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Original Research Article

An Observational Study to Evaluate Anterior Approach Sciatic Nerve Block in Combination with Femoral Nerve or Saphenous Block for Below Knee Surgeries

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Abstract

Introduction: Sciatic nerve block is useful technique for unilateral lower limb surgeries particularly in patients who are not suitable for Central neuraxial blocks.

Methodology: Forty patients from 20-70 years of either sex scheduled for below knee lower limb surgeries on elective or emergency basis, under sciatic nerve block by anterior approach in combination with femoral or saphenous nerve block were included under this trial. All blocks were given by landmark and PNS guided technique. Nerve block characteristics, success rate, patient comfort, complication etc. were observed.

Results: Majorities of the patients (77.5%) required singe attempt. Only in 87.5 % patients' plantar flexion was observed with nerve locator. In 5% patients, drug was injected when only paresthesia was found. Onset of sensory block was relatively fast 7.95 ±0.9 mins but motor blocks took time to establish 15.23 ± 0.9 mins. Primary block achieved in 21.5 ± 1.34 mins. Total procedure time with supplemental block were 5.76 ± 0.56 mins. Readiness time for surgery was 31.4 ±1.1 mins. Duration of motor block (3.86 ± 0.28 hrs) was less than the sensory block (8.27 ± 0.5 hrs). Duration of analgesia was quite larger (9.46 ± 0.52 hrs). Incidence of discomfort associated with performance of block was less. About block technique 78.9% patients said it hardly hurt. Only in 2.6 % patients required supplementation in form of IV sedation. 5% failed block patients were given spinal anaesthesia 35 minutes after block.

Conclusion: Sciatic nerve block by anterior approach, lessen total procedure time for combination blocks. Foot twitches should be considered as end point and hamstring contractions should not accepted as motor response. In difficult block, try internal rotation of leg to expose nerve under the femur. Sciatic bock takes longer time (fairly 25-30 minutes) for full motor and sensory block achievement and provide long lasting postoperative analgesia, better tourniquet tolerance with stable hemodynamics. Anterior sciatic nerve block is therefore safe and effective technique and deserve to be used more widely for unilateral lower limb surgeries and post-operative analgesia.

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Introduction

All the injured are not healthy and they may have associated head injury, pelvic fracture, vertebral fracture, COPDs, congestive cardiac failure with hypotension, obesity, arthritis or with many other illnesses.

Spinal and epidural anaesthesia are most widely utilized regional anaesthesia for lower limb surgeries, particularly in emergency as having associated systemic disorder. They produce undesirable cardiovascular effects secondary to sympathetic blockade. That is why anesthetist requires to search safe and effective alternative lower-limb anesthetic technique. Lower extremity nerve blocks provide effective postoperative analgesia without residual motor blockade, loss of bladder and bowel control and complications of central neural blockade or general anaesthesia. Brachial plexus anaesthesia has become emergingly popular over last decades due to better understanding of related anatomy, availability of multiple approaches and use of peripheral nerve stimulator.

Unlike upper limb, in lower extremity nerves travel wide separately and deeply situated from their origins making it impossible to block them all with a single approach. Due to intricacy of the nerve supply of the joints of the lower extremity, sciatic nerve block on its own is almost never adequate as sole anaesthesia for lower limb surgery. It is almost always necessary to block other peripheral nerves to the lower extremity as well. Sciatic nerve block is therefore usually performed in conjunction with femoral or atleast saphenous nerve block [4]. Different approaches for sciatic nerve block are classical posterior, lateral, Raj supine lithotomy, popliteal, mid-femoral, para-sacral and Beck's supine anterior approach. The classical approach for sciatic nerve block was described by Labat and was modified by Pitkinson, requires patient to keep either in sim's or prone position [5]. In extremely obese patient or patient with lower-limb injury frequently associated with fracture of long bones, pelvis or vertebrae, increases hazards of change in position. To overcome such problems new anterior sciatic nerve approach was first described by Beck (1963) and later by Adrini (1967-1970) [6].

