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Ultrasound Guided 3in1 and Sciatic Nerve Block in Knee and Below Knee Surgeries

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Abstract

Background: Because no fasting, specific preparation, or preoperative optimization is necessary, regional block anaesthesia is the greatest alternative for life-saving surgeries when both general anaesthesia and central neuraxial anaesthesia are dangerous. It is also more stable than the central neuraxial blockade, which has adverse effects such as hypotension, bradycardia and meningitis. Peripheral nerve blocks also give surgical anaesthetic with higher cardiorespiratory stability. Peripheral nerve blocks (PNBs) are becoming more common in the field of anaesthesia as novel methods like ultrasonography and peripheral nerve stimulators have been developed. The goal of this project is to examine new developments in ultrasound guided nerve blocks and excellent anaesthetic techniques for lower limb surgery to improve patient satisfaction. Conclusion: For femoral fractures, the US-guided three-in-one FNB is a simple and safe treatment that may be done in the emergency department with little US expertise. Rapid, effective anaesthesia is provided by the three-in-one FNB, which has also been demonstrated to reduce opioid and local anaesthetic requirements for pain control.

Key words: Ultrasound Guided 3in1, Sciatic Nerve Block, Knee and Below Knee Surgeries.

1.Introduction

The number of day-case or short-stay surgical procedures has increased significantly over the last decade, anaesthetic techniques have evolved to facilitate early recovery and postoperative mobilisation, early mobilisation improves both short and long-term functional outcomes, decreases the risk of respiratory tract infections, and shortens the length of hospital stay (1).

When a patient has major surgery on a lower limb, the healing process might be hampered by pain that is not well managed, which can lead to joint stiffness and sluggish improvement in mobility (2).

It is possible to deliver full surgical anaesthesia below and around the knee by using the 3:1 combination of the sciatic and femoral nerve blocks for lower limb surgery (3), although this approach is seldom used.

FNB, initially reported in 1973, may be used either as a single-nerve or 3-in-1 block (femoral nerve, thigh skin, and obturator nerve) as an analgesic adjunct to other anaesthetic procedures (4), and it can also be employed as an analgesic modality in its own right.

Use of ultrasound (US) guidance has been demonstrated to reduce opioid and volume of local anaesthetic needed for pain control during three-in-one (3-in-1) femoral nerve block (FNB) (5).

For anaesthesia or analgesia during lower limb surgery, a sciatic nerve block (SNB) is sometimes used in conjunction with an ipsilateral lumbar plexus block (LBP) or the anterior and posterior nerve blocks of the femoral nerve (ANB).

One study found that ultrasound-guided popliteal sciatic nerve block reduced procedure pain and improved patient satisfaction while increasing block onset speed and block duration. This study also found that ultrasound-guided popliteal sciatic nerve block decreased procedure pain and increased patient satisfaction.

The purpose of this research was to examine the best and most efficient anaesthetic techniques for lower limb surgery, as well as the most recent developments in ultrasound-guided nerve blocks.

2. Femoral Nerve

The lumbar plexus's major nerve is the femoral nerve. It is formed by the dorsal divisions of the L2-L4 ventral rami.. It has a function in the lower limbs' motor and sensory processing. As a consequence, it has control over the primary muscles of hip flexion and knee extension. The anterior and medial thigh, as well as the medial leg down to the hallux, are all controlled by this nerve. Because it begins in the lumbar spine and travels down into the pelvis and the lower limbs, it has multiple branches (8).

