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Original Research Article

"Comparison Study between Conservative Treatment and Nerve Block Treatment in Foot Pain"

Dr. Basim Mohammed Shihab[1], Dr. Khaled Ali Khaleel[2*], Dr. Nibras Sameer Hameed[3], Dr. Mortada Jubara[4], Dr. Zaid Al-Attar[5]

[1]Senior Anesthesiologist, MBCHB, FICMS, Alkindi Teaching Hospital. Department of Anesthesia, Intensive Care and Pain Managment, Baghdad, Iraq
[2]Senior Anesthesiologist, MBCHB, DA, FICMS, AL Sadir Hospital, Department of Anesthesia, Intensive Care and Pain Management, Baghdad, Iraq
[3]Senior Anesthesiologist, MBCHB, FICMS, Medical City Teaching Hospital, Department of Anesthesia, Intensive Care and Pain Management, Baghdad, Iraq
[4]Chief of Regional Anesthesia and Pain Management Subspeciality at Arab Board Council for Medical Specialization, Baghdad, Iraq
[5]Lecturer, MBCHB, PHD, Department of Pharmacology, Al-Kindy College of Medicine University of Baghdad, Iraq

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Abstract: ***Objective:*** Ultrasound guidance nerve block in foot pain management is a new method in management of foot pain. It is simple, safe and cheap. We did this trial to compare the pain scores during both rest and activity and the functional ability after doing nerves block in comparison to patients who received non steroid anti-inflammatory drugs (conservative treatment). ***Materials and methods:*** We choose 90 patients in this double blind study, all are suffering of foot pain. Their ages ranging between35 and 80years, their weight ranging between 50 and 105 and their VAS pain scores between 6 and 9. We divided them into 2 groups, first group which has 45 patients who received NSAID only while the second group which also contain 45 patients who underwent nerve block. ***Results:*** The intensity of pain using VAS pain scores was small in the nerve block group after 6months, 1 year and 2 years in comparison with first group. The function scores of foot using American orthopedics of foot and ankle society scores (AOAFS) also was better in the second group (nerve block group). ***Conclusion***: Ultrasound guidance ankle nerves block is better than using conservative anti-inflammatory drugs in reducing pain scores and improve the function capacity of the patients in patients with foot pain.

Keywords: Depomedrol, alcohol, nerve block, NSAID.

INTRODUCTION

Foot pain is a common complaint in the pain clinic and has a wide etiology and differential diagnosis with the most important cause is mechanical factors [1]. History taking, good physical examination and radiological examination which include foot x ray, CT scan, MRI and ultrasonography are very important in diagnosis of the cause of foot pain and hence decrease the wide spectrum of the differential diagnosis [2].

Causes of foot pain can be classified as follow:

1. Arithretic which include fibromyalgia, gouty arthritis, rheumatoid arthritis and seronegative arithropathy.
2. Infection which include diabetic ulcer, warts and osteomyelitis.
3. Neurological causes which include lumbar radiculopathy from L4-S2 levels disc prolapse, neuroma, tarsal tunnel syndrome or posterior tibial n entrapment.
4. Neoplastic causes like Ewing sarcoma
5. Vascular causes.
6. Mechanical causes: these divided according to the site into:

A- Planter which include planter fasciitis, heel spru, calcaneal stress fracture lateral or medial planter n entrapment, neuroma and heel pad syndrome.
B- Posterior which include Achilles tendenopathy, retrocalcaneal bursitis and calcaneal apophysitis (sever disease).
C- Medial midfoot which include posterior tibialis tendenopathy, flexor digitorum tendonopathy, flexor halluces longus tendenopathy and tarsal tunnel syndrome.

***Corresponding Author:** Dr. Khaled Ali Khaleel
Senior Anesthesiologist, MBCHB, DA, FICMS, AL Sadir Hospital, Department of Anesthesia, Intensive Care and Pain Management, Baghdad, Iraq

D- Lateral midfoot which include peroneal tendenopathy and sinus tarsi syndrome

Planter fasciitis is the most common cause of foot pain and forms about 10% of population [3].

As all know that non steroids anti-inflamatory drugs like ibuprofen, indomethacin, diclofenac and others have many side effects like gastric erosion, hyperglycemia, hypertension and they are cost not effective because must be taken daily.

Patients and Method

90 patients were chosen for this double blind trial, the age of the patients were between 30 and 80 years, their weight were between 55 and 94 KG. Patients who refused to be enrolled in the study, patients who are allergic to local anesthetic agents, psychotic patients, patients with neurological deformity, patients with coagulopathy diseases, patients who have infection at site of injection were excluded from the study. Using the sealed envelope method the patients were divided into two groups:

1. First group which contain 45 patients who received conservative treatment and this is the control group. (NSAID group). Those patients received anti-inflammatory non steroid analgesic drugs like brufen, diclofenac, indomethacine, etc.
2. Second group which include 45 patients who received USG nerve block and this is the study group. (Nerve Block group)

This study was done in Alsader general hospital from October 2019 to October 2021. After explaining the results, the details and the complication of the intervention procedure, all patients sign the research acceptance formate.Then patients admitted to the theater in the out patient department of the hospital. In the theater we put cannula and do routine monitoring of the patient which include PR, BP, SPO2.We did USG superficial and deep) peroneal nerve block in patients who have pain and tenderness in dorsal aspect of the foot in supine position and did USG posterior tibial nerve block and sural nerve block in patients who had pain and tenderness in planter aspect of the foot in prone position. In any of these blocks we use depomedrol 20-40 mg per nerve in addition we use 1 ml of alcohol 50% in sural nerve block because it is a pure sensory nerve. We inject depomedrol 20 mg in site of maximum tenderness, i.e area of pathology.