In 1959, lateral approach described by Ichiyanghi and modified by Guardini in 1984. Local anesthetic drug given in sub gluteal space, just below femur. The technique is difficult and associated with high incidence of sparing [7]. Block of sciatic nerve at popliteal fossa is associated with high chances of tibial nerve sparing and patchy effect [8]. Anterior approach to sciatic nerve has been designed to obtain complete anaesthesia in all areas supplied, with patient in supine position. The technique is relatively new and difficult, require skillful anesthesiologist to perform block. The techniques of nerve localization are, eliciting paresthesia, Nerve stimulation, and Ultra sonography. Of these, we had used nerve stimulation and paresthesia techniques.

Therefore this Anterior sciatic nerve block was planned to achieve anaesthesia and analgesia of foot, leg, and distal thigh in combination with femoral or saphenous nerve [5][6] block.

Aims of study

The continuing search for ideal anaesthesia for unilateral below knee lower limb surgeries, has resulted in the study of anterior sciatic nerve block in combination with femoral or saphenous nerve block with following aims.

- Time to perform block
- Onset of primary block
- Time to achieve readiness for surgery
- Quality of blockade
- Extent and duration of motor and sensory block
- Duration of postoperative analgesia
- Patient's comfort during block procedure and during surgery
- Success rate
- Frequency of side effects

Material and Methods:

After institutional approval the study was carried out in 24 months. Forty patients (ASA I-III) from 20-70 years of either sex scheduled for below knee lower limb surgeries on elective or emergency basis, under sciatic nerve block by anterior approach in combination with femoral or saphenous nerve block were included prospectively under trial. Patient with history of bleeding disorder, allergy to local anesthetic, infection at local site, pregnant patients or neuropathies were excluded from study.

Preparation and explanation: As per standard departmental protocol all monitoring devices were attached. All the patients were explained about the procedure and what the patient feel while the block was performed and how limb would be felt, when it would be anaesthetized. All the patients were explained regarding feeling of contractions with nerve locator and feeling of tingling along the course of sciatic nerve. All blocks were performed by the same anesthetist and assessed by blinded investigator, who was not involved in the performance of the block. Postoperative evaluation was done in the ward by the same blinded investigator.

Group: Patients were given anterior sciatic nerve block with femoral or saphenous nerve block according to requirement of tourniquet pain relief. Patients require tourniquet application were given, sciatic nerve block with femoral nerve block.

Equipment and drugs: Antiseptic solutions, drapes, insulated 19G 10 cm long short bevel needle, Nerve locator, ECG electrodes, and multipara monitor.

For sciatic nerve block: Lidocaine 2%- 10ml, Bupivacaine 0.5% - 10ml, Epinephrine 5 μg/ml – 1:200000 concentration, Distilled water to make total volume 30ml, Soda-bicarb solution 7.5% 1ml/10 ml of drug.

For femoral nerve block: Lidocaine 2% - 5ml, Bupivacaine 0.5% -5ml, Epinephrine 5μg /ml – 1:200000 concentration, Soda-bicarb solution 7.5% 1ml/10 ml of drug. Total volume 15ml.

For Saphenous nerve block: Lidocaine 2%- 2ml, Bupivacaine 0.5% - 2ml, Epinephrine 5μg/ml– 1:200000 concentration, Total volume 8ml.

Total dose of local anesthetic drug with all three blocks was not exceeded, lidocaine HCL 2% - 5-7 ml/kg and Bupivacaine 0.5 % - 1–2 ml/kg. Position: Patient kept in supine position with leg in neutral position.

Landmarks: ASIS (Anterior Superior Iliac Spine), Public tubercle, Greater trochanter.

