Physiological effects of neuroaxial block

The site of action of local anaesthetic solution in the epidural space or subarachnoid is the nerve root.as the root carries somatic,visceral,autonomic fibers,physiological effects observed are related to block ofconduction in these fibers.

Spinal[subarachnoid]block

Technique

1.preoperative assessment;

-select the patient,examine carefully

-explain the procedure for the patient and written consent

2.I.V.infusion should started before procedure

3.correct positioning of the patient

4.full strile technique,spinal kit and drugs and spinal needle selection >22G ,25G

5.put patient in lateral position and lumber spine is flexed to spread spinous process and enlarge interlaminar space

-mid line approach ,skin of chosen interspace[commonly L4andL5]

-spinal needle is advanced in mid line sagittal plane directed cephalad 10degree toward the space

-needle will pass through skin ,subcutaneous tissue,supraspinous ligament,interspinous ligament,ligamentum flavum and dura mater

Alittle resistance followed by apopping sesation will be felt then stilet removed CSF flows freely from the needle

Very slow injection of local anaesthetic solution should be given in subarachnoid space ,after injection remove needle with stilet ,dress the site and patient put in supine position

 -vassopressors should be available ,moniter pulse rate ,blood pressure,respiration and ECG is essential.

Commen drugs used;

Lignocaine[xylocaine],onset time 1-3min.,duration45-75min. Bupivacaine,onset time2-4min.,duration120-180min.hyper baric75%

DIFFERENT TYPES OF BLOCK:

1-saddle:upper level of analgesiaS1,uses ;cystoscopy,perineal ,anal surgery.

2-low spinal:upper level L1,T12,uses;perineal, anal,lower extremities.

3-medium spinal:upper levelT10,T8,uses;lower abdominal surgery,appendix,prostate,hip surgery,lower extremities.

4-high :upper level T4,uses all abdominal surgery

5-unilateral spinal analgesia.

Indication of spinal block:

1.surgery below umbilicus

2. blood less operative field

3.obstetrical procedure4. Patient with medical illness ex. Diabetes,thyrotoxicosis.

CONTRAINDICATIONS

1.patient with anticoagulant therapy,coagulation diseases

2.hypovolemia.

3.infection at injection site or deformity.

4.active bacterial or viral infection of peripheral or central nervous system.

 5.increase intracranial pressure, chronic neurological diseases,peripheral neuropthy.

6.patient refusal.

COMPLICATIONS:

1-hypotention

2-sever itching

3-confused state

4-nausea&vomiting

5-post dural puncture headache,backache.

6-cauda equine syndrome

7-meningitis,high spinal anaesthesia

8-unexpected cardiac arrest

ADVANTAGES OF SPINAL

1.simple,quick to perform,rapid onset

2.perform analgesia &muscular relaxation

 3.low dose needed,lower risk of systemic toxicity

4.low risk of pulmonary aspiration

5.less physiological response to injery

Epidural Anaesthesia

 Follows from the injection of local anaesthetic solution into epidural space.blocks the nerve roots as they emerge from spinal cord &traverse the epidural space.

Local anaesthetic used: -lignocaine 1-2% onset 5-15min.,duration 60-90 min.

-bupivacaine 0.5-0.75% onset10-20min.,duration>180min.addition of adrenaline to local anaes.prolonge their

Procedure of epidural anaes. Is mostly similar to that of spinal anaes.but the identification of epidural space is the most important.

Epidural Space:

1-more or less a circular space surrounding the dural sac &it's extentions,extend from foramen magnum to coccyx.

2-negative pressure in the space.

3-structures pierced to get the space in the midline plane:skin,subcutaneous tissue,supraspinous lig.,interspinous lig.,&ligamentum flavum

4-following points help to detect the needle in the space:

a..sudden disappearance of resistance to the advancing needle

b..sudden ease of injection of air from the needle attached to the syringe

INDICATION OF EPIDURAL:

1-upper&or lower abdominal surgery ,lower limb,perineum,obstetric cases

2-post operative pain relief,painless labour

3- in combination with intravenous drug&with general anaesthesia

COMPLICATIONS

1-inadvertent dural tap may lead to:

Total spinal block -postspinal headache

2-toxcity of druge,failure of block

3-haematoma in spinal canal,extradural infection or abscess

4-hypotention due to systemic absorption,high sympathetic block,bradycardia with sympathetic block to T1-T4

5-truma to spinal cord&nerve roots

6-nausea&vomiting,shivering

7-prolonged analgesia or paraesthesia

COMPARISON BETWEEN SPINAL &EPIDURAL

 epidural spinal

Technique easy relatively diffecult

Drug dosage small large

Onset of action rapid2-3min. slow20-30min.

Site of action spinal cord&roots diffusion ,relies on mass&volume

Extend of block extensive depend on dose&volume

Intensity of block usually complete may be incomplete

Segmental block no yes

Success rate 100% missed segment,failure may occure

Quality of block satisfactory patchy block

Headache commen less commen

Backache frequent less frequent

Notes:

-epidural space is widest in the midline posteriorly.in the lumber region it is about 5mm.

-ligamentum flavum is composed of elastic fiber disposed in vertical direction.thinnest in cervical region &gradually thickened as it descends caudally.