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Thermal radiofrequency in the relief of low back pain of facet joint origin. Result of a case series

Radiofrecuencia térmica en alivio del dolor lumbar de origen facetario. Resultado de una serie de casos

Jose Fernando Rodriguez, Alejandra Calle, Rene Felipe Rodriguez, Claudia Marcela Arias, Lina Susana Caracas, Daniel Santiago Gonzalez, Carlos Gustavo Benitez, Rene Fernando Rodriguez

Clinica Nueva Rafael Uribe Uribe, Cali, Colombia.

Correspondence: Daniel Santiago Gonzalez. Email: danielgonzalez87@hotmail.com

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Abstract

Background: Low back pain is the most common causes of medical consultation, being responsible for 10-15% of labor incapacity. In Colombia is third cause of consultation in the hospital emergency department, the leading cause of job relocation and second cause of disability pensions. The importance of evaluating the effectiveness of different therapeutic measures is important; how radio-frequency to relief of pain.

Objective: To describe clinical, therapeutic and evolutionary data of the medial branches thermal radiofrequency in the relief of low back pain of facet origin.

Methods: Was a cross-sectional study from a cohort of patients with lumbar facet pain. Subject was treatment with thermal radiofrequency. The first control was taken from the first month, then every three months up to a year after treatment. A procedure was considered successful when there was a reduction in pain of 50% or more.

Results: The procedure was success in 80% of patients at the first month; the success of the procedure was progressively decreasing over time; 3 months (70%), 6 (61%), 9 (44%), and 12 (diminish to 25%). It was reported as an adverse effect an initial increase of pain in a patient and other patients with the sensation of diminished of the leg strength that disappeared during the first week.

Conclusions: The thermal radiofrequency of the medial branches reduce chronic low back pain of facet origin. The improvement gradually decreases. The low incidence of side effects and radiofrequency complications justify its use.

Resumen

Introducción: El dolor lumbar es causa frecuente de consulta médica, responsable de 10-15% de incapacidades laborales. En Colombia es la tercera causa de consulta en servicios de urgencias, la cuarta en medicina general, la primera causa de reubicación laboral y la segunda de pensiones por invalidez, por esto la importancia de evaluar la efectividad de diferentes medidas terapéuticas, como la radiofruencia, para alivio de esta clase de dolor.

Objetivos: Describir los datos clínicos, terapéuticos y evolutivos a corto plazo de la radiofrecuencia térmica de los ramos mediales en el alivio del dolor lumbar de origen facetario.

Métodos: Se realizó un estudio transversal de la cohorte de pacientes con dolor lumbar facetario sometidos a radiofrecuencia térmica. Se analizaron variables demográficas y clínicas; se evaluaron en el primer control al mes y controles trimestrales, hasta un año de seguimiento. Se calificó como mejoría al procedimiento aquel paciente que con disminución del dolor <50% con respecto al basal.

Resultados: El procedimiento fue efectivo en 80% de los pacientes; disminuyó progresivamente con el tiempo: 3 meses (70%), 6 (61%), 9 (44%) de mejoría y 12 (disminuyó a 25%). Como efectos adversos, un paciente refirió incremento inicial del dolor y otro sensación de disminución de la fuerza de las piernas que desapareció durante la primera semana.

Conclusiones: La radiofrecuencia térmica de los ramos mediales disminuye el dolor lumbar crónico de origen facetario. La mejoría se reduce gradualmente. La baja incidencia de efectos colaterales y complicaciones de la radiofrecuencia justifican su utilización.

Key contribution of the study

Objective:	Describe the short-term clinical, therapeutic and evolutionary data of the thermal radiofrequency of the medial branches in the relief of low back pain of facet origin.
Study design:	A cross-sectional study of the cohort of patients with low back pain of facet origin was carried out.
Source of information	Patients with lumbar pain at the consultation, in the period from November 2011 to October 2013.
Population/sample	59 Patients over 18 years of age of both genders with a diagnosis of chronic low back pain of facet origin who underwent thermal radiofrequency of the medial lumbar branches.
Statistical analysis	To assess the change in treatment response, the McNemar test was used for the evaluation periods.
Principle findings	Thermal radiofrequency of the medial branches appears to be an effective method for the relief of chronic low back pain of facet origin. In the five controls, including the one performed at one year, the difference was statistically significant considering the percentage of patients who maintained a 50% improvement (p: <0.001).