Nerve root of the thigh

Humans' biggest nerve, the sciatic, is located in the lower back and travels through the lower limbs to the heel of each foot. A large amount of the skin and muscles of the thigh, leg, and foot are supplied by the sciatic nerve (9)

The ventral rami of spinal nerves L4 through S3 give rise to this nerve, which comprises fibres from the lumbosacral plexus's posterior and anterior divisions. To summarise, after they exit from the lower vertebrae, all of the nerve fibres merge together to create one nerve. Foramen inferior to the piriformis muscle, together with the pudendal nerve and arteries as well as nerves to the obturator internus and posterior cutaneous nerve leave the pelvis via larger sciatic foramina. The sciatic nerve then progresses down the posterior compartment of the thigh deep to the long head of the biceps femoris muscle, superficial to adductor magnus and short head of biceps femoris muscle, and laterally to semitendinosus and semimembranosus muscles. It separates into two major branches just before it reaches the popliteal fossa. The tibial nerve, which descends in the posterior compartment of the leg and foot, is one of the branches. Common peroneal is another branch that carries out its function by travelling along both sides of the leg and foot's medial-anterior compartments (10).

Cutaneous nerves on the outside of the leg

The lateral femoral cutaneous nerve is one of several lumbar plexus nerves that provide feeling to the thigh (LFCN).

Dorsal branches of L2 and L3 ventral rami are often used to supply the lateral femoral cutaneous nerve. There is an inguinal ligament in the pelvis where it emerges from behind the psoas major and heads toward the notch on the anterior superior iliac spine (ASIS).

Branches of the anterolateral femoral cutaneous nerve supply feeling to the anterior and posterior thigh, respectively. (11).

The obturator artery

Opbturator nerves originate in the lumbar plexus and provide the thigh with sensory and motor input. In order to adduct the thigh, this nerve delivers motor innervation to the thigh's medial compartment. Medial upper thigh, hip, and knee articular branches are supplied by the nerve's sensory branches. The obturator nerve plays an important role in a variety of hip and knee-related pathologies and surgical treatments. This is because of its placement in the pelvis and upper thigh as well as its origin in the lumbar plexus, which makes it an important anatomical feature in many therapeutic scenarios. (12)

Anatomical basis for pain

As one of the most frequent medical complaints, pain is a popular cause for individuals to seek medical assistance. IASP defines pain as an unpleasant sensory and emotional experience connected with existing or prospective tissue damage or explained in terms of such damage or both, as defined by the International Association for the Scientific Study of Pain (IASP). An important part of this definition is that pain is not merely a sensory experience, but that it may also be related with emotional and cognitive reactions as well (13).

Classification of pain

1- Pathophysiological classification

Nociceptive and neuropathic pain are the two most common forms. Inflammation in the tissues results in nociceptors, which are sensitive to noxious stimuli. In reaction to oxygen deprivation, tissue disturbance or inflammation, nociceptors may respond to a variety of stimuli, including heat, cold, vibration, strain and chemical compounds released by tissues. Based on where the active nociceptors are, somatic and visceral pain may be split.

Dependent on the length of time a person has been in pain

Acute and chronic pain may be categorised based on the beginning of the pain, which can be useful in determining the appropriate course of therapy. Acute pain is characterised by a fast onset lasting less than 30 days, a significant intensity, and a brief duration. Nociceptors in the skin are stimulated by tissue damage, which causes this sensation, which eventually goes away. Continuous or recurrence of pain that lasts longer than three months qualifies as chronic pain. When an injury is repeatedly aggravated, or when the noxious stimulus persists for a long time, the pain might return (14).

nociception's neurobiology and pain pathways

The injured tissues elicit a typical local inflammatory response, which results in peripheral sensitization. An increase in nociceptors' sensitivities is caused by the production of conventional inflammatory mediators, such as cytokines and leukotrienes.

Central sensitization:-The highly myelinated nociceptive fibres in the lamina transmit the high-intensity pain feeling to the spinal cord, where afferent impulses alter the excitability of neurons there. An elevated pain threshold activates the hypothalamus, thalamus, and ascending reticular, limbic, and thalamo-hypothalamic systems, which in turn triggers the release of all catabolic and anabolic hormones before reaching the cortex, therefore regulating the autonomic, neuroendocrine response. During a skin incision, the experience of pain may cause sympathetic activation even in the deeper planes of anaesthesia (e.g., an increase in heart rate and blood pressure) (15).

