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ORIGINAL ARTICLE

Effectiveness of Popliteal Nerve Block in below Knee Surgeries

SALMAN MOHSIN[1], NASIR ALI RAHIM NAJJAD[2], ZARA RIZWAN[3], TOOBA MUGHAL[4], SHAKIL MALIK[5]
[1-4]Senior Registrars, Department of Anaesthesia, The Indus Hospital, Karachi
[5]Assistant Professor of Anaesthesia, Sindh Institute of Urology & Transplantation, Karachi
Correspondence to Dr. Salman Mohsin, E-mail: dr.salman1980@hotmail.com Cell: 0331-2091338

ABSTRACT

Aim: To observe the effectiveness of sciatic nerve block in popliteal fossa (popliteal nerve block) and saphenous nerve block on the medial site of upper tibia in local population
Study design: Descriptive cross-sectional study
Place and duration of study: Department of Anesthesia, The Indus Hospital, Karachi from 11th March 2013 to 15th March 2014.
Methodology: One hundred and fourteen patients with elective operations like wound debridement of foot, amputation of toes were included. After 15 minutes of giving the block, and at the time of incision, the patient was asked about his/her pain level by showing the pain scale. If the patient points at level 0, the surgery was proceed and the block was termed as effective.
Results: Most of the patients were between 51-70 years of age and mean age was 58.83±9.21 years. There were 73(64.04%) males and 41(35.96%) females. Seventy four (64.91%) were in ASA-III, 32(28.07%) were in ASAIV and 8(7.02%) were in ASAV. The pain was not reported in 103(90.35%) patients while 11(9.6%) had pain in which 4 patients had mild pain, 5 moderate and 2 had severe pain. Block was effective in 103(90.35%) cases and ineffective in 11(9.65%) cases.
Conclusion: Sciatic nerve block in popliteal fossa (popliteal nerve block) and saphenous nerve block on the medial site of upper tibia be taken as an anaesthesia method for surgeries below the knee as well as for the control of the post-operative pain specifically in patients where spinal anaesthesia is not favorable
Keywords: Below knee surgery, Sciatic nerve block, Popliteal nerve block

INTRODUCTION

Below knee surgery is an everyday occurrence in the field of general surgery and orthopedic surgery and is mostly required for diabetic and trauma patients because of infected wounds[1]. These surgeries may vary from wound debridement to amputations. A large number of these patients are severely compromised due to systemic involvement and end organ failure[2]. Hemodynamic instability, sepsis and coagulation disorders are major hindrances to general anaesthesia or central neuronal blockade[3-5].

Peripheral nerve blocks allow us an opportunity to provide surgical anaesthesia without compromising the general systemic stability. In below knee, the sciatic nerve which is the only motor supply of the lower limb and saphenous nerve which provides sensory supply to the medial site below knee can be blocked, providing an excellent surgical anaesthesia without any systemic involvement. A combination of local anaesthetic drugs bupivicaine 0.5% plain dose 2-2.5mg/kg and xylocaine plain 2% dose 3-4mg/kg are widely used globally to provide safe and quality anesthesia[6].

Danelli et al[7] did a prospective, randomized, observer-blinded study in Italy and they found out that the success rate was 82% for nerve stimulation. In Belgium, Singelyn et al[8] prospectively assessed the reliability of popliteal sciatic nerve blocks and recommended the technique the safe and reliable alternative to more common forms of anaesthesia for surgery below the knee. They reported that block provided sufficient anaesthesia in 92% cases, discomfort associated with the block procedure was found to be minimal by 89% of the patients and 95% patients were completely satisfied with perioperative analgesia.

The objective of the study was to observe effectiveness of sciatic nerve block in popliteal fossa and saphenous nerve block on the medial site of upper tibia in local population

MATERIALS AND METHODS

This descriptive cross-sectional study was performed at The Indus Hospital, Karachi from 11th March 2013 to 15th March 2014 and 114 patients were enrolled. All patients of age 40-80 years, ASA 3, ASA 4 and ASA 5, either sex and elective operations like wound debridement of foot, amputation of toes were included. Patients with known hypersensitivity with regional anaesthetic used, infection at the site where the block has to be performed, use of tourniquet above the knee and nerve injury were excluded. An anesthetic assistant who is not involved in the study was assessed the block. The procedure was explained and the patient counselled, after an intravenous line is maintained, standardized monitoring of noninvasive blood pressure, as well as ECG in addition to attachment of an oximetry. The anatomic land marks after positioning of the patient was identified, aseptic measures was taken to introduce the nerve stimulator needle. 35 to 40 ml of local-anesthetic was injected on observing contraction of foot muscles (0.2 to 0.5 mV) by anesthetist having post fellows up experience of above 2 years. After 15 minutes of giving the block, and at the time of incision, the patient was asked about his/her pain level by showing the pain scale. The patient was asked to point at the level of his/her pain. If the patient points at level 0, the surgery was proceed and the block was termed as effective. If the patient points at any other level of pain, the surgery did not proceed and the block was termed as ineffective. Data was entered and analyzed using SPSS-16.

