"EFFICACY OF ULTRA SOUND GUIDED POPLITEAL SCIATIC NERVE BLOCK AND DISTAL SCIATIC BIFURCATION NERVE BLOCK IN PROVIDING ANASTHESIA FOR BELOW KNEE SURGERIES"

By

Dr. HIMAJA KATAMANENI

DISSERTATION SUBMITTED TO SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH, KOLAR, KARNATAKA

In partial fulfillment of the requirements for the degree of

DOCTOR OF MEDICINE

IN

ANAESTHESIOLOGY

Under the Guidance of

Dr. SUJATHA M P

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MAY 2025

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EFFICACY OF ULTRA SOUND GUIDED POPLITEAL SCIATIC NERVE BLOCK AND DISTAL SCIATIC BIFURCATION NERVE BLOCK IN PROVIDING ANASTHESIA FOR BELOW KNEE SURGERIES ABSTRACT Background: For efficient anesthetic and postoperative analgesia, peripheral nerve blocks are routinely utilized in lower limb procedures. One such method for below knee surgeries is the popliteal sciatic nerve block. Aim: To compare the efficacy of popliteal sciatic nerve block and distal sciatic bifurcation nerve block in terms of onset of sensory and motor blockade, as well as the duration of analgesia in patients undergoing below-knee surgeries. Materials and Methods: 72 patients undergoing below-knee procedures were enrolled in this randomized controlled experiment. They were divided into two groups, Group A receiving a popliteal sciatic nerve block and Group B receiving a distal sciatic bifurcation nerve block, both of which used 30 milliliters of 0.5% Bupivacaine. The duration of analgesia, the need for rescue analgesia, and postoperative pain levels using the Visual Analogue Scale (VAS) were the secondary goals, whereas the key outcomes were the time at which sensory and motor blocking began. SPSS v26.0 was used for the statistical analysis, and $p<0.05$ was chosen as the significance level. I Results: "Group A experienced the onset of sensory block significantly faster, averaging 15.5 minutes, compared to 18.1 minutes in Group B ($p<0.05$). Although the initiation of motor block in Group A occurred 23 minutes earlier than in Group B, this difference did not reach statistical significance ($p>0.05$). The duration of pain relief and the requirement for additional analgesia were comparable between the two groups ($p>0.05$). However, two hours postoperatively, Group A reported a significantly lower average Visual Analog Scale (VAS) pain score than Group B ($p<0.05$)." Conclusion: Popliteal sciatic nerve block provides a faster onset of sensory blockade and better postoperative pain control compared to distal sciatic bifurcation nerve block, while both techniques offer overall comparable analgesic efficacy. Keywords: Popliteal sciatic nerve block, sensory blockade, distal sciatic bifurcation nerve block, motor blockade, regional anesthesia, postoperative analgesia. II INTRODUCTION Peripheral nerve blocks, which are commonly carried out under ultrasound guidance and are considered an alternative to spinal anesthesia and its accompanying unwanted side effects, are used in the majority of lower limb surgeries. Because they may be performed in a number of locations, sciatic nerve blocks in the popliteal fossa is the most often used peripheral nerve blocks in lower limb surgeries.1 The need for this study arises from the fact that various possible sites are present for achieving the desired action of the block. However, the literature available about the studies done so far is inconclusive2–4 and studies where separate injections have been given into both tibial and common peroneal nerves showed that 2 separate blocks were better than a single block given pre bifurcation.5,6 Hence a comparative study between pre bifurcation block in the popliteal fossa and post bifurcation into tibial and peroneal nerve block separately using ultra sound guidance would help to locate the better site for block efficacy and can have a significant impact on block performance and improved patient outcomes and also help for better postoperative analgesia. REVIEW OF LITERATURE The "popliteal sciatic nerve block is one of the most frequently used nerve blocks in lower limb surgeries. The sciatic nerve innervates most of the lower leg, both sensory and motor."7 A popular anesthetic method that effectively anesthetizes the calf, ankle, tibia, fibula, and foot is the distal sciatic nerve block, also known as the popliteal fossa block. The key anatomical landmarks and nerve stimulator techniques needed to execute the block properly are highlighted in this section.8 When performed using ropivacaine (long-acting local anesthetics), the popliteal fossa block can deliver extended analgesia for 12–24 hours following foot surgery. As a standalone technique, it ensures effective anesthesia and postoperative pain relief, facilitates the calf tourniquet use, and avoids the complications associated with neuraxial blocks.9–11 "Course of sciatic nerve: It descends down the posterior ischium after the ventral rami of spinal nerves L4-S3 merge to create it." The dorsal and ventral branches that emerge from each ventral ramus correspond to the medial and lateral portions of the sciatic nerve, respectively. The sciatic nerve retains its lateral/medial fiber structure along its trip; in the distal thigh, it separates, with the medial half becoming the tibial nerve (TN) and the lateral fibers eventually becoming the common peroneal nerve (CPN).8 "The point at which the sciatic nerve divides into the tibial (medial) and common peroneal (lateral) branches typically occurs 6 to 10 cm above the popliteal crease as the nerve moves down into the thigh, though this anatomical location can vary significantly. These nerves pass through the diamond-shaped popliteal fossa, which is bordered medially by the semitendinosus and semimembranosus tendons and laterally by the biceps femoris tendon."8 Functional anatomy The tibial and common peroneal nerves are the two separate nerve trunks that make up the sciatic nerve. From their pelvic origin, these nerves are encased in a shared perineural sheath that is distinct from each nerve's unique epineurium. According to ultrasound research, a local anesthetic injected into this sheath produces a quick, secure, and efficient block without piercing the epineurium, preventing the need for an intraneural injection. "The sciatic nerve splits slightly proximal to the popliteal fossa as it descends toward the knee, usually between 50 and 120 mm above the popliteal crease. The common peroneal nerve then travels laterally along the fibula's head and neck, producing the superficial and deep peroneal nerves, the cutaneous branches that compose the sural nerve, and the branches that feed the knee joint"12. Structure and function The sciatic nerve is key for movement, supplying the back thigh muscles—biceps femoris, semimembranosus, semitendinosus, and the ischial part of adductor magnus—needed for bending the knee and drawing the leg inward. "After it splits, the tibial nerve continues to serve the back of the leg and foot, powering muscles like the gastrocnemius, soleus, plantaris, popliteus, flexor hallucis longus, flexor digitorum longus, and tibialis posterior, all crucial for pointing the foot down and curling the toes. The common fibular (peroneal) nerve targets the front and side leg muscles, activating the peroneus longus and brevis for turning the foot outward, and muscles like the tibialis anterior, extensor hallucis longus, extensor digitorum longus, and fibularis tertius for lifting the foot and straightening the toes."14. With the exception of the medial leg, which is serviced by the saphenous turnitin

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ABSTRACT

Background: For efficient anesthetic and postoperative analgesia, peripheral nerve blocks are routinely utilized in lower limb procedures. One such method for below knee surgeries is the popliteal sciatic nerve block.

Aim: To compare the efficacy of popliteal sciatic nerve block and distal sciatic bifurcation nerve block in terms of onset of sensory and motor blockade, as well as the duration of analgesia in patients undergoing below-knee surgeries.

Materials and Methods: 72 patients undergoing below-knee procedures were enrolled in this randomized controlled experiment. They were divided into two groups, Group A receiving a popliteal sciatic nerve block and Group B receiving a distal sciatic bifurcation nerve block, both of which used 30 millilitres of 0.5% Bupivacaine. The duration of analgesia, the need for rescue analgesia, and postoperative pain levels using the Visual Analogue Scale (VAS) were the secondary goals, whereas the key outcomes were the time at which sensory and motor blocking began. SPSS v26.0 was used for the statistical analysis, and p<0.05 was chosen as the significance level.

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Date: **Dr. HIMAJA KATAMANENI**

Place: Kolar

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ABBREVIATIONS

ASA – American Society of Anesthesiologists

ATK – Above-the-Knee

BFM – Biceps Femoris Muscle

BTK – Below-the-Knee

CPN – Common Peroneal Nerve

LA – Local Anesthetic

mA – Milliampere

PA – Popliteal Artery

PSNB – Popliteal Sciatic Nerve Block

PV – Popliteal Vein

ScN – Sciatic Nerve

SmM – Semimembranosus Muscle

StM – Semitendinosus Muscle

TN – Tibial Nerve

US – Ultrasound

VAS – Visual Analog Scale

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ABSTRACT

Background: For efficient anesthetic and postoperative analgesia, peripheral nerve blocks are routinely utilized in lower limb procedures. One such method for below knee surgeries is the popliteal sciatic nerve block.

Aim: To compare the efficacy of popliteal sciatic nerve block and distal sciatic bifurcation nerve block in terms of onset of sensory and motor blockade, as well as the duration of analgesia in patients undergoing below-knee surgeries.

Materials and Methods: 72 patients undergoing below-knee procedures were enrolled in this randomized controlled experiment. They were divided into two groups, Group A receiving a popliteal sciatic nerve block and Group B receiving a distal sciatic bifurcation nerve block, both of which used 30 milliliters of 0.5% Bupivacaine. The duration of analgesia, the need for rescue analgesia, and postoperative pain levels using the Visual Analogue Scale (VAS) were the secondary goals, whereas the key outcomes were the time at which sensory and motor blocking began. SPSS v26.0 was used for the statistical analysis, and $p<0.05$ was chosen as the significance level.

Results: "Group A experienced the onset of sensory block significantly faster, averaging 15.5 minutes, compared to 18.1 minutes in Group B ($p<0.05$). Although the initiation of motor block in Group A occurred 23 minutes earlier than in Group B, this difference did not reach statistical significance ($p>0.05$). The duration of pain relief and the requirement for additional analgesia were comparable between the two groups ($p>0.05$). However, two hours postoperatively, Group A reported a significantly lower average Visual Analog Scale (VAS) pain score than Group B ($p<0.05$)."

Conclusion: Popliteal sciatic nerve block provides a faster onset of sensory blockade and better postoperative pain control compared to distal sciatic bifurcation nerve block, while both techniques offer overall comparable analgesic efficacy.

Keywords: Popliteal sciatic nerve block, sensory blockade, distal sciatic bifurcation nerve block, motor blockade, regional anesthesia, postoperative analgesia.

INTRODUCTION

INTRODUCTION

Peripheral nerve blocks, which are commonly carried out under ultrasound guidance and are considered an alternative to spinal anesthesia and its accompanying unwanted side effects, are used in the majority of lower limb surgeries. Because they may be performed in a number of locations, sciatic nerve blocks in the popliteal fossa is the most often used peripheral nerve blocks in lower limb surgeries.[1]

The need for this study arises from the fact that various possible sites are present for achieving the desired action of the block. However, the literature available about the studies done so far is inconclusive[2–4] and studies where separate injections have been given into both tibial and common peroneal nerves showed that 2 separate blocks were better than a single block given pre bifurcation.[5,6]

Hence a comparative study between pre bifurcation block in the popliteal fossa and post bifurcation into tibial and peroneal nerve block separately using ultra sound guidance would help to locate the better site for block efficacy and can have a significant impact on block performance and improved patient outcomes and also help for better postoperative analgesia.

AIMS & OBJECTIVES

AIMS & OBJECTIVES

Primary objective

“Compare the efficacy of popliteal sciatic nerve block with distal sciatic bifurcation nerve block in terms of onset of sensory and motor blockade.

Secondary objective

Compare the duration of analgesia with popliteal sciatic nerve block and distal sciatic nerve block.”

REVIEW OF LITERATURE

REVIEW OF LITERATURE

The "popliteal sciatic nerve block is one of the most frequently used nerve blocks in lower limb surgeries. The sciatic nerve innervates most of the lower leg, both sensory and motor."[7] A popular anesthetic method that effectively anesthetizes the calf, ankle, tibia, fibula, and foot is the distal sciatic nerve block, also known as the popliteal fossa block. The key anatomical landmarks and nerve stimulator techniques needed to execute the block properly are highlighted in this section.[8]

When performed using ropivacaine (long-acting local anesthetics), the popliteal fossa block can deliver extended analgesia for 12–24 hours following foot surgery. As a standalone technique, it ensures effective anesthesia and postoperative pain relief, facilitates the calf tourniquet use, and avoids the complications associated with neuraxial blocks.[9–11]

"Course of sciatic nerve: It descends down the posterior ischium after the ventral rami of spinal nerves L4-S3 merge to create it."

The dorsal and ventral branches that emerge from each ventral ramus correspond to the medial and lateral portions of the sciatic nerve, respectively. The sciatic nerve retains its lateral/medial fiber structure along its trip; in the distal thigh, it separates, with the medial half becoming the tibial nerve (TN) and the lateral fibers eventually becoming the common peroneal nerve (CPN).[8] "The point at which the sciatic nerve divides into the tibial (medial) and common peroneal (lateral) branches typically occurs 6 to 10 cm above the popliteal crease as the nerve moves down into the thigh, though this anatomical location can vary significantly. These nerves pass through the diamond-shaped popliteal fossa, which is bordered medially by the semitendinosus and semimembranosus tendons and laterally by the biceps femoris tendon."[8]

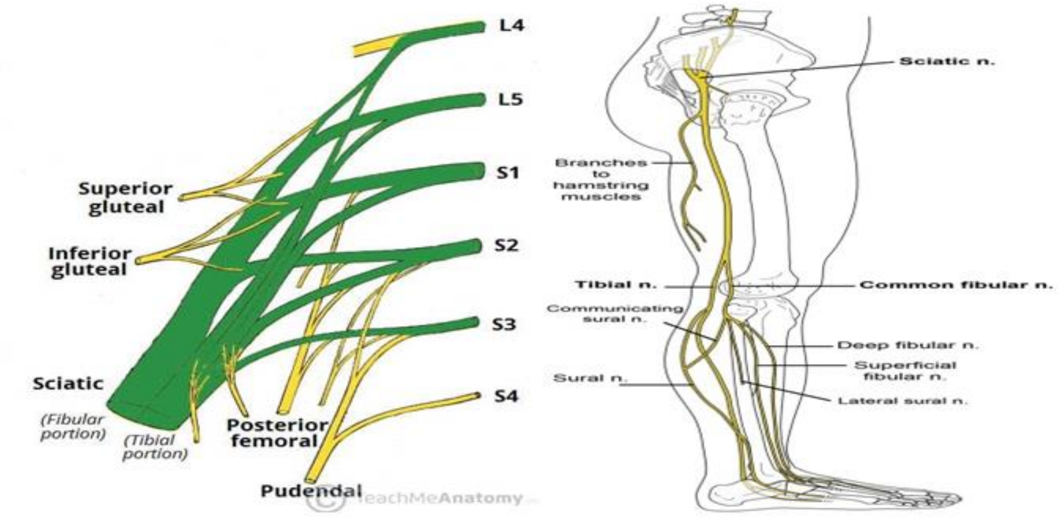

Figure 1: Sciatic nerve root and innervation

Functional anatomy

The tibial and common peroneal nerves are the two separate nerve trunks that make up the sciatic nerve. From their pelvic origin, these nerves are encased in a shared perineural sheath that is distinct from each nerve's unique epineurium. According to ultrasound research, a local anesthetic injected into this sheath produces a quick, secure, and efficient block without piercing the epineurium, preventing the need for an intraneural injection.

"The sciatic nerve splits slightly proximal to the popliteal fossa as it descends toward the knee, usually between 50 and 120 mm above the popliteal crease. The common peroneal nerve then travels laterally along the fibula's head and neck, producing the superficial and deep peroneal nerves, the cutaneous branches that compose the sural nerve, and the branches that feed the knee joint"[12].

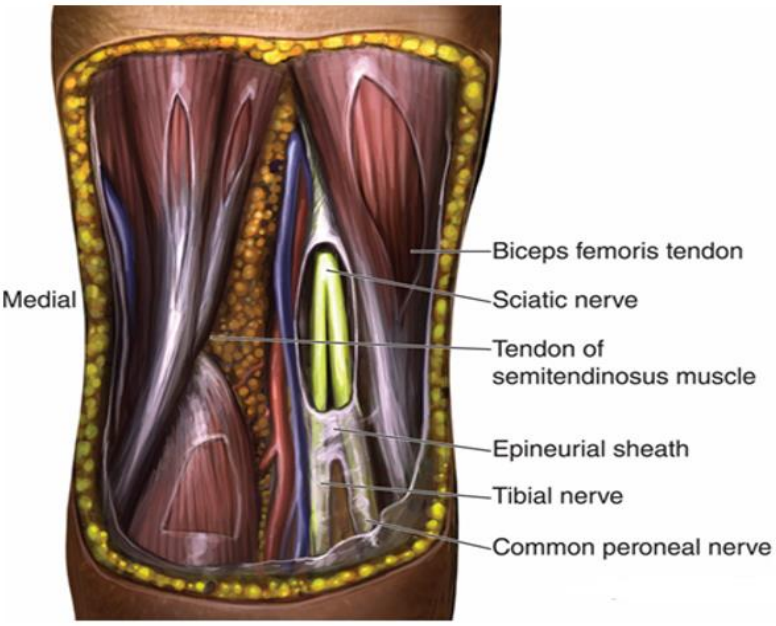

Figure 2: Anatomy of the distal sciatic nerve.[13].

