IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 20, Issue 8 Ser.3 (August. 2021), PP 01-05
www.iosrjournals.org

Effect Of Continuous Perineural Femoral Vs Continuous Adductor Canal Block For Postoperative Analgesia Following Below Knee Amputation- A Comparative Prospective Study

Dr. Allu Yogithadevi
Assistant Professor, Department of Anesthesiology , King George Hospital, Visakhapatnam,

Dr. Praveen kumar Moturi
Assistant Professor, Department of Anesthesiology, King George Hospital, Visakhapatnam,

Dr. C Gunaseelan,
Resident, Department of Anesthesiology, King George Hospital, Visakhapatnam.)

OBJECTIVES: *Postoperative pain after below knee amputation cause major impediment to recovery. Most of the patients need opioid analgesics for pain relief which can cause adverse effects in elderly patients. However, regional analgesia with continuous perineural catheter infusion of local anesthetic is effective. This study compares the efficacy of continuous femoral nerve and continuous adductor canal block for post-operative analgesia following below knee amputation.*
METHODS: *60 patients undergoing below knee amputation were randomly selected in two groups. Group I receiving ultrasound guided continuous femoral nerve infusion and Group II receiving continuous adductor canal infusion at the rate of 5ml/hour (0.2% ropivacaine). The primary outcomes were the VAS scores and rescue analgesics requirements at different time intervals in the first 72 hours. Statistical analyses will be done by SPSS version 21.*
RESULTS: *Baseline demographic data were comparable. Continuous femoral nerve infusion has decreased mean VAS scores(2.76±0.19) and reduced post-operative opioid requirements compared to the continuous adductor canal infusion(3.4625±0.40) in the first 72 hours.*
CONCLUSION*: Continuous perineural infusion of local anesthetics is effective method of providing post-operative analgesia and reduced opioid requirements in that continuous femoral nerve block infusion is superior compared to that of continuous adductor canal infusion following below knee amputation.*
KEYWORDS: *Continuous femoral nerve block, continuous adductor canal block, post-operative analgesia, below knee amputations.*

Date of Submission: 26-07-2021 Date of Acceptance: 11-08-2021

I. Introduction :

Lower limb amputations can cause significant disability almost 80% of the patient develop phantom pain and chronic pain following amputation also impairs the quality of life. Opioids are the mainstay for post-operative analgesia which can adverse events which is more common in the elderly patients who makes the large population of patient undergoing amputation. Regional analgesia with perineural catheters[1] offers simple yet better postoperative pain relief and decreases the opioid use. In this study, we compare the effects of continuous femoral[2] and adductor canal block for post-operative analgesia for patients undergoing below knee amputation.

II. Materials And Methods :

After getting approval from institutional ethics committee,the study was undertaken at King George Hospital, attached to Andhra Medical College during the period January 2020 to July 2021. 60 patients (30 patients for each group) who met the inclusion and exclusion criteria were selected.

INCLUSION CRITERIA:

- Patients undergoing below knee amputation who are willing to participate in the study and available during the period of study
- ASA grade 1,2 and 3

EXCLUSION CRITERIA:

- Patients who are not willing to participate in the study and not available during the period of study
- Local site infections.
- Patients on anticoagulant therapy
- Peripheral neuropathy
- Body mass index >40
- Pre-existing allergy to amide local anaesthetics
- At the end of the surgery, patients in group I were kept in supine position, prepared and draped. Under strict aseptic precautions, the ultrasound transducer should be covered with sterile cover. The out of plane approach facilitates femoral sheath catheterisation[2] due to the fact that this alignment technique places the catheter along the axis of the plexus facilitating catheter advancement. An 18G Tuohy's needle is advanced and a 20G catheter is threaded 3-5 cm beyond the needle tip underneath the iliac fascia nearby the femoral nerve. In order to facilitate the catheter progression through perineural sheath, hydrodissection technique with fluid is utilized. 20ml of 0.2% ropivaccine[3] is injected as bolus dose followed by 0.2% ropivaccine at 5ml/hour continuous infusion for 72 hours.
- At the end of the surgery, patients in group II received Continuous adductor canal block. Continuous adductor canal block is given under ultrasound guidance by placing a high frequency linear ultrasound transducer transverse to the longitudinal axis of the extremity at mid-thigh, approximately midway between the iliac spine and the patella. Once the femoral artery is identified underneath the sartorius muscle with the vein in the short axis, an 18G Tuohy's cannula is inserted from the lateral side of the transducer, through the Sartorius muscle with the tip lateral to the artery. 20ml of 0.2% ropivaccine is injected as bolus dose followed by 0.2% ropivaccine at 5ml/hour continuous infusion for 72 hours[4].
- Pain scores are assessed by Visual Analogue Scale(VAS)[6] and compared at different time intervals at 0,4,8,12,24,48 and 72 hours.
- Rescue analgesia was given with Injection FENTANYL 100mcg iv when the VAS score was more than 4. The amount of rescue analgesia required is also noted in both groups.
- Complications such as bleeding, hematoma, block failure, infection and catheter migration were noted and excluded from the study.
- Data is entered in a Microsoft Excel spreadsheet, and statistical package analysis is done for social sciences (S.P.S.S. version 21). Categorical data are expressed as proportions and quantitative data as means and standard deviation.
- Appropriate tests are applied wherever necessary.
- The independent Student's 't' test was used to test the statistical significance and
- The p-value of <0.05 was taken as statistically significant(S)

III. Results:

The demographic characteristics of the two groups were comparable in terms of age, height, weight, gender and ASA classification. There was no significant difference in the duration of surgery.

Sixty patients were randomized in to two groups.

At 0 hours, the mean VAS score in Group I is 0.5, and in Group II is 0.6, and the p-value is not statistically significant.

At 2,4,8,12,24, 48, 72, the mean VAS scores in group I were 1.96,3.3,3,83,3.33,3.3,3.167 and 2.73 and in group II were 2.7, 4.2,4.56,4.33,4.16,4.06 and 3.06 and the p-value is statistically significant.

The mean amount of rescue analgesia (fentanyl used) in micrograms in Group I is 70, and in Group II is 153.33, and the p-value is statistically significant (p-value <0.05).

TABLE 1: DEMOGRAPHIC DATA

PARAMETER	GROUP I MEAN±SD	GROUP II MEAN±SD	p value
AGE(YEARS)	55.6±6.25	54.6±6.33	0.5405
HEIGHT(CMS)	163.47±7.4	162.8±8.22	0.7674
WEIGHT(KGS)	65.6±15.16	66.6±14.83	0.7971
GENDER	MALE(21) FEMALE(9)	MALE (19) FEMALE(11)	
ASA CLASSIFICATION	ASA I-1 ASA II-20 ASA III-9	ASA I-2 ASA II-19 ASA III-9	
DURATION OF SURGERY(MINS)	90.3±11.86	91.26±14.58	0.7807

TABLE 2: VAS SCORES IN GROUP I AND GROUP II AND AMOUNT OF RESCUE ANALGESIA USED IN BOTH THE GROUPS

VAS SCORES	GROUP I	GROUP II	P value
0 HOURS	0.5±0.9	0.6±0.932	0.6740
2 HOURS	1.96±0.88	2.7±1.31	0.0128
4 HOURS	3.3±1.14	4.2±1.76	0.0392
8 HOURS	3.83±0.98	4.56±1.73	0.0490
12 HOURS	3.33±1.2	4.16±1.89	0.0469
24 HOURS	3.3±1.44	4.3±2.07	0.0339
48 HOURS	3.16±1.2	4.06±1.83	0.0281
72 HOURS	2.73±1.04	3.06±1.04	0.2241
AMOUNT OF RESCUE ANALGESIA	70±93	153±125	0.0050