Line A	A line drawn from ASIS to pubic tubercle and intersected in 3 equal parts.
Line B	A parallel line to line A from greater trochanter tip to medially.
Line C	A perpendicular line from medial 1/3rd of line A to line B was drawn.
Insertion Point 'X'	Cut point of line B and line C

Procedure: Using nerve locator: Muscle contractions were observed in the supplied area. As needle goes nearer to the nerve, strength of twitch increase. Current was lowered down progressively. When twitch was obtained at 0.2 to 0.5 mA, 2 ml of drug was injected, twitch ceased, which confirmed the area of injection. If still contractions not ceased needled was withdrawn slightly and twitches reconfirmed. (Because nerve might be stimulated by direct mechanical stimulation by needle). After confirming area of injection full dose of drug was injected. Under fully aseptic precaution and after giving local anaesthesia, all blocks were given.

Anterior sciatic nerve block technique: After marking landmarks, line A, B, C, were made on anterior aspect of thigh, insertion point 'X' was marked.

Tract was made with 18 G1½ inches needle at 'X' mark. Nerve locator was set as mentioned above and attached to insulated needle.

19 G 15cm insulated short bevel needle inserted at insertion mark 'X' in perpendicular direction to skin until anteromedial surface of femur was met.

The needle was slightly withdrawn and redirected medially to miss the femur until foot twitches were obtained.

When planter flexion was elicited with output current 0.5 mA, 25 to 30 CC volume of local anesthetic solution injected slowly after careful negative aspiration. In difficult cases nerve was located with leg in internal rotation.

Femoral nerve block technique: Pulsation of femoral artery was palpated just 1.5 cm below inguinal ligament. Puncture site marked 0.5-1.0 cm lateral to the femoral artery.

24 G 1½ inches needle inserted at puncture site 'Y' perpendicular to skin till fill of click.

10-15 CC local anesthetic solution was injected through needle after negative aspiration. Firm pressure was applied immediately distal the puncture site.

Saphenous nerve block technique: Under all aseptic and antiseptic precautions saphenous nerve was blocked by subcutaneous infiltration of local anesthetic solution just medial the tibial tuberosity.

Evaluation criteria: Onset of sensory block: Interval from local anesthetic injection to loss of sensation using pin prick test (with 23 G hypodermic needle) in area of distribution of the tibial sural, common peroneal, planter nerves as shown in the table below:

Tibial	Upper ½ of central area of back of leg Lower surface of the heel
Sural	Lower ½ of central area of back of leg Lower 1/3rd of lateral area of calf Lateral border of foot up to tip of little toe.
Common peroneal nerve	Sole of foot Anterior skin adjoining all digital cleft except last one. Upper 2/3rd of lateral area of calf.

Grading was given as follows: S0: No sensation, S1 Dull pain and S3 as Normal sensation. All the patients were evaluated at every 5 minutes interval up-to 35 minutes. Onset of motor block: Interval from local anesthetic solution injection to cessation of movement in any of the distribution of the tibial/sural, common peroneal, planter and nerve to Hamstrings as shown in the table:

Assessment Of A Nerve	Method	
Tibial / Sural nerve	-	To planter flex the foot at ankle joint
Common peroneal nerve	-	To dorsiflex the foot at ankle joint
Planter nerves (medical and lateral)	-	To move great toe (medial planter) To move rest toes (lateral planter)
Nerve to Hamstrings	-	To flex the knee

Grading was given as follows: M0 Complete paralysis, M1 Paresis and M3 as Normal muscle tone and power. All the patients were evaluated at every 5 minutes interval up to 35 minutes.

Number of attempts: To locate the sciatic nerve was noted.

Time to elicit contractions: Time taken from insertion of needle to obtain a distal motor response was noted.

Current required: Maximum distal muscle contraction with lowest possible current was noted.

Distance from skin to sciatic nerve: Depth of insertion of needle from skin to sciatic nerve was noted.

Distance from skin to femur: Depth of locating femur anteromedial surface from skin was noted.