Nociceptors

Those are the main afferent free nerve terminals that may be triggered by mechanical, thermal or chemical stimuli and are found all throughout the body (including skin, viscera, muscles, joints, and the meninges). In the dorsal horn of the spinal cord, nociceptive and descending modulatory input such as (bradykinin, prostaglandins, serotonin, nerve growth factor) are integrated with nociceptive and descending input from peripheral nociceptors, activating peripheral nociceptors and releasing neurotransmitters such as substance P and calcitonin gene–related pep (16).

Afferent fibres: primary

There are main afferent A fibres that convey non-noxious impulses in addition to A and C fibres that provide noxious sensory information. They all have unique properties that enable them to transmit distinct kinds of sensory information.

Assesment of Pain

The initial and continuous evaluation of pain requires that the intensity of the pain be quantifiably measured. Unidimensional instruments (the Verbal Rating Scale (VRS), Numeric Rating Scale (NRS), and Visual Analog Scale (VAS)) and multidimensional questionnaires may also be used to assess pain severity. The patient's age, capacity to speak, and other factors may influence the selection of a pain scale (using language, movements, or other specific circumstances). Scales other than VRS (i.e., mild, moderate, severe) may give more information, and a numeric scale is more typically used in hospitals, thus the VRS may not be the best option.

Finding out how drowsy someone is For the first time, the Ramsay Sedation Scale (RSS) was used to measure a patient's level of sedation. There are six tiers based on the patient's reusability. Using this scale in the ICU and elsewhere when sedatives or narcotics are administered is easy since it is an intuitively evident scale (17).

Bupivacaine

Indications

Amide-based local anaesthetic Bupivacaine was developed in 1957 and is one of the most powerful local anaesthetics on the market. Regional anaesthesia, epidural anaesthesia, spinal anaesthesia, and local infiltration are all methods that make use of local anaesthetics. By raising the threshold for electrical excitation, local anaesthetics typically prevent nerve cells from generating an action potential. Neuronal diameter, degree of myelination, and conduction velocity all influence the course of anaesthesia. In the real world, the following is the sequence in which nerve function is lost: (18)

- Pain
- Temperature
- Touch
- Proprioception
- Skeletal muscle tone

Bupivacaine's mechanism of action:

To be considered a local anaesthetic, a compound must have three structural components: an aromatic ring, an ester or an amide linking group (such as procaine) or an ionizable amine group (such as bupivacaine). The two chemical characteristics that dictate the action of all LAs are as follows: (19) \sAdministration

There are three concentrations of bupivacaine available: 0.25 percent, 0.5 percent, and 0.75 percent, respectively.

A variety of techniques are employed, including local infiltration (for post-surgical analgesia), peripheral nerve blocks (for dental and other minor surgical procedures, orthopaedic surgery), spinal anaesthesia (injected into the CSF to produce anaesthesia for orthopaedic surgery, abdominal surgery, or caesarean delivery), epidural anesthesia/analgesia for labour pain, and a caudal block (anesthesia and analgesia below the umbilicus, usually for paediatric surgery). Lidocaine Pharmacology (No. 20)

Indication

Local anaesthetic Lidocaine was formerly known as lignocaine, and it is an amide compound. To compare it to other local anaesthetics, it was developed by Nils Löfgren and Bengt Lundquist during three years in 1943–1946. Because of its better safety profile over prior local anaesthetics, it was quickly used widely across medicine. The medication is often used in conjunction with epinephrine for local anaesthetic (which acts as a vasopressor and extends its duration of action at a site by opposing the local vasodilatory effects of lidocaine). (21).

The Way Things Work

For lidocaine to work, sodium ion channels on the inner surface of nerve cell membranes must be blocked. Neurons receive the uncharged form via neural sheaths and into axoplasm, where it is converted to anions by hydrogen ion conduction. In order to avoid neuronal depolarization, this cation binds reversibly to sodium channels from within, keeping them open. The dissociation constant (pKa) of lidocaine, a weak base, makes it difficult to dissolve in water (22).