3- Sample Size

We consider the confidence level is 95% and we consider the confidence interval is 10% (0.1) like statistical analysis of any study. From the table of Z scores we found that 0.95 is presented by 1,96, so Z value is 1.96. In the pain clinic of our hospitals the prevalence of foot pain due to any cause is 15 % so p value is 0.15. The Q value equal to 1-p so Q=1-p, so Q=1-0.15 so Q=0.85.Now PQ equal to0.1275. Now if we square the Z value he result will be 1.96*1.96=384.16 so the value of square Z will be 384.16. This square Z value if we multiply it with PQ the resultis 384.16*0.1275 and this equal to 48.9804. This mean that we must collect at least 49 patients to be enrolled in this study. We take 90 patients because of probability that some patients will drop from the trial because of exclusion criteria or because of failure to follow some patient.

Statistical Analysis

After obtaining and collecting all data about age, weight, gender pain scores in rest and activity and functional activity scores using AOAFS scoring system before treatment and 6months,1 years, 2years) after treatment, we use statistical package for social sciences (SPSS) to take the results. The results were expressed as mean and standard deviation. We used the independent t- test to compare the results of quantitative data and the paired t-test to compare the results of qualitative data. We consider p value of less than 0.05 as a value of statistical significance.

RESULTS

The results were summarized as in the following tables and graphs:

Table 1: Demographic changes

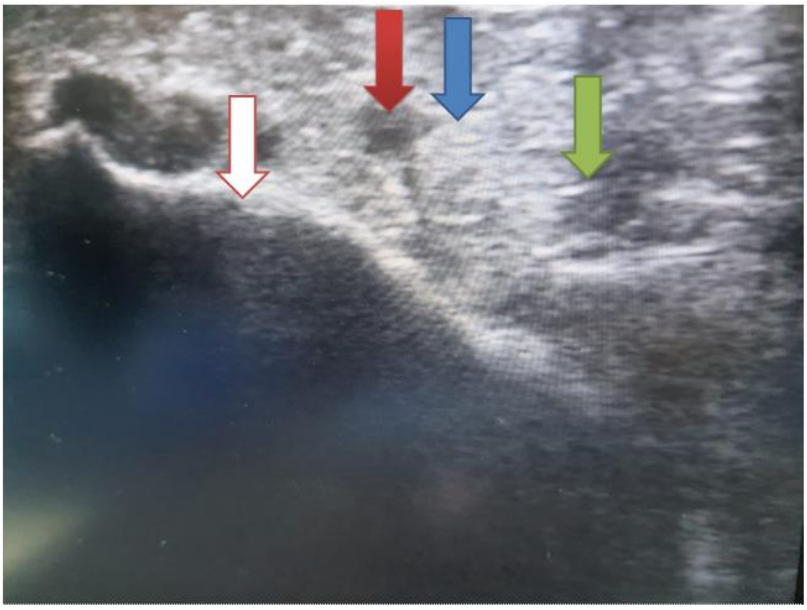
	NSAID group	N block group	P value	Significance
Age (years)	58.868+-14.713	60.822+-13.489	0.256	NS
Gender(male: female)	20:25	30:15	0.731	NS
Weight(KG)	73.688+-12.509	73.488+-13.620	0.471	NS

NS=non significant

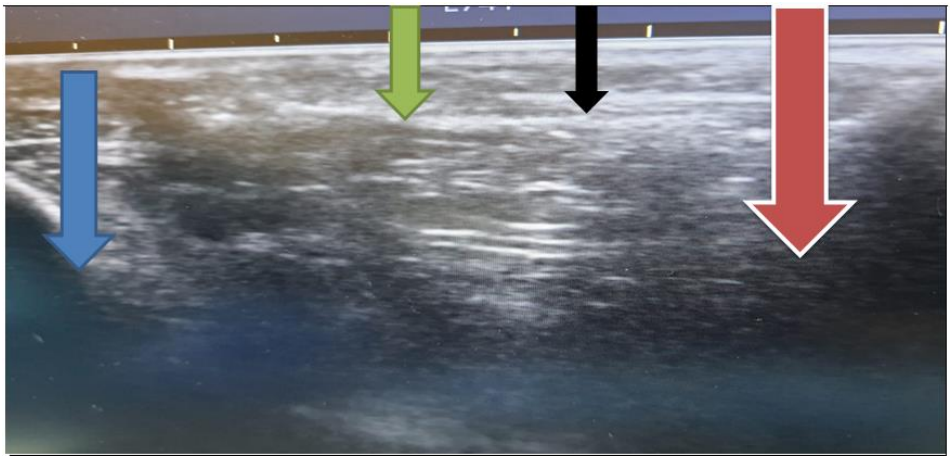
Table 2: Mean and slandered deviation of VAS and AOAFS in both NSAID group and N block group