Distance from femur to sciatic nerve: Distance between anteromedial surface of femur to sciatic nerve located was noted.

Total procedure duration: The time from needle insertion to completion of injection of drug and removal of needle, with combination blocks

Primary effect: Interval from local anesthetic injection to loss of pinprick sensation achieved in the sensory areas mentioned above at end of 35 minutes.

Spared nerves: After 35 minutes of block were noted.

Requirement of supplementation: In form of local infiltration, sedation, spinal anaesthesia, or general anaesthesia were recorded.

Time for readiness for surgery: Total procedure time + Time for additional blockade.

Tourniquet tolerance: Duration of tourniquet tolerance was noted.

Duration of motor block: Evaluation was done every hourly postoperatively till 10 hours. It was determined by movement of joint of lower limb i.e. from injection of drug to return of joint movement (ankle joint)

Duration of sensory block: Evaluation was done every hourly postoperatively till 15 hours. It was determined by return of pinprick sensation i.e. from injection of drug to return of pinprick sensation (L4-5 S1-3).

Duration of postoperative analgesia: Time from injection of drug to return of pain sensation. Evaluation was done every hourly postoperatively till 20 hours it was done with help of visual analogue score (VAS).

0 1 2 3 4 5
6 7 8 9 10

0 – suggested no pain and 10 – suggested excruciating pain

Any patient demanding supplementary analgesia and having pain score > 5 on VAS were given analgesia in form of inj. Diclofenac sodium 1.5mg/kg IM and time of injection was noted.

Success rate: It was defined according to Vester-Anderson criteria. Sensory block of at least two of the following tibial, sural, common peroneal planters, nerve to Hamstrings.

Failed block was defined absence of sensory anaesthesia in all the nerves or presence of anesthesia in just one nerve.

Complications: Any incidence of arterial or venous puncture, infection at injection site, hematoma, and paresthesia at injection time and neurological sequalae were noted.

Patients comfort: Was noted with block procedure and during surgery also.

With block procedure Minimal – hardly hurt Mild – Not too bad

Moderate – significant painful but acceptable Severe – it was awful.

During surgery Good, Satisfactory Unsatisfactory.

Monitoring

Intraoperative: Patients were monitored for pulse rate, blood pressure, respiration, SpO2, ECG. All the patients were given: Pentazocine 0.3 mg kg -1 IV, Promethazine 0.25 mg kg -1 IV after establishment of block, Midazolam 1 mg IV was given just prior the starting of surgery

Postoperative: Following surgery all the patients were examined every hourly postoperatively till 20 hours.

Postoperatively all the patients were monitored for pulse rate, blood pressure, respiration, duration of sensory block, motor block, and postoperative analgesia.

Patients were monitored for any paresthesia, nerve damage, infection, or hematoma formation at local site.

Statistical analysis: Results were noted and mean, standard deviation and standard error of mean were calculated.

Observation and Results:

Table 1: Demographic data

Age (years)	**20-70**
Sex (Male / female)	68.4% / 31.6%
Weight (Kgs)	40-70
ASA Physical status I II III	 22.50 % 52.50% 25.00 %
Emergency / elective	75% / 25%

Table 2: Surgeries performed

Nerve Block	**Operation**	**No**	**%**
Sciatic nerve block + Saphenous nerve block	External fixation of # tibia Excision of fibular exostosis Debridement of leg	12 04 12	31.60 10.50 31.60
Sciatic nerve block + Femoral nerve block	Below knee amputation Tension band wiring for pott's #	07 03	18.40 07.90

The above table shows that, majority of the surgeries (73.7 %) performed under sciatic nerve block in combination with saphenous nerve block (26.3 %), rest were done under sciatic nerve block with femoral nerve block.

Table 3: Duration of surgery:

Duration of surgery (Hours)	**No**	**%**
0.5 to 1.5	22	57.90
1.5 to 2.5	13	34.20
2.5 to 3.5	00	00.00
> 3.5	03	07.90

The above table shows majority of block provided anaesthesia adequate for surgical procedure lasting up to 3.5 to 4 hours, although the average operative time in our patients was 1.5 hours.