The blockage of the sciatic nerve

The sciatic nerve blockade is one of the most widely utilised methods in our clinic for lower limb surgery and pain management. When carried out methodically, it has a high success rate. (23)

It is ideal for knee, calf, ankle, and foot surgeries. Besides the medial strip of skin, the saphenous nerve is responsible for the entire anaesthesia of the lower leg. Femoral nerve or lumbar plexus blocks may be used to anaesthetic the whole lower leg when paired with femoral nerve blocks. Hip surgery may benefit from a lumbar plexus block. Continuous popliteal (sciatic nerve) block for postoperative pain management following severe orthopaedic foot surgery has been established in several investigations.

Anatomy of the rectus abdominis

The longest and thickest nerve in the body is the sciatic nerve. Upper extremity nerves get sensory and motor input from the lumbar plexus (L4-5 and S1-3). The larger sciatic foramen is located just below the piriformis muscle and allows the sciatic nerve to leave the pelvis. This nerve passes through a gap between the inner muscle layer and the gluteus maximus muscle, in the gluteal area of your body (superior and inferior gemellus muscles, obturator internus muscle and quadratus femoris muscle). Preparation of Probes and Needle Orientation (25)

Lie the patient on his back in a semi-prone posture (Sims' position). Using the standard method proposed by Labat in 1924, the transducer is placed over the gluteal area to provide a short axis image of the sciatic nerve. Probe Settings, Needle Choice, Gain and Focus

Using a 2 to 5 MHz transducer, put it firmly on the specified spot after skin and transducer pretreatment. Focus range, gain, and depth of field should all be adjusted to match the machine's imaging capabilities. 8 to 10 cm 22G insulated needle is employed, and nerve stimulator may be used as an adjutant to validate the needle tip's closeness to the nerve's surface. An injection of 20-30 ml of local anaesthetic is produced. Scanning and the Localization of Nerves

In this area, the sciatic nerve might be difficult to locate since it is both thin and broad. To properly detect the sciatic nerve, a systematic strategy based on accurate identification of tissues (bone, muscle, and arteries) is required. To begin, locate the skeletal components. Find the ischial bone, which shows as a long curved hyperechoic line with the corresponding bone shadow below. The ischial spine is of interest (Fig. A). When the bone shadow on the medial face of the transducer vanishes, move the transducer caudally (Fig. B). To detect the ischial spine medially, place the transducer slightly cephalic again. This will locate the broadest piece of the bone segment with the hyperechoic line extending medially, the ischial spine (Fig. 2C). (26)

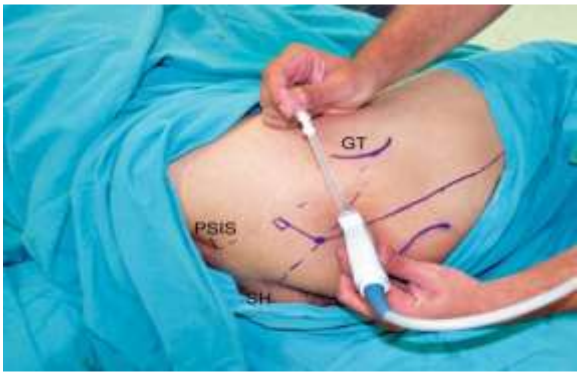

Fig.1: Classic landmarks for labat approach, in-plane approach is demonstrated: GT—greater trochanter, PSIS—posterior superior iliac spine, SH—sacral hiatus

Note the bony segment on the medial aspect at the level of the ischial spine (Fig. C) is widest as compared to the bony segments cephalad (Fig. A) and caudad (Fig. B).

A

B

C

Fig. 2 A: At the level of ischial bone, continuous hyperechoic line—too cephalic transducer placement

B: At the level of the tip of ischial bone, absent medial bone shadow—too caudal transducer placement**.**

C: At the level of ischial spine, note the medial bone shadow—correct transducer placement

Localisation of the sciatic nerve in this region can be challenging because of the required depth of penetration. If the above-mentioned steps cannot visualise the nerve, it is recommended to identify the nerve in the subgluteal region (where it is easier to visualise) and then trace it cephalic to the gluteal region.

