**INDICATION & CONTRAINDICATIONS OF SPINAL ANESTHESIA**

The principle of spinal anaesthesia (sub arachnoid nerve block or spinal analgesia) is to produce transient and reversible block of conduction of the impulses through the anterior and posterior spinal nerve roots along with the posterior roots ganglion in the dorsal, lumbar and sacral regions of the body. All these afferent impulses are blocked by the spinal analgesia and no pain is felt during the operation and early post-operative period till the effect of the drugs used is present. If spinal headache occurs, it should be treated with analgesics and patient is advised to take plenty of fluids and strict bed rest as spinal headache occurs only on attaining upright posture.

**Key words:**

- Principle of spinal anesthesia
- Indications of spinal anesthesia
- Contra indications of spinal anesthesia
- Management of post spinal anesthesia

The principle of spinal anaesthesia (sub arachnoid nerve block or spinal analgesia) is to produce transient and reversible block of conduction of the impulses through the anterior and posterior spinal nerve roots along with the posterior roots ganglion in the dorsal, lumbar and sacral regions of the body.

This block is produced by depositing local anesthetic drug (Cinchoacaine Hydrochloride 0.5% solution 1-2 mls or Bupivacaine 0.5% 2-3 mls in adults) or hyperbaric Bupivacaine (0.75%) about 1-2 ml within the sub arachnoid space at any lumbar interspace below the termination of spinal cord (lower border of L1 in adults) usually between L3-4 or L4-5 leading to the paralysis of the autonomic, sensory and motor activity in the same order.

Anterior spinal nerve root is efferent and contains fibers of:
1. Motor nerve supply to the voluntary muscles (causing temporary paralysis after spinal block).
2. Pre-ganglionic fibers (sympathetic from T1-L3) causing vasodilatation and hypotension after spinal block.

Posterior spinal root is afferent and carries afferent impulses from the whole body including viscera to central nervous system. Each posterior root has a ganglion and conveys fibers of:
1. Pain.
2. Temperature.
3. Touch.
4. Pressure.
5. Proprioception from the bones, joints and tendons.

All these afferent impulses are blocked by the spinal analgesia and no pain is felt during the operation and early post-operative period till the effect of the drugs used is present.

**INDICATIONS**

**OPERATIONS BELOW THE DIAPHRAGM**
1. Operation on the lower limbs.
2. Operation on the perineum.
3. Operation on the lower abdomen.

General anaesthesia is preferred and gives better control of the body function in upper abdominal surgery.

The incidence of nausea, vomiting and pain is more under spinal anaesthesia. It is more for upper abdominal surgery as a block upto T4 is required which is usually not attained as intercostal muscles are also paralysed and patient may become hypoxic.

Spinal analgesia is very suitable for lower abdominal surgery and lower limb surgery.

Spinal analgesia puts more stress on the cardiovascular system. The hemodynamic changes are acute and severe especially with higher spinal block.

The incidence of hypotension can be reduced by infusion of 1-2 liters of crystalloids or about 1 liter of colloids, vasopresins like ephedrine, plenoxybenzamine, mephenetermine and metaraminol are also used to present hypotension.

**GENERAL OBSTETRICS**
1. Vaginal delivery.
2. Caesarean section.
3. Vaginal Hysterectomy.

**DIAGNOSTIC AND THERAPEUTIC PROCEDURES**
Those procedure which are painful like cystoscopy and urethral dilatation.

**IN STRONG AND MUSCULAR PATIENTS**
It gives reasonable muscle relaxation for surgical procedures.

**CHEST DISEASES**
It is relatively suitable in patients with respiratory disease such as asthma, emphysema and chronic bronchitis if operation has to be done on lower abdominal area.

**DIABETES MELLITUS**
It is controversial to use spinal anaesthesia in diabetic patients. There are certain biochemical and metabolic disturbances in diabetes mellitus.

These do not get aggravated by the spinal anaesthesia where as these abnormalities get worse by general anaesthesia.

**NEURO MUSCULAR DISORDERS**
Myasthenia gravis and other muscular dystrophies where effect of muscle relaxants may be prolonged for several hours.

**FULL STOMACH**
If patient is not empty stomach and operation is an emergency, spinal analgesia may be given.

There will be lesser risk of the aspiration syndrome (Mendelson’s syndrome) in patients with full stomach.
However the necessary precautions should be taken in either case.

**OBSTETRICS PATIENTS**
Most of the time these patients are not empty stomach.

Spinal analgesia is safer than general anaesthesia as the hazards of aspiration of gastric contents (Mendelson’s syndrome) in mother and respiratory depressant effects on the foetus (due to general anaesthesia) are avoided.