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Introduction

Lower back pain is a common and widespread public health problem (1). Amongst the causes of medical consultation for pain, only headache exceeds those in number compared to low back pain. Low back pain has a greater socioeconomic impact and is responsible for 10-15% of work disabilities in people between 18 and 55 years of age, surpassed only by the common cold as a cause of absenteeism from work (2,3). The highest incidence of low back pain occurs in the most productive years and the global prevalence is 12% (1,4,5). In Colombia, this type pf pain is the third cause of consultation in emergency services, the fourth in general medicine and the first for workplace relocation, Comparing this national panorama with the world, many similarities are observed and the figures have changed little in recent years (6.7).

More than 80% of people suffer from low back pain throughout their lives (8-10), and this type of pain is non-specific in 85% of patients, since the source that generates it is not identified. Many factors have been associated as possible causes of the pain, however, including degeneration in the intervertebral or facet discs, obesity, sedentary lifestyle, and hereditary factors (11-13). A low percentage of cases can be attributed to specific factors such as cancer (0.7%), spinal infection (0.01%), Cauda Equina Syndrome (0.04%), fracture (4%), ankylosing spondylitis (0.3-5%), spinal stenosis (3%) or herniated disc with radiculopathy (4%) (14,15). Joint pain is responsible for 10-15% of chronic low back pain. The pain generally begins insidiously with predisposing factors, such as spondylolisthesis, degenerative disc disease and advanced age.

Micro-trauma caused by falls or repetitive actions cause bone fissures, capsular tears or articular cartilage tears, micro-hemorrhages, entrapment of the meniscus, inflammation of the synovial capsule, or enthesopathies at the insertion points of the multifidus muscle (16-19).

Of the people who suffer from low back pain, 65% recover during the first six weeks, 85-90% during the first eight weeks, while 10% develop permanent disability (20-23). After twelve weeks, recovery is unlikely; Less than half of the people who have been disabled for 26 weeks return to work and the return is almost nil in those who have been absent from work for more than 104 weeks (24-27). Low back pain affects quality of life by increasing psychological stress, partner dysfunction, and reducing social and physical activity (28-31).

At present, it is accepted that the treatment of choice for the management of lumbar pain is thermal radiofrequency. In this procedure, an electrode is guided towards the articular facets of the vertebrae, creating an alternating electric field that generates heat at the tip of the electrode. A fluoroscopic radiographic evaluation is performed to verify that the orientation of the electrode is parallel to the course of the medial branch nerves. The electrode is heated to 42°C, then the current flows from the tip of the electrode to the tissue, and if the cause of the pain is of facet origin, it would be eliminated.

Given the importance of low back pain as a cause for medical consultation and its influence on the quality of life of patients, finding an effective treatment for this condition is crucial. The aim of our study was to describe the short-term clinical, therapeutic and evolutionary data of thermal radiofrequency of the medial branches in the relief of facet-based low back pain.

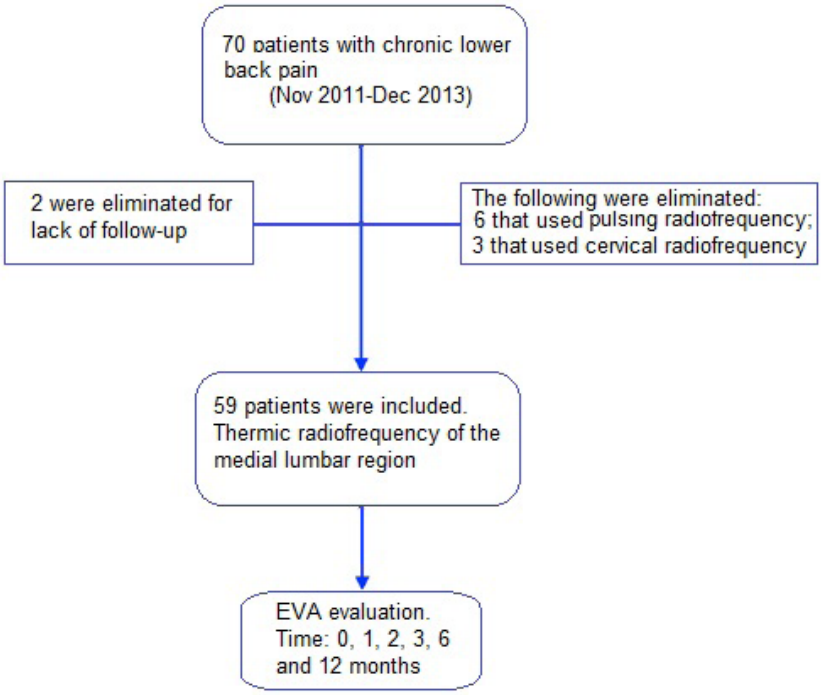

Figure 1. Diagram that shows the stages of the patient selection process.

