

*Research Article***Evaluation of Pain Relief After Neurotomy in Chronic Knee Osteoarthritis****Alaa F. Gaber, Omya Sh. Mohammed, Abd El Raheem Mahmoud and Sarah M. Omar**

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Abstract

Background: Nowadays, pain and disability due to chronic knee arthritis is a very common problem in middle aged people. A lot of modalities for management are available, including conservative analgesics and up to surgical interventions. Radiofrequency ablation of genicular nerves is assumed to be an effective less invasive and safe pain alleviation modality. **Objectives:** to evaluate long term pain relief after genicular nerves radiofrequency neurotomy by using the Oxford Knee Score. **Study design:** prospective randomized single blind clinical trial. **Methods:** this study involved 60 patients with moderate to severe osteoarthritis. 30 patients received the traditional methods for OA treatment (group 1) while the other 30 patients underwent the GN radiofrequency neurotomy (group 2). The outcome was measured using the Oxford Knee Score along a follow up period of 3 months. **Results:** there was significant difference in the improvement of the Oxford Knee score at 1st week, 1st and 3rd months following the procedure with better results at group 2. **Limitations:** We recommend the use of the radiofrequency (RF) neurotomy on a larger number of OA patients, with a longer follow-up period. **Conclusion:** RF can ameliorate pain and disability in chronic knee osteoarthritis in a safe and effective manner.

Key words: Genicular nerve, osteoarthritis, Oxford Knee Score.**Introduction**

Osteoarthritis (OA) is one of the most disabling forms of joint disease, being the most common form of them. It is characterized by progressive deterioration and loss of articular cartilage with concomitant structural and functional changes in the entire joint, including the synovium, meniscus (in the knee), periarticular ligaments and subchondral bone⁽¹⁾.

The exact reason for OA is unknown but the suspected one being the biomechanical stress affecting the articular cartilage and subchondral bone leading to wear and tear of the affected joint⁽²⁾.

For chronic pain alleviation in knee osteoarthritis, genicular nerve block can be done using local anesthetics or in combination with corticosteroids. Genicular nerves ablation can also be done using radiofrequency either sonar guided or under fluoroscopy⁽³⁾.

Oxford Knee Score is one of the tests developed to evaluate the pain and functional improvement after knee or hip total joint replacement. It

can be also used to evaluate the degree of OA. It consists of 12 multiple choice questions answered by the patients with scores ranging from 0 up to 48 with 48 is the best score⁽⁴⁾.

Methods

This prospective randomized single blind clinical trial was approved by the Faculty of Medicine, Minia University local ethical committee. It involved 60 adult patients with moderate to severe chronic knee OA. Patients were consented to take part in this study, then randomly allocated by computer generated tables into one of two groups; Group 1; where Patients received the traditional treatment for knee osteoarthritis in the form of NSAIDs and chondroitin sulfate, and Group 2; who underwent the RF neurotomy of the genicular nerves.

Inclusion criteria included patients with age ranging from 35 to 80 years old with moderate to severe knee osteoarthritis not responding to medical treatment for at least 6 months.

Exclusion criteria included patients with other causes of pain such as radiculopathy, neurological disorders.

In group 2, with vital signs monitoring, the intervention was performed under complete aseptic condition. The patient was placed supine on the fluoroscopy table with the knee flexed to 15° degree by a pillow beneath it. After sterilization. Points targeted for needle insertion were marked. These points were anesthetized with 1 ml lidocaine 2%. The RF needle was inserted at each targeted point towards the lateral and medial junction of the femoral shaft and condyle and medial junction of the tibial shaft and condyle. After reaching the target site, RF electrode was inserted through the cannula

and tip temperature was raised to 90° C for 90 seconds. Patients were discharged at the same day and were advised to have a 24 hour rest. Follow up was done at 1st week, 1st and 3rd months after the procedure.

Results

Patients who met the inclusion criteria were included in this study. Demographic data is presented in (Table 1) but (table 2) shows characteristics of the disease without any significant differences between the two groups.