	NSAID group	N block group	p value	Significance
VAS before treatment	7.400 +- 1.303	7.155 +- 1.460	0.202	NS
VAS 6 months after treatment	5.088 +- 1.040	2.577 +- 0.988	0.001	HS
VAS 1 year after treatment	4.911 +- 0.949	2.511 +- 0.894	0.001	HS
VAS 2 year after treatment	5.400 +- 0.617	2.311 +- 0.874	0.001	HS
AOAFS before treatment	40.755-+4.671	39.311 +- 4.435	0.068	NS
AOAFS 6 months after treatment	60.400 +- 5.714	70.244 +- 8.694	0.001	HS
AOAFS 1 year after treatment	59.555 +- 4.560	70.733 +- 7.117	0.001	HS
AOAFS 2 year after treatment	58.955 +- 3.483	70.911 +- 7.219	0.001	HS

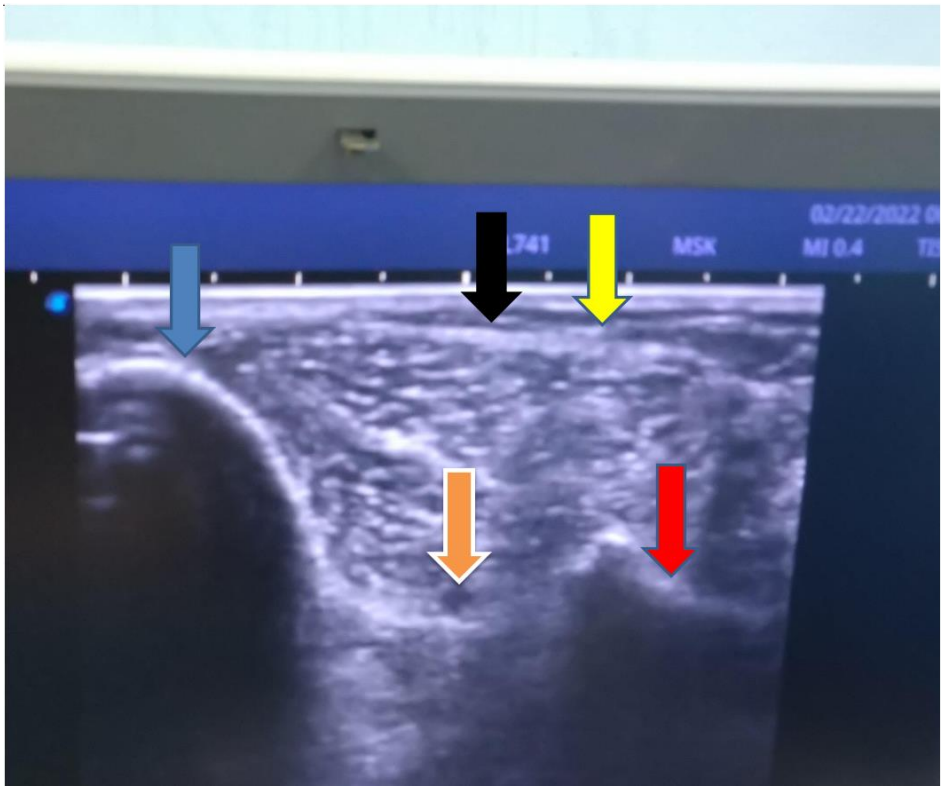
NS = non significant
HS = high significant



Picture 1: USG posterior tibial N block
White arrow refer to medial malleolus
Red arrow refer to posterior tibial nerve
Blue arrow refer to posterior tibial nerve
Green arrow refer to needle trajectory