Structure and function

The sciatic nerve is key for movement, supplying the back thigh muscles—biceps femoris, semimembranosus, semitendinosus, and the ischial part of adductor magnus—needed for bending the knee and drawing the leg inward. "After it splits, the tibial nerve continues to serve the back of the leg and foot, powering muscles like the gastrocnemius, soleus, plantaris, popliteus, flexor hallucis longus, flexor digitorum longus, and tibialis posterior, all crucial for pointing the foot down and curling the toes. The common fibular (peroneal) nerve targets the front and side leg muscles, activating the peroneus longus and brevis for turning the foot outward, and muscles like the tibialis anterior, extensor hallucis longus, extensor digitorum longus, and fibularis tertius for lifting the foot and straightening the toes."[14]. With the exception of the medial leg, which is serviced by the saphenous nerve, the sciatic nerve covers the majority of the lower leg and foot and is essential for sensory innervation in addition to motor function.

Blood supply and Lymphatics

The vascular supply is derived from both extrinsic and intrinsic systems. The extrinsic system comprises arterial and venous contributions from surrounding regional vessels, collectively known as the *vasa nervorum*. These external vessels supply the outer layers of the nerve and support overall perfusion. Complementing this, the intrinsic vascular system consists of longitudinally oriented arteries and veins that lie beneath the epineurium, running along the length of the nerve. These intrinsic vessels form anastomoses with the extrinsic vasculature at multiple junctions, creating a complex and highly variable collateral network that ensures consistent blood flow throughout the nerve. Among the major branches of the sciatic nerve, the tibial division is noted to have a more robust and well-developed blood supply compared to the common fibular division, which may have implications for vulnerability to ischemic injury.

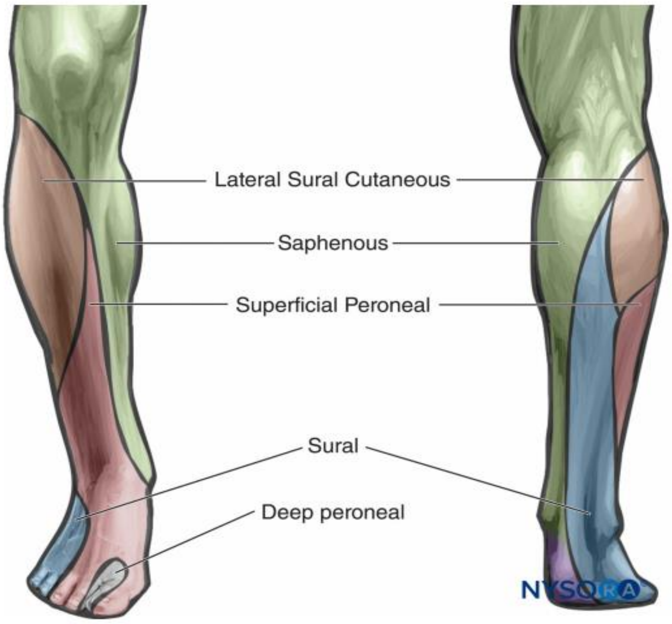

Figure 3: Sensory distribution of anaesthesia after popliteal block.

Ultrasound anatomy

To do the block in a lateral decubitus position, "place the ultrasound transducer transversely at the popliteal crease. Find the popliteal vein, which is 3–4 cm deep, just above the popliteal artery. The hyperechoic oval with a honeycomb pattern is the tibial nerve, which is situated laterally and superficially to the vein. The semimembranosus and semitendinosus are medial, while the biceps femoris is lateral. Sciatic nerve branches may be verified by ankle dorsiflexion and plantar flexion, and the nerve can be distinguished from fat by tilting the probe caudally"[15].

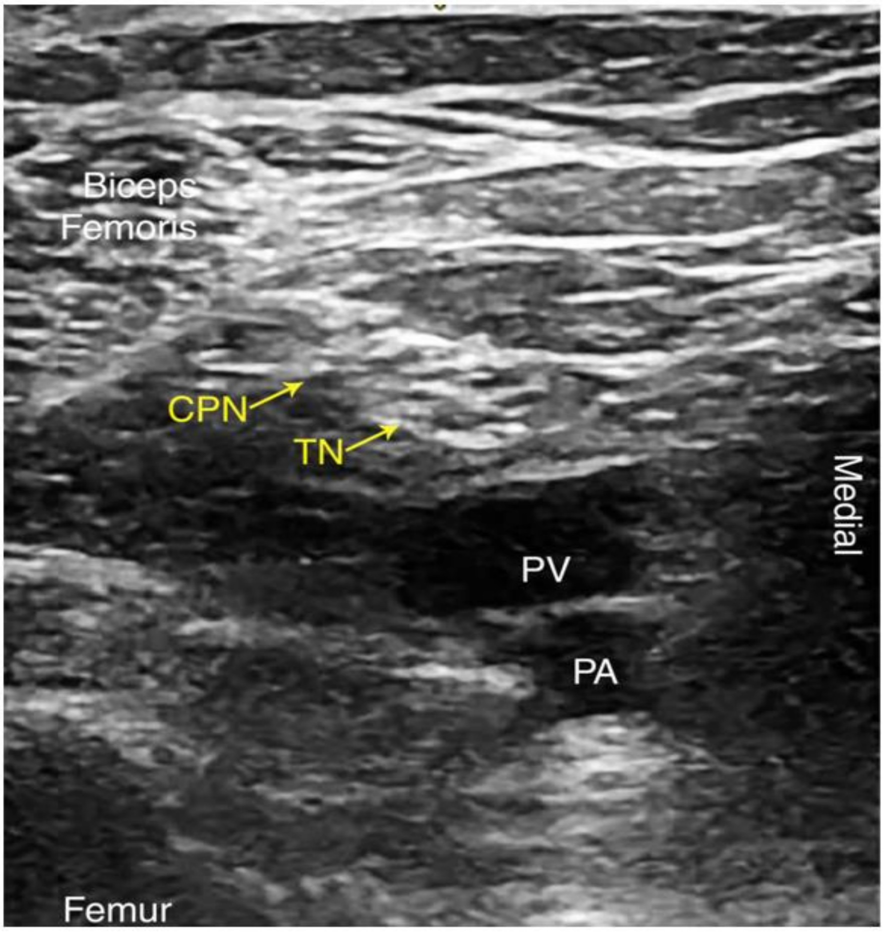

Figure 4: Sciatic nerve Sono anatomy at the popliteal fossa.

"CPN can be found a little more superficially and laterally after the tibial nerve has been identified. The ultrasound transducer should be positioned proximally until both nerves are visible merging to create the sciatic nerve prior to its bifurcation in order to verify their connection. Although it may be located nearer the crease or, in certain situations further up in the thigh, this junction usually occurs 5–10 cm above the popliteal crease."

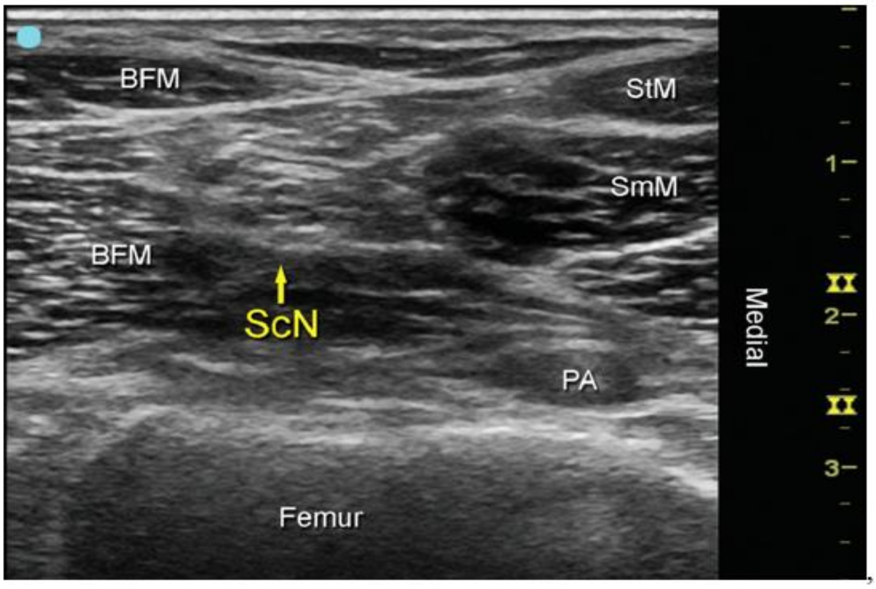

Figure 5: Sono anatomy of the sciatic nerve (ScN) before its division.

The recommended equipment for performing a popliteal sciatic nerve block includes:

- **Ultrasound machine** with a linear transducer (12-4MHz), along with a sterile sleeve and gel
- **Standard nerve block tray** containing essential instruments
- **20 ml syringe** filled with local anaesthetic
- **Short bevel needle** (50-100mm,21-22 gauge)
- **Sterile gloves** for maintaining aseptic technique

Each of these components plays a crucial role in ensuring a successful and safe nerve block procedure.

Landmarks and Patient Positioning: Posterior Approach

The patient is placed in either the lateral or prone position for the posterior approach to the popliteal sciatic nerve block.

- When employing nerve stimulation, it is advised to have a tiny footrest to make it easier to identify motor responses..
- The footrest also helps **relax the hamstring tendons**, which improves ease of **transducer placement and manipulation** during ultrasound-guided procedures.

Proper positioning enhances visualization of the sciatic nerve and contributes to the accuracy and effectiveness of the nerve block.

Intertendinous (Posterior) Approach

The patient is positioned **prone** with the foot of the affected side protruding slightly off the edge of the bed. This allows for **easy observation of even the slightest foot or toe movement** in response to nerve stimulation.

Equipment Required:

A **standard regional anesthesia tray** should include:

- **Sterile materials:** Towels, 4-in. × 4-in. gauze packs, gloves, and a marking pen
- **Local anesthetic preparation:**
- **Needles:**
    - **25-gauge needle,** One **1.5-inch,** for skin infiltration
    - **short-bevel,** One **5-cm, needle** for nerve localization

This setup ensures a **safe and effective block**, minimizing complications while optimizing nerve localization.

Needle Insertion and Nerve Stimulation

To monitor movement and observe the foot and toes' motor responses, the practitioner should be on the patient's side and place their palpating palm on the biceps femoris muscle.

- The needle is introduced at the midpoint between the tendons.
- The nerve stimulator should be initially set to deliver 1.5 mA current (2 Hz, 100 µsec).
- Proper needle placement is confirmed when advancement does not cause local muscular twitches.
- The first response observed is typically a foot twitch, indicating sciatic nerve stimulation.
- The stimulating current is then gradually decreased, and the needle is repositioned until twitches persist at 0.2–0.5 mA.

Usually, this happens three to five centimeters below the skin. Following a negative blood aspiration, a gradual injection of 20 mL of local anesthetic is administered.

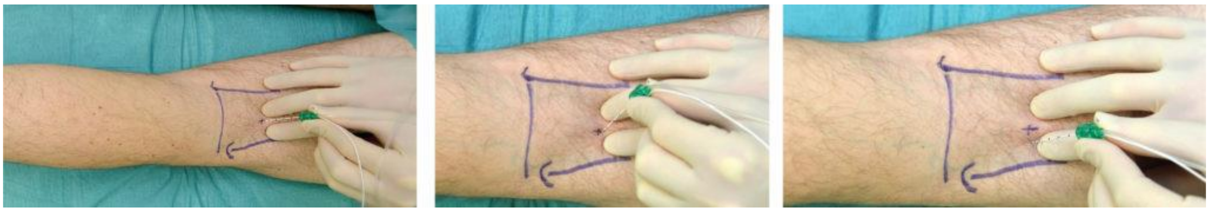

Figure 6: Popliteal block, intertendinous approach.

Motor Responses and Nerve Identification

“Two distinct **motor responses** can be elicited depending on the stimulated nerve:

1. **Common peroneal nerve stimulation → Dorsiflexion and eversion** of the foot.

2. **Tibial nerve stimulation → Plantar flexion and inversion** of the foot”

Indication and contraindication

In regional anesthesia, “the popliteal block is frequently used for treatments including Achilles tendon repair, short saphenous vein stripping, corrective foot surgery, and foot debridement. The popliteal fossa block preserves knee flexibility and increases postoperative mobility by providing anesthetic to the leg beneath the hamstring muscles, in contrast to a more proximal sciatic nerve block.”[16]

Anesthesia Distribution

With the exception of the leg's medial aspect, the whole distal two-thirds of the lower limb can be rendered anesthetic with a popliteal block. Depending on the surgical location, a saphenous nerve block could be required in some situations. However, it is usually not necessary to treat tourniquet pain below the knee since the deep muscle beds are largely affected by pressure and ischemia, not the superficial nerves[17].

Ultrasound guided block

In order to guarantee exact needle insertion and efficient anesthesia, ultrasound-guided popliteal sciatic nerve block requires precise imaging. “A linear ultrasonic transducer with a high frequency (5–10 MHz) is chosen and configured to operate in the middle of the frequency range, not at either extreme. The ultrasound machine's depth is set to around 3 to 5 cm so that the anatomical features may be clearly seen.”

Figure 7: Prone popliteal block transducer orientation

To get the best view, the transducer is placed across the popliteal crease. First, the popliteal artery is located, with the vein just above it. The tibial nerve lies above both. Slightly tilting the probe improves clarity by adjusting for anisotropy. Moving the probe upward reveals the common peroneal nerve, seen to the side and above the tibial nerve. Continuing upward shows the sciatic nerve splitting into its two main branches.

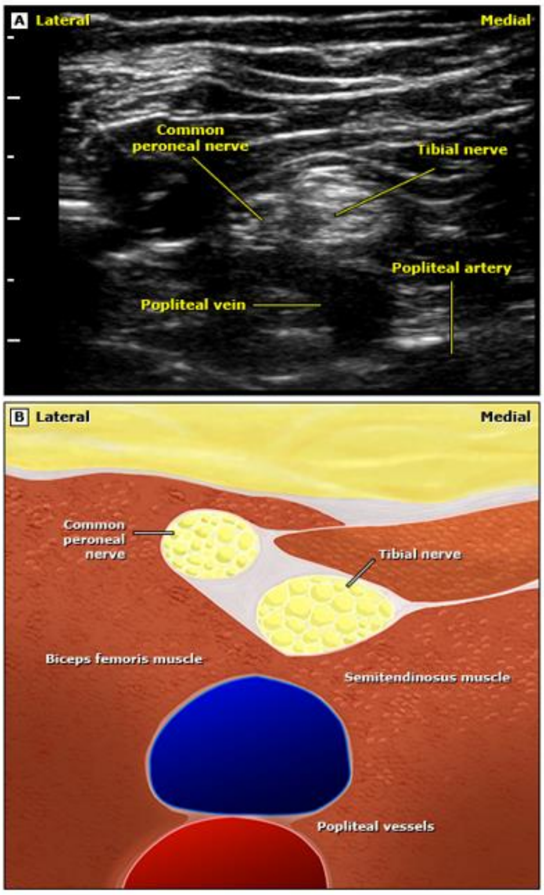

Figure 8: popliteal nerve block schematic and ultrasound

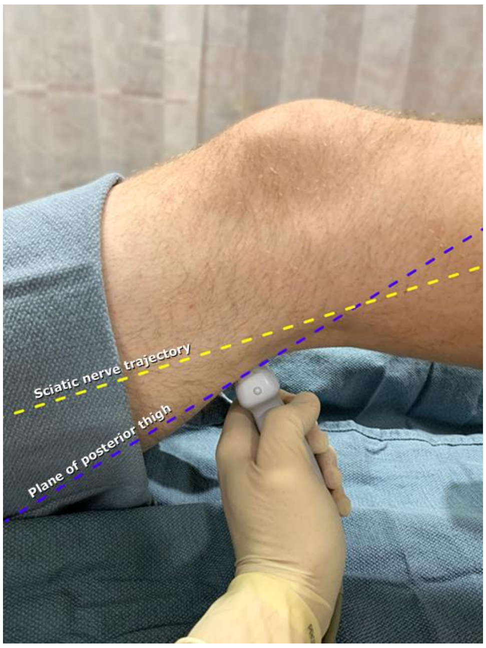

Figure 9: Popliteal block transducer orientation with the patient supine

"The sciatic nerve is a spherical, honeycomb-shaped structure with a hyperechoic perineurium around hypoechoic fascicles. It usually lies between the semimembranosus/semitendinosus (medially) and the biceps femoris (laterally). The nerve splits into the common peroneal (lateral) and tibial (medial) nerves as it is traced distally. The popliteal artery is not a trustworthy marker because of its distance, even if it may be visible ventral to the nerve"[18–20].

