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Research Article

Comparative Study of Split Skin Graft Under Femoral Nerve and Lateral Cutaneous Nerve Block: Blind Verses USG Technique

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ABSTRACT

Introduction: Local anaesthetic based nerve blockade of the lateral cutaneous nerve (LCN) of the thigh has been used extensively for postoperative analgesia in skin grafting. Sonographic nerve localization has been an increasingly popular technique to provide regional nerve blocks.

Material and Method: A total 60 patients of ASA grade I, II and III, age between 20-50 years, undergoing skin grafting surgery of lower limb were enrolled and randomly divided into two groups of 30 patients in each (FN+LCN Blind and FN+LCN USG Guided). Onset and duration of sensory blockade, duration of post-operative analgesia, requirement of analgesics, ease of technique and complications were noted.

Results: The onset of sensory block was early in USG guided group as compared to blind technique. Whereas duration of sensory block was prolonged in USG guided technique than blind. Also, postoperative analgesia prolonged in USG guided group than blind technique. In blind technique, maximum patients required analgesics as compared to patients in USG guided group. USG guided group required less duration and less no of pricks to perform block as compared blind technique. VAS from baseline was markedly reduced within both the groups at all time intervals, but fast decreased observed in USG guided procedure indicating the overall efficacy of the procedure.

Conclusion: USG guided block had early onset of sensory block, prolonged duration of sensory analgesia and post operative analgesia with lesser requirement of analgesic, also improve block success rate, and decrease complications as compared to blind block for skin grafting. Thus, ultrasound-guided technique could be performed safely with better patient comfort and longer duration of analgesia than FN+LCN blind technique.

Key Words: *Skin grafting; femoral nerve; Lateral cutaneous nerve; USG Guided; Sensory blockade; Analgesia*

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INTRODUCTION

Along with the surgical anaesthesia, post operative analgesia and care are the major responsibility of the anaesthesiologist. Peripheral nerve blocks inhibit the propagation of impulses in nerve terminals to inhibit the perception of pain by the cerebral cortex. Local anaesthetics will temporarily block the transmission of pain[1]. Surgeries of the lower limb can be done under general anaesthesia, sub arachnoid block and peripheral nerve blocks. Major surgeries require anaesthesia to be potent and safe at the same time. Peripheral nerve blocks show better results in the matter of drug toxicity and side effects as compared to intravenously given anaesthetic agents[2].

USG guidance for femoral nerve block can improve block success rate and decrease complications[3]. Compared with neurostimulation, ultrasound guided FNB results in greater success rates, permits a 50% reduction in local anaesthetic (LA) volume and displays prolonged analgesia[4,5]. The advantage of an ultrasound approach is to be able to clearly visualize and identify the vessels or soft tissue. The onset time and the quality of a regional anaesthetic technique for lower extremities is improved by ultrasonographic nerve identification compared with older techniques[6,7].

Local anaesthetic–based nerve blockade of the lateral cutaneous nerve of the thigh has been used extensively for postoperative analgesia in skin grafting and sonographic nerve localization has been an increasingly popular technique to provide regional nerve blocks[8]. So, we decided to assess the efficacy of femoral nerve and lateral cutaneous nerve block in skin grafting under blind block verses USG Guided block.

MATERIAL AND METHODS

60 patients were included in this study after proper permission taken from institutional ethical committee. Study carried out after applying inclusion and exclusion criterion and after taking written valid informed consent. Patients were

randomly assigned into two groups with help of computer A standard regional anaesthesia tray was prepared with the following equipment-

1. Sterile towels and gauze packs
2. Sterile gloves, marking pen, and surface electrode.
3. One 1% 25-gauge needle for skin infiltration
4. Pre-Medication Drugs -

- Inj. Ondansetron 0.08 mg/kg i.v. Inj. Pantaprazol 40mg i.v

5. Drugs for regional block: -

- Inj. Bupivacaine 0.25%(20ml) 2mq/kgInj. Lignocaine 0.2% (20ml) 5mg/kg.

On the day prior to surgery pre-anaesthetic evaluation was done and detailed history of cardiovascular system, respiratory system, central nervous system, drug therapy and drug allergy were taken. On arrival of the patient in the operating room, ECG, Pulse oximetry and Blood Pressure base line values were recorded.

1. Blind Technique: Landmarks: Three essential landmarks, the anterior superior iliac spine, pubic tubercle and femoral artery were identified. Inguinal ligament: Line drawn between the anterior superior iliac spine (ASIS) and pubic tubercle (PT). Femoral artery just below the inguinal ligament.

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Lateral cutaneous Nerve typically is visualized between the tensor fasciae latae muscle (TFLM) and the sartorius muscle (SaM), 1-2 cm medial and inferior to the anterior superior iliac spine (ASIS) and 0.5-1.0 cm deep to the skin surface. The needle is inserted in plane in a lateral-to-medial orientation, through the subcutaneous tissue. A fascial “pop” or “click” may be felt as the needle tip enters the plane between the TFLM and SaM. After negative aspiration, local anaesthetic was injected.