**ADVANTAGES ANAESTHESIA OF SPINAL**
Spinal anaesthesia is economical, easy to administer, rapid onset of action, less blood loss, no effect on uterine tone, less incidence of pulmonary aspiration, minimal upset of body chemistry and no immediate post-operative pain.

**CONTRAINDICATIONS**

**NATURE OF PATIENT**
It should not be forced upon the unwilling patient who does not give consent.

Spinal analgesia without consent is an assault. It should not be given to un-co-operative, extremely tense or psychotic patients who may become more un-co-operative during surgery.

**BLEEDING DISORDERS AND PATIENTS ON ANTICOAGULANTS**
There is danger of piercing the venous plexus with the spinal needle which could result in spinal cord compression by haematoma.

**SEPTICAEMIA**
It may result in meningitis.

**RAISED INTRACRANIAL PRESSURE**
The shift of the brain may occur with loss of cerebro-spinal fluid (danger of conning). Some risk is seen in cases of intracranial tumours as well.

**INFECTIONS**
Skin infection or chronic dermatitis near the lumbar puncture site.

Pathogens may be introduced and cause meningitis.

**NEUROLOGICAL DISORDERS**
Systemic disease with neurological involvement such as pernicious anaemia, neurosyphilis or porphyria.

**SPINAL CORD LESIONS**
Pre-existing spinal cord disease. (Amyotrophic lateral sclerosis and multiple sclerosis).

**SHOCK**
Hypotension, dehydration, hypovolemia and patients in shock when the blood pressure is less than 90 mm of Hg.

**HYPERTENSION**
There is risk of severe fall of blood pressure after spinal anaesthesia in these patients.

**SPINAL DEFORMITIES**
Deformed back, lordosis, spondylosis, scoliosis, kyphosis and hypertrophic arthritis. In such cases lumbar puncture may be difficult and un-necessary trauma due to repeated spinal needle puncture may occur.

**TYPE OF SURGERY**
When estimated operating time is more than three hours.

When surgery is to be performed in prone
position.

**GASTRO INTESTINAL PERFORATIONS**
In such cases contraction of the intestine adds to the soiling of the peritoneum with gastro-intestinal contents as in perforated peptic ulcer and intestinal perforations.

**SPLINTED DIAPHRAGM**
Patients with splinted diaphragm which interferes with breathing such as:
1. Hydramnios
2. Very large ovarian cyst or tumours.

**MANAGEMENT OF A PATIENT AFTER SPINAL ANALGESIA**

**INTRAVENOUS FLUIDS**
Intravenous fluids should be started before the administration spinal anaesthesia.

**POSITION OF THE PATIENT**
It is supine flat or supine with five degree head side tilt. Lateral position for unilateral analgesia.

The patient is kept for 5-10 minutes in each position for the anaesthetic action to be complete.

**MONITORING OF THE BLOOD PRESSURE**
Blood pressure is monitored every five minutes as hypotension is the major ill effect. If hypotension occurs following measures are taken:
1. Ephedrine 30 mg is given intravenously in divided doses.
2. Intravenous fluids are given at a faster rate.
3. The foot end side of the patient is raised.
4. Oxygen inhalation is started.

**RESPIRATION**
One should watch for respiratory depression and difficult breathing as these are the risks in high analgesia.

As soon as the respiratory failure is recognized by difficult breathing and cyanosis, the patient is intubated and oxygen is given by intermittent positive pressure ventilation till adequate spontaneous respiration is maintained.

**NAUSEA AND VOMITING**
The cause of nausea and vomiting is looked for.

It is mostly due to hypotension. The blood pressure is noted immediately. If hypotension is present, intravenous fluids are given at a faster rate.

Ephedrine 30mg is given intravenously. Oxygen inhalation is started and patient is asked to breathe deeply.

It will relieve the hypotension, nausea and vomiting.

If the blood pressure is normal, then the antiemetic drugs are used.

It may be due to the traction on the viscera and mesentery. The traction is stopped for a while and these symptoms disappear.

**PAIN**
If some pain is felt during operation, analgesics are used such as pethidine 100 mg. If the pain is severe, it is better to supplement the spinal anaesthesia with general anaesthesia.

**POST OPERATIVE MANAGEMENT**
1. Raise the foot end of the bed for 3-4 hours. It helps to maintain the blood pressure by increasing the venous return.
2. It helps to prevent the venous stasis and post-operative spinal headache.
3. Record the blood pressure, pulse, respiration and temperature regularly.

A void reading, coughing, straining and strong lights during first few days. It helps to prevent spinal headache.

If spinal headache occurs, it should be treated with analgesics and patient is advised to take plenty of fluids and strict bed rest as spinal headache occurs only on attaining upright posture.

If it is severe, extradural injection of normal saline 30-50 ml or extradural blood patch with 10-15 mls of patient’s own blood is given at the site of previous spinal puncture. It relieves the spinal headache in almost all cases.