Performing the block[6,21]

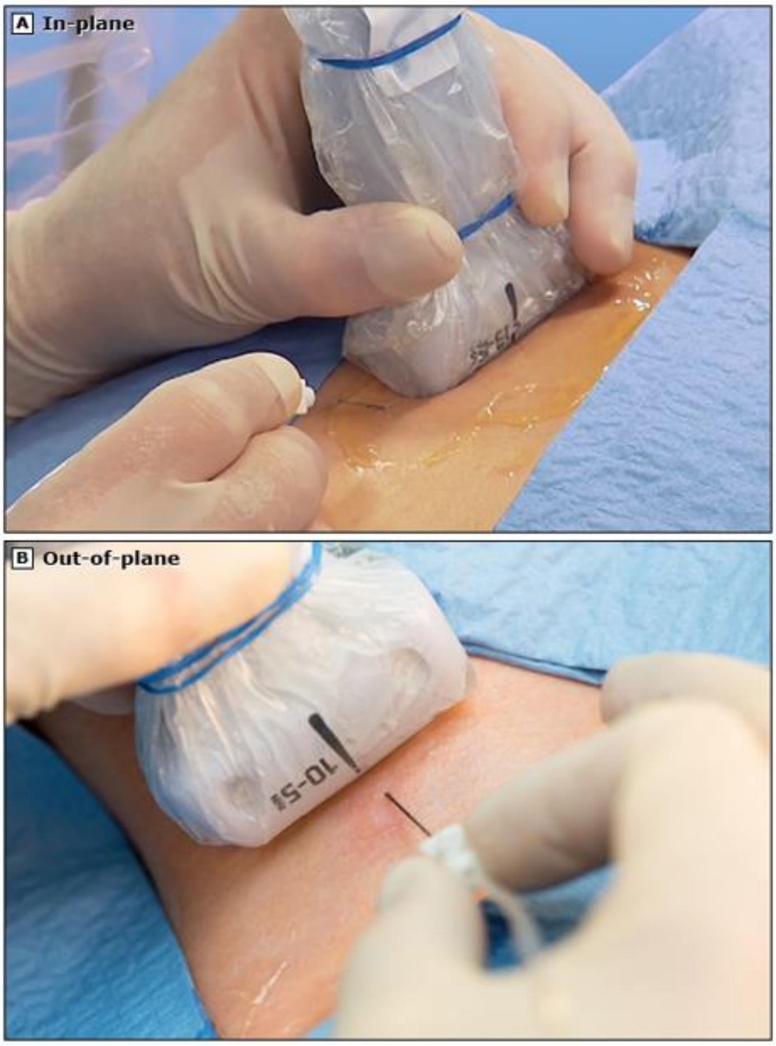

Figure 10: Scanning and needle placement in plane and out of plane

"Inserting the needle through the biceps femoris targets the subparaneural space near the nerves. Injecting here boosts block success (84–90%) compared to epineurial injections (56–63%) and remains safe. Although some use three injections, a single-injection method is more commonly favored."[22]

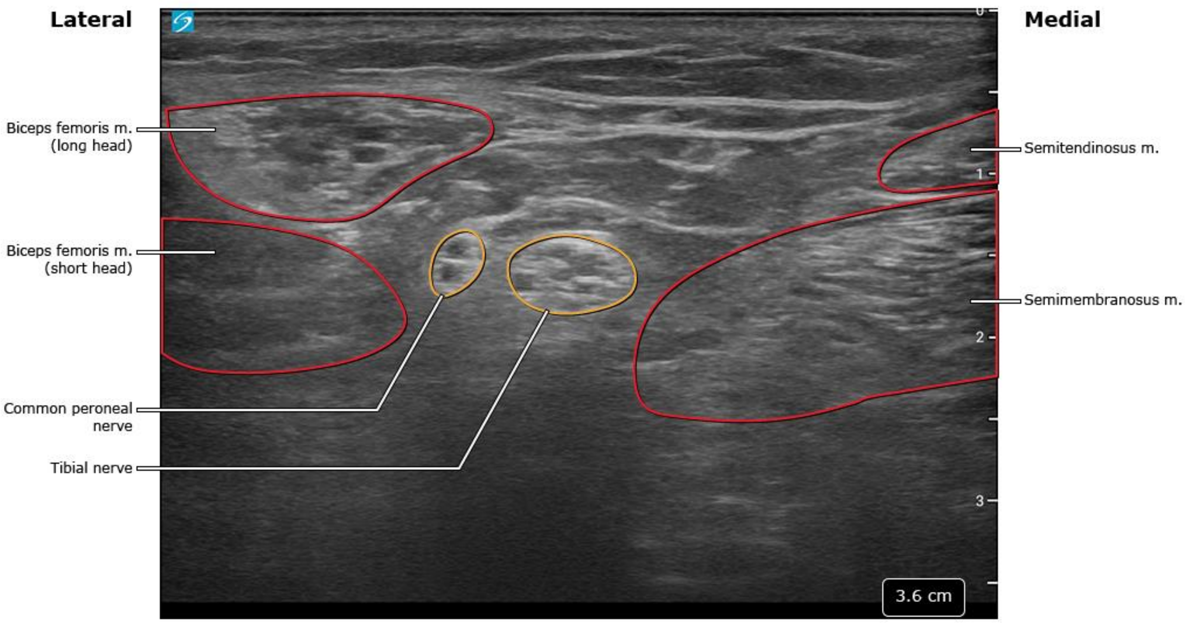

Figure 11: Ultrasound for popliteal block

For the single-injection method, the needle is moved ventral to the common peroneal nerve, with the tip lateral to the tibial nerve, between the two nerves. To see nerve separation, 1-2 mL of saline is administered once a negative aspiration has been confirmed. In order to guarantee circumferential distribution, the anesthetic's spread around the nerves is tracked and the needle tip is adjusted as necessary. The three-injection method involves gradually injecting 10 mL of LA after positioning the needle medial to the tibial nerve. A further 10 mL is injected once the needle is gently removed and moved between the tibial and common peroneal nerves. For the last 10 mL injection, the needle is positioned just lateral to the common peroneal nerve.

PHARMACOLOGY OF BUPIVACAINE

"Bupivacaine is a local anesthetic belonging to the amide class, distinguished by its specific pharmacological properties, with chemical formula C18H28N2O. It is commonly utilized in various anesthetic techniques, including regional, epidural, spinal anesthesia, and direct local infiltration. Local anesthetics like bupivacaine work by raising the threshold for nerve excitation, blocking the initiation and spread of action potentials, and thus stopping nerve signal transmission"[23,24].

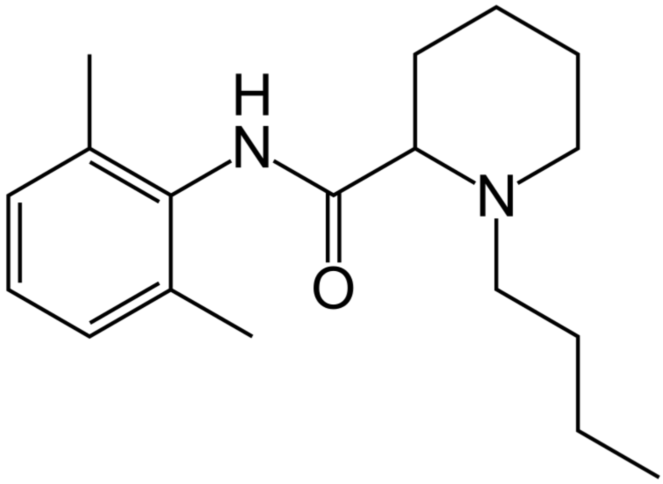

Figure 12: Structure of bupivacaine

Mechanism of action

Three essential structural elements are shared by all local anesthetics (LAs): "an ionizable amine group that gives them aqueous solubility; an aromatic ring that confers lipophilicity; and a connecting linkage that can be either an ester (like procaine) or an amide (like bupivacaine). Lipid solubility and ionization constant (pKa) are the two main physicochemical characteristics that control the pharmacological action of LAs."

Highly lipid-soluble agents can penetrate nerve membranes more effectively, increasing their anesthetic potency and duration. Local anesthetics must first penetrate the nerve membrane as a neutral, non-ionized free base.

These channels are made up of auxiliary beta subunits that regulate function and a core alpha subunit that forms the ion-conducting pore and houses the binding site for LAs. The alpha subunit is highly glycosylated to preserve proper membrane alignment and has four homologous domains, each with six transmembrane segments. Unlike local anesthetics, other neurotoxins like tetrodotoxin and scorpion toxins bind to extracellular sites on the Na^+ channel.

In vascular smooth muscle, Na^+ channel inhibition leads to vasodilation due to reduced contractile tone. In the cardiac tissue, LAs like bupivacaine uniquely bind with high affinity and exhibit slow dissociation from cardiac Na^+ channels, resulting in prolonged depolarization (reduced Vmax) and potential for ventricular arrhythmias. Additionally, bupivacaine interferes with cardiac Ca^{2+} and K^+ channels, contributing to dose-dependent myocardial depression and disruption of excitation-contraction coupling. It can also bind to β-adrenergic receptors, attenuating epinephrine-induced cAMP formation, which may explain its resistance to standard cardiovascular resuscitation efforts in toxicity cases.

As plasma levels rise, local anesthetics may first produce neuronal hyperexcitability in the central nervous system (CNS), which might show up as tremors or seizures. This is followed by widespread depression and drowsiness. Overall, local anesthetics demonstrate fiber-selective and state-dependent blockade, with pain fibers (small, unmyelinated) being inhibited first, followed by temperature, touch, proprioception, and eventually motor fibers, producing the classic progression of anesthesia.[25]

Administration

Three common concentrations of bupivacaine—0.25%, 0.5%, and 0.75%—allow for customized dosage based on the kind and degree of anesthetic needed. It is commonly used in many different methods of regional anesthesia. "These include spinal anesthesia, which is injected into the cerebrospinal fluid for major procedures like abdominal or orthopedic surgery and cesarean sections, local infiltration for post-surgical analgesia, peripheral nerve blocks for procedures like dental work or orthopedic surgeries, epidural anesthesia or analgesia to manage labor pain, and caudal blocks, which are frequently used in pediatric patients for surgeries involving areas below the umbilicus"[26].

"To boost the effectiveness and longevity of nerve blocks, bupivacaine is often paired with adjuvants. Alpha-2 agonists like clonidine and dexmedetomidine significantly extend anesthetic duration. Dexamethasone, a corticosteroid, also prolongs anesthesia, though it's unclear whether this is due to local or systemic effects. Magnesium, an NMDA receptor blocker, may enhance block duration by reducing nerve excitability and altering synaptic transmission. Ongoing research continues to explore these and other agents to enhance block efficacy while reducing toxicity risks"[27]. This technique not only improves block accuracy but also facilitates early detection of potential complications, thereby helping to minimize the risk of bupivacaine-induced toxic effects[28].

Contraindications

"Contraindications include drug or ingredient hypersensitivity, amide anesthetic allergy, injection site infection, obstetric paracervical block, use in obstetric anesthesia at 0.75% concentration, IV regional anesthesia, and intra-articular continuous infusion. Caution is advised in patients with sulfite allergy, heart block, liver or kidney dysfunction, poor cardiac function, low blood volume or pressure, and in the elderly, debilitated, or critically ill."[29].

Various articles;

Discalzi A et al. (2024) "assessed the effectiveness of endovascular revascularization of critical limb ischemia with ultrasound-guided popliteal sciatic nerve block in controlling procedural pain. After 10 minutes, the pre-procedural mean Visual Analog Scale (VAS) pain score decreased from 7.86 ± 1.81 to 2.04 ± 2.20, and at the completion of the procedure (mean duration 43 minutes, $p < 0.0001$), it had further decreased to 0.74 ± 1.43. PSNB was effective in 96% of patients." The block took 4–10 minutes to complete, and the only side effect that was noted was a little foot drop that went away completely after 48 hours. These results provide credence to PSNB as a useful technique for improving patient compliance and comfort during endovascular treatments[30].

Chow CL et al. (2024) found that PSNB is a safe and efficient method for managing pain during the stabilization of foot and ankle fractures. The patients in this research had ASA classifications of I (2 patients), II (4 patients), and III (1 patient), with an average age of 46. In every instance, total sensory and motor obstructions were accomplished. There was a little blood loss (16.4 mL), an average post-operative inpatient stay of 3.57 days, and an average operating duration of 117 minutes. There were no side effects from localized anesthetic. These findings suggest that orthopedic surgeons can successfully perform foot and ankle fracture fixation using PSNB, ensuring excellent intraoperative analgesia[31].

Tripathi R et al., (2024) showed that effective block is characterized by rapid execution (5.25 ± 1.24 minutes), quick sensory (4.25 ± 1.30 minutes) and motor (7.10 ± 1.35 minutes) block onset, and prolonged duration of complete sensory (300.25 ± 16.87 minutes) and motor (247.00 ± 15.06 minutes) blockade. Postoperative analgesia lasted an average of 340.50 ± 13.77 minutes. With a high success rate (95%) and patient satisfaction (95%), this approach is a valuable addition to perioperative pain management strategies[32].

A research by Oguslu U et al. (2023) found very few adverse events during endovascular therapy; only three occurrences of extended effects resolved in less than a day. In comparison to patients who received mild procedural sedation and analgesia, patients in the PSNB group reported noticeably lower VAS ratings. Operator satisfaction was much greater with PSNB, even if patient satisfaction was similar between groups. These results imply that PSNB is a good substitute for conventional pain relief, especially for individuals who are at high risk[33].

Fascia iliaca block (FIB) showed better postoperative pain control than popliteal plexus blockade (PPB) after total knee arthroplasty, according to Abdelraheem TM et al.'s (2023) Patients in the FIB group consumed less morphine during the first 24 hours, had a delayed time to initial rescue analgesia, and had significantly lower Numeric Rating Scale (NRS) ratings at several time points. Notwithstanding these benefits, the two groups' rates of recovery, patient satisfaction, and side effects such hypotension, bradycardia, and PONV were similar. Given its effectiveness in pain management with minimal side effects, FIB may be preferred over PPB in this surgical setting[34].

An average of 34.5 cc of local anaesthetic (LA) was used for the Patel SK et al. (2023) trial, with no documented side effects including nerve damage or vascular puncture. The process took an average of 33 minutes to finish, and about 9 minutes after the surgery, sensory block was accomplished. This method should be regarded as a good choice for lower-extremity anaesthesia in the emergency room due to its effectiveness and safety record[35].

“According to a systemic review and meta-analysis study by White L et al. (2022) to assess the safety and efficacy of proximal popliteal sciatic nerve block in comparison to distal sciatic bifurcation or selective tibial and peroneal nerve block, there is unlikely to be a significant clinical benefit to performing popliteal sciatic nerve block at any one anatomical location. The optimal position for an injection can be influenced by the patient's anatomy, the clinician's decision, and the location of the greatest ultrasound imaging.”[4].

Li Y et al. in 2021 found that the single popliteal sciatic nerve block performed under ultrasound guidance to be a successful postoperative analgesic technique for calcaneal fractures. There was also a notable improvement in the satisfaction of nurses, surgeons, and patients. These results demonstrate how popliteal sciatic nerve block improves postoperative pain management and the patient experience in general[36].

Zhu LJ et al., (2021) “observed that the above-knee lateral approach for ultrasound-guided sciatic nerve block (SNB) demonstrated superior sciatic nerve (SN) visibility, shorter scan and needle insertion times, shallower SN depth, and fewer needle passes compared to the alternative approach. While the success rate of SN identification was slightly higher in the lateral approach group, no significant differences were observed in sensory block onset or postoperative analgesia duration. Additionally, no cases of acute systemic toxicity or hematoma were reported. These findings suggest that the ultrasound-guided above-knee lateral approach is a reliable and effective option for SNB in below-knee surgeries”[37].

Kang C et al., (2021) conducted retrospective study to assess the ultrasound guided nerve block in lower extremity surgeries it was observed that ultrasound-guided selective nerve blocks, including the sciatic nerve (SN), lateral femoral cutaneous nerve (LFCN), femoral nerve (FN), obturator nerve (ON), and posterior femoral cutaneous nerve (PFCN), demonstrated high efficacy and favourable clinical outcomes in lower-extremity surgeries. The mean procedure time varied by the number of nerves blocked, with SN block taking 1.1 min, FN/SN block taking 2.5 min, and FN/SN/LFCN/ON block taking 4.8 min. Anesthesia onset averaged 48 minutes, with durations of 4.5 hours for FN and 5.6 hours for SN dermatomes. Postoperative analgesia lasted an average of 11.5 hours. Tourniquet tolerability improved with additional blocks. Patient satisfaction was high (VAS 9.3), with no reported anesthetic-related complications. Therefore, ultrasound-guided nerve block is a safe and effective option for lower-extremity anesthesia and analgesia[38].