Table 1. Basal sociodemographic characteristics of the population.

Variable	Total n=59
Age (years)	60 ± 12
Gender	
Feminine	33 (56)
Groups of ages (n, %)	n (%)
<55	22 (37)
56-65	17 (29)
>66	20 (34)
Pain intensity (EVA)	8 ± 2
Pain intensity in categories	
< 5	10 (17)
> 6	49 (83)
Evolution in months	59 (3-360)
Evolution of the pain in months	
<12	12 (20)
13-59	30 (51)
>6	17 (29)
Previous surgery (n, %)	
n	50 (85
Deferred or irradiating pain (n, %)	
Yes	47 (80)
Reference zone	
Above the knee	35 (59)
Periodicity	
Continuous	38 (64)
Consumes potent opioids	
No	52 (88)

Methods

A cross-sectional study of the cohort of patients with low back pain from the consultation in the UNIDOLOR pain unit of the Rafael Uribe University Clinic was carried out, in the period from November 2011 to October 2013.

Study population

All patients with a diagnosis of chronic low back pain of facet origin who were undergoing thermal radiofrequency of the medial lumbar branches and who were over 18 years of age were included (of both genders). The treatment was performed with fluoroscopic guidance using a 10-cm long, 20-gauge radiofrequency cannula with a 10-mm exposed tip at a temperature of 80 degrees for 75 seconds. Those patients who received pulsed radiofrequency therapy or cervical radiofrequency were excluded and those patients who did not attend their control consultations were also excluded (Figure 1). The characteristics analyzed were: demographic variables (gender, age), pain evaluation was measured according to the visual analog pain scale (VAS), pain characteristics (intensity, periodicity, evolution, radiation), previous surgeries, previous treatments and use of opioids (Table 1).

Clinical data

The pain assessment was measured by means of the Visual Analogue Pain Wing or VAS, which marks an intensity between 0 and 10, with 0 being no pain and 10 being the maximum referred pain in his life, this scale is given according to the patient's perception. It was evaluated during the first consultation and in the subsequent follow-ups, 1, 3, 6, 9 and 12 months. To evaluate the pain reduction outcome, the initial evaluation of the VAS (pre-treatment) and the final evaluation of each control up to 12 months (post-treatment) were taken. The percentage change formula [(Final VAS-Initial VAS / Initial VAS) * 100] was used to assess the outcome and those patients with a percentage change >50% were considered as responders to treatment (32,33,34).

Statistical analysis

For data analysis, a database made in Excel and analyzed in Stata version 11 was used. Quantitative variables are presented as mean and standard deviation and categorical variables as relative and absolute frequencies. To evaluate the response to treatment, the percentage of change in the VAS before and after the treatment was made dichotomous, considering >50% as responders and <50% as those who did not respond. To assess the change in treatment response, the McNemar test was used for the evaluation periods.

Ethics

According to the Resolution of the Ministry 008430 Article 11, the investigation is considered without risk. In order to comply with ethical considerations, authorization was requested from the manager of the clinic where the work was undertaken. The Research Ethics Committee of the Health Faculty of the Universidad Libre in Cali approved the study. The study did not require an informed consent signed by the patient, since it was an observational study. The treating physician examined each patient and treatment was established according to the criteria of the treating physicians. All patients were informed of the best treatment for their pathology.

Results

Were selected 59 medical records for analysis. Patient identification was kept hidden. The demographic and clinical variables of the patients in baseline conditions are presented in Table 1. Low back pain of facet origin primarily affected people over 55 years of age (63%), who were mainly retired. The gender ratio was 1.3: 1, being higher in women. In 80% of the patients, the evolution of pain was greater than one year. Radiated pain was observed in 41% of the population. In 83% the intensity of pain was equal to or greater than 6/10. Regarding the variables related to the treatment, it was found that 54% (32) underwent a diagnostic block before performing radiofrequency, 12% were operated on without a previous diagnostic block and 34% (20) underwent