Table 4: Number of attempts

No. of attempts	**No**	**%**
1	31	77.50
2	08	20.00
3	01	02.50

Majorities of the patients required singe attempt (77.5%). 20% patients required 2 attempts. Only 2.5% patients required 3 attempts.

Table 5: Current required for sciatic nerve block

Current (mA)	**No**	**%**
0.2	30	78.90
0.3	05	13.20
0.4	02	05.30
> 0.4	01	02.60

In most of the patient (78.9 %) nerve was located at 0.2 mA current.13.2 % patients required 0.3 mA current.

Table 6: Techniques to locate sciatic nerve

Technique	**No**	**%**
Planter flexion with nerve locator	35	87.5
Paresthesia + Plantarflexion	03	07.5
Paresthesia alone	02	05

Only in 87.5 % patients' plantarflexion was observed with nerve locator. In 5% patients, drug was injected when only paresthesia was found.

Table 7: Anterior sciatic nerve block characteristics

Block characteristics	Mean ± SE
Sensory onset (min)	07.95 ± 0.90
Motor onset (min)	15.23 ± 0.90
Total procedure time with supplemental blocks (min)	05.76 ± 0.56
Primary block time (min)	21.50 ± 1.34
Readiness time for surgery (min)	31.40 ± 1.10

Onset of sensory block was relatively fast 7.95 ±0.9 mins but motor blocks took time to establish 15.23 ± 0.9 mins. Primary block achieved in 21.5 ± 1.34 mins. Total procedure time with supplemental block were 5.76 ± 0.56 mins. Readiness time for surgery was 31.4 ±1.1 mins.

Table 8: Duration of block (hours) (mean ± se)

Duration	Hours
Duration of sensory block	8.27 ± 0.50
Duration of motor block	3.86 ± 0.28
Duration of postoperative analgesia	9.46 ± 0.52

Duration of motor block (3.86 ± 0.28 hrs) was less than the sensory block (8.27 ± 0.5 hrs). Duration of analgesia was quite larger (9.46 ± 0.52 hrs).

Table 9: Distance to locate sciatic nerve (mean ± se)

Distance	Cm
Skin to femur	05.19 ± 0.24
Femur to nerve	04.90 ± 0.22
Skin to nerve	10.07 ± 0.42

Femur was met from skin at 5.19 ± 0.24 cm. Needle was needed to pass 4.9 ± 0.22 cm further deep from femur to locate nerve.

Table 10: Sparing of nerves (at end of 35 minutes)

Sparing of the nerves	No	%
Tibial Nerve	0	0
Common Peroneal Nerve	0	0
Medial Planter Nerve	1	2.6
Nerve to Hamstrings	1	2.6

There was no sparing of tibial and common peroneal nerves. While medial planter and nerve to Hamstrings were spared, each in 2.6 % patients.

Table 11: Comfort grades. (During block procedure)

Grades	No	%
Hardly hurt	30	78.90
Not too bad	08	21.10
Agonizing	00	00.00

Incidence of discomfort associated with performance of block was less. 78.9 % patients said hardly hurt about procedure.

During surgery: All the patients were comfortable during surgery.

Table 12: Patients receiving block and those requiring additional anaesthesia

	No	%
Successful blocks	38	95 .00
Required additional anaesthesia		
L.A. IV sedation Both	00 01 00	00.00 02.60 00.00
Failed	02	05.00

Only in 2.6 % patients required supplementation in form of IV sedation. 5 % failed block patients were given spinal anaesthesia 35 minutes after block.

Discussion

Majority of the patients in our study were between 20-50 years and of ASA I-III of either sex (M>F). 75% patients were polytrauma, emergency patients and many of them were with full stomach.