All patients in the Arjun BK et al. (2019) trial finished the study satisfactorily and without the need for extra analgesics. The average onset periods for the motor and sensory blocks were 4.65 ± 0.48 and 3.35 ± 0.49 minutes, respectively. Throughout the surgery, hemodynamic stability was maintained, and postoperative analgesia lasted an average of 7.5 ± 0.8 hours. On a three-point Likert scale, patient satisfaction was scored as satisfactory[39].

Hussien RM et al., (2018) conducted study to assess the ultra sound guided sciatic nerve block for below knee amputations it was observed that, popliteal approach for sciatic nerve block demonstrated a 100% success rate, faster block performance time, fewer complications, and eliminated the need for postoperative rescue analgesia. Despite these advantages, more surgeons preferred the sub-gluteal approach[40].

"Ali HA et al. (2016) found no significant differences across two groups in terms of demographic information, hemodynamic changes, arterial O_2 saturation, respiratory rate, surgical site, or overall success rate. In addition to extending the block's length, ultrasound-guided femoral and sciatic nerve blocks have been shown to decrease the start time of sensory and motor blockade, shorten the time until surgery begins, reduce patient pain, and lower complication rates"[41].

Eldegwy MH et al., (2015) "observed that blocking the tibial and common peroneal nerves separately (two injections) distal to the sciatic nerve bifurcation results in a significantly early to complete sensory block compared to a pre-bifurcation sciatic nerve block (one injection) ($P<0.05$). The two methods did not, however, differ significantly in terms of patient satisfaction, success rate, block performance duration, or full motor block ($P>0.05$). According to these results, when seeking a quicker start of sensory block, a two-injection strategy distal to the bifurcation is preferable than a single-injection strategy above the bifurcation"[42].

A prospective research comparing subparaneural and circumferential extraneural injections at the bifurcation level in ultrasound-guided popliteal sciatic nerve block was carried out by Choquet O et al. (2014). Compared to subparaneural and extraneural injections, accidental intraepineural injection had an even shorter onset time ($P = 0.01$). These results imply that the best method for maximizing the length and speed of sensory blockage in popliteal sciatic nerve blocks is subparaneural injection[43].

In a prospective, randomized, observer-blinded trail conducted by Tran DQ et al., (2013) observed that, both the single-injection and three-injection techniques for the popliteal sciatic nerve block resulted in comparable success rates, ranging from 85% to 88%, with a 95% confidence interval (CI) of the intergroup difference between −14% and 19%. The potential for an undiscovered intergroup difference of up to 19% in success rate and 7.83 minutes in total time cannot be completely ruled out, though, given the 95% confidence interval (CI)[3].

In a research by Sala-Blanch X et al. (2012), within 30 minutes of injection, every patient in both groups experienced an effective block, which is sufficient sensory blockade for surgery without the need for further medication. "The ultrasound-guided subparaneural block (US-SPB) group, however, had a far greater percentage of patients who attained complete sensory (80% vs. 4%, P < 0.001) and motor block (60% vs. 8%, P < 0.001) at 15 minutes after injection. However, a greater proportion of patients in the US-SPB group achieved complete block at 15 minutes compared to the NS-SPB group"[5].

A randomized double-blind study by Faiz SH et al. (2011) "found that ultrasound-guided popliteal sciatic block using a single injection at the sciatic division led to a faster onset of sensory and motor block compared to the traditional nerve stimulator method. No patients in either group experienced paraesthesia, nerve injury, or other complications. These findings suggest the Two point guidance (TPG) technique may offer a quicker block onset than the Single-point guidance (SG) approach."[2].

According to a research by Buys MJ et al., patients in the tibial-peroneal group achieved a full block substantially faster than those in the sciatic group (19.2 vs. 26.1 minutes; P = 0.006). (2010) These findings suggest that blocking the tibial and common peroneal nerves separately in the popliteal fossa initiates anesthesia faster than doing a prebifurcation sciatic block.[6].

In a prospective study conducted by Prasad A et al., (2010), Popliteal sciatic nerve block (SNB) performed distal to the bifurcation results in a significantly shorter onset time for both sensory (21.4 ± 9.9 vs. 31.4 ± 13.9 minutes, P = 0.005) and motor (21.5 ± 11.3 vs. 32.4 ± 14.9 minutes, P = 0.006) blockade compared to a proximal approach. Both techniques achieved complete block success, with no significant differences in procedure time, discomfort, or patient satisfaction. Therefore, distal SNB may be a preferable option for surgical anaesthesia[21].

MATERIALS & METHODS

SAMPLE SIZE ESTIMATION

MATERIAL & METHOD

Source of Data

"This study was conducted on patients undergoing below knee surgeries done under regional anesthesia at R.L. Jalappa Hospital and Research Centre attached to Sri Devaraj Urs Medical College, Tamaka, Kolar during the period from April 2023 to April 2025."

Study Design: Randomized control trial.

Sample Size: 36 in each group.

Duration of study: May 2023 to October 2024Sampling Method: Computer generated randomized sampling.

Sample size estimation

"Sample size was estimated based on the study by Michael J et al[6]

The study mean ±SD complete sensory block as 26.1±11.7 in group A and 19.2±9.4 in group B with an average difference of 6.9 and combined SD of 10. At 5% level of significance and 80% power sample size required is 36 in each group.

Formula:

Sample size is estimated using the formula

$$n = \frac{2[Z_{\alpha/2}+Z_{\beta}]^{2} * \sigma^{2}}{d^{2}}$$

n = minimum required sample size.

$z_{1-\alpha/2}$= The critical value (Table value) from a standard normal distribution that the test statistic must exceed in order to show a statistically significant result at 'α' level of significance.

$z_{1-\beta}$= Standard normal table value for the power of the test $(1-\beta)$

σ = Standard deviation of the response variable (obtained from previous study

d = the effect size = the minimum clinically important difference that the investigator wishes to detect.

Sample size calculation:

Mean in Group A: 26.1

Mean in Group B: 19.2

Average difference (d): 6.9

Combined standard deviation (σ): 10

Level of significance (α): 0.05 ⇒ $Z\alpha/2 = 1.96$

Power (1-β): 80% ⇒ $Z\beta = 0.84$

Formula

$n=2\times(Z\alpha/2+Z\beta)^2\times\sigma^2 / d^2$

Now plugging in the values:

$n=2\times(1.96+0.84)^2\times10^2 / 6.9^2$

n = 1568 / 47.61

n = 32.94

the sample size is rounded to 36 per group”

Inclusion Criteria

- Age 18 to 60 years
- Patients undergoing lower limb surgeries below knee and foot under regional anaesthesia.
- ASA 1 and 2.

Exclusion Criteria

- Patients with coagulation disorders.
- Pregnant women.
- Patients with peripheral arterial disease and peripheral neuropathies.
- Patients not willing to participate in the study.

Method of collection of data:

- Patients undergoing below knee and foot surgeries under regional anesthesia were randomly selected using a computer-generated random sequence. Patients were blinded to their study group.

- Informed consent was taken from the patients.

- Result values were recorded using a proforma.

Methodology

- "A detailed history of the patient was taken one day prior to the surgery. Complete physical examination was done. Routine investigations were checked. Patient was explained about the procedure and consent was obtained from patient to participate in the study. On the day of the surgery an Intravenous line was secured and IV fluids connected and vitals were checked in the preoperative room. Patient once shifted to operating room routine monitors (pulse oximeter, NIBP and ECG) were connected and baseline vitals were noted. Patients were placed in prone position and popliteal area was painted and draped. Scan was done using a Philips Inno Sight ultrasound machine with a Linear probe of 12-4MHz frequency."

- **Group A:**

- "Patients in group A were given popliteal sciatic nerve block with 0.5% Bupivacaine (30 ml). Patient were placed in prone position and using a linear probe with ultra sound guidance the tibial nerve was identified first (lateral and superficial to popliteal artery) and traced proximally to where it fuses with peroneal nerve to the point where they both form the common sciatic trunk. For this group the block performer need not be aware of the exact neural bifurcation location however for the uniformity of the block site common sciatic nerve was traced anteriorly until its appearance changes to elliptical from circular structure. Block was given just distal to this level."

- **Group B:** "Patients in group B were given a Distal sciatic bifurcation nerve block with 0.5% Bupivacaine (30 ml). For this block also patients were placed in prone position and the tibial nerve was identified (lateral and superficial to popliteal artery) and was followed anteriorly to the point where it merges with common peroneal nerve and the bifurcation point is identified as the site where both the branches are continuous forming a bilobular pattern."

- Once the block was performed the below mentioned parameters were monitored.

Parameters to be observed

- "Time of onset of sensory and motor blockade. Onset of sensory block was accessed by pin prick test and motor blocked was checked assessing dorsal and plantar flexion."
- Time at which complete sensory and motor blockade achieved.
- Duration of action of the block.
- Visual analogue scale postoperatively at 0 hr,1hr, 4hr, 8hr, 12hr, and 24 hr.
- Requirement of IV analgesia within 24hrs.
- Patient satisfaction.

Postoperative analgesia

- Visual analogue scale was recorded immediately on shifting to recovery room and then at 1 hr, 4 hr, 8 hr, 12 hr, and 24 hr for both the groups. If the patient complaints of pain IV Diclofenac 75mg was given.

STATISTICAL ANALYSIS

All the patient data were collected in proforma and entered in excel sheet. The data were analysed using SPSS v26.0 operating on windows 10. The data were summarised as mean, standard deviation, frequency and percentage. The summarised data were represented using tables, figures, bar diagram and pie chart. The mean difference between the mean were compared using unpaired t-test and follow-up data within group using paired t-test. The categorical data were compared using chi-square test. For all statistical purpose a p-value of <0.05 was considered statistically significant.

RESULTS

RESULTS

Included 72 patients with 36 in each group. **Group A:** Patients in group A were given popliteal sciatic nerve block with 0.5% Bupivacaine (30 ml). **Group B:** Patients in group B were given a Distal sciatic bifurcation nerve block with 0.5% Bupivacaine (30 ml).

Table 1: Mean age

	Group A		Group B		p-value
	Mean	SD	Mean	SD	
Age	53.6	12.3	54.7	14.7	0.722

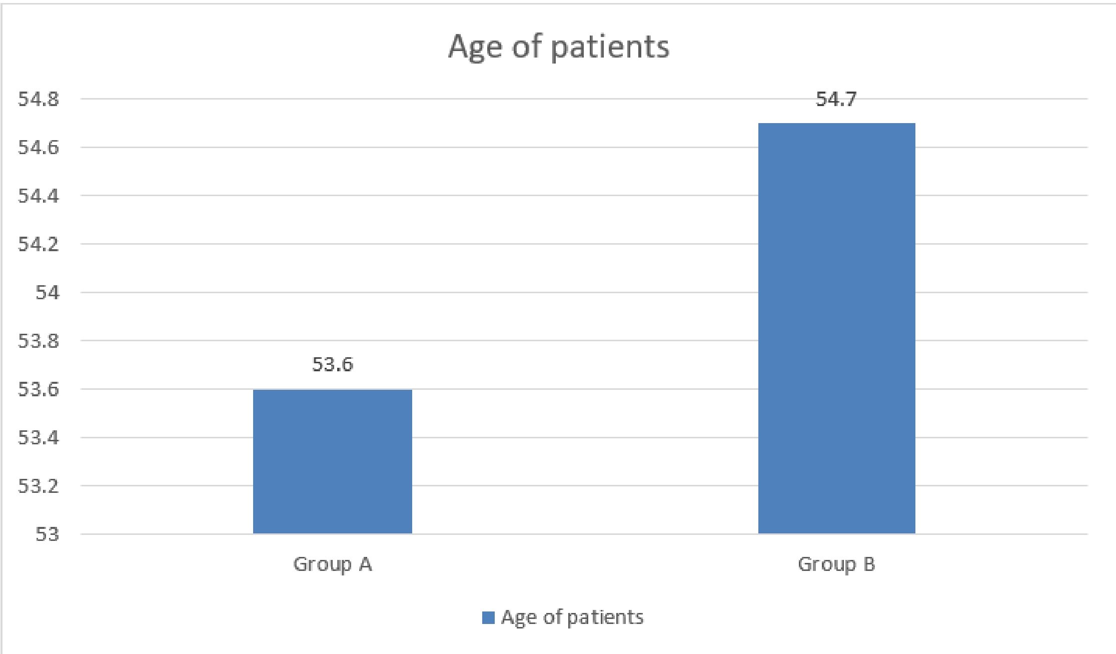

Figure 13: Mean age comparison between the groups

Table 2: Distribution according to gender and ASA grade between the groups

		Group A		Group B		Chi-square p-value)
		N	Percent	N	Percent	
Gender	Female	9	25.0%	9	25.0%	-
	Male	27	75.0%	27	75.0%	
ASA grade	1	12	33.3%	14	38.9%	0.69 (0.706)
	2	24	66.7%	22	61.2%	

Overall male preponderance in present study with 75% male in group A and group B.(p>0.05) Also, the distribution according to ASA grade was also found to be comparable.

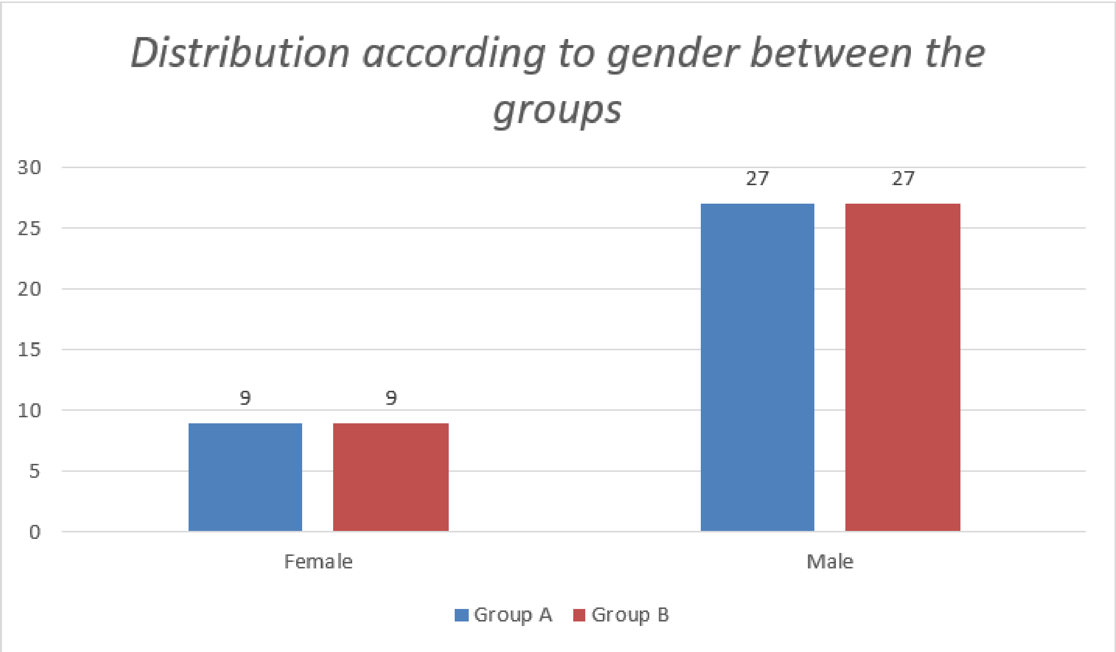

Figure 14: Distribution according to gender between the groups

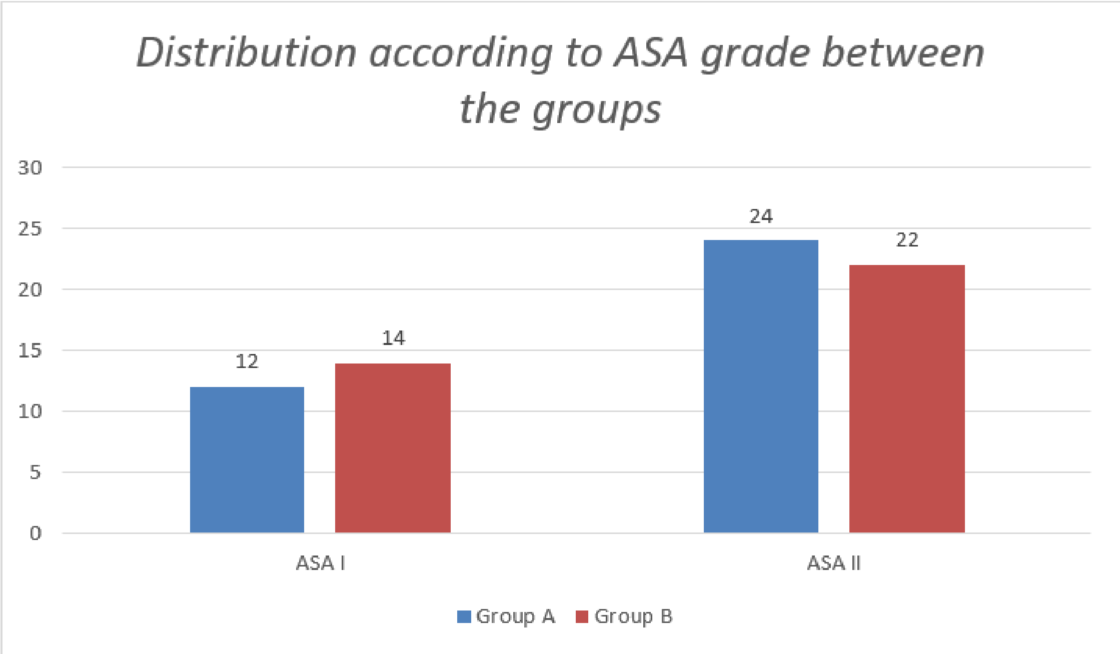

Figure 15: Distribution according to ASA grade between the groups

Table 3: Mean sensory and motor block

	Group A		Group B		p-value
	Mean	SD	Mean	SD	
Onset of sensory block (mins)	15.5	4.7	18.1	4.1	0.01*
Onset of motor block (mins)	20.3	4.3	22.4	5.2	0.06