RESULTS

Most of the patients were between 51-70 years of age and mean age was 58.83±9.21 years. There were 73(64.04%) males and 41(35.96%) females. Seventy four (64.91%) were in ASA-III, 32(28.07%) were in ASAIV and 8(7.02%) were in ASAV. The pain was not reported in 103(90.35%) patients while 11(9.6%) had pain in which 4 patients had mild pain, 5 moderate and 2 had severe pain. Effectiveness of sciatic-nerve block in popliteal-fossa (popliteal nerve block) and saphenous nerve block on the medial site of upper tibia, the block was effective in 103(90.35%) cases and ineffective in 11(9.65%) cases (Table 1).

Figure-1: Frequency of effectiveness among all cases

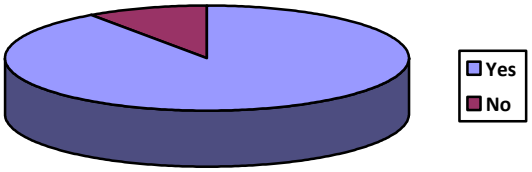

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Table 1: Demographic information of the patients (n=114)

Variable	n	%age
Age (years)		
41 – 50	22	19.30
51 – 60	42	36.84
76 – 70	39	34.21
71 – 80	11	9.65
Gender		
Male	73	64.04
Female	41	35.96
ASA Status		
ASA III	74	64.91
ASA IV	32	28.07
ASA V	8	7.02
Pain Intensity		
No pain	103	90.35
Mild pain	4	3.51
Moderate pain	5	4.39
Severe pain	2	1.75
Effectiveness of sciatic nerve block		
Ineffective block	11	9.65
Effective block	103	90.35

DISCUSSION

There are various clinical advantages related with peripheral anesthesia which not only contributes in improving the patient outcomes but also reduces the average health cost. In cases where cost effectiveness is considered and the surgical procedure is constrained to a single day surgery there have been a reduction observed in pain and increase in patients comfort[9]. With the advancement of science various anesthesia as local, opioids, non steroidal as well as anti-inflammatory have been applied during surgery and their variant impact has been observed[10,11].

Peripheral nerve block is associated with efficient result in health considerations with a significant reduction in pain and the application of anti-inflammatory drugs. A reduction in opioids usage with decrease in overall comorbidities with earlier patients discharged has been observed in cases with peripheral nerve block application. Cases where procedures related with upper and lower extremities are related the regional anesthesia have been observed to be highly effective and desired. However cases where peripheral nerve block is used the success is dependent on the anesthesiologist proficiency in context of neuraxial and general anesthesia[9,10].

Various approaches have been used for the application of nerve block including posterior, front, lateral and popliteal approach. In context with sciatic nerve majority of the patients are satisfied with the popliteal approach due to being easy and reservation of the homonymous-hamstring muscle post sciatic nerve block allowing early mobilization. This protocol involves reduced discomfort with no pain induction by calf-tourniquet[12,13]. An additional sympathetic nervous-system block can be applied with PSNB for controlling pain as well as burning sensation[14]. The rate can be increases from 80% to 90% by deliverance of nerve stimulator in conditions where loss of confrontation technique is done.[15] In present study efficiency of sciatic-nerve block in popliteal fossa or popliteal nerve block as well as saphenous nerve-block on the medial-site of upper tibia was 90.35%.

Popliteal nerve block can limit side effects associated with general anesthesia and some with regional anesthesia. For the former minor side effects as nausea and major as cardiovascular events are reduced. In this study no incidence of hypotension, bradycardia, postoperative urinary retention, shivering or of post dural-puncture headache due to spinal anesthesia was found. hemodynamically unstable cases surgery could be performed without involvement of augmented risk.

Within the side effects of PNB incomplete block, direct damage of the nerve, localized hematoma as well as consequent ischemic injury, infection, risk of intravenous management of local anesthetic requires consideration[16]. In the present study no such side effect were noticed. However, Hajek et al[17] stated superficial-peroneal nerve and sural-nerve injury in 1.91% cases.

Possible reasons found were peroneal and sural nerve injury, nerve toxicity, direct damage to the nerve damage, ischemia, blockage of the local-anesthetic flow relative to tourniquet. Even in cases with very small risk involved patients should be properly informed. Cases that require the suitable anesthetic method requires close monitoring for checking on the occurrence of side effects. There is a need of further investigation for identifying the ideal anesthetic process.

CONCLUSION

Peripheral nerve blocks can efficiently be applied for cases with lower limb amputations, with a condition of cardiovascular constancy and good postoperative-analgesia. There were discrete variations in duration for completion of nerve block. Sciatic nerve block in popliteal fossa (popliteal nerve block) as well as saphenous nerve block on medial-site of upper tibia were known as comparatively safe, conditioned to appropriate anesthesia level, decreased side effects through spinal anesthesia, and presented outstanding results on postoperative-pain control. Sciatic nerve block in popliteal fossa (popliteal nerve block) and saphenous nerve block on the medial-site of upper tibia are suggested as considerable anesthetic technique for under knee surgeries anesthesia and also for the control of postoperative pain specifically in cases where spinal anesthesia is not favorable.

Conflict of interest: Nothing to declare

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