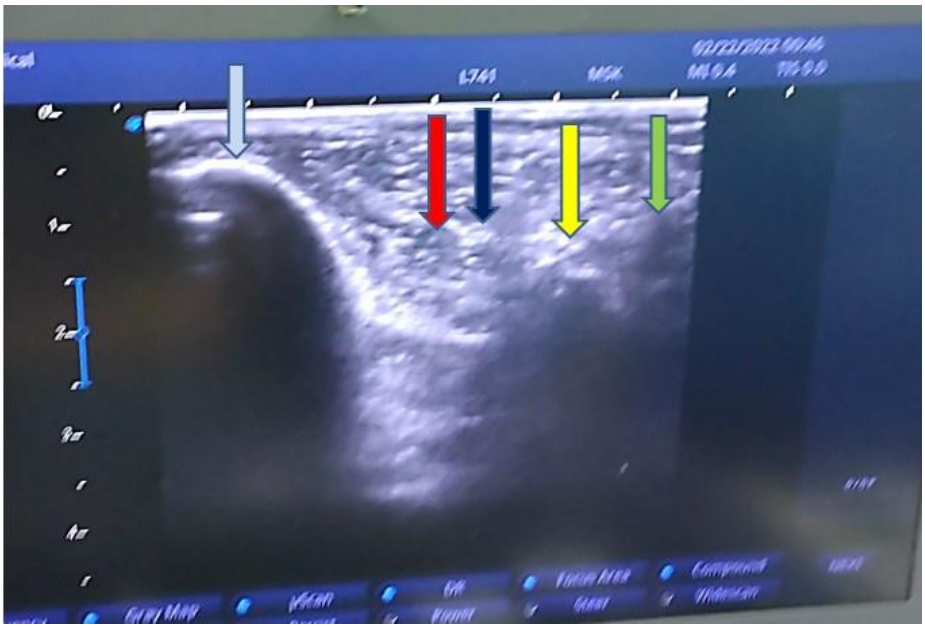


Picture 2: USG sural nerve block
Blue arrow refer to lateral malleolus
Red arrow refer to achillocalcaneal tendon
Green arrow refer to sural nerve
Black arrow refer to needle trajectory



Picture 3: USG block of superficial peroneal nerve

Blue arrow refer to tibia
Red arrow refer to fibula
Orange arrow refer to anterior tibial nerve
Yellow arrow refer to needle trajectory
Black arrow refer to superficial peroneal nerve



Picture 4: USG Deep peroneal nerve block

Blue arrow refer to tibia
Red arrow refer to anterior tibial A.
Green arrow refer to fibula
Yellow arrow refer to needle trajectory
Black arrow refer to deep peroneal N position

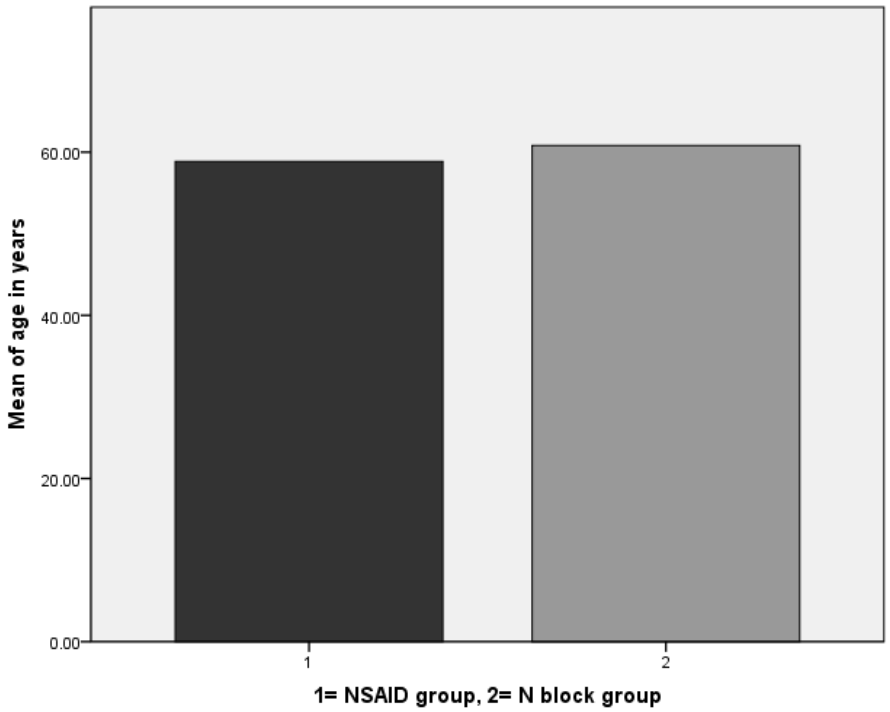


Figure 1: NSAID group versus nerve block group in the term of age in years, there is no significant statistical difference (p=0.256)

