

A PROSPECTIVE RANDOMIZED COMPARATIVE STUDY BETWEEN ULTRA SOUND GUIDANCE VERSUS DUAL GUIDANCE (ULTRA SOUND PLUS NERVE STIMULATOR) TECHNIQUE FOR THE SUCCESS OF POPLITEAL SCIATIC BLOCK IN BELOW KNEE SURGERIES



Medical Science

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KEYWORDS

INTRODUCTION

Most of the surgeries below knee are done as semi emergency procedures requiring ankle block or spinal anaesthesia. The disadvantage of ankle block is that it requires multiple injections; inadequate block or edema at the site causes block failure.

However, nowadays the sciatic nerve block in popliteal fossa is a better alternative than spinal anesthesia and has been shown to reduce perioperative pain and opioid requirements. In regional anesthesia, the use of ultrasound guidance techniques is an emerging field.

Ultrasound guidance has been reported to improve success rates for many types of peripheral nerve blocks. In comparison to use of ultrasound guidance for single-injection peripheral nerve blocks alone, traditional techniques using electrical stimulation plus modern ultrasound guidance together may reduce procedural times, reduce sensory block onset, increase block duration, and increase success rates.

AIMS AND OBJECTIVES

To compare ultrasound guided technique with dual guidance using ultrasound guidance plus nerve stimulation in Popliteal Sciatic nerve block in terms of:-

1. Duration taken to perform the block.
2. Onset of Sensory Block.
3. Duration of Block.
4. Quality of Block.
5. Any side effect or complication following the block.

Methodology:

The nerve stimulation is to obtain visible or palpable twitches of the foot or toes at a current of 0.2–0.5 mA.

After initial stimulation of the sciatic nerve is obtained, the stimulating current is gradually decreased until twitches are still seen or felt at 0.2–0.5 mA. This typically occurs at a depth of 5–7 cm. At this point, the needle should be stabilized and, after aspiration test for blood, 30–40 mL of local anesthetic is injected slowly.

When motor response can be elicited only with current of ≥ 0.5 mA, tibial nerve response may be associated with a higher success rate of anaesthesia of both divisions of the nerve. Isolated twitches of the calf muscles should not be accepted as reliable signs because they can be the result of stimulation of the sciatic nerve branches to the calf muscles that may be outside the sciatic nerve sheath.

Visualization of the Needle under Ultrasound Imaging

The visibility (distinct reflection signal) of the needle tip certainly is the most important aspect because this is the part of the needle that is placed in the target area next to the nerve. However, in particular when using the in-plane approach to visualize its entire length up to the target nerve.



OBSERVATIONS AND RESULTS

A total of 42 patients (21 in each group) were included in this Experimental study, aimed to compare the duration taken to perform the block, sensory onset of block, duration of block, quality of block and any side effects following Ultrasound or Ultrasound plus Nerve stimulator guided technique for Popliteal Sciatic Nerve block.

Group USG Statistics

Table 1: Demographic profile

	Age	Duration taken to perform the block (min)	Sensory Onset of Block (min)	Sensory Onset of Block (min)
N Valid	21	21	21	21
Mean				
Median		9.95	22.33	467.62
Std. Deviation		10.00	22.00	510.00
Minimum	52.67	9.00	19.00	178.04
Maximum	54.00	11.00	25.50	630.46
Percentiles	11.473			60.00
25	34			510.00
50	70			585.00
75	41.00			
	54.00			
	63.00			

The group-Plain USG

The mean duration taken to perform the block was 9.95 mins and standard deviation of 4.63 with minimum time of 7 mins and maximum time of 15 mins.

For the sensory onset of block, the mean time was 22.3 min and standard deviation of 4.68 with minimum time of 15 mins and maximum of 30 mins.

The total duration of block mean time was 467.6 min and standard deviation of 178.04 with minimum time of 60 mins and max time of 630 mins.

the quality of block was assessed after 30 mins of giving the block and 85% patient's VAS score was less than 3 and only 14 % patients had VAS score more than 3. Thus, more number of patients were satisfied with the block.

Group USG Plus NS Statistics

Table 2: Demographic profile

	Age	Duration taken to perform the block (min)	Sensory Onset of Block (min)	Sensory Onset of Block (min)
Mean	21	21	21	21
Median				
Std. Deviation		15.10	21.38	465.71
Minimum	47.38	15.00	20.00	10.00
Maximum	50.01	18.91	24.00	510.00
Percentiles	25	10.00	4.26	10.00
25	50.05	15.00	16.00	420.00
50	50.05	15.00	18.50	510.00
75	50.05	15.00	20.00	510.00
	6.50	6.50	24.00	510.00

The Group- USG plus NS

The mean duration taken to perform the block was 15.1 min and standard deviation of 2.18 with minimum time of 10 mins and maximum time of 18 mins.

For the sensory onset of block, the mean time was 21.3 min and standard deviation of 4.26 with minimum time of 16 mins and maximum of 30 mins.

The total duration of block mean time was 465.7 min and standard deviation of 147.29 with minimum time of 60 mins and max time of 610 mins

In Group USG plus NS, the quality of block was assessed after 30 mins of giving the block and 90% patients VAS score was less than 3 and 9 % patients had VAS score more than 3. Thus, more number of patients were satisfied with the block.

In Group USG plus NS, 90.5 % of block was successful and only 9 % patients were supplemented with general anaesthesia.

Mann-Whitney U value is equal to 27 and P value < 0.001.

There is a significant difference in Duration taken to perform the block (min) between USG and USG NS Group

Mann-Whitney U value is equal to 185 and P value = 0.375 > 0.05

There is no significant difference in Sensory Onset of Block (min) between USG and USG NS Group.

Mann-Whitney U value is equal to 194 and P value = 0.512 > 0.05

There is no significant difference in duration of Block between USG and USG NS Group.

Mann-Whitney U value is equal to 189 and P value = 0.076 > 0.05

There is no significant difference in Quality of Block between USG and USG NS Group.

CONCLUSION.

1. There was a significant difference in duration taken to perform the block. It took additional time for the USG plus NS group, from first contact of the ultrasound probe to identifying the popliteal nerve and then stimulating it to get the desired motor response. And after confirming the response, the local anaesthetic solution was injected.

2. Using only ultrasound or using both ultrasound plus nerve stimulator does not improve the sensory onset of block timings 3. There was no significant difference in duration of block between USG and USG NS Group.

3. There was no significant difference in quality of block and patient satisfaction between USG and USG NS Group.

4. There was no report of any side-effect in this study and only 5 patients including both the groups required supplementation of general anaesthesia.

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