The main purpose of sedation was to relieve anxiety and to provide analgesia to decrease discomfort during surgery and pain relief in polytrauma patients. As we have anaesthetized needle path with local anesthetics, we have not given any premedication except anticholinergic prior to block.

Surgeries performed: Operations like external fixation of fracture of tibia, excision of fibular exostosis, debridement of leg were carried out under anterior sciatic nerve block in combination with saphenous nerve block in 73.7 % patients. Below knee amputations, TBW of pott's fracture were done under sciatic nerve block with femoral nerve block in 26.3 % patients, as they required tourniquet application.

Saphenous or femoral nerve blocks were required in combination for anaesthetizing medial part of leg, although some below knee surgeries can be done under sciatic nerve block alone. [18][14][6][5] Sciatic nerve block in combination of femoral, femoral cutaneous, obturator nerve block required for above knee lower limb surgeries [6][5].

Duration of surgery: In majority of cases surgery lasted from 0.5 to 2.5 hours and in 7.9% patient surgery lasted for > 3.5 hours.

Numbers of attempts for sciatic nerve block: In our study 1 and 2 attempts required in 77.1 % and 20 % patients respectively. Only 2.5% patients required more than 3 attempts where twitches were not elicited with nerve stimulator so, block was given on paresthesia technique. In patients who required more than one attempts, we tried to direct needle slight lateral or internal rotation of leg in supine position. As described in Reg. Anaesth pain Med 1998; 23(3): 38 internal rotations of leg improve ability to approach the sciatic nerve.

Local anesthetic agent and volume: We have used mixture of Lidocaine 5-7 mg kg -1 and Bupivacaine 1-2 mg kg -1 diluted to required volume with distilled water with Epinephrine and soda-bicarb solution.

Volume of drug used for different blocks as follows: Anterior sciatic nerve block: 20-30 CC, Femoral nerve block: 10-15 CC and Saphenous nerve block: 7- 8 CC.

All most all references have used 30cc volume for sciatic nerve block [3][5][6][7][13][14][16]. Bassam Al Nasser [16], used 50% mixture of Lidocaine 2% and Bupivacaine 0.5% with Epinephrine for intermediate action.

Dalens et al,[12] described mixtures of Lidocaine 0.5 % and Bupivacaine was 0.25% safe in pediatric patients. Magora et al [6], suggest mixture of 0.25 % Bupivacaine and 0.75 % Lidocaine with 1:400000 Epinephrine for rapid onset and prolonged analgesia. As per Miller: Alkalization decrease onset time and give dense block. Guardini et al [7], used 0.25% plain Bupivacaine for sciatic and other combination nerve blocks with dose not exceeding > 2mg kg -1.

Following table shows peak plasma concentration of Bupivacaine in different studies: (Table 13)

Table 13:

Author	Drug	Dose	Peak plasma concentration
Coventry and Todd	Bupivacaine + $NaHCO_3$ + Epinephrine Bupivacaine + $NaHCO_3$	2 mg kg -1	0.40 mg/lit 0.60 mg/lit
Moore and collogues	Bupivacaine with Epinephrine	400 mg	1.60 mg/lit
Misra and collogues	Bupivacaine Bupivacaine with Epinephrine	3 mg kg -1	0.75 mg/lit 0.70 mg/lit
Connolly et al	Bupivacaine	200 mg	0.60 mg/lit

As shown in table maximum plasma level of Bupivacaine with 3 mg/ kg was 0.7 – 0.75 mg /lit. However, recommended safe plasma level of Bupivacaine is 2.0 - 2.5 mg/lit.

Though we have not measured plasma concentration of local anesthetic drug, we did not find any signs or symptoms of systemic toxicity, with 2 mg/kg dose of Bupivacaine.

Sciatic nerve through anterior approach is difficult to locate as it exposes nerve behind the lesser trochanter [21]. Dalens et al [12] 12 observed twitches at first, second and third attempts in 62%, 13% and 3% cases respectively. In 20% cases they did not find twitches.