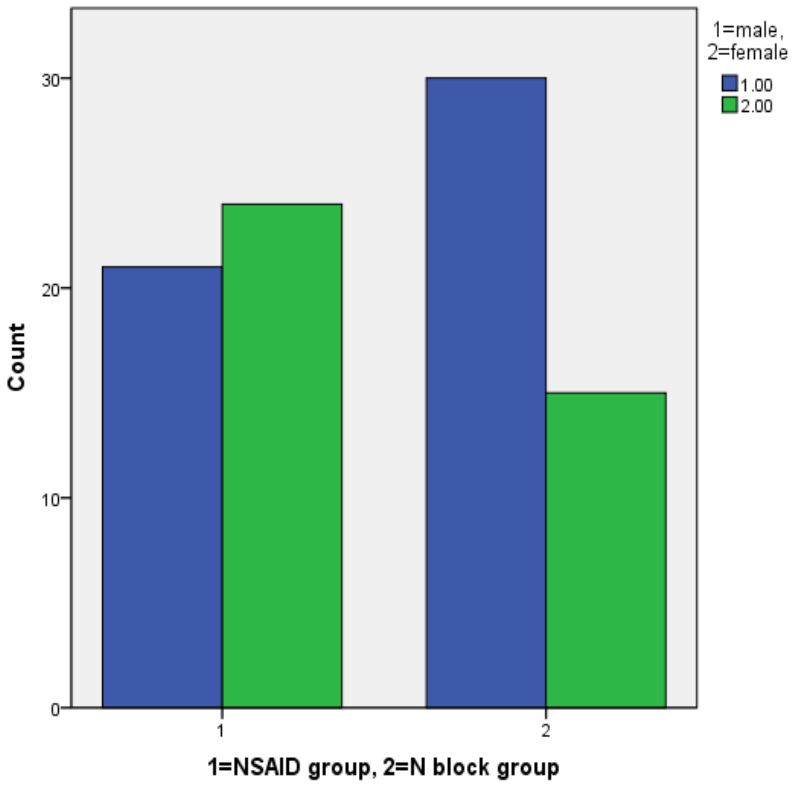


Figure 2: NSAID group versus nerve block group in the term of gender, there is no significant statistical difference (P=0.731)

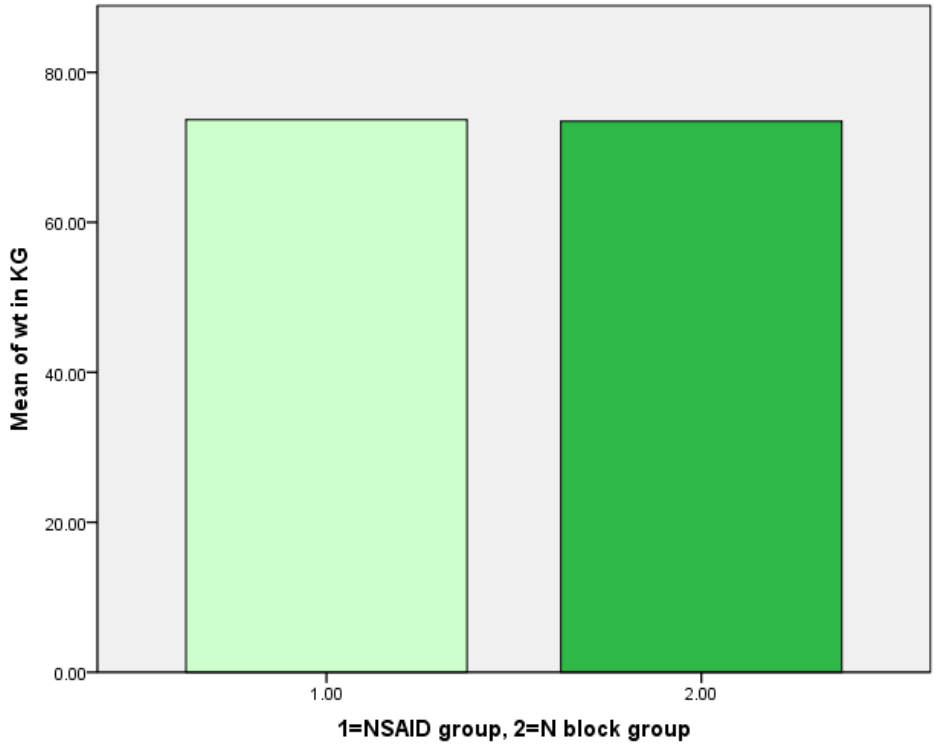


Figure 3: NSAID group versus nerve block group in term of weight in KG, there is no significant statistical difference (p=0.471)

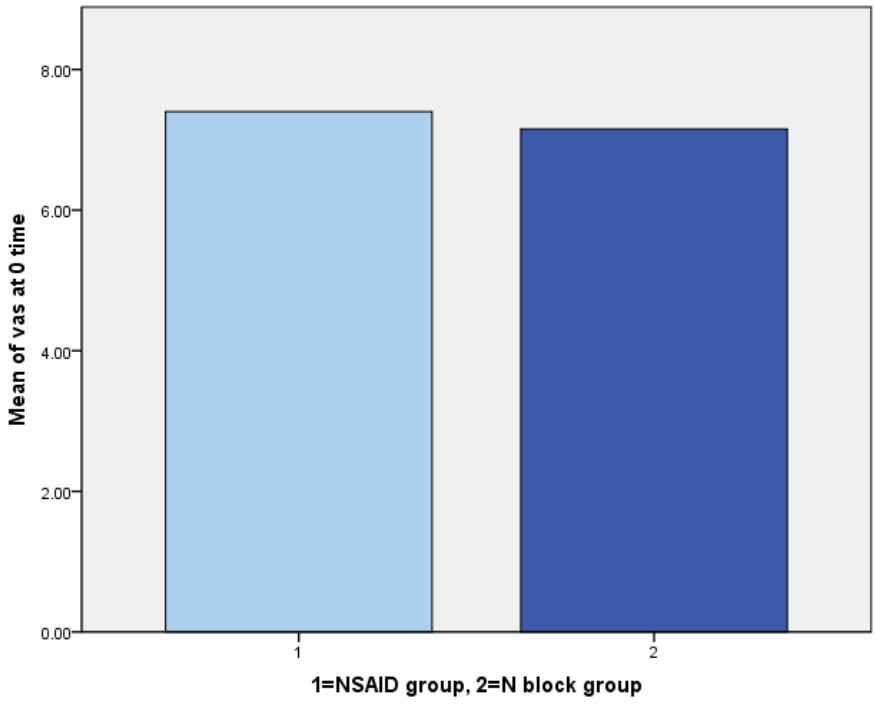


Figure 4: NSAID group versus nerve block group in terms of VAS before treatment at 0 time, there is no significant statistical difference (p=0.202)