2. USG guided block technique: The ultrasound machine is generally placed to the opposite side of the operator and the practitioner faces the screen. A high frequency (6 - 18 MHz) linear array probe was preferred and used with depth initially set between 4 and 6 cm and adjusted as needed. A curvilinear probe can be used if more depth was warranted. The probe was placed in the inguinal crease, parallel to the inguinal ligament and transverse to femoral vein and artery with the indicator towards the patient's right. The leg was slightly externally rotated if possible. The probe was slid medial to lateral position until the femoral vessels seen. The nerve lies about 1-2 cm. lateral to the artery, positioned below fascia iliaca and lata and above the iliopsoas muscle and contained within a triangular-shaped sheath of fascia by the ligamentum ileopectineus. The nerve itself can have a triangular or oval shape and was often not clearly visualized. Because of this, the triangle created by the femoral artery medially, fascial planes anteriorly and the iliopsoas muscle posteriorly was used as the target for the block. The nerve becomes visualized after injection.

The in-plane technique, the needle was inserted at the lateral border of the probe and advanced to the deep border of the femoral nerve. If the nerve was not well visualized, the deep border of the triangle described above was targeted. Advance the needle until the fascia lata and iliaca were punctured. Resistance and a ‘pop’ may be felt when passing through these planes if a blunt or short bevel needle was used. A small bolus of local anaesthetic was injected, approximately 1cc. The bolus should surround the nerve and the nerve should appear more defined with a properly placed bolus. If this occurs, the injection was continued. If the bolus was not seen, or if the nerve becomes less defined, injection was stopped, and the needle repositioned. Reposition of the needle may also be necessary if the bolus fails to surround the anterior or medial aspect of the nerve. About 15 -25 cc of local anaesthetic was injected and paraesthesia should occur within 15 — 30 minutes.

RESULTS

The onset of sensory block was early in USG guided group (3.7min) as compared to blind technique (7.23min). Whereas duration of sensory block was prolonged in USG guided technique (438.71min) than blind (398.46min). Also, postoperative analgesia prolonged in USG guided group (468.4min) than blind technique (285.8min. In blind technique, maximum patients required analgesics (46.66%) as compared to patients in USG guided group (16.66%). USG guided

group required less duration and less no of pricks to perform block as compared blind technique, (P<0.05). VAS from baseline was markedly reduced within both the groups at all time intervals, but fast decreased observed in USG guided procedure indicating the overall efficacy of the procedure (p<0.001).

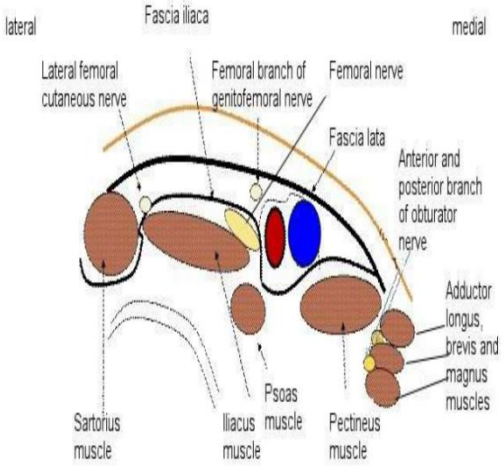

Figure 1: Cross section of the right thigh, just below the anterior superior iliac spine

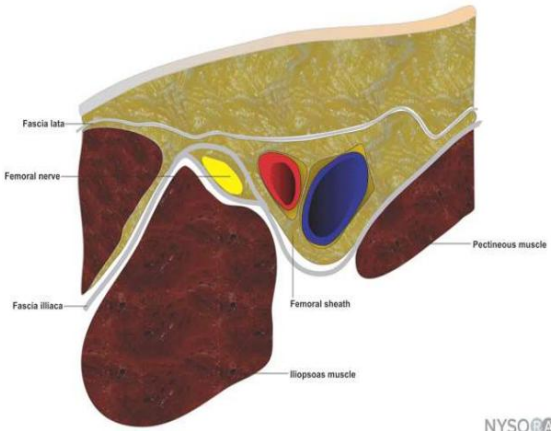

Figure 2: Landmark

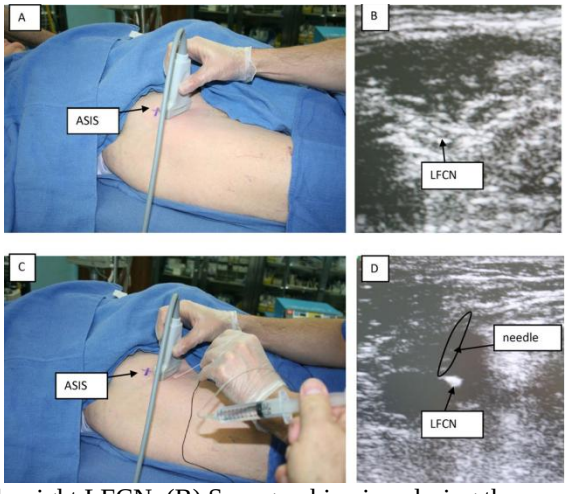

Figure 3: (A) US scanning for the right LFCN. (B) Sonographic view during the scan. (C) Needle insertion under US guidance. (D) Sonographic view of needle and anesthetic infiltration around the nerve.