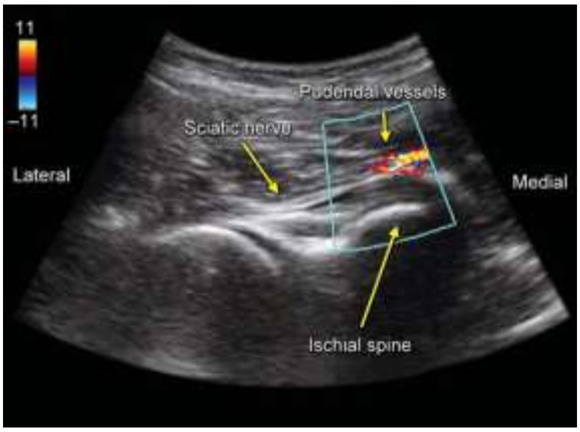

Fig 3: Pudendal vessels are seen on the medial aspect of sciatic nerve on colour Doppler

Local Anaesthetic Injection as well as Needling

It is difficult to administer an ultrasound-guided sciatic nerve block in the gluteal area for a variety of reasons: Due to the depth involved, a lower frequency curved probe is required for deep beam penetration: Two to four centimetres of adipose tissue may cover the buttocks; the sciatic nerve may be flat and broad in the short axis view; and it is difficult to see the block needle due to its steep angulation. (27)

Approaches in and out of the plane (IP and OOP) are both viable options. The needle is introduced from the transducer's lateral side toward the transducer's medial side, in line with the transducer, using the IP method. Observe the needle as it passes through the GMM and reaches the sciatic nerve right above the ischial bone. The shaft of the needle may be difficult to see, and tissue movement is frequently the sole indication of the needle's course. The movement of the nerves indicates when a needle has made contact with a nerve.

Locating the Nerves via Scanning There are several ways to observe and recognise the anatomical components that make up the sacroiliac joint; bone, muscle, and blood vessels. From the surface (skin) to deep and lateral (medial-to-lateral) structures, scan and recognise them. Determine the bone structures first; the ischial tuberosity on the medial side and the greater trochanter on the lateral aspect, both of which cast the usual curving hypoechogenicity with hyperechoic line in sound. After that, look for varying-thickness adipose tissue on top of the GMM and the quadratus femoris muscle underneath it. The surface GMM and deeper quadratus femoris muscles are separated by the fascia. GMM and Quadratus Femoris muscles are separated by hyperechoic fascial planes in which the sciatic nerve is seen as a narrow triangular-shaped structure (Fig.). A thin and broad sciatic nerve may be difficult to detect. In order to recognise the hyperechoic structure as the sciatic nerve, the fascial plane between the two muscles must be well defined. (28)

Transverse (short axis) views might be difficult to see since the nerve is both thin and broad. The long axis of the sciatic nerve may be scanned longitudinally for clues. Due to its wide medio-lateral reaching, the nerve shows as a broad hyperechoic band in the long axis image. As a diagnostic tool, it's helpful to scan and trace the path of the sciatic nerve from its proximal to its distal end (i.e. from the popliteal fossa to the subgluteal region). When the patient is in the prone position, the nerve is in its anatomical place, making nerve tracing simpler than when the patient is in the lateral decubitus position. (28)

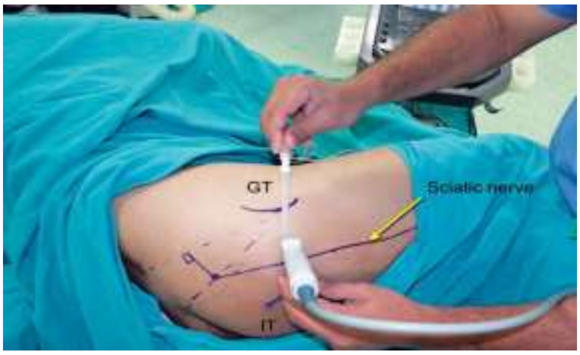

Fig 4: Landmarks for subgluteal approach, in-plane approach isdemonstrated: GT—greater trochanter, IT—ischial tuberosity

