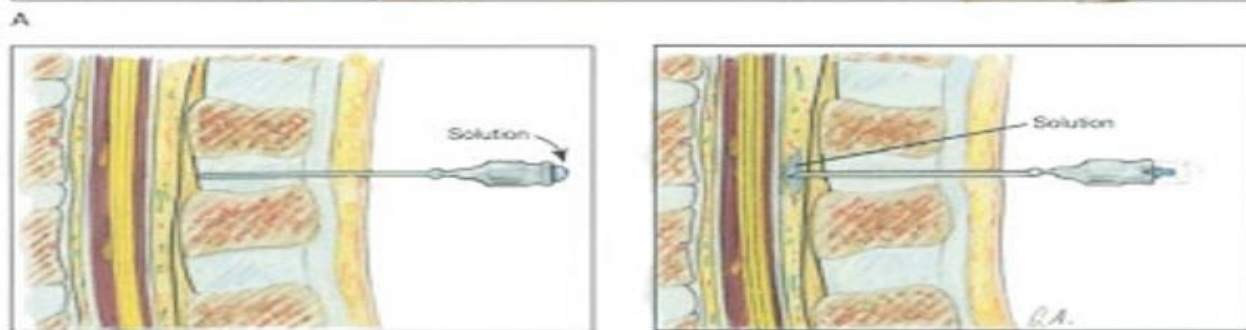
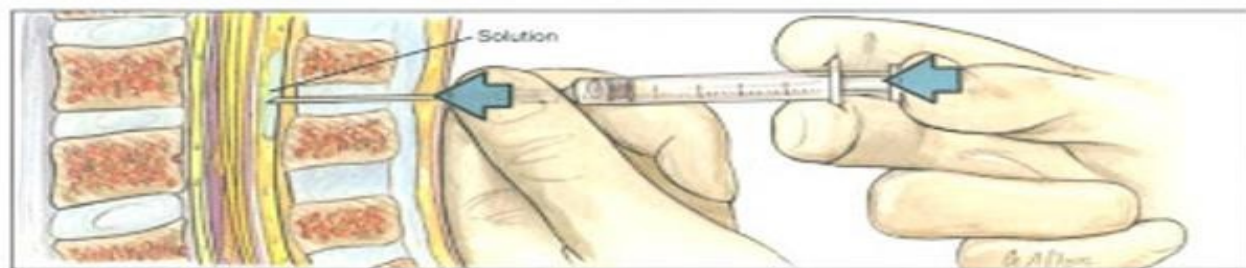
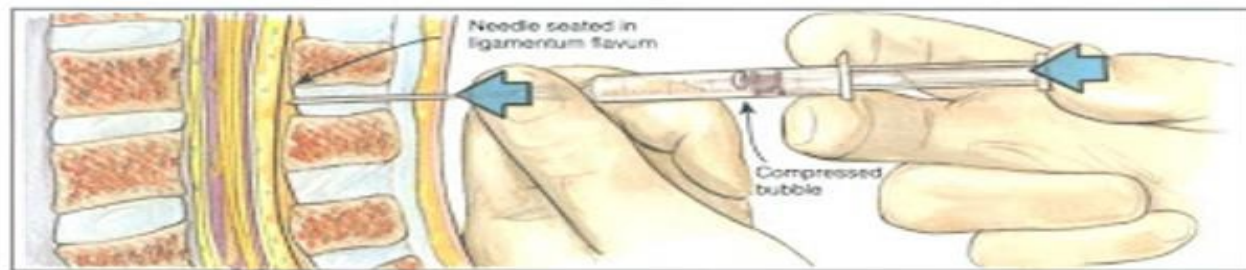
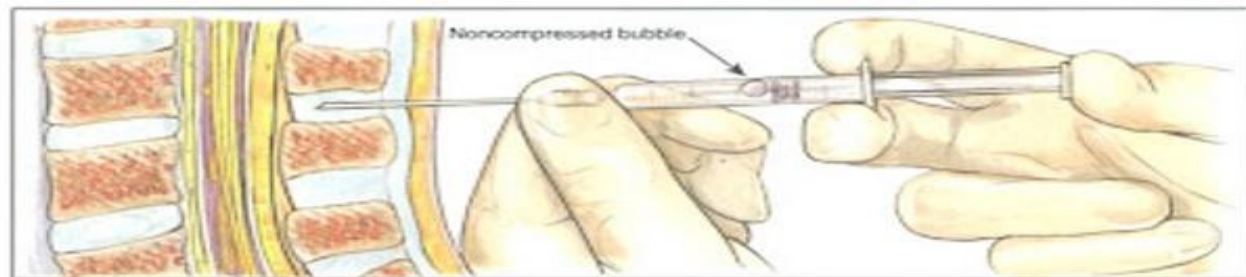


TECHNIQUE

It involves the insertion of a hollow needle and a small, flexible catheter into the space between the spinal column and outer membrane of the spinal cord (epidural space) in the middle or lower back. The area where the needle will be inserted is numbed with a local anesthetic. Then the needle is inserted and removed after the catheter has passed through it.

