IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 15, Issue 2 Ver. XI (Feb. 2016), PP 58-59
www.iosrjournals.org

Sacral Posterior Roots Block

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Abstracts*: Certain short durable surgeries need the only sensory block. Way to offer hemodynamic stability during surgery by neuraxial block is always highly acceptable. For the above purpose in the lower limbs, we administered lumbosacral posterior roots block to 50 patients of ASA 11 and 111 with 2.5ml of 0.25 % (hypobaric) bupivacaine in the prone position through the 1st or 2nd dorsal foramen of the sacrum. Intrathecal deposition of low concentrated local anaesthetic produced only sensory block without the motor involvement and hemodynamic disturbance. Lumbosacral posterior roots block are good for the short durable surgery in the lower limbs. It does not disturb the hemodynamic status of the body even in the ill patients.*
Keywords*: Hypobaric, local anaesthetic, posterior roots, sacral dorsal foramen*

I. Introduction:

The spinal cord is the most important vital link between the body and the brain extending from the foramen magnum to the level of the first or second lumbar vertebrae. The spinal cord consisting of two consecutive rows of nerve roots on the each side give rise to posterior and anterior roots. The dorsal roots travel to the dorsal root ganglion to join with the anterior roots and form 31 pairs of the spinal nerves in the intervertebral foramen. Administration of the hypobaric solution near the posterior roots causes the only sensory block. By such hypothesis, we designed to estimate the effects of the posterior roots block through the first or second dorsal foramen of the sacrum.

II. Methods

After approval of Medical Ethical Review Board of Howrah Orthopedic Hospital of Eastern Railways, we recruited 50 patients belonging to ASA class II and III for their lower limb surgery in the period from June 2014 to June 2015. We received advanced informed consent from all participants at the time of preoperative visit. We explained them about the expected benefits and complications of the posterior roots block through the first dorsal foramen of the sacrum and discarded the patients with local infection or coagulopathy or deformed sacrum.

In the O.T, we started peripheral infusion and monitoring for blood pressure, heart rate, E C G and oxygen concentration. We identified the anatomical landmarks [1] like the spinous process of the fourth lumbar vertebra (L4), posterior superior iliac spine and the tip of the coccyx in the prone position without the pillow under abdomen as sacrum is a fixed bone. Next, we located the mid-point between L4 and coccyx as the third sacral vertebra (S3) and the first sacral vertebra (S1) as mid-point of L4 and S3. We marked the second sacral vertebra (S2) as the mid-point between S1 and S3 at the level of the posterior superior iliac spine as dimple of skin. The spinous processes of S1 and S2 are found approximately 2.5 cm apart, and their respective foramina lie 1.5 cm caudal and lateral to them.

With aseptic preparation and infiltration of the selected area with 6ml of 1% injection lignocaine, we inserted the spinal needle perpendicularly through the first or second dorsal foramina until it contracted with bone or entered through the foramen. In the case of bony touch, we had withdrawn the needle a little and again redirected towards the foramen until it punctured the dural sac confirmed by the appearance of CSF. We injected 2.5ml of 0.25 % injection bupivacaine (hypobaric) slowly through the spinal needle.

We recorded heart rate, blood pressure, and oxygen concentration at every five minutes and assessed the upper level of the sensory block by pinprick and motor block by modified Bromage scale. We also recorded the onset time of sensory block (time gap between the dural puncture and bilateral loss of sensation of the lower limbs) and the duration of the sensory block (time difference between the dural puncture and complete recovery of the sensory block). We sent all collected data for statistical analysis using Graphpad Prism 5.

III. Results

50 geriatric participants developed lumbosacral dorsal roots block through the first or second sacral foramen. All participants developed bilateral sensory block up to 12th dermatome. Partial motor block developed. All movements of all joints in lower limbs were present. The only weakness in the lower limbs developed. Surgeons were not disturbed during the surgical procedure. All participants did not complain about pain or discomfort. All participants developed hemodynamic stability. All patients lifted up their legs immediate

after the operation and moved from OT table to trolley. Their demographic, hemodynamic and nerve block profiles are cited in the table no 1.

IV. Discussion

Successful development of sensory block by lumbosacral dorsal roots block is the ultimate result of this study. Associated hemodynamic stability during surgical procedure magnifies its efficiency and promotes its acceptability for practical implication. Our previous study of sacral saddle block [2] supports the fact of the only sensory block on the inner side of the thigh and perineum. The conventional saddle block through the lumbar route produces the similar sensory block along with motor block to some extent.

Caudal continuation of the brainstem forms the spinal cord and gives rise 31 pairs of spinal nerves by the combination of dorsal and ventral roots in the intervertebral foramen. Consecutive two rows of the posterior roots remain within the posterior portion of dural sac and come in immediate contact of LA injected intrathecally at the terminal portion of the dural sac preferably through the sacral route to limit the cephalic extension. Ultimately, it has resulted from the blockade of posterior roots of lumbosacral spinal segments which is responsible for the neural control of the lower limbs.

Technically, the anaesthetic procedure is similar to that of the intrathecal procedures through the dorsal foramen of the sacrum [1, 2, 3] but differs in action depending on volume and concentration of LA. This study has consisted of the predominant sensory block of both lower limbs.

It is always foramen dependent intrathecal procedure. The infrequent presence of obliterated foramen or presence of smaller impassable foramen as in Ankylosis Spondylitis [4] or presence of the abnormal termination of dural sac at the level of L4 or absence of sacral canal in 5-10% of the population [5] limits its practical implication.

Posterior roots block is a safe anaesthetic technique with maximal hemodynamic stability and the sensory block of lower limbs. Even in the presence of limited organ reserve and compromised cardio-respiratory status, it is highly suitable for geriatric patients who are very prone to develop hypotension during the conventional spinal anaesthesia. More future studies are essential for its worldwide acceptance and routine use to establish its simplicity and benefits to the geriatric patients for their lower limbs' surgeries where the only sensory block is necessary.

V. Conclusion

The lumbosacral posterior roots block provides maximal hemodynamic stability and useful sensory block to the geriatric patients for their short durable surgeries of the lower limbs.

Reference

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Table No 1 Demography Profile

Age (Year)	45.25±5.12
Sex (M:F)	3:2
Height (cm)	160.45±4.38
Weight (Kg)	55.65±1.92
HEMODYNAMIC PROFILE	
Syst Blood Pressure (mm Hg)	115.61±3.65
Pulse (Beats/min)	85.36±4.53
Oxygen concentration Spo2 (%%)	99.5±5.35
NERVE BLOCK PROFILE	
Onset of Sensory Block (Min)	3.12±1.25
Duration of Sensory Block (Min)	125.96±4.32
Motor Block	No motor block developed