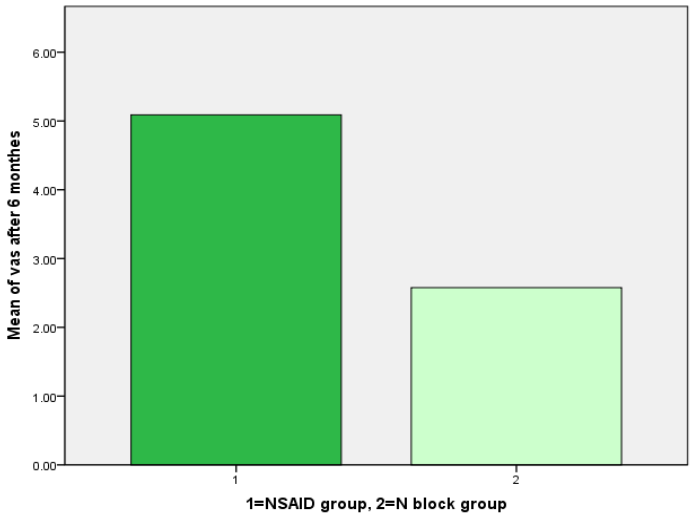


Figure 5: NSAID group versus nerve block group in terms of VAS after 6 months after treatment, there is significant statistical difference (p=0.001)

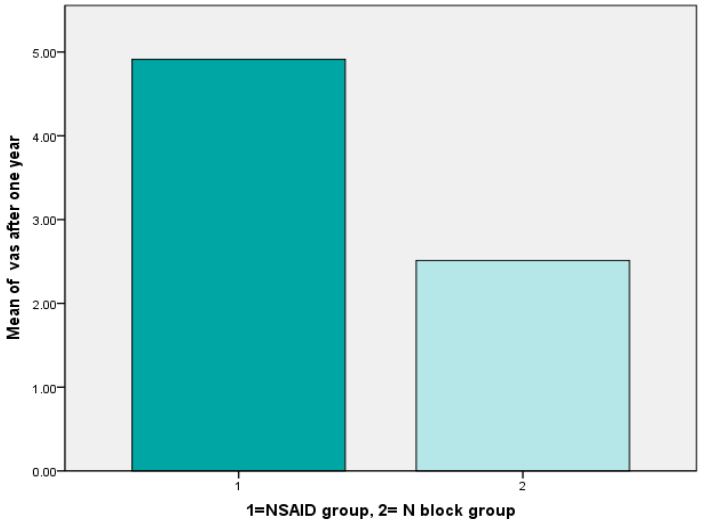


Figure 6: NSAID group versus nerve block group in terms of VAS after one year after treatment, there is significant statistical difference (p=0.001)

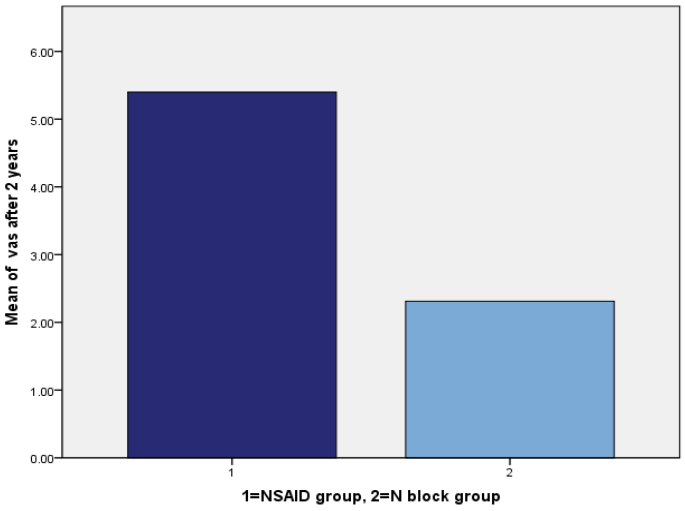


Figure 7: NSAID group versus nerve block group in terms of VAS after 2 years after treatment, there is significant statistical difference (p=0.001)

