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The Feasibility And Utility of Lumbosacral Triangle Block for Lower Limbs' Surgery: an Observational Study

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Abstracts: *Deeply seated obturator nerve does not get easily blocked by conventional technique. The lumbosacral triangle on the lateral sides of 5th lumbar vertebra is crossed by obturator nerve, lumbosacral trunk (L4, 5) and sympathetic trunk. The femoral nerve is separated from this triangle by psoas major muscle. Deposition of local anaesthetic in this triangle may spread downward over ventral roots of sacral plexus and laterally to femoral nerve. Assuming such hypothesis, 30 participants were administered lumbosacral triangle block with 30 ml of local anaesthetic on the lateral side of the body of 5th lumbar vertebra with help of nerve stimulator needle. Obturator, femoral and sciatic nerves undergo motor and sensory block by single shot of injection. Lumbosacral triangle block is the best approach for unilateral lower limb block.*

Keywords: *lumbosacral, peripheral nerve block, paravertebral space, obturator nerve*

I. Introduction

The lumbosacral triangle of marcille is the inlet for lumbosacral trunk (L4-L5), sympathetic trunk and obturator nerve to pelvic cavity over ala of sacrum and the femoral nerve descends along its lateral side. Deposition of local anaesthetic (LA) at this lumbosacral triangle and at its lateral broader under supervision of nerve stimulator may offer femoral, obturator and sciatic nerve blockade for unilateral lower limb surgeries. This study was adopted to test this hypothesis to evaluate its efficiency in regulation of hemodynamic stability and provision of preoperative and postoperative analgesia.

II. METHODS

After approval of the medical ethics committee, written informed consents were obtained from thirty participants of ASA physical status of II and III, undergoing surgeries of projected unilateral lower limb . Patients with local infection or associated with head injury or coagulopathy were discarded during preoperative visit. In the O.T, we started peripheral infusion and non –invasive monitoring like blood pressure, heart rate, ECG and oxygen concentration. Anatomical landmarks like highest points of iliac crests and spine of 5th lumbar vertebra (L5) were indentified in lateral position of the patients keeping surgical side up. L5 was located at the mid-line below the line joining two highest points of iliac crests. A point of 3 cm lateral from middle of L5 on the surgical side was marked as point of insertion for nerve stimulator needle. This site was infiltrated with 1% injection lignocaine after proper aseptic preparation and draping.

A mixture of local anaesthetic containing injection lignocaine 200 mg, injection bupivacaine 75 mg, injection ropivacaine 75 mg and 20 ml water was made beforehand to use. The nerve stimulator is attached to a 100 mm insulated needle at an initial current setting of 1m A and frequency of 2 Hz. The nerve stimulator needle was introduced horizontally towards the body of L5 and frequently needle touched the transverse process of L5. This bony touch was bypassed by withdrawing the needle a little and redirected the needle either caudally or in cephalad direction to cross the barricade. Contraction of the adductor group of muscle or quadriceps confirmed the paravertebral space and after negative suction for blood or cerebrospinal fluid or both 30 ml of LA was injected. Patients were kept on the same position to detect its clinical effects after 5 minutes. Absence of pain or minimizing the pain after block indicated the effectiveness of the block.

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 deposition of LA and unilateral loss of sensation of the target lower limb) and the duration of the sensory block (time gap between the deposition of LA and complete recovery of the sensory block). Similarly onset of motor block (time gap between the deposition of LA and unilateral loss of motor power of the target lower limb) and duration of motor block (time gap between the deposition of LA and complete recovery of the motor block) were estimated. Administration of sacral spinal

anaesthesia (6) was alternative option in case of failure or incomplete block. No such option was needed. No patient needed systemic sedation or analgesic. All patients were administered oxygen via nasal catheter at the rate of 3 litres / minute. All collected data were sent for statistical analysis.

III. Results

With deposition of local anaesthetic in the lumbosacral triangle 30 patients developed femoral, obturator and lumbosacral trunk nerve block easily. Adductor and quadriceps groups of muscles undergo motor and sensory block with complete relief of pain from fracture site and increase of postoperative analgesia. Lumbosacral triangle block provides hemodynamic stability in all participants with complete motor and sensory block of the surgical side. Their hemodynamic and demographic profiles are cited in table no 1. Nerve block profile is cited in the table no 2.

IV. Discussion

Easy development of obturator nerve and lumbosacral trunk (L4, 5) block after deposition of local anaesthetic in the lumbosacral triangle of Marcille without undesirable complications constitutes main outcome of this study. Associated development of nerve block for the femoral, sacral component of the sciatic nerve with hemodynamic stability represents secondary outcome of the study. No other study is available regarding this procedure as this approach is completely new one in the field of peripheral nerve block. The technical part of this study is similar to that of psoas compartment block (1, 2, 3) with different sites for penetration of the needle. The lumbosacral triangle block is performed at the level of 5^{th} lumbar vertebra compared to 3^{rd} lumbar vertebra in case of psoas compartment block. The undesirable side effects and complications like epidural spread, (4) total spinal anaesthesia, hypotension, intraperitoneal injection, retroperitoneal hematoma, renal puncture and systemic toxicity make psoas compartment block unreliable to accept as routine practice.