There is significant quick onset of sensory block in group A (15.5mins) patients compared to group B (18.1mins) with a p value of <0.05. Also, time required for onset of motor block in group A (20.3mins) compared to group B (22.4mins) was shorter, however this finding was not statistically significant. (p>0.05)

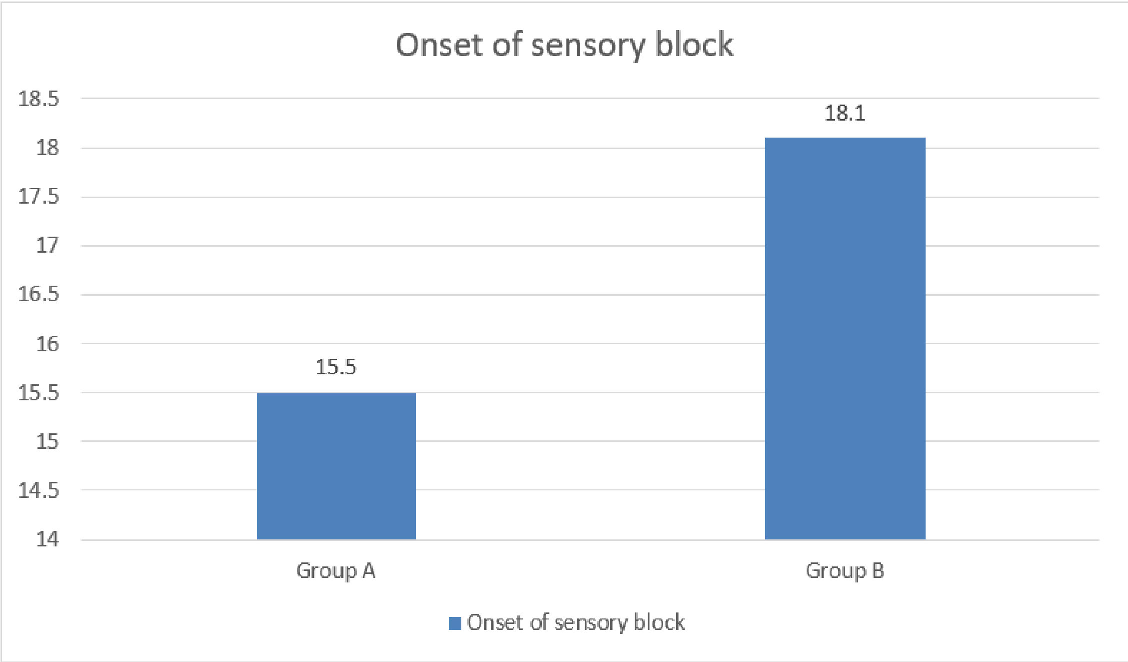

Figure 16: Comparison of mean sensory block between the groups

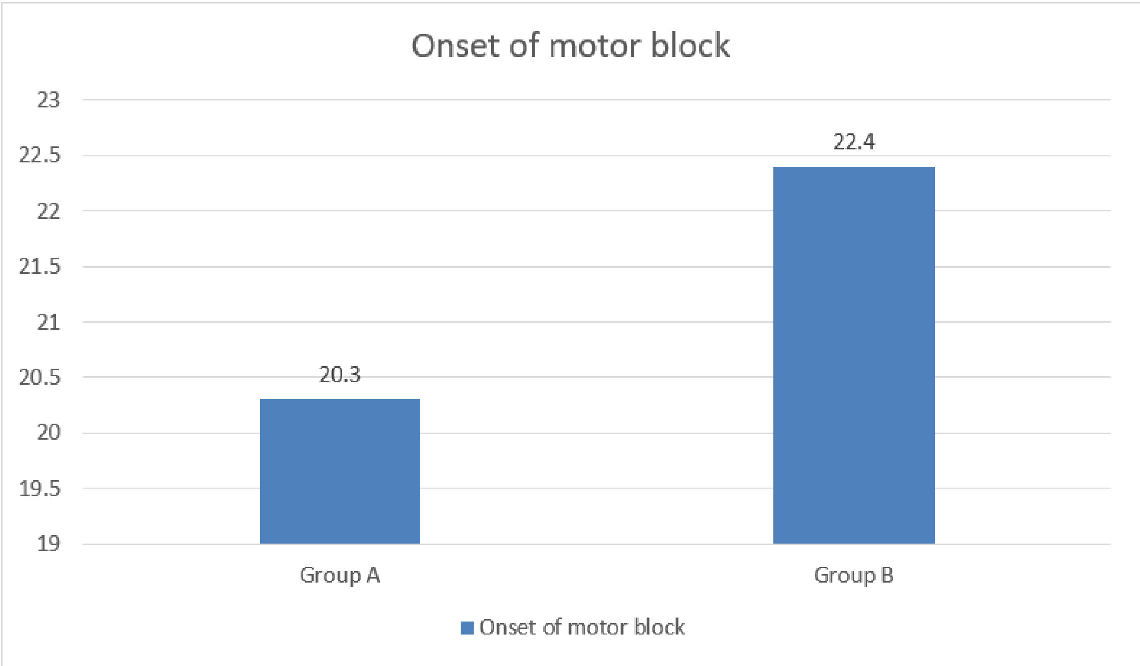

Figure 17: Comparison of mean motor block between the groups

Table 4: Comparison of mean time for complete sensory and motor block, and rescue analgesia time between the groups

	Group A		Group B		p-value
	Mean	SD	Mean	SD	
Complete sensory and motor block achieved time	20.7	4.5	22.6	5.0	0.08
Rescue analgesia time hrs	32.1	8.0	31.6	10.2	0.78

There is comparable time period for complete sensory and motor block achieved between the groups. Also, the time duration for rescue analgesia required was comparable between the group with no significant difference noted. ($p>0.05$)

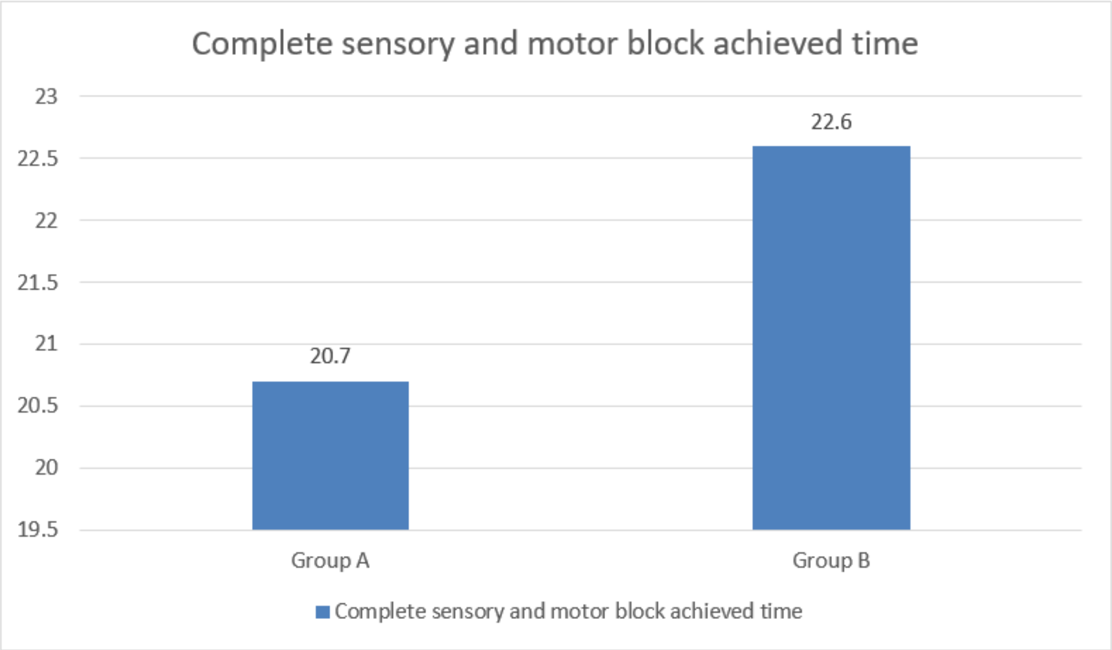

Figure 18: Comparison of mean time for complete sensory and motor block between the groups

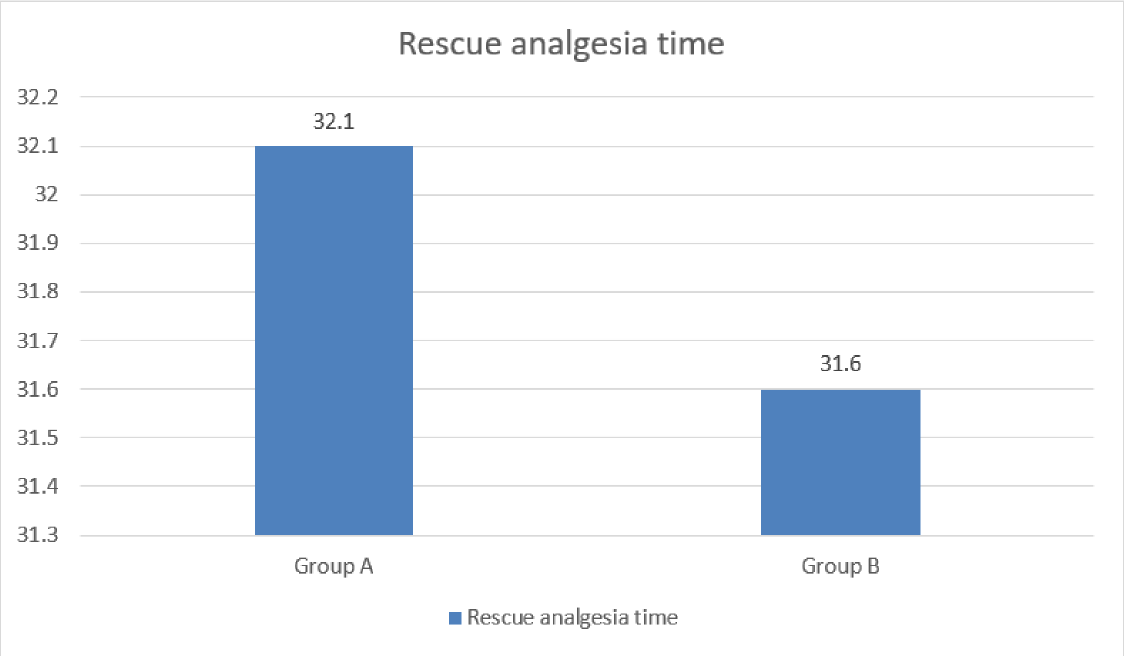

Figure 19: Comparison of mean time for rescue analgesia time between the groups

Table 5: Total analgesia requirement in 24hrs between the groups

		Group A		Group B		Chi-square p-value)
		N	Percent	N	Percent	
Total analgesia requirement in 24hrs	NIL	32	88.9%	28	77.8%	2.086 (0.35)
	Once	4	11.1%	7	19.4%	
	Twice	0	0.0%	1	2.8%	

There is no significant difference in requirement of total analgesia in 24hrs between the groups. However 1 case in group B required twice (2.8%) and 7 case required once (19.4%)for analgesic medication in comparison to group A with only 4 (11.1%) patients requiring the once total analgesic medication.(p>0.05)

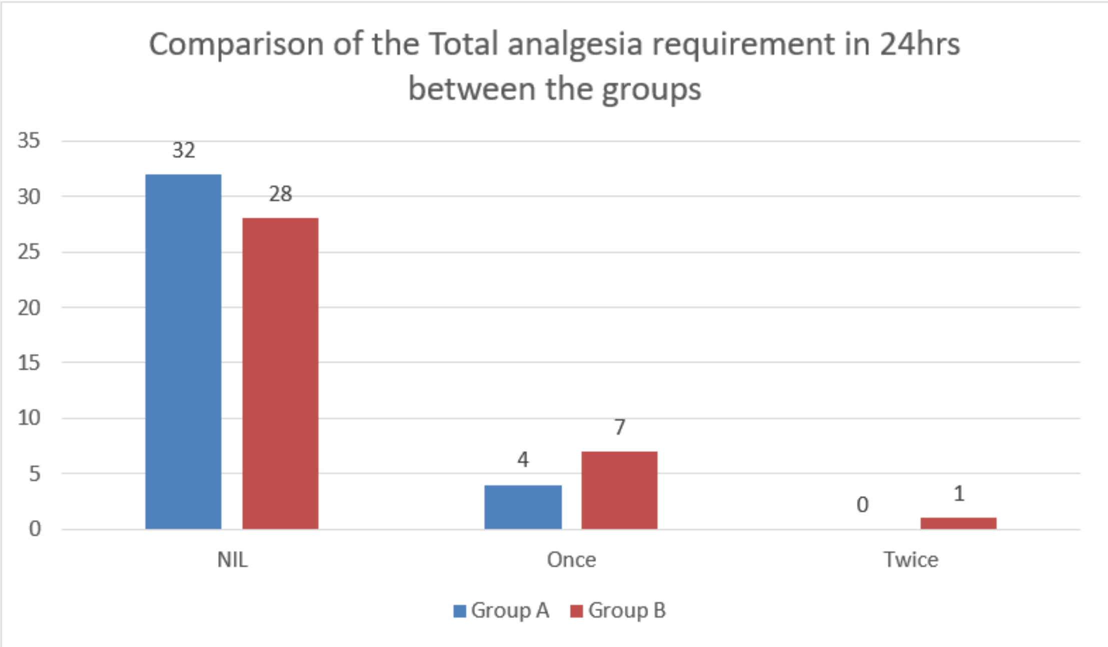

Figure 20: Comparison of the Total analgesia requirement in 24hrs between the groups

Table 6: The mean VAS score across groups

VAS	Group A		Group B		p-value
	Mean	SD	Mean	SD	
0hr	.4	.8	.9	1.2	0.04*
1hr	.0	.0	.1	.2	0.144
4hr	.0	.0	.0	.0	-
8hr	.1	.4	.2	.7	0.499
12hr	.3	.7	.3	.7	0.82
24hr	.9	1.4	.9	1.2	0.77

There is comparable mean VAS score between the groups at various time interval. However, study recorded with significant lower mean VAS score at 2hr post operative period in group A compared to group B.($p<0.05$) but VAS score was insignificant.