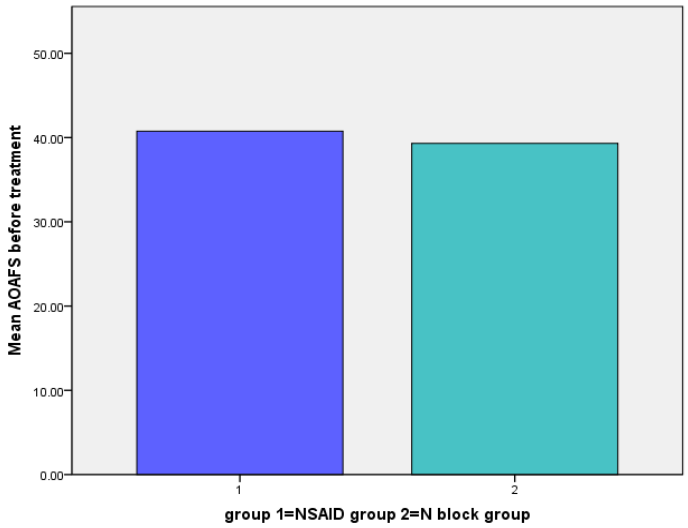


Figure 8: NSAID group versus nerve block group in terms of AOAFS before treatment at 0 time, there is no significant statistical difference (p=0.068)

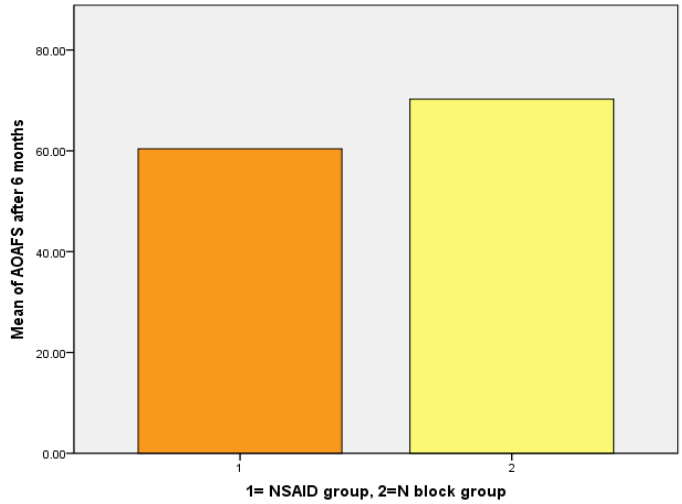


Figure 9: NSAID group versus nerve block group in terms of AOAFS 6 months after treatment, there is significant statistical difference (p=0.001)

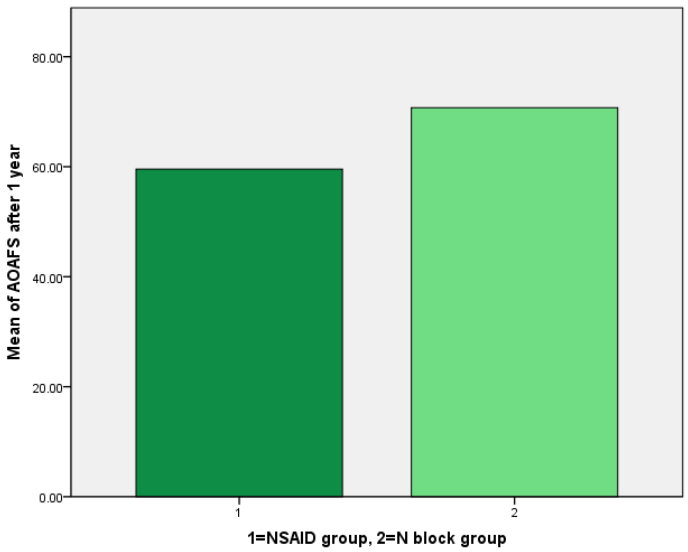


Figure 10: NSAID group versus nerve block group in terms of AOAFS one year after treatment, there is significant statistical difference (p=0.001)

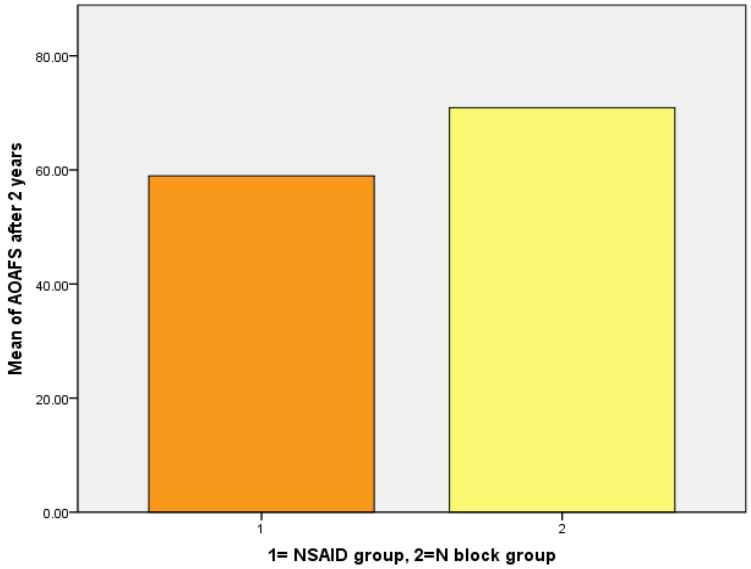


Figure 11: NSAID group versus nerve block group in terms of AOAFS two year after treatment, there is significant statistical difference (p=0.001)

DISCUSSION

In our study we found that posterior tibial N block and sural n block or /and deep and superficial n block has better results than conventional conservative treatment (NSAID and physiotherapy) in regard to pain and improvement of function. This finding is similar to study done by Rebecca D Lewis and his colleagues who divided their patients into two groups, first group received conventional therapy alone and second group used orthotics whether prefabricated or custom fitted whether alone or in addition to the conservative treatment, they found the second group patients get better pain relieve and better improvement in function than the second group [4].