Needling Technique and Local Anaesthetic Injection

Ultrasound-guided sciatic nerve block in the subgluteal/ infragluteal region is easier compared to the gluteal approach due to various reasons: (1) the nerve is relatively superficial; (2) overlying layer of adipose tissue is less; (3) nerve is more hyperechoic and fascial plane is easier to identify; (4) quadratus femoris muscle is more easily identifiable providing a good interface between the nerve and GMM. [26]

The OOP approach can be used for both the single shot and catheter techniques,The needle is inserted from caudal to cephalic direction. Both hydro-location and nerve stimulation will help determine the needle tip position. With either approach, 20 to 30 ml of local anaesthetic injection under direct ultrasound observation is usually sufficient. Circumferential spread of hypoechoic local anaesthetic solution around the nerve is desirable but seldom achieved with single needle placement. Moving the needle around the medial and lateral ends of the nerve (multipoint injection) often gives a more satisfactory block compared with a single point injection. [26]

Extent of spread of hypoechoic fluid around the nerve can be observed by scanning the nerve proximally and distally. The subgluteal/infragluteal region is a convenient location for catheter placement and continuous sciatic nerve block. Catheter can be easily anchored in this region compared to the gluteal region with less risk of dislodgement. Another convenient location to block the sciatic nerve is proximal to popliteal fossa where it is more superficial compared to the gluteal and subgluteal approach. [28]

Fig 5 : Subgluteal approach, sciatic nerve appears as triangular structure within the fascia: GT—greater trochanter, IT—ischial tuberosity.

Popliteal Approach

Anatomy

The sciatic nerve in the popliteal fossa is bordered superolaterally by the long head of the biceps femoris muscle and supero-medially by the semimembranosus (SMM) and semitendinosus (STM) muscles. The sciatic nerve branches into common peroneal nerve and the tibial nerve at variable location along its course in the distal thigh. Popliteal sciatic nerve block is indicated for procedures below knee, foot and ankle. [25]

Probe Settings, Needle Choice, Gain and Focus

Skin and transducer preparation is done as routine. Place a linear 38 mm, 7 to 10 MHz transducer, 6 to 8 cm proximal to the popliteal crease to capture the short axis view of the popliteal sciatic nerve. Machine imaging is optimised, by selecting the appropriate depth (usually 4-5 cm), focus range (usually within 2-3 cm) and gain. 6 to 8 cm, 22G insulated needle is used. 20 ml of local anaesthetic is prepared for injection. [26]

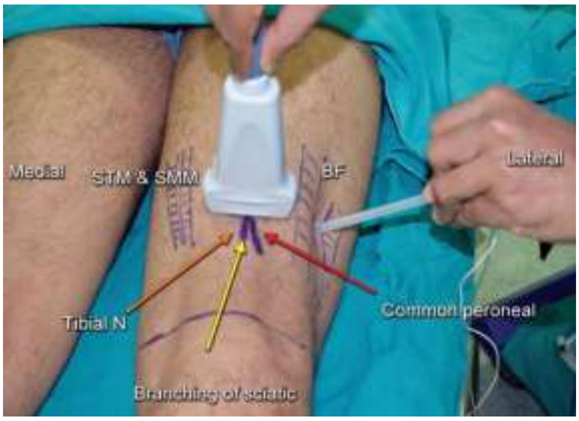

Fig 6: Sciatic nerve branching in the popliteal fossa, in-plane approach demonstrated: STM—semitendinosus, SMM—semimembranosus, BF—biceps femoris

Scanning Technique and Nerve Localisation

Perform a systematic anatomical survey of structures from superficial (skin) to deep and from medial to lateral. First, identify the femur that is deep and casts a hypoechoic bony shadow with hyperechoic lining. Next, identify the popliteal vessels that are superficial to the femur. [29]

Colour Doppler can be used to identify the artery and vein. The popliteal vein is usually found collapsed by the pressure of the transducer. Lifting the pressure of the transducer will bring the popliteal vein in view. It is important to locate the popliteal vein in order to avoid any intravascular injection of local anaesthetic.