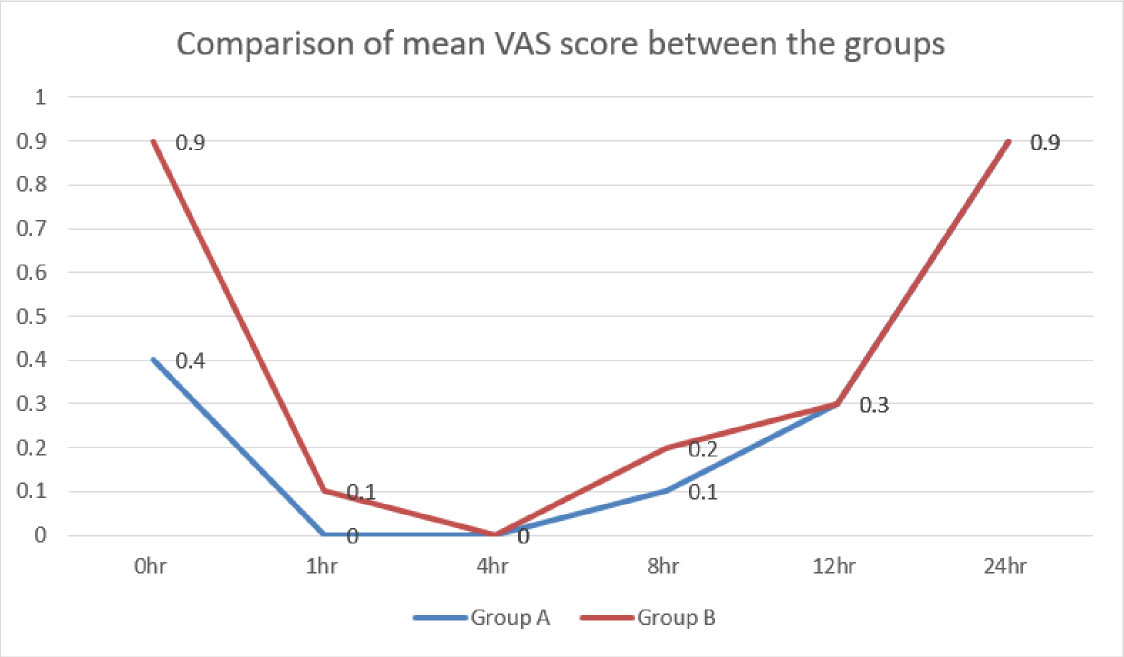

Figure 21: Comparison of mean VAS score between the groups

DISCUSSION

DISCUSSION

Peripheral nerve blocks, especially under ultrasound guidance, are commonly employed in lower limb surgeries as a safer alternative to spinal anesthesia, which may carry potential complications. Of these, the popliteal sciatic nerve block is among the most frequently used techniques for procedures involving the lower extremities. This block can be administered at multiple locations along the nerve's course, offering flexibility in its application. However, despite its frequent use, there remains uncertainty regarding the optimal site of injection to achieve the best anesthetic effect. Existing literature presents inconclusive findings on whether a single block at the pre-bifurcation level or separate blocks at the post-bifurcation level—targeting the tibial and common peroneal nerves individually—provides superior efficacy. Studies that have examined separate injections into both tibial and peroneal nerves suggest that dual blocks may offer better outcomes than a single injection before the bifurcation.

Given these uncertainties, a comparative study evaluating pre-bifurcation and post-bifurcation popliteal sciatic nerve blocks using ultrasound guidance could provide valuable insights into which technique offers greater efficacy in terms of block performance and postoperative pain management. Identifying the optimal injection site may not only enhance block efficiency but also improve patient outcomes by ensuring better intraoperative anesthesia and prolonged postoperative analgesia. Understanding these factors is essential for refining regional anesthesia techniques and optimizing perioperative care in lower limb surgeries.

"There were 72 patients in the current study, 36 of whom were in groups A and B, respectively. Group A: Patients in group A received 30 milliliters of 0.5% bupivacaine for a popliteal sciatic nerve block. Group B: Patients in group B received 30 milliliters of

0.5% buprevacaine for a distal sciatic bifurcation nerve block."

Patients in groups A and B had similar mean ages, with group A patients being 53.6 years old and group B patients being 54.7 years old. The distribution of genders in the groups was similar, with 75% of the participants in groups A and B being men overall in the current study. ($p>0.05$) Additionally, it was discovered that the distribution by ASA grade was comparable.

In the study done by Eldegwy MH et al., comparing ultra sound guided separate tibial and common peroneal nerve injection with single injection proximal to bifurcation, with Group I averaging 35 years and Group II 38.7 years, the two groups' mean ages were similar. There was a male preponderance in both groups. The groups did not differ significantly in terms of patient weight, height, or ASA grade.[42].

The mean age of patients in a randomized control trial by Tran DQ et al. comparing subepineural and traditional USG guided PSN block was similar, with 47.1 years in the prebifurcation injection group and 43.7 years in the bifurcation group. They did, however, reflect a little female preponderance in both groups, and there was no discernible variation in the distribution of patients by gender. There were no discernible differences in the groups' BMI, ASA, or kind of surgery[18].

In a study conducted by Zhu LJ et al., documented mean age was comparable between the groups with 42.6yrs in group L and 43.54yrs in group A. The male preponderance is documented in both the groups, with comparable mean BMI, ASA grade and type of surgery between the groups[37].

"In our study there is significant quick onset of sensory block in group A (15.5mins) patients compared to group B (18.1mins). ($p<0.05$) Also time required for onset of motor blockade in group A (20.3mins) was shorter in comparison with group B (22.4mins), however it's not statistically significant. ($p>0.05$) There is comparable time period for complete sensory and motor block achieved between the groups. Also, the time duration for rescue analgesia required was comparable between the group with no significant difference noted.” (p>0.05)

“An ultrasound-guided sciatic nerve block was performed 5 cm proximal to (group P) or 3 cm distal to (group D) its bifurcation in the popliteal fossa in a research by Prasad A et al. They found that when SNB is performed distal to the bifurcation, the onset time for both sensory (21.4 ± 9.9 vs. 31.4 ± 13.9 minutes, P = 0.005) and motor (21.5 ± 11.3 vs. 32.4 ± 14.9 minutes, P = 0.006) blockade wa s significantly shorter than when it is done proximally”[21].

In a different study by Faiz SH et al., they made the study by comparing 2 groups based on technique used to give block i.e single-point guidance (SG) and two-pop guidance(TPG) technique and “the mean duration of complete sensory block in the groups was 35.4 ± 4.1 minutes and 24.9 ± 4.2 minutes, respectively. The TPG group showed a significantly shorter duration (P = 0.001) than the SG group. This study compared which ultrasound-guided sciatic nerve block Prebifurcation or separate Tibial-Peroneal nerve works faster.” Likewise, the average time for a full motor block was 63.3 ± 4.4 minutes for the SG group and 48.4 ± 4.6 minutes for the TPG group, indicating that the TPG group had a considerably lower duration (P = 0.001). These data imply that, in comparison to the SG approach, the TPG technique causes a quicker onset of both sensory and motor block[2].

Research by Arjun BK et al. “found that combined ultrasound-guided popliteal sciatic and adductor canal block—with mean sensory and motor block onset durations of 3.35 ± 0.49 and 4.65 ± 0.48 minutes, respectively—is a good substitute for below-knee procedures in high-risk patients”[39].

In contrast to a circumferential extraneural injection, a subparaneural injection considerably shortens the length of tibial nerve sensory blockade and speeds up the block initiation time (P = 0.002 and P = 0.04, respectively), according to a research by Choquet O et al. Additionally, the subparaneural technique had a greater block success rate. Compared to subparaneural and extraneural injections, accidental intraepineural injection had an even shorter onset time (P = 0.01). These results imply that the best method for maximizing the length and speed of sensory blockage in popliteal sciatic nerve blocks is subparaneural injection[43].

In agreement, another study by Eldegwy MH et al. demonstrated that blocking the tibial and common peroneal nerves separately (two injections) distal to the sciatic nerve bifurcation significantly speeds up the completion of a sensory block compared to blocking the sciatic nerve pre-bifurcation (one injection) ($P<0.05$). The two methods did not, however, differ significantly in terms of patient satisfaction, success rate, block performance duration, or full motor block ($P>0.05$). According to these results, when seeking a quicker start of sensory block, a two-injection strategy distal to the bifurcation is preferable than a single-injection strategy above the bifurcation[42].

The popliteal technique for sciatic nerve block showed a 100% success rate, a quicker block performance time, fewer complications, and the elimination of the requirement for postoperative rescue analgesics, according to a research by Hussein RM et al. According to these results, the popliteal and sub-gluteal approaches both provide sufficient analgesia[40].

According to a research by Tripathi R et al., popliteal nerve blocks performed under ultrasound guidance before to bifurcation are a very safe and efficient method of delivering anesthetic and analgesia during foot and ankle procedures. Fast execution (5.25 ± 1.24 minutes), rapid sensory block onset (4.25 ± 1.30 minutes) and motor block start (7.10 ± 1.35 minutes), and extended duration of total sensory (300.25 ± 16.87

minutes) and motor (247.00 ± 15.06 minutes) blockade are the procedure's defining characteristics[32].

The groups' requirements for complete analgesia throughout a 24-hour period do not differ significantly. In contrast to group A, which had only 11.1% of patients, group B had 19.4% of patients that needed post-operative analgesia overall, with the exception of one instance (2.8%) that needed it twice. ($p>0.05$) Additionally, the groups' mean VAS scores at different time intervals are comparable. However, the study found that group A had a significantly lower mean VAS score two hours after surgery than group B. ($p<0.05$)

“The average duration of postoperative analgesia was 7.5 ± 0.8 hours, and hemodynamic stability was maintained throughout the surgery in a research by Arjun BK et al. that combined adductor canal block and ultrasound guided popliteal sciatic nerve block. On a three-point Likert scale, patient satisfaction was scored as satisfactory”[39]. “The average duration of postoperative analgesia was 11.5 hours. Additional blocks (35 minutes after SN block, 51 minutes after FN/SN block, and 84 minutes after FN/SN/LFCN/ON block) increased tourniquet tolerance. No anesthetic-related problems were recorded, and patient satisfaction was great (VAS 9.3). Thus, according to a research by Kang C et al., ultrasound-guided nerve block is a secure and efficient choice for lower-extremity anesthesia and analgesia”[38].

The mean analgesic duration was found to be comparable between the groups, with 20.31 hours in group L and 20.34 hours in group A. This is consistent with another study by Zhu et al. that compared ultrasound guided sciatic nerve block in patients posted for below knee surgeries with above knee approach (Group L) and anterior approach (Group A)[37].

According to a research by Li Y et al., found patients in Group A, those in Group B had fewer adverse responses, a lower requirement for rescue analgesia, and significantly lower VAS ratings at many time periods (T2–T5) ($p < 0.001$). Furthermore, group B experienced longer durations of analgesia pump use, the time to beginning of patient-controlled intravenous analgesia (PCIA), and the time to first pushing the analgesia pump ($p < 0.05$). There was also a notable improvement in the satisfaction of nurses, surgeons, and patients. These results demonstrate how popliteal sciatic nerve block improves postoperative pain management and the patient experience in general.[36]

Abdelraheem TM et al. conducted a study comparing fascia iliaca block (FIB) and ultrasound-guided popliteal plexus block for postoperative analgesia following total knee arthroplasty. The patients in the FIB group had a delayed time to first rescue analgesia, significantly lower Numeric Rating Scale (NRS) scores at multiple time points, and less morphine consumption in the first 24 hours. Notwithstanding these benefits, the two groups' rates of recovery, patient satisfaction, and side effects such hypotension, bradycardia, and PONV were similar. Given its effectiveness in pain management with minimal side effects, FIB may be preferred over Popliteal plexus block in this surgical setting[34].

In a study by Oguslu U et a., documented with minimal Adverse events, only three cases of prolonged effect resolving within 24 hours. "Patients who received a popliteal sciatic nerve block (PSNB) had significantly lower Visual Analog Scale (VAS) pain scores compared to those who underwent moderate procedural sedation and analgesia. Although patient satisfaction was similar in both groups, operator satisfaction was notably higher with PSNB. These results support PSNB as an effective alternative for pain control, especially in high-risk patients."[33]. The postoperative analgesia average duration was

340.50 ± 13.77 minutes. According to a research by Tripathi R et al., this method is a useful supplement to perioperative pain management techniques because of its high success rate (95%) and patient satisfaction (95%)[32].

“In study by Discalzi A et al., the PSNB was successful in 96% of patients, significantly reducing pain scores from a pre-procedural mean Visual Analog Scale (VAS) of 7.86 ± 1.81 to 2.04 ± 2.20 after 10 minutes, and further decreasing to 0.74 ± 1.43 by the end of the procedure (mean duration 43 minutes, $p < 0.0001$).” These findings support PSNB as a valuable tool to enhance patient comfort and compliance during endovascular procedures.[30]

Prasad A et al., concluded that Both techniques achieved complete block success, with no significant differences in procedure time, discomfort, or patient satisfaction. Therefore, distal SNB may be a preferable option when a rapid onset of surgical anesthesia is required.[21] “Both pre-bifurcation and bifurcation posterior popliteal sciatic nerve blocks show similar success rates and complete anesthesia-related times when a local anesthetic is placed inside the paraneural sheath, according to Tran DQ et al.”[3]. According to Ali HA et al., “US guided femoral and sciatic nerve blocks extended the block's length while decreasing the start time of sensory and motor blockade, reducing the time to surgical initiation, minimizing patient pain, and lowering complication rates”[41].

Also, study by Zhy LJ et al., found that the above-knee lateral approach for ultrasound-guided SNB demonstrated superior SN visibility, shorter scan and needle insertion times, shallower SN depth, and fewer needle passes compared to the alternative approach. Although the lateral approach group had a somewhat greater success rate in SN identification, there were no appreciable variations in the length of surgical analgesia or the onset of sensory block. Furthermore, no reports of hematoma or acute systemic toxicity were recorded. These results imply that an efficient and dependable method for SNB in below-knee procedures is the ultrasound-guided above-knee lateral approach[37].

Recommendations

1. **Preference for Popliteal Sciatic Nerve Block:** Given the significantly quicker onset of sensory blockade in Group A (popliteal sciatic nerve block) compared to Group B (distal sciatic bifurcation nerve block), it is recommended to prefer the popliteal approach for faster pain relief, particularly in procedures requiring prompt anesthesia.
2. **Consideration of Motor Block Onset:** Although the motor block onset was faster in Group A, the difference was not statistically significant. Therefore, either technique may be considered in procedures where early motor blockade is not a primary concern.
3. **Postoperative Analgesia Planning:** Since the requirement for rescue analgesia and total analgesic consumption within 24 hours were comparable between both groups, the choice of block technique should be based on factors other than postoperative analgesia, such as procedural ease and surgeon preference.
4. **Pain Management in Early Postoperative Period:** The significantly lower mean VAS score at the 2-hour postoperative period in Group A suggests better early pain control. Hence, popliteal sciatic nerve block may be a preferable choice for patients at higher risk of early postoperative pain.
5. **Clinical Decision Based on Individual Patient Needs:** As both blocks provide similar durations of complete sensory and motor blockade, patient-specific factors such as the type of surgery, expected pain levels, and patient comorbidities should guide the choice of block technique.

6. **Future Research and Larger Sample Studies:** further work with larger sample sizes and follow-up with longer duration is advised to confirm the effectiveness and therapeutic benefits of these two approaches, since the results show a trend but do not prove clear superiority.

SUMMARY

SUMMARY

Seventy two patients included, with 36 in each group.

Group A: “Patients in group A were given were popliteal sciatic nerve block with 0.5percent Bupivacaine (30 ml).

Group B: Patients in group B were given a Distal sciatic bifurcation nerve block with 0.5percent Bupivacaine (30 ml).

Patients in groups A and B had similar mean ages, with group A patients being 53.6 years old and group B patients being 54.7 years old.

Overall male preponderance in present study with 75percent male in both group.($p>0.05$)

Also, the distribution according to ASA grade was also found to be comparable.

There is significant faster onset of sensory block in group A(15.5mins) patients compared to group B (18.1mins). ($p<0.05$) The time required for onset of motor block in group A (20.3mins) is faster than group B (22.4mins), clinically however this finding was not statistically significant. ($p>0.05$)

The time it takes for each group to reach full motor and sensory block is similar. Additionally, with no discernible difference in the time duration needed to provide rescue analgesia across the groups. ($p>0.05$)

There is no significant difference in total analgesia requirement in 24hrs between the groups. However, 1 case in group B required twice (2.8percent) and 7 (19.4percent) patients required once for post operative analgesic medication in comparison to group A with only 4(11.1percent) patients requiring the once total analgesic medication. ($p>0.05$)

There is comparable mean VAS score between the groups at various time interval. However, study recorded with significant lower mean VAS score at 2hr post operative period in group A compared to group B.”($p<0.05$)

CONCLUSION

CONCLUSION

The results demonstrated a significantly faster onset of sensory blockade in the popliteal sciatic nerve block group (Group A) compared to the distal sciatic bifurcation nerve block group (Group B). Although the onset of motor blockade was also quicker in Group A, this difference was not statistically significant. The duration of complete motor and sensory blockade, as well as the time to rescue analgesia, was comparable between both groups, indicating similar overall analgesic efficacy. While the total analgesic requirement over 24 hours was not significantly different, Group B had a slightly higher proportion of patients requiring additional analgesia. Notably, patients in Group A reported significantly lower pain scores at the 2-hour postoperative period, suggesting better immediate postoperative analgesia. In conclusion, popliteal sciatic nerve block provides a quicker onset of sensory blockade and superior early postoperative pain relief, while both techniques offer comparable overall analgesic outcomes.

LIMITATIONS

The study has some limitations, which include firstly it being a single centre study which limits its external validity and applicability of the results to other setting or population. Also, study was conducted among smaller sample size of 36 in each group, though it was calculated statistically, it is relatively small and also may limit its generalizability to larger population. The short-term follow-up till 24hrs was done, which can be prolonged to evaluate the necessary delayed complications. Hence, a larger sample size study conducted at multiple centres will strengthen the findings of present study making it to be generalised to a larger population.