Table (1): Demographic data

variable	<u>group 1</u> N= 30	<u>group 2</u> N= 30	<u>P value</u>
Age (years)			
Range	(43-72)	(40-75)	<i>0.319</i>
Mean ± SD	55.8±9	54±7.5	
Sex			
Male	14(46%)	16(53%)	<i>0.773</i>
Female	16(53%)	14(46%)	
BMI (kg / m2)			
Mean ± SD	25.77±4.74	26.96±3.3	<i>0.714</i>
Occupation			
Sedentary life	8(26%)	6(20%)	<i>0.511</i>
Hard worker	22(73%)	24(80%)	

- Independent samples T test for parametric quantitative data between the two groups
- Chi square test (if expected value within cell >5) and Fisher exact test (if expected value within cell <5) for qualitative data between the two groups
- Significant difference at P value < 0.05

Table (2): Characteristics of the disease

variable	group 1 N= 30	group 2 N=30	P value
Side			
Rt	11(36%)	13(43%)	0.473
Lt	19(63%)	17(56%)	
Disease duration (years)			
Range	(2-25)	(2-24)	
Mean± SD	13±7.4	10.2±6.4	
IA injection			
Yes	15(50%)	16(53%)	0.258
No	15(50%)	14(46%)	
Last IA injection duration(months)			
Range	(5-36)	(5-46)	
OA stage			
Stage III	16(53%)	18(60%)	0.544
Stage IV	14(46%)	12(40%)	

- Independent samples T test for parametric quantitative data between the two groups
- Chi square test for qualitative data between the two groups
- Significant difference at P value < 0.05

Oxford Knee Score values were significantly lower in group 2 during the whole follow-up period. In the same time, follow-up the Oxford Knee Score showed significant decreases when compared to their corresponding basal value in each group (Table 3).

Table (3): Oxford knee score

Follow up times	group 1 N= 30	group 2 N= 30	P value	Intragroup comparison	SN	MN
pre treatment (baseline)				<i>Pre vs 1 w</i> <i>Pre vs 1 m</i> <i>Pre vs 3 m</i>	<0.001* <0.001* <0.001*	<0.001* <0.001* <0.001*
Median	36	37	0.958			
IQR	(35-42)	(35-43)				
1 week				1 w vs 1 m 1 w vs 3 m	<0.001* 0.033*	<0.001* 0.037*
Median	27	22	0.023*			
IQR	(23-33)	(19-29)				
1 month				1 m vs 3m	0.176	0.490
Median	23	19	0.034*			
IQR	(20-32)	(17-26)				
3 months						
Median	25	19	0.004*			
IQR	(22-32)	(17-29)				

- *Mann Whitney test for non-parametric quantitative data between the two groups*
- *Friedman test for non-parametric quantitative data between the 4 times within each group, followed by Wilcoxon signed rank test between each 2 times*
- **: Significant difference at P value < 0.05*

Discussion

Osteoarthritis (OA) is a progressive joint disease characterized by joint inflammation and a reparative bone response. It is one of the top five most disabling conditions that affects more than one-third of persons >65 years of age. Global estimates reveal more than 100 million people are affected by OA⁽⁵⁾.

This small randomized study shows the clinical efficacy of RF genicular neurotomy for chronic knee OA. This study found that RF genicular neurotomy induced potent analgesia in patients with chronic knee OA pain. Although the follow-up period was only three months, these patients also experienced significant functional improvement.

Karaman et al., have performed an intra-articular Pulsed RF in 31 patients, and found at least two cm decrease in VAS scale, concluding that PRF interventional treatment of chronic knee OA was an effective and safe method⁽⁶⁾.

Bellini et al., have utilized cooled RF for the genicular nerve in nine patients after total knee arthroplasty. Patients achieved improvements in VAS scores and WOMAC index in the 1st, 3rd, 6th and 12th month follow-ups after the procedure⁽⁷⁾.

In agreement with Choi et al., where there was significant improvement in the VAS along the follow up period in the group treated with genicular nerve radiofrequency ablation, this was the same trend occurred with the Oxford Knee Score in our study⁽⁸⁾.

We are in agreement with Jadon et al., who compared the efficacy of monopolar versus bipolar genicular nerve radiofrequency for chronic knee osteoarthritis based on the Oxford Knee Score. At all points in the study, all the subjects reported significant improvement in the Oxford scores following the intervention⁽⁹⁾. Also, Ahmed A et al., performed genicular nerve neurolysis for four patients and there was significant improvement in the Oxford Knee Score for 6 months after performing the procedure⁽¹⁰⁾.

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