DISCUSSION

The lateral femoral cutaneous nerve (LFCN) supplies a large area of thigh skin that is commonly used for harvesting a skin graft. Pain management and regional anaesthesia specialists have been using both anatomical landmarks and US

guided techniques to perform blockade for surgical intervention or treatment of chronic pain. Wardrop was able to anesthetize the lateral thigh surface areas ranging from 250 cm2 to 1020 cm2, with a mean of 569 cm2 for skin graft harvesting using anatomical landmarks. Cuignet et al reported fascia iliaca compartment block using a large volume of anesthetic solution (Ropivacaine 0.2% 40 ml), allowing larger anesthetized area albeit at cost of undesirable motor block.

Demographic characteristics: The present study was conducted on 60 patients of skin grafting. The most common age group was between 31 to 40 years followed by 20 to 30 years. The mean age in both was around 36 years. Both age groups were equivalent with regard to age groups. While in Jamnagar A et al study the mean age of patients in group NS was 49.17 years and in group US it's was 49.53 years. Bindi B et al reported the mean age of patients was 52.84 years.

Hemodyanamic parameters: Comparison of heart rate between the two groups was done using student t test. The heart rate at baseline and at the time of induction was not statistically significant. Heart rate at one minute after induction showed a fall in blind group which was statistically significant, (p=0.006). No statistically significant difference was noted at 3 and 5 minutes after induction.

Block characteristics: In the present study, mean onset of sensory block was early in FN+LCN USG Guided group (3.7 min) as compared to FN+LCN Blind Technique group (7.23 min). Similarly, Janagal A et al study, the ultrasound technique provided early onset of sensory block as compared to femoral nerve block under nerve stimulator guidance. Khan M et al observed that nerve block was found effective in all cases. 90.91% showed excellent results. The procedure seemed to be easy, safe, and less costly for skin grafting. Shannon J et al reported the NS technique significantly improved the success of the LFCN block over the fan technique (100% vs. 40%, P=00002). The extent of successful blocks was no difference between the two techniques. Success in stage 2 was similar to that in stage 1 (85%) predicting clinical utility.

Vas score: Pain in the lateral thigh associated with autologous skin graft harvesting and dressing changes for patients with burns is amenable to treatment with regional anesthesia.[8]in the present study, the baseline VAS score was similar in both the groups, which decreased more in FN+LCN USG Guided group as compared to FN+LCN blind technique group at 5 and 10 minutes after the administration of FN+LCN blind ($p = 0.001$ and 0.037, respectively), but became similar between the groups at 15 minutes post-block ($p = 0.347$). However, VAS from baseline was markedly reduced within both the groups at all time intervals, but fast decreased in VAS seen in FN+LCN USG Guided procedure indicating the overall efficacy of the procedure ($p<0.001$). Shank ES et al revealed Pain scores (VAS) in the immediate post-operative period PACU suggested a regional technique (single-shot block and/or catheter) that led to better comfort. On postoperative day 1, there was less difference between the control group and the single-shot group, but the catheter group was still quite comfortable. The difference between the control group and block group VAS scores was significant ($p< 0.004$), and a block versus catheter VAS scores ($p<0.18$).

Complications: In the current study, complications, such as vascular puncture and skin bruising were more in the FN+LCN group because of its blind technique, whereas other minor complications were similar between the two groups. There was no case of nerve injury observed in any case. These findings are comparable with the study conducted by Janagal A et al. Nerve injuries have also been reported without major adverse sequelae even with ultrasound technique by Schafhalter-Zoppoth et al., but, we did not have any such complication in any patient in present study.

CONCLUSION

In the present study, USG guided block had early onset of sensory block, prolonged duration of sensory analgesia and post operative analgesia with lesser requirement of analgesic and also improve block success rate and decrease complications as compared to blind block for skin grafting. Thus, ultrasound-guided technique could be performed safely with better patient comfort and longer duration of analgesia than FN+LCN Blind Technique.

The study recommended that wound with loss of skin needs grafting for early healing and to prevent deformity and disability. For skin grafting femoral nerve and lateral cutaneous nerve block can be used as regional anaesthesia. However, USG guided block seem to be easy and safe for skin grafting. As the pain of the skin graft site after surgery is comparatively severe, this block provides effective postoperative analgesia.

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