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ANNEXURES

ANNEXURE

PROFORMA

STUDY: EFFICACY OF ULTRA SOUND GUIDED POPLITEAL SCIATIC NERVE BLOCK AND DISTAL SCIATIC BIFURCATION NERVE BLOCK IN PROVIDING ANASTHESIA FOR BELOW KNEE SURGERIES

Investigators: Dr.Himaja Katamaneni , Dr. Sujatha MP

1. Name of the patient: 2. Age/Sex: 3.Blood Group:

4. IP No: 5. ASA grade:

- **General physical examination:**

Pulse rate: respiratory rate: BP: Temperature:

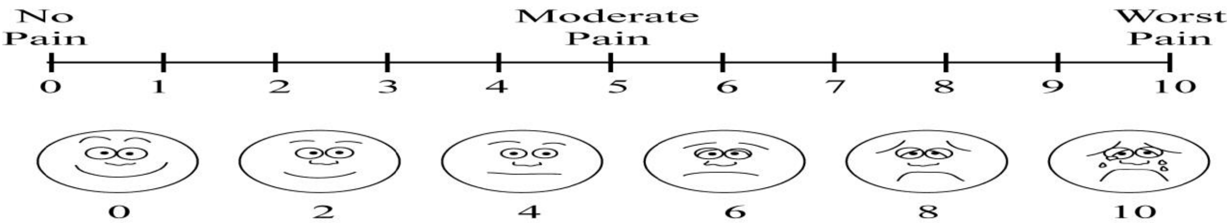
- **Diagnosis:**
- **Surgery:**
- **VAS - VISUAL ANALOGUE SCALE** (for pain)

0 - No pain

1-3 - mild pain

4-6 - moderate pain

7-10 – severe pain



TIME	0 hrs	1 hrs	4hrs	8hrs	12 hrs	24hrs
VISUAL ANALOUGUE SCALE						

Group: __________

- Time at which rescue analgesic was required ……………………
- Total analgesia requirement in 24hrs-
- Onset of sensory block - mins assessed using pin prick test
- Onset of motor block - mins is assessed using plantar and dorsiflexion.
- Complete sensory and motor block achieved - mins

PATIENT INFORMATION SHEET

STUDY: EFFICACY OF ULTRA SOUND GUIDED POPLITEAL SCIATIC NERVE BLOCK AND DISTAL SCIATIC BIFURCATION NERVE BLOCK IN PROVIDING ANASTHESIA FOR BELOW KNEE SURGERIES.

Investigators: Dr Himja Katamaneni/ Dr.Sujatha MP

Study location: R.L .Jalappa Hospital and Research Centre attached to Sri Devaraj Urs Medical College, Tamaka, Kolar.

Details -Patients undergoing lower limb surgeries regional anaesthesia.

This study is done to help determine which among the 2 blocks popliteal sciatic nerve block and distal sciatic bifurcation nerve block is better in providing anesthesia for below knee surgeries .You will be selected to one of the 2 groups and based on which group you belong to the respective block will be given under ultrasound guidance before surgery. You will be evaluated for pain for a period of 24hrs. the drug used for the study is 0.5% bupivacaine. Some of the adverse effects associated with the drug are dizziness, dry mouth, headache. The procedure is relatively safe .The alternative to this procedure for your surgery will be spinal anesthesia. Any need for change in anesthesia plan, post op rescue analgesia will also be explained.

Patients with coagulation disorders, prior neurovascular bundle injuries and pregnant women will be excluded from the study.

Please read the information and discuss with your family members. You can ask any question regarding the study. If you agree to participate in the study, then relevant information and history will be taken. This information collected will be used only for dissertation and publication and presentation in conference.

All information collected from you will be kept confidential and will not be disclosed to any outsider. Your identity will not be revealed. There is no compulsion to agree to this study. The care you will get will not change if you don’t wish to participate. The drug required for the study will be provided by the principal investigator. There will not be any monetary benefits/incentives for taking part in this study. You are required to sign/ provide thumb impression only if you voluntarily agree to participate in this study.

For further information contact

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ರೋಗಿಯ ಮಾಹಿತಿ ಹಾಳೆ

ಸಂಸ್ಥೆಯ ಹೆಸರು: ಶ್ರೀ ದೇವರಾಜ್ ಅರಸ್ ಅಕಾಡೆಮಿ ಆಫ್ ಹೈಯರ್ ಎಜುಕೇಶನ್ ಅಂಡ್ ರಿಸರ್ಚ್

ಅಧ್ಯಯನ: ಮೊಣಕಾಲಿನ ಕೆಳಗಿನ ಶಸ್ತ್ರಚಿಕಿತ್ಸೆಗಳಿಗೆ ಅನಸ್ತೇಷಿಯಾವನ್ನು ಒದಗಿಸುವಲ್ಲಿ ಅಲ್ಟ್ರಾ ಸೌಂಡ್ ಗೈಡೆಡ್ ಪಾಪ್ಲಿಟಿಯಲ್ ಸಿಯಾಟಿಕ್ ನರಗಳ ಬ್ಲಾಕ್ ಮತ್ತು ಡಿಸ್ಟಲ್ ಸಿಯಾಟಿಕ್ ಬೈಫರ್ಕೇಶನ್ ನರ್ವ್ ಬ್ಲಾಕ್‌ನ ಪರಿಣಾಮಕಾರಿತ್ವ.

ತನಿಖಾಧಿಕಾರಿಗಳು: ಡಾ.ಹಿಮಜಾ ಕಾಟಮನೇನಿ/ ಡಾ.ಸುಜಾತಾ ಎಂ.ಪಿ

ಅಧ್ಯಯನದ ಸ್ಥಳ: ಆರ್ ಎಲ್ ಜಾಲಪ್ಪ ಆಸ್ಪತ್ರೆ ಮತ್ತು ಸಂಶೋಧನಾ ಕೇಂದ್ರ , ಶ್ರೀ ದೇವರಾಜ್ ಅರಸ್ ವೈದ್ಯಕೀಯ ಕಾಲೇಜು ಟಮಕ, ಕೋಲಾರ.

ವಿವರಗಳು: ಮೊಣಕಾಲಿನ ಕೆಳಗಿನ ಶಸ್ತ್ರಚಿಕಿತ್ಸೆಗಳಿಗೆ ಒಳಗಾಗುವ ರೋಗಿಗಳಿಗೆ ಪ್ರಾದೇಶಿಕ ಅರಿವಳಿಕೆ.

ಮೊಣಕಾಲಿನ ಕೆಳಗಿನ ಶಸ್ತ್ರಚಿಕಿತ್ಸೆಗಳಿಗೆ ಅರಿವಳಿಕೆ ನೀಡಲು 2 ಬ್ಲಾಕ್‌ಗಳಲ್ಲಿ ಪಾಪ್ಲೈಟಲ್ ಸಿಯಾಟಿಕ್ ನರ ಬ್ಲಾಕ್ ಮತ್ತು ಡಿಸ್ಟಲ್ ಸಿಯಾಟಿಕ್ ಕವಲೊಡೆಯುವ ನರಗಳ ಬ್ಲಾಕ್ ಯಾವುದು ಉತ್ತಮ ಎಂದು ನಿರ್ಧರಿಸಲು ಸಹಾಯ ಮಾಡಲು ಈ ಅಧ್ಯಯನವನ್ನು ಮಾಡಲಾಗುತ್ತದೆ .ನಿಮ್ಮನ್ನು 2 ಗುಂಪುಗಳಲ್ಲಿ ಒಂದಕ್ಕೆ ಆಯ್ಕೆ ಮಾಡಲಾಗುತ್ತದೆ ಮತ್ತು ನೀವು ಯಾವ ಗುಂಪಿಗೆ ಸೇರಿದ್ದೀರಿ ಎಂಬುದರ ಆಧಾರದ ಮೇಲೆ ಶಸ್ತ್ರಚಿಕಿತ್ಸೆಗೆ ಮುನ್ನ ಅಲ್ಟ್ರಾಸೌಂಡ್ ಮಾರ್ಗದರ್ಶನದಲ್ಲಿ ಸಂಬಂಧಿತ ಬ್ಲಾಕ್ ಅನ್ನು ನೀಡಲಾಗುತ್ತದೆ. 24 ಗಂಟೆಗಳ ಕಾಲ ನೋವಿನಿಂದ ನಿಮ್ಮನ್ನು ಮೌಲ್ಯಮಾಪನ ಮಾಡಲಾಗುತ್ತದೆ. ಅಧ್ಯಯನಕ್ಕೆ ಬಳಸಲಾಗುವ ಔಷಧವು 0.5% ಬುಪಿವಕೈನ್ ಆಗಿದೆ. ಔಷಧಿಗೆ ಸಂಬಂಧಿಸಿದ ಕೆಲವು ಪ್ರತಿಕೂಲ ಪರಿಣಾಮಗಳು ತಲೆತಿರುಗುವಿಕೆ, ಒಣ ಬಾಯಿ, ತಲೆನೋವು. ಕಾರ್ಯವಿಧಾನವು ತುಲನಾತ್ಮಕವಾಗಿ ಸುರಕ್ಷಿತವಾಗಿದೆ .ನಿಮ್ಮ ಶಸ್ತ್ರಚಿಕಿತ್ಸೆಗೆ ಈ ವಿಧಾನಕ್ಕೆ ಪರ್ಯಾಯವಾಗಿ ಬೆನ್ನುಮೂಳೆಯ ಅರಿವಳಿಕೆ ಇರುತ್ತದೆ. ಅರಿವಳಿಕೆ ಯೋಜನೆಯಲ್ಲಿ ಯಾವುದೇ ಬದಲಾವಣೆಯ ಅಗತ್ಯತೆ, ನಂತರದ ಪಾರುಗಾಣಿಕಾ ನೋವು ನಿವಾರಕವನ್ನು ಸಹ ವಿವರಿಸಲಾಗುತ್ತದೆ.

ಹೆಪ್ಪುಗಟ್ಟುವಿಕೆ ಅಸ್ವಸ್ಥತೆ ಹೊಂದಿರುವ ರೋಗಿಗಳು, ಪೂರ್ವ ನ್ಯೂರೋವಾಸ್ಕುಲರ್ ಬಂಡಲ್ ಗಾಯಗಳು ಮತ್ತು ಗರ್ಭಿಣಿಯರನ್ನು ಅಧ್ಯಯನದಿಂದ ಹೊರಗಿಡಲಾಗುತ್ತದೆ.

ದಯವಿಟ್ಟು ಮಾಹಿತಿಯನ್ನು ಓದಿ ಮತ್ತು ನಿಮ್ಮ ಕುಟುಂಬ ಸದಸ್ಯರೊಂದಿಗೆ ಚರ್ಚಿಸಿ. ಅಧ್ಯಯನಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ನೀವು ಯಾವುದೇ ಪ್ರಶ್ನೆಯನ್ನು ಕೇಳಬಹುದು. ನೀವು ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಒಪ್ಪಿದರೆ, ನಂತರ ಸಂಬಂಧಿತ ಮಾಹಿತಿ ಮತ್ತು ಇತಿಹಾಸವನ್ನು ತೆಗೆದುಕೊಳ್ಳಲಾಗುತ್ತದೆ. ಸಂಗ್ರಹಿಸಿದ ಈ ಮಾಹಿತಿಯನ್ನು ಪ್ರಬಂಧ ಮತ್ತು ಪ್ರಕಟಣೆ ಮತ್ತು ಸಮ್ಮೇಳನದಲ್ಲಿ ಪ್ರಸ್ತುತಿಗಾಗಿ ಮಾತ್ರ ಬಳಸಲಾಗುತ್ತದೆ.
ನಿಮ್ಮಿಂದ ಸಂಗ್ರಹಿಸಲಾದ ಎಲ್ಲಾ ಮಾಹಿತಿಯನ್ನು ಗೌಪ್ಯವಾಗಿ ಇರಿಸಲಾಗುತ್ತದೆ ಮತ್ತು ಯಾವುದೇ ಹೊರಗಿನವರಿಗೆ ಬಹಿರಂಗಪಡಿಸಲಾಗುವುದಿಲ್ಲ. ನಿಮ್ಮ ಗುರುತನ್ನು ಬಹಿರಂಗಪಡಿಸಲಾಗುವುದಿಲ್ಲ. ಈ ಅಧ್ಯಯನವನ್ನು ಒಪ್ಪಿಕೊಳ್ಳಲು ಯಾವುದೇ ಒತ್ತಾಯವಿಲ್ಲ. ನೀವು ಭಾಗವಹಿಸಲು ಬಯಸದಿದ್ದರೆ ನೀವು ಪಡೆಯುವ ಕಾಳಜಿಯು ಬದಲಾಗುವುದಿಲ್ಲ. ಅಧ್ಯಯನಕ್ಕೆ ಅಗತ್ಯವಿರುವ ಔಷಧವನ್ನು ಪ್ರಧಾನ ತನಿಖಾಧಿಕಾರಿ ಒದಗಿಸುತ್ತಾರೆ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಯಾವುದೇ ವಿತ್ತೀಯ ಪ್ರಯೋಜನಗಳು/ಪ್ರೋತ್ಸಾಹಗಳು ಇರುವುದಿಲ್ಲ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ನೀವು ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ಸಮ್ಮತಿಸಿದರೆ ಮಾತ್ರ ನೀವು ಸಹಿ/ಹೆಬ್ಬೆರಳಿನ ಗುರುತನ್ನು ಒದಗಿಸಬೇಕಾಗುತ್ತದೆ

ಹೆಚ್ಚಿನ ಮಾಹಿತಿಗಾಗಿ ಸಂಪರ್ಕಿಸಿ

ಡಾ ಸುಜಾತಾ. ಎಂ.ಪಿ
ಅರಿವಳಿಕೆ ಶಾಸ್ತ್ರದ ಪ್ರಾಧ್ಯಾಪಕ
ಅರಿವಳಿಕೆ ವಿಭಾಗ, SDUMC ಕೋಲಾರ
ಮೊಬೈಲ್ ಸಂಖ್ಯೆ: 9448854349

INFORMED CONSENT FORM

Date:

Name of the institution: SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH.
Name of the principal investigator: Dr. Himaja Katamaneni
Name of the guide: Dr. Sujatha MP
Name of the subject/participant:

STUDY: EFFICACY OF ULTRA SOUND GUIDED POPLITEAL SCIATIC NERVE BLOCK AND DISTAL SCIATIC BIFURCATION NERVE BLOCK IN PROVIDING ANASTHESIA FOR BELOW KNEE SURGERIES.

I, ____ aged _____________ ,after being explained in my own vernacular language about the purpose of the study and the risks and complications of the procedure, hereby give permission for using popliteal sciatic nerve block or distial sciatic bifurcation nerve block in lower limb surgeries for anaesthesia. The nature and risks involved have been explained to me to my satisfaction. I have been explained in detail about the study being conducted. I have read the patient information sheet and I have had the opportunity to ask any question and give my valid written informed consent without any force . I consent voluntarily to participate as a participant in this research. I hereby give consent to provide my history, undergo physical examination, undergo the procedure, undergo investigations and provide its results and documents etc. to the doctor / institute etc. For academic and scientific purpose, the operation / procedure, etc. may be video graphed or photographed. All the data may be published or used for any academic purpose. I will not hold the doctors / institute etc. responsible for any untoward consequences during the procedure / study. I am aware that there wont be any monetary benefits for taking part in this study.
A copy of this Informed Consent Form and Patient Information Sheet has been provided to the participant.

________________ ________________

(Signature & Name of Pt. Attendant) (Signature/Thumb impression & Name of Patient/Guardian)
(Relation with patient)

Witness 1:
Witness 2:

____
(Signature & Name of Research person /doctor)

ಮಾಹಿತಿಯುಕ್ತ ಸಮ್ಮತಿಪತ್ರ

ದಿನಾಂಕ:

ಸಂಸ್ಥೆಯ ಹೆಸರು: ಶ್ರೀ ದೇವರಾಜ್ ಅರಸ್ ಅಕಾಡೆಮಿ ಆಫ್ ಹೈಯರ್ ಎಜುಕೇಶನ್ ಅಂಡ್ ರಿಸರ್ಚ್.