Site of motor response:

We considered injection of drug, when planter-flexion or dorsiflexion of foot found on stimulation of nerve, as proper stimulation of sciatic nerve results in rhythmic contractions of foot, and gives high success rate.

Paul H. Ting et al [14], recommended to consider only foot twitches as end point. Twitches of Hamstrings are common but should not be accepted 21, may lead to inadequate anaesthesia.

However, Guardini et al [7], described three motor response on stimulation of sciatic nerve in sub-gluteal region by lateral approach like, Tibial nerve– planter flexion and inversion of foot. Common peroneal nerve– Dorsi flexion and eversion of foot. Nerve to Hamstrings– Paradoxical flexion of thigh

Current required for sciatic nerve block: In 78.9% patients' nerve was located with minimum current 0.2 mA. In 13.2% patients required 0.3 mA, 5.3% patients required 0.4 mA and

2.6 % patients required 0.4 –1 mA current to locate sciatic nerve. My study correlate with Bassam Al Nasser [16], Nysora [21], and Washington.com et al [22]. All have recommended 0.2-0.5 mA current to locate sciatic nerve.

Nerve stimulation at small current (< 0.2 mA) may indicate intraneural placement of the needle [18] [22]. So in that case needle should be slightly withdrawn to avoid intraneural injection of drug.

Block characteristics:

Onset: The average sensory onset time was 07.95 ± 0.9 minutes the average motor onset time was 15.23 ± 0.9 minutes. We found that sensory onset faster than motor onset. These results were consistent with results of George P Beck [5].

Total Procedure Time: We took 5.76 ± 0.56 minutes for complete procedure of anterior sciatic nerve block and combination blocks.

Primary Block Time: Average time required to achieve primary effect was 21.5 ± 1.34 minutes

Readiness time for surgery: Time required for readiness of surgery was 31.4 ± 1.1 minutes. Our result was comparable to result of Beck (20-40minutes) [5]. Paul H. Ting [14] has mentioned that anterior sciatic nerve block may require a good thirty minutes or more to set up fully.

Longer time taken for complete sciatic nerve block than other peripheral nerve blocks might be due to its thickness (2 x 1.5cm) [5]. Duration of block: In our study, Duration of sensory block was longer than motor. Duration of sensory block was 8.27 ± 0.5 hours. Duration of motor block was 3.86 ± 0.28 hours. Duration of postoperative analgesia was longer 9.46 ± 0.52 hours.

Bernard Dalens et al [12] noted average duration of sensory block 7.5 ± 1.4 hours, motor block 4.3 ± 1.6 hours in mixture of Lidocaine and Bupivacaine drug group. Duration of sensory block in our study was significantly longer.

Connolly, et al [15] has noted 15.8 hours for post-operative analgesia was significantly high from our value. Duration of sensory block varied in each study, may be due to following reasons.

Like, type of drug (Plain vs mixture), concertation and volume of drug, dose of drug, additives (Epinephrine, soda-bicarb) etc.

Distance to locate sciatic nerve: We found average distance from skin to femur was 5.19 ± 0.24 CM. Average distance from femur to nerve was 4.9 ± 0.22 CM. Average distance from skin to nerve was 10.07 ± 0.42 CM. Magora, et al [6] has located nerve 4.6 cm deep the femur and comparable to our study finding.

Molloy 17 and Beck [5] described depth of sciatic nerve from femur was 4.5-6 cm, while Paul H. Ting [14] has mentioned depth of sciatic nerve from femoral medial edge was 3-5 cm. The depth for sciatic nerve from skin of thigh was 8-10 cm [23].

Sparing of the nerves (at end of 35 minutes): We found no sparing of tibial, common peroneal nerves. Medial planter nerve and nerve to Hamstrings were spared each in 2.6% patients. High percentage of success rate and little sparing in sciatic nerve block at this point may be because of injecting anesthetic solution in facial compartment in proximity to a compact nerve with all fibers in one bundle [5], particularly when nerve was stimulated at 0.2 - 0.5 mA.