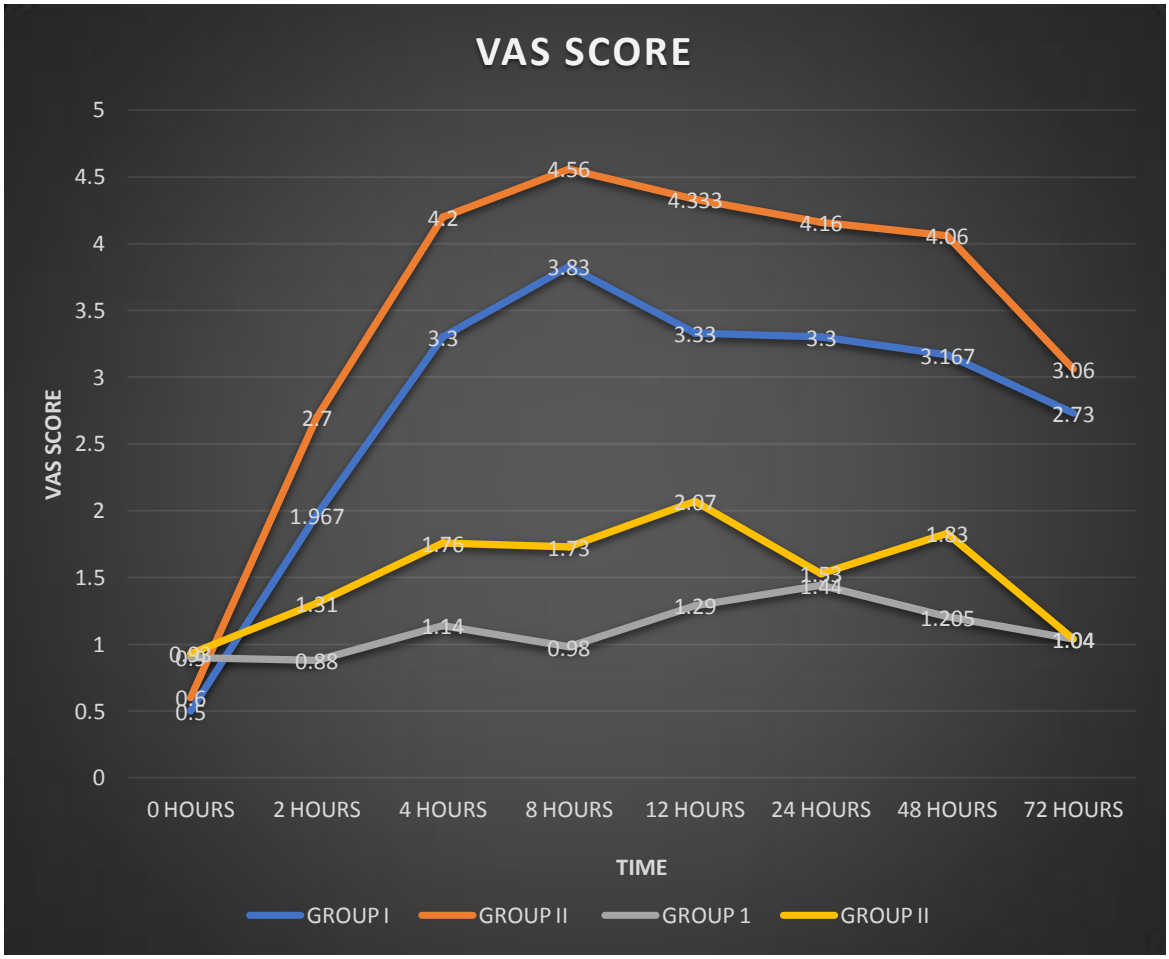
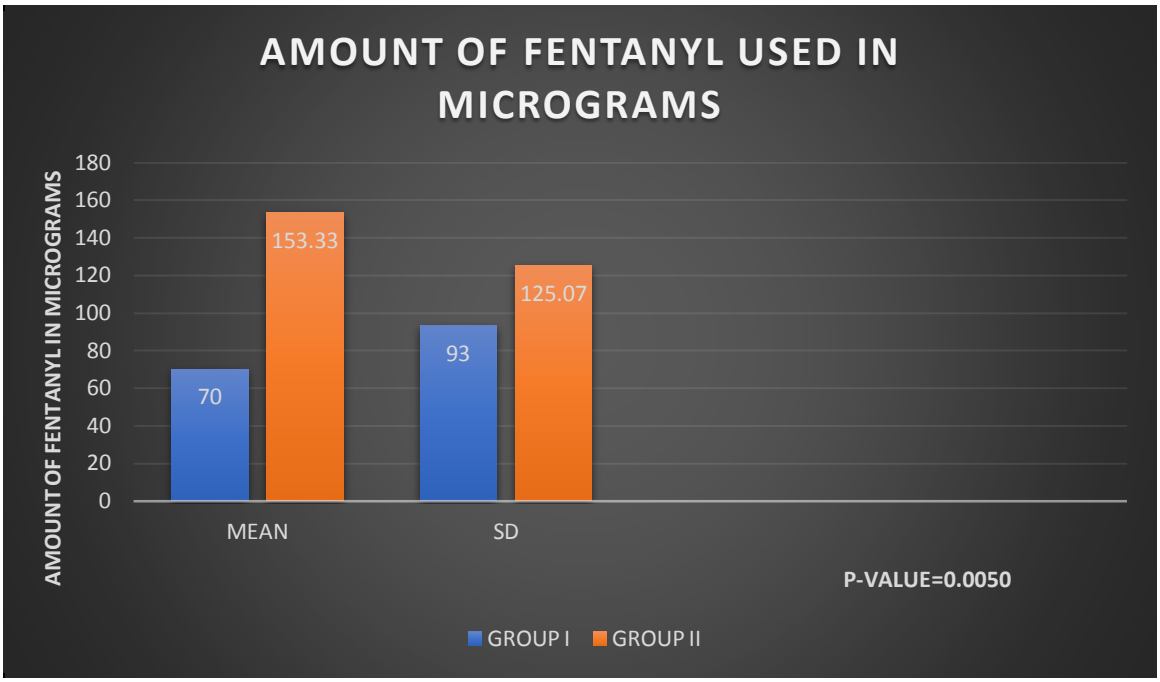