ಪ್ರಧಾನ ತನಿಖಾಧಿಕಾರಿ ಹೆಸರು ; ಡಾ.ಹಿಮಜಾ ಕಾಟಮನೇನಿ

ಮಾರ್ಗದರ್ಶಿ ಹೆಸರು; ಡಾ ಸುಜಾತಾ . ಎಂ.ಪಿ

ರೋಗಿಯ ಹೆಸರು;

ಅಧ್ಯಯನ: ಮೊಣಕಾಲಿನ ಕೆಳಗಿನ ಶಸ್ತ್ರಚಿಕಿತ್ಸೆಗಳಿಗೆ ಅನಸ್ತೇಷಿಯಾವನ್ನು ಒದಗಿಸುವಲ್ಲಿ ಅಲ್ಟ್ರಾ ಸೌಂಡ್ ಗೈಡೆಡ್ ಪಾಪ್ಲಿಟಿಯಲ್ ಸಿಯಾಟಿಕ್ ನರಗಳ ಬ್ಲಾಕ್ ಮತ್ತು ಡಿಸ್ಟಲ್ ಸಿಯಾಟಿಕ್ ಬೈಫರ್ಕೇಶನ್ ನರ್ವ್ ಬ್ಲಾಕ್‌ನ ಪರಿಣಾಮಕಾರಿತ್ವ.

ನಾನು,

____ ವಯಸ್ಸು ______, ಅಧ್ಯಯನದ ಉದ್ದೇಶ ಮತ್ತು ಕಾರ್ಯವಿಧಾನದಅಪಾಯಗಳು ಮತ್ತು ತೊಡಕುಗಳ ಬಗ್ಗೆ ನನ್ನ ಸ್ವಂತ ಭಾಷೆಯಲ್ಲಿ ವಿವರಿಸಿದ ನಂತರ, ಸಾಮಾನ್ಯ ಅರವಳಿಕೆ ಅಡಿಯಲ್ಲಿ ಶಸ್ತ್ರಚಿಕಿತ್ಸೆಗೆ ಒಳಗಾಗುತ್ತಿರುವ ವಯಸ್ಸಾದ ಮಧುಮೇಹ ಮತ್ತು ಮಧುಮೇಹವಲ್ಲದ ರೋಗಿಗಳಲ್ಲಿ ಕಷ್ಟಕರವಾದ ವಾಯುಮಾರ್ಗವನ್ನು ಊಹಿಸಲು ವಿಭಿನ್ನ ವಾಯುಮಾರ್ಗ ಪರೀಕ್ಷೆಗಳ ಮೌಲ್ಯಮಾಪನ" ಅನ್ನು ನಿರ್ವಹಿಸಲು ಯಾವುದೇ ಬಲ ಅಥವಾಪೂರ್ವಗ್ರಹವಿಲ್ಲದೆ ನನ್ನ ಮಾನ್ಯ ಲಿಖಿತ ತಿಳುವಳಿಕೆಯ ಒಪ್ಪಿಗೆಯನ್ನು ಈ ಮೂಲಕನೀಡುತ್ತೇನೆ. ಒಳಗೊಂಡಿರುವ ಸ್ವರೂಪ ಮತ್ತು ಅಪಾಯಗಳನ್ನು ನನ್ನ ತೃಪ್ತಿಗೆವಿವರಿಸಲಾಗಿದೆ. ನಡೆಸುತ್ತಿರುವ ಅಧ್ಯಯನದ ಬಗ್ಗೆ ನನಗೆ ವಿವರವಾಗಿತಿಳಿಸಲಾಗಿದೇ. ನಾನು ರೋಗಿಯ ಮಾಹಿತಿ ಹಾಳೆಯನ್ನು ಓದಿದ್ದೇನೆ ಮತ್ತುಯಾವುದೇ ಪ್ರಶ್ನೆ ಕೇಳುವ ಅವಕಾಶ ನನಗೆ ಸಿಕ್ಕಿದೆ. ನಾನು ಕೇಳಿದ ಯಾವುದೇಪ್ರಶ್ನೆಗೆ ನನ್ನ ತೃಪ್ತಿಗೆ ಉತ್ತರಿಸಲಾಗಿದೆ. ಈ ಸಂಶೋಧನೆಯಲ್ಲಿ ಪಾಲ್ಗೊಳ್ಳಲು ನಾನುಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ಒಪ್ಪುತ್ತೇನೆ. ನನ್ನ ಇತಿಹಾಸವನ್ನು ಒದಗಿಸಲು, ದೈಹಿಕಪರೀಕ್ಷೆಗೆ ಒಳಗಾಗಲು, ಕಾರ್ಯವಿಧಾನಕ್ಕೆ ಒಳಗಾಗಲು, ತನಿಖೆಗೆ ಒಳಗಾಗಲುಮತ್ತು ಅದರ

ಫಲಿತಾಂಶಗಳು ಮತ್ತು ದಾಖಲೆ ಇತ್ಯಾದಿಗಳನ್ನು ವೈದ್ಯರಿಗೆ / ಸಂಸ್ಥೆಗೆನೀಡಲು ನಾನು ಈ ಮೂಲಕ ಒಪ್ಪಿಗೆ ನೀಡುತ್ತೇನೆ. ಶೈಕ್ಷಣಿಕ ಮತ್ತು ವೈಜ್ಞಾನಿಕಉದ್ದೇಶಕ್ಕಾಗಿ ಕಾರ್ಯಾಚರಣೆ / ಕಾರ್ಯವಿಧಾನ ಇತ್ಯಾದಿ ವೀಡಿಯೊಆಗಿರಬಹುದು ಗ್ರಾಫ್ ಅಥವಾ ಛಾಯಾಚಿತ್ರ, ಎಲ್ಲಾ ಡೇಟಾವನ್ನು ಯಾವುದೇಶೈಕ್ಷಣಿಕ ಉದ್ದೇಶಕ್ಕಾಗಿ ಪ್ರಕಟಿಸಬಹುದು ಅಥವಾ ಬಳಸಬಹುದು. ಕಾರ್ಯವಿಧಾನ/ ಅಧ್ಯಯನದ ಸಮಯದಲ್ಲಿ ಯಾವುದೇ ಅಹಿತಕರ ಪರಿಣಾಮಗಳಿಗೆ ನಾನುವೈದ್ಯರು / ಸಂಸ್ಥೆ ಇತ್ಯಾದಿಗಳನ್ನು ಜವಾಬ್ದಾರರನ್ನಾಗಿಮಾಡುವುದಿಲ್ಲ.

________________ _____________

(ಸಹಿ ಮತ್ತು ಪಂ. ಅಟೆಂಡೆಂಟ್) (ಸಹಿ / ಹೆಬ್ಬೆರಳು ಅನಿಸಿಕೆಮತ್ತು ರೋಗಿಯ ಹೆಸರು) (ರೋಗಿಯೊಂದಿಗಿನ ಸಂಬಂಧ)

ಸಾಕ್ಷಿ 1:

ಸಾಕ್ಷಿ 2:

(ಸಹಿ ಮತ್ತುಸಂಶೋಧನಾ ವ್ಯಕ್ತಿ / ವೈದ್ಯರ ಹೆಸರು) *[ಭಾಗವಹಿಸುವವರಿಗೆ ಈ ತಿಳುವಳಿಕೆಯುಳ್ಳ ಒಪ್ಪಿಗೆ ನಮೂನೆ ಮತ್ತು ರೋಗಿಯಮಾಹಿತಿ ಹಾಳೆಯ ನಕಲನ್ನು ಒದಗಿಸಲಾಗಿದೆ]*

MASTER CHART

MASTERCHART

SL.NO	Group	UHID NO	AGE	GENDER	ASA GRADE	ONSET OF SENSORY BLOCK(mins)	ONSET OF MOTOR BLOCK(mins)	COMPLETE SENSORY AND MOTOR BLOCK ACHIEVED TIME	RESCUE ANALGESIA TIME(hrs)	TOTAL ANALGESIA REQUIREMENT IN 24 HRS	VAS 0 HRS	VAS 1 HRS	VAS 4 HRS	VAS 8 HRS	VAS 12 HRS	VAS 24 HRS
1	Group A	492195	49	**M**	2	18	25	25	21	**once-INJ DICLOFINAC 75MG**	3	0	0	1	2	4
2	Group A	226730	40	**F**	2	10	16	16	44	NIL	0	0	0	0	0	0
3	Group A	222596	54	**M**	2	10	25	25	27	NIL	0	0	0	1	1	3
4	Group A	303287	33	**M**	1	30	15	30	18	**once-INJ DICLOFINAC 75MG**	0	0	0	2	3	3
5	Group A	110536	75	**M**	2	9	10	10	40	NIL	0	0	0	0	0	1
6	Group A	372922	77	**M**	2	12	21	21	24	**NIL**	0	0	0	0	2	3
7	Group A	331159	27	**M**	1	24	30	30	32	NIL	0	0	0	0	0	0
8	Group A	273980	46	**F**	1	20	20	20	40	NIL	0	0	0	0	0	0
9	Group A	271515	51	**M**	1	15	22	22	26	NIL	0	0	0	0	0	0
10	Group A	269873	52	**F**	1	15	18	18	30	NIL	0	0	0	0	0	0
11	Group A	273493	32	**M**	1	15	18	18	31	NIL	0	0	0	0	0	0
12	Group A	265684	71	**M**	2	20	22	22	27	NIL	0	0	0	0	0	0
13	Group A	263450	48	**M**	2	20	22	22	18	**once-INJ DICLOFINAC 75MG**	0	0	0	0	0	4
14	Group A	272422	67	**M**	2	20	23	23	30	NIL	0	0	0	0	0	0
15	Group A	241461	80	**M**	2	12	15	15	40	NIL	0	0	0	0	0	0
16	Group A	306545	47	**M**	2	15	25	25	28	NIL	0	0	0	0	0	0
17	Group A	329568	57	**M**	1	15	19	19	28	NIL	0	0	0	0	0	0
18	Group A	313803	66	**M**	2	18	20	20	28	NIL	0	0	0	0	0	0

SL.NO	Group	UHID NO	AGE	GENDER	ASA GRADE	ONSET OF SENSORY BLOCK(mins)	ONSET OF MOTOR BLOCK(mins)	COMPLETE SENSORY AND MOTOR BLOCK ACHIEVED TIME	RESCUE ANALGESIA TIME(hrs)	TOTAL ANALGESIA REQUIREMENT IN 24 HRS	VAS 0 HRS	VAS 1 HRS	VAS 4 HRS	VAS 8 HRS	VAS 12 HRS	VAS 24 HRS
19	Group A	277357	58	**M**	2	13	20	20	20	**once-INJ DICLOFINAC 75MG**	0	0	0	0	0	4
20	Group A	198317	52	**F**	2	15	25	25	27	NIL	0	0	0	0	0	0
21	Group A	274812	43	**M**	1	10	18	18	28	NIL	0	0	0	0	0	2
22	Group A	380869	55	**M**	1	20	25	25	43	NIL	0	0	0	0	0	0
23	Group A	479574	57	**M**	1	20	23	23	40	NIL	0	0	0	0	0	0
24	Group A	535365	59	**M**	2	15	20	20	30	NIL	0	0	0	0	1	1
25	Group A	97470	47	**F**	2	10	15	15	34	NIL	2	0	0	0	0	0
26	Group A	552181	69	**F**	2	10	15	15	49	NIL	2	0	0	0	0	0
27	Group A	524754	43	**M**	2	20	25	25	39	NIL	0	0	0	0	0	0
28	Group A	96817	55	**M**	1	15	20	20	31	NIL	0	0	0	0	1	2
29	Group A	524010	48	**F**	2	15	25	25	33	NIL	1	0	0	0	0	3
30	Group A	554553	56	**M**	2	15	15	15	44	NIL	1	0	0	0	0	0
31	Group A	96187	55	**M**	1	15	20	20	31	NIL	0	0	0	0	1	2
32	Group A	523696	40	**F**	2	20	25	25	42	NIL	0	0	0	0	0	0
33	Group A	201954	50	**M**	2	10	15	15	29	NIL	0	0	0	0	0	0
34	Group A	560549	65	**M**	2	15	25	25	45	NIL	1	0	0	0	1	2
35	Group A	507772	47	**F**	2	10	15	15	34	NIL	2	0	0	0	0	0
36	Group A	529510	57	**M**	2	12	18	18	26	NIL	2	0	0	0	0	0
37	Group B	374323	48	**M**	2	16	16	16	40	NIL	2	0	0	0	1	1
38	Group B	476029	61	**M**	1	27	32	32	37	NIL	3	0		0	0	0
39	Group B	329714	55	**M**	1	12	19	19	16	**once-INJ DICLOFINAC 75MG**	0	0	0	0	0	3

SL.NO	Group	UHID NO	AGE	GENDER	ASA GRADE	ONSET OF SENSORY BLOCK(mins)	ONSET OF MOTOR BLOCK(mins)	COMPLETE SENSORY AND MOTOR BLOCK ACHIEVED TIME	RESCUE ANALGESIA TIME(hrs)	TOTAL ANALGESIA REQUIREMENT IN 24 HRS	VAS 0 HRS	VAS 1 HRS	VAS 4 HRS	VAS 8 HRS	VAS 12 HRS	VAS 24 HRS
40	Group B	314715	68	**M**	2	20	13	20	9	**once -INJ DICLOFINAC 75MG**	2	0	0	3	2	4
41	Group B	501368	71	**M**	2	25	23	25	39	NIL	0	0	0	0	0	2
42	Group B	293067	72	**M**	2	20	30	30	48	NIL	0	0	0	0	0	0
43	Group B	285063	63	**M**	2	20	30	30	33	NIL	3	1	0	0	0	0
44	Group B	278031	30	**M**	1	15	25	25	14	**once-INJ DICLOFINAC 75MG**	3	0	0	0	1	2
45	Group B	273535	58	**M**	1	15	18	18	28	NIL	0	0	0	0	0	0
46	Group B	269669	60	**M**	1	15	20	20	29	NIL	0	0	0	0	0	0
47	Group B	246141	65	**M**	2	20	22	22	42	NIL	0	0	0	0	0	0
48	Group B	255019	50	**M**	2	17	25	25	32	NIL	2	0	0	0	0	2
49	Group B	237912	19	**M**	1	25	30	30	43	NIL	2	1	0	0	0	0
50	Group B	272542	54	**M**	2	20	22	22	46	NIL	0	0	0	0	0	0
51	Group B	269870	47	**F**	1	20	25	25	29	NIL	0	0	0	0	0	0
52	Group B	293221	52	**M**	1	14	18	18	28	NIL	0	0	0	0	0	0
53	Group B	329977	52	**M**	1	15	20	20	20	**once-INJ DICLOFINAC 75MG**	2	0	0	0	0	3
54	Group B	475480	55	**M**	1	15	20	20	32	NIL	0	0	0	0	0	0
55	Group B	469605	20	**M**	1	15	18	18	45	NIL	0	0	0	0	0	0
56	Group B	296175	68	**M**	2	15	20	20	28	NIL	0	0	0	0	0	0
57	Group B	527171	52	**M**	2	15	15	15	34	NIL	0	0	0	0	0	0
58	Group B	507772	47	**F**	2	25	30	30	34	NIL	0	0	0	0	0	3
59	Group B	527915	49	**M**	2	15	15	15	39	NL	0	0	0	0	0	0
60	Group B	550218	46	**F**	2	15	15	15	22	**once-INJ DICLOFINAC 75MG**	0	0	0	3	2	2

SL.NO	Group	UHID NO	AGE	GENDER	ASA GRADE	ONSET OF SENSORY BLOCK(mins)	ONSET OF MOTOR BLOCK(mins)	COMPLETE SENSORY AND MOTOR BLOCK ACHIEVED TIME	RESCUE ANALGESIA TIME(hrs)	TOTAL ANALGESIA REQUIREMENT IN 24 HRS	VAS 0 HRS	VAS 1 HRS	VAS 4 HRS	VAS 8 HRS	VAS 12 HRS	VAS 24 HRS
61	Group B	324550	55	**F**	2	15	20	20	46	NIL	0	0	0	0	0	1
62	Group B	523896	40	**F**	2	20	25	25	42	NIL	0	0	0	0	0	0
63	Group B	554553	56	**M**	2	15	15	15	44	NIL	1	0	0	0	0	0
64	Group B	465981	52	**M**	1	15	25	25	31	NIL	0	0	0	0	0	0
65	Group B	552181	69	**F**	2	20	25	25	31	NIL	1	0	0	0	0	0
66	Group B	557776	69	**M**	2	15	20	20	28	NIL	0	0	0	0	0	0
67	Group B	557891	23	**F**	1	25	30	30	40	NIL	0	0	0	0	1	2
68	Group B	564711	62	**F**	2	20	25	25	25	NIL	3	0	0	0	0	1
69	Group B	551159	82	**M**	2	15	25	25	25	**twice -INJ DICLOFINAC 75MG**	3	0	0	1	3	3
70	Group B	560549	65	**M**	2	18	25	25	25	NIL	3	0	0	0	0	0
71	Group B	568137	75	**F**	2	27	30	30	20	**once-INJ DICLOFINAC 75MG**	3	0	0	0	0	1
72	Group B	567392	59	**M**	1	16	20	20	12	**once-INJ DICLOFINAC 75MG**	3	0	0	1	3	3