We did not get blockade of posterior cutaneous nerve of thigh. Our finding matches with Paul H. Ting's observations [14]. However, Bernard Dalens et al, found posterior cutaneous nerve block in 85% pediatrics cases.

Hemodynamics: The hemodynamic variables respiratory rate, SpO2 and ECG findings were stable and comparable pre and postoperatively. Our findings were comparable with Beck [5] and Magora et al [6]. Patient's comfort and tourniquet tolerance: During block procedure 78.9% patients were comfortable. They said needle hardly hurted. 21.1% patients said procedure was not too bad.

In anterior supine approach patient need not to change position of body or leg [14][23]. We had ameliorated needle prick pain with local infiltration at local site. We had not elicited paranesthesia and low current delivered at tip of insulated needle will not produce discomfort to patient. When sciatic nerve was blocked by posterior, lateral on supine Raj approach, change in position for sciatic nerve block and combination nerve block was required, which may not be tolerated in polytrauma patients. During surgery all patients in our study were comfortable. Tourniquet pain was sufficiently relieved with sciatic and femoral nerve block combination [22], in whole period of surgery. (Mean duration of surgery was 1.25 hours). To reduce discomfort, particularly in long duration surgery and in polytrauma patients, it is preferable to give systemic sedation and or narcotics as required [6].

Success rate: Success rate was decided according to Vester-Anderson criteria. We found 95% blocks successful among which 2.6 % patients required IV sedation. In our study failure rate was 5%, were given spinal anaesthesia after 35 minutes. In one patient the patellar contractions were wrongly interpreted and in other patient foot twitches were not elicited by repeated attempts with nerve stimulator, so drug was given on LOR technique.

Geroge P. Beck [5], reported 94.23% success rate with 5.77 % failure rate. He explained that the failure rate was due to block given by house staff with varying degrees of experience. McNicol [11], found 94.87 % success rate and 5.13 % failure with loss of resistance or nerve stimulator technique.

Magora et al 6 observed 86-37 % blocks successful among which 15.91% patients had partial anaesthesia and 13.63 % failure rate. They explained failure rates were due to following reasons:

Poor selection of patients & surgery and inadequate training.

Complications: We did not find any complications during our study in any patient, although complications like vessel puncture, infection, hematoma, postoperative paresthesia can occur. Though, we found paresthesia in 7.9% patients while giving block but none of our patient developed any postoperative neurological sequel. Our findings were comparable with that of Beck's [5] findings. Magora [6] found generalized tremor in 4.55 % patients probably because of large amount of local anesthetics used (up to 100 ml of L.A. solution). Total 14.44% patients complained only numbness during recovery from block in relevant lower limb, in Dalens et al studies [12] with either technique LOR, paresthesia, nerve stimulation.

Conclusion:

After view to the observations and results of our study, we came to the following conclusions. Anterior sciatic nerve block in combination with femoral or saphenous nerve block is simple and easy technique, based on a safe and easily palpable landmarks.

Sciatic nerve block by anterior approach, lessen total procedure time for combination blocks. Foot twitches should be considered as end point and hamstring contractions should not accepted as motor response.

In difficult block, try internal rotation of leg to expose nerve under the femur.

Sciatic bock takes longer time (fairly 25-30 minutes) for full motor and sensory block achievement and provide long lasting postoperative analgesia, better tourniquet tolerance with stable hemodynamics.

Anterior sciatic nerve block is therefore safe and effective technique and deserve to be used more widely for unilateral lower limb surgeries and post-operative analgesia.

Abbreviation: PNS (peripheral Nerve Stimulator), Sciatic Nerve, Femoral nerve, Saphenous Nerve, Paresthesia, VAS (visual Analogues Score)

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