FIGURE 1: VAS SCORES IN GROUP I AND GROUP II

FIGURE 2: AMOUNT OF RESCUE ANALGESIA USED



IV. Discussion:

Postoperative pain relief has been of great interest to humankind down the ages. **Hans J Gerbershagen et al. [6] in 2013** reported that severe pain after surgery remains a significant problem, occurring in 20-40% of the patients.

Paul F et al.[7] in 2010 stated that despite recent advances in understanding the pain pathways and physiology of acute pain. The development of newer opioid and non-opioid analgesics and novel methods of drug delivery system and more widespread use of pain-reducing minimally invasive surgical techniques, discomfort after the surgical procedures remains a challenge for almost all practitioners.

They concluded that evidence-based procedure-specific multimodal analgesic protocols were needed to enhance the quality of postoperative pain management. A satisfactory pain relief method after surgery is essential. However, pain management can be achieved by various methods such as oral or rectal analgesics, anti-inflammatory drugs, local anesthetic creams, intramuscular injections, continuous intravenous infusions, patient-controlled analgesia (P.C.A.), regional analgesia, and nerve blocks.

Because of regional anesthetic techniques' advantages over the other methods, many authors have conducted many studies to evaluate the regional analgesic techniques. However, the regional analgesic techniques available were epidural analgesia and peripheral nerve blocks such as femoral nerve block and adductor canal block for following amputation surgeries.