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The anesthetic medication is injected into the catheter to numb the body above and .below the point of injection as needed



B



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 -

Testing for level of block

?If Sympathetic block occurs

Skin temperature sensation Changes in the skin temperature

:Sensory level

Pin prick using sterile needle•

Loss of touch is two dermatomes lower than pin prick -

Motor block -

Modified Bromage scale of onset of motor Block -



Bromage 3 (complete)
Unable to move feet or knees



Bromage 2 (almost complete)
Able to move feet only



Bromage 1 (partial)
Just able to move knees



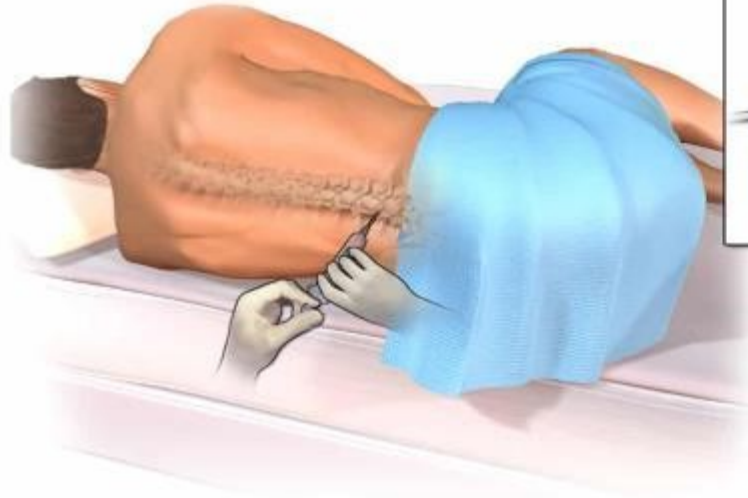
Bromage 0 (none)
Full flexion of knees and feet

Preparation for central neuraxial block

- Full Assessment
- All equipment, drugs, I.V fluids and facilities that mentioned in the preparation to local anesthetic injection should be available
- Full asepsis
- A sedative benzodiazepine or ketamine
- If the patient heavily sedated or ill, he/ she should be positioned in the lateral position with his/ her back parallel to the edge of the table and knees and head fixed.

POSITIONS FOR LUMBAR PUNCTURE

Lumbar Puncture



Lying Position



Sitting Position

IMAGE SOURCE: WIKIPEDIA



CONTRAINDICATIONS

:Absolute

- .Raised intracranial pressure -
- .Coagulopathy, blood dyscrasias or full anticoagulant therapy -
- .Skin infection at site of injection -
- .Marked spinal deformity -
- .Hypovolaemia -
- .Patient refusal -

:Relative

Mildly impaired coagulation
Neurological diseases

³⁶ Systemic infection

COMPARISON BETWEEN SPINAL ANESTHESIA AND EPIDURAL ANESTHESIA

Spinal anesthesia	Epidural anesthesia
1) Drug delivered to the subarachnoid space and into the CSF	1) Drug delivered outside the dura (outside CSF)
2) Injected only below the 3 rd lumbar vertebra to avoid piercing the spinal cord	2) May be given at cervical, thoracic, lumbar or sacral sites
3) smaller dose injected	3) larger dose injected
4) onset: 2 – 5 minutes for initial effect, 20 minutes for maximum effect	4) onset: 5 – 15 minutes for initial effect, 30 – 45 minutes for maximum effect
5) cause a significant neuromuscular block (muscle relaxation)	5) Doesn't cause a significant neuromuscular block
6) Gives profound block of all motor and sensory function below the level of injection	6) Blocks a 'band' of nerve roots around the site of injection, with close-to normal function below the levels blocked.
7) almost always a one-shot only	7) an indwelling catheter may be placed that allows for repeated doses

LOCAL ANESTHETICS

There are many anesthetic drugs used for neuraxial block; lidocaine, bupivacaine, levobupivacaine, and ropivacaine. Doses are associated with the amount of the local anesthetic and the concentration of the solution, depends on age, body height and weight, type and duration of the surgery, as example; bupivacaine dosage that required for spinal (intradural) anesthesia ranges between **0.5 – 2 ml** of **0.75%** solution (approximately **4 – 15** mg), epidural dosage for adults ranged between 10 – 20 ml of 0.25%, 0.50%, 0.75% (**25 – 150mg**)

QUIZ



Any questions?

*Thank
You*