Note the muscle groups medially (SMM and STM) and laterally (biceps femoris muscle). Move the transducer proximally while keeping the popliteal artery in view at all times. At about 6 to 8 cm from the popliteal crease, the sciatic nerve is seen as a hyperechoic structure, always posterior (superficial) and lateral to the artery (Fig.). [30]

Visualisation of sciatic nerve can be improved by angulating the transducer beam caudally towards the foot, thereby bringing the angle of incidence of beam with nerve at 90º. Scan the posterior aspect of thigh both proximally and distally to assess the branching of the sciatic nerve. A point should be marked at which the sciatic nerve branches into its tibial and common peroneal components. The block should be conducted anywhere above this marked point of divison. [30]

Nerve visualisation is significantly improved once local anaesthetic is injected due to enhanced contrast between the hyperechoic nerve and the hypoechoic fluid collection. [30]

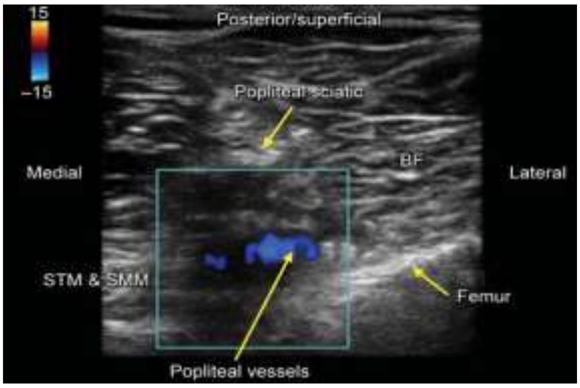

Fig. 7 : Sciatic nerve is postero-lateral to the popliteal vessels shown in colour Doppler: STM—semitendinosus, SMM—semimembranosus, BF—biceps femoris

Local Anaesthetic Injection as well as Needling

An ultrasound-guided popliteal sciatic nerve block is a reasonably shallow procedure. No matter which strategy is used, both IP and OOP methods are appropriate.

Typically, the OOP technique is utilised to do a single injection or catheter insertion. Needles are put in a distal-to-proximal manner, from caudally to cephalic, using the OOP technique. The needle should be positioned on either side of the nerve. The popliteal artery is avoided by inserting the needle from the side to the medial in the IP technique. To stimulate the sciatic nerve electrically is a possibility. In most cases, 20 ml of local anaesthetic is all that is required to provide a good block. (31)

The femoral shaft is the first sonoanatomical marker to be identified because of the dark bony shadow it creates. Maintain the perpendicular angulation of the probe as you move it from side to side. Because even the tiniest angulation makes it more difficult to maintain needle visibility in the deeper tissues, this is particularly crucial for in-plane needle advancement. Adductor magnus and gluteus maximus or biceps femoris are two of the largest muscles in the lower leg, and the sciatic nerve may be seen between them (Figure). In most cases, colour doppler is useful in detecting any vessels that may cross the needle's course of travel. For avoiding any vessel, it's advantageous if you can switch between cephalad and caudad needling directions (e.g., from caudad to cephalad). (26)

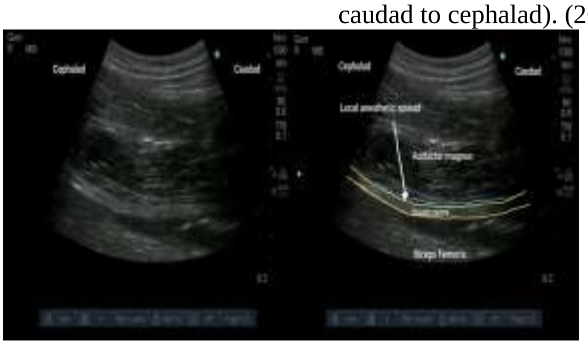

Fig. 8 : Ultrasound longitudinal view of a sciatic nerve in the anterior approach. The typical anesthetic spread forms a thin hypoechoic line on top of the nerve.