Peripheral nerve blocks can facilitate accelerated recovery and pain relief by reducing nausea and vomiting, reducing the perioperative stress response and organ dysfunction, avoiding fatigue and early mobilization, and postoperative discharge.

In 2008, a prospective randomized clinical trial conducted by **Rodrigo de Lima E Souza**[8] demonstrated the effects of single-injection femoral nerve blocks in postoperative patients with 0.25% bupivacaine and 0.25% ropivacaine in patients undergoing total knee replacement and anterior cruciate ligament reconstruction for postoperative analgesia. They concluded that femoral nerve block is an effective postoperative analgesia method following T.K.R. and A.C.L. reconstruction, particularly for the first 10 hours after spinal anesthesia.

However, to prolong peripheral nerve blockade effects, continuous nerve infusions were suggested for prolonged and safe analgesia.

Continuous infusion of local anesthetic via femoral nerve and adductor canal reduces postoperative opioid consumption following lower limb amputation.

Although post-operative pain was well managed in both groups, there is statiscally significant difference between both the groups in which continuous femoral nerve catheter has decreased VAS scores and decreased opioid requirement.

LIMITATIONS:

- Smaller sample size of the study
- Pain scoring is purely subjective.
- Phantom pain[5] is a complex phenomenon which likely to develop either due to pre-amputation pain or due to transection of nerves at the time of surgery.

Since this is just a comparative study, phantom pain cannot be assessed.
A prospective study was needed to investigate the effectiveness in lowering phantom and stump pain.

CONCLUSION OF THE STUDY:

- Continuous perineural infusion of local anesthetics is a safe and effective method of providing post-operative analgesia and reduced opioid requirements in that continuous femoral nerve block infusion is superior compared to that of continuous adductor canal infusion following below knee amputation.

References:

[1]. Pinzur MS, Garla PGN, Pluth T, Vrbos L. Continuous postoperative infusion of a regional anesthetic after an amputation of the lower extremity. A randomized clinical trial. J Bone Joint Surg Am 1996;78(10):1501e5.
[2]. Fisher A, Meller Y. Continuous postoperative regional analgesia by nerve sheath block for amputation surgeryea pilot study.Anesth Analg 1991;72(3):300e3.
[3]. Elizaga AM, Smith DG, Sharar SR, Edwards WT, Hansen Jr ST. Continuous regional analgesia by intraneural block: effect on postoperative opioid requirements and phantom limb pain following amputation. J Rehabil Res Dev 1994;31(3):179e87.
[4]. Lennox PH, Winkelaar GB, Umedaly H, Hsiang YN. A continuous perineural infusion of local anesthetic provides effective postoperative pain management after lower limb amputation. Can J Anaesth 2002;49(6):639e40.
[5]. Katz J. Prevention of phantom limb pain by regional anaesthesia. Lancet 1997;349(9051):519e20.
[6]. Gerbershagen HJ, Aduckathil S, van Wijck AJ, Peelen LM, Kalkman CJ, Meissner W. Pain Intensity on the first day after surgery: a prospective cohort study comparing 179 surgical procedures. Anesthesiology. 2013 Apr;118(4):934-44
[7]. White PF, Kehlet H. Improving postoperative pain management: what are the unresolved issues? Anesthesiology. 2010 Jan;112(1):220-5.
[8]. De Lima E Souza R, Correa CH, Henriques MD, de Oliveira CB, Nunes TA, Gomez RS.
[9]. Single-injection femoral nerve block with 0.25% ropivacaine or 0.25% bupivacaine for postoperative analgesia after total knee replacement or anterior cruciate ligament reconstruction. J ClinAnesth. 2008 Nov;20(7):521-7.

Dr. Allu Yogithadevi, et. al. "Effect Of Continuous Perineural Femoral Vs Continuous Adductor Canal Block For Postoperative Analgesia Following Below Knee Amputation- A Comparative Prospective Study." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(08), 2021, pp. 01-05.