The lumbosacral triangle of Marcille is a triangular gap on both sides of the body of 5^{th} lumbar vertebra. Its base is formed by the ala of the sacrum, lateral border is made by medial border of the psoas major muscle and floor is formed by transverse process of 5^{th} lumbar vertebra and ilio-lumbar ligament. Apex is formed by lateral and medial wall of the triangle. The obturator nerve crosses the triangle vertically over the ala of sacrum along its lateral border and the lumbosacral trunk (L4, 5) runs over the ala of the sacrum along the medial border of the triangle. Femoral nerve lies on the lateral side of psoas major and is easily approachable. The medial wall, base, and floor of the triangle are made by bones which limit the progress of the needle to avoid the damage the other structures. It is situated at the end of psoas compartment on the ala of sacrum.

The introduction of nerve stimulator needle helps to detect the lumbosacral triangle by stimulation of obturator nerve or lumbosacral trunk or femoral nerve with clinical manifestation of adductor muscles contraction or the great toe movement or quadriceps response respectively. Deposition of local anaesthetic causes motor and sensory block over the area innervated by blocked nerves. The deposited local anaesthetic(LA) in this triangle does not flow to opposite side which remained unaffected. The deposited LA descends downwards over the ventral roots of sacral plexus and blocked the superior gluteal nerve(L4,5,S1), inferior gluteal nerve (L5,S1,2) for surgeries on gluteal region. Cutaneous supply of anterior half of gluteal region remained free from block as the cutaneous supply of this area depends on subcostal, L1 and L2 nerve. For the hip surgeries, additional block for them is essential. Hamstring group of muscles (L5 S1,2) undergo motor and sensory block due to downward spread of LA over the ventral roots of sacral plexus. Femoral and obturator nerves easily block the quadriceps and adductor group of muscles respectively.

The position of lumbar intervertebral foramen and origin of Psoas major muscle place the roots of the lumbar plexus within Psoas major muscle which descends along the pelvic brim and forms lateral wall of the lumbosacral triangle. Femoral nerve emerging low on the lateral border of the Psoas major muscle descends in the groove between psoas and iliacus muscle. The obturator nerve emerging from the medial border of the psoas major muscle at the pelvic brim and crosses ala of sacrum and enters the pelvis.

Deep location of obturator nerve at the level of obturator foramen makes the conventional approach unpopular and handicapped. At the lumbosacral triangle, obturator nerve is easily approachable before branching without complication of epidural spread, intrathecal involvement, hypotension and total spinal unlike psoas compartment block.(5) The use of nerve stimulator needle with or without complete or partial sacralisation of the transverse process of 5^{th} lumbar vertebra limits the study.

Further study is essential to explore the possibilities of lower limb surgeries in geriatric patients who are less responsive to hypotension created by conventional neuraxial block.

V. Conclusion

Obturator, femoral and sciatic nerve block were performed by the deposition of LA in lumbosacral triangle of marcille and make it suitable for lower limb surgery in geriatric patients. It provides hemodynamic stability, preoperative and postoperative analgesia and reduces need of systemic analgesia.

Table 1: DEMOGRAPHIC PROFILE

Age (yrs	72.56±4.56
Sex (M;F)	20:10
Height (Cm)	161.91±5.43
Weight (Kg)	62.15± 3.53
HEMODYNAMIC PROFILE	
Systolic Blood Pressure (mm Hg)	123.56±14.32
Heart Rate (Beats/min)	78.43±4.35
Oxygen Concentration (SP02 %)	99.31±0.13

Table 2 : NERVE BLOCK PROFILE

Onset of sensory block (min)	4.53±1.43
Onset of motor block (min)	5.25±0.86
Duration of sensory block (min)	504.15±15.75
Duration of motor block (min)	306.64±12.45
Duration of postoperative analgesia (min)	650.57±14.53

Reference

[1]. Awad IT, Duggan EM Posterior lumbar plexus block: anatomy, approaches and techniques. Reg Anesth Pain Med 2005; 30: 143-9.

[2]. Capdevila X, Macaire P, Dadure C, Choquet O, Biboulet P, Ryckwaert Y, d'Athis F . Continuous psoas compartment block for postoperative analgesia after total hip arthroplasty: new landmarks, technical guidelines, and clinical evaluation.Anesth Analg 2002;94:1606-13.

[3]. Sim IW, Webb Anatomy and anaesthesia of the lumbar somatic plexus.Anaesth Intensive Care 2004;32:178-87.

[4]. Mannion S. Epidural spread depends on the approach used for posterior lumbar plexus block. Can J Anesth 2004; 51: 516-7.

[5]. Auroy Y, Benhamou D, Bargues L, Ecoffey C, Bruno Falissard B, Mercier F, Bouaziz H , Samii K.Major Complications of Regional Anesthesia in France. Anesthesiology 2002; 97:1274–80

[6]. Paria R, Surroy S, Majumder M, Paria B, Paria A, Das G. Sacral spinal anaesthesia. Indian Journal of Anaesthesia. 2014;58(1):80.