Technique of three blocks in one

For postoperative analgesia, one typical peripheral nerve block is known as the "3-in-1" block, which utilises a single injection to block the femoral, LFC, and obturator nerves. For appropriate analgesia and anaesthesia during and after knee and anterior thigh surgery, the ability to restrict the distributions of these three nerves is critical. Many years have passed since anaesthesiologists utilised the 3-in-1 block to put patients to sleep and relieve their pain during lower-extremity surgery. 3-in-1 blocks may be difficult to apply and result in anaesthetic sparing to the Obturator nerve, which can cause significant unhappiness among both patients and anaesthesia professionals alike. (33) It is also emphasised that the 3-in-1 block is often done utilising external stimulation and/or ultrasound guidance for insertion, requiring specialised skills and expertise to reliably give adequate peripheral nerve analgesia. Because of the block's closeness to the femoral artery and the greater likelihood of systemic absorption and toxicity, 33, utilising a 3-in-1 block increases the possibility of adverse effects. Femoral, obturator, and lateral skin nerves of the thigh are anaesthetized. During and immediately after injection, a proximal pressure is exerted.

Fig 9. Ultrasound probe on right side of patient's groin [5]

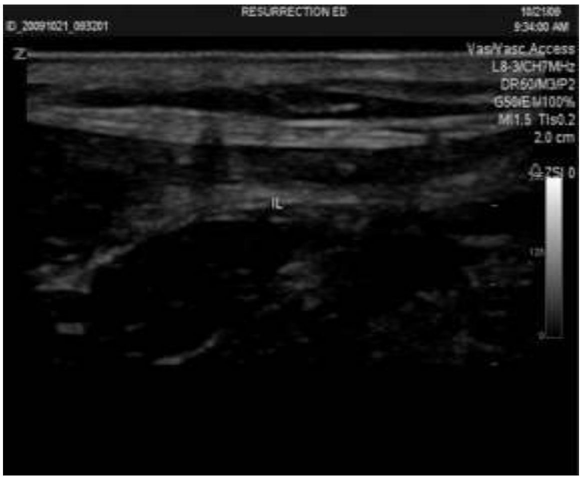

Fig 10 . Inguinal ligament (IL). [5]

(A)

(B)

Fig 11 A- Ultrasound image of femoral vein (FV), artery (FA), nerve (FN) and inguinal ligament (IL). B- Ultrasound image of femoral vein (FV), artery (FA), and nerve (FN) with color flow doppler. (5)

Fig 12 . Lateral approach of 21 gauge spinal needle with 20 ml of bupivacaine 0.5% on patient's right side. (5)

Finlayson and Underhill (35) initially documented the use of regional anaesthetic in the ED in the late 1980s, and it has been utilised ever since. Regional anaesthetic for hip fracture patients in the ED is still not the norm, despite decades of precedent. Regional anaesthesia was used in only 7% of hip fracture cases in 2010, according to a large, multicenter Australian cohort study. (36)

The use of US-guided regional anaesthetic in the emergency room for a range of traumatic illnesses is also on the rise, as shown by numerous recent studies. US-guided fascia iliaca compartment block was shown to be a viable alternative to regional anaesthesia in hip fractures in another investigation. The three-in-one block may need a more accurate injection of anaesthetic, but it utilises just a fraction of the volume. In patients who have undergone a total knee arthroplasty, both of these methods have shown comparable results. (38)

4. Conclusion

In the event of a femoral fracture, the US-guided three-in-one FNB is a simple and safe technique that may be done in the emergency department with minimum US expertise. As well as providing fast, efficient anaesthesia, studies suggest that the 3-in-1 FNB reduces pain management opioid and local anaesthetic requirements.

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