Kelvin Tai Loon Chew and his colleagues who did his trial on 54 patients with chronic planter fasciitis and divided their patients into 3 groups. First group (19) patients who received autologous conditioned plasma (ACP) with conventional therapy, second group (19) patients received extracorporal shockwave therapy (ECWT) with conventional therapy and third group(16) patients who received conventional therapy only. The conventional therapy consists of stretching exercises and orthotics. They use pain visual analogue scale (VAS), American orthopedic foot and ankle society (AOFAS) ankle foot scale and ultrasound planter fascia thickness at base time before treatment and at 1,3,6) months after treatment. They found treatment with ACP with conventional therapy cause improvement in pain in 1 month (p=0.037) and in ESWT group they found significant pain improvement in 1, 3, 6 months (p=0.017, p=0.022, p=0.042). They also found functional outcome (AOFAS scores) had improved in ACP group at 3, 6 months (p=0.004 and p=0.013respectivly) and in the ECWT improvement was in 1 & 3 months (p=0.011 &p=0.003 respectivly) in comparison with group who take only conventional treatment. They also found that there is no differences between ACP and ESWT groups in sense of pain intensity (VAS) and functional improvement (AOFAS), but the ACP group show significant reduction in planter fascia thickness at 3 & 6 months when compared with conventional group (p=0.015 and p=0.014 respectively) and in ESWT group the improvement was in 3 & 6 months (p=0.019 and p=0.027respectivly) [5].

Peerbooms and his colleagues who did his trial on 115 patients in Oct 2019 and divided them into two groups, first group 63 patients who received platelets rich plasma PRP (PRP group) while the second group 52 patients received corticosteroids (corticosteroid group). The outcome parameters used in their trial was foot function index pain scores, foot function index disability, American orthopedics foot and ankle society and quality of life scores. All these outcomes parameters were measured at baseline time (before intervention), 1 month, 3 months, 6 months and one year after the intervention. They found that pain scores decreased in both groups but in steroid group the reduction was quick and remained stable while in PRP group the reduction in pain scores was modest and reach lower point after 1 year, so the PRP group showed significant lower pain scores after one year than the steroid group. Regarding the function scores, they found the PRP group showed significant lower foot function index disability scores than the steroid group(mean differences=12, $p<0.05$). SO they conclude that PRP reduce pain and increase function more than corticosteroid injection [6].

Govindarajan and his colleagues in their trial on 20 patients, all are complaining from heel pain and diagnosed as a case of planter fasciitis with calcaneal spru. They divided the patients into 2 groups, first group which contain 10 patients who did posterior tibial

nerve block10-13 minutes before injection of methyl prednisolone in the planter fascia, while the second group which also contain 10 patients who received injection of steroid without prior block of posterior tibial n block. They found that first group patients have much less pain scores (VAS) than second patients group (p<0,001) and are much complaint and satisfied. About complication of the procedure, they found that fat necrosis was 0% in first group while it was 10% in the second, pressure periostitis was 0% in first group and 10% in the second, rapture of planter fascia was 0% in both groups and 90%of patients in first group received 3 injection while in second group 40% of patients only receive 3 injection [7].

Mansiz-Kaptan in their trial on 60 patient, they use dextrose prolotherpay for the treatment of cases with resistant planter fasciitis because they found that dextrose solution can regenerate and improve the weakened tissue or any ligament as in cases of planter fascia ligament. They divided the patients into 2 groups, the first called the phototherapy group which had 30 patients they inject 5 ml of 30% dextrose, mixed with4 ml normal saline and 1 ml of lignocaine 2% so this is solution 15% dextrose solution, while the second group which also contain 30 patient and called the control group they inject 9 ml of normal saline mixed with 1 ml of lignocaine 2%. In both groups they inject the mixture twice with 3 weeks interval. They use VAS pain scores during both rest and activity, the foot function index to measure disability and planter fascia thickness by ultrasonography in their 15 weeks follow up period. The measurements were done before treatment and at 7 & 15 weeks after the treatment. They found significant improvement in VAS (during activity and rest), foot function index and planter fascia thickness so they conclude that dextrose prolotherapy is effective for 15 weeks in planter fasciitis treatment [8].

CONCLUSION

Doing ultrasound guidance nerve blocks (superficial and deep peroneal nerve in dorsum foot pain and /or posterior tibial and sural nerve block in planter foot pain) is effective, easy and rapid method in reducing VAS pain scores and improving the function capacity and life style of patients with foot pain when we compare it with drugs treatment.

RECOMMENDATION

In any patient with chronic foot pain who do not take benefit from conservative NSAID drugs after 2-3 months, I ask all pain physicains to do USG selective nerve block and to do more researches about this method of treatment on larger sample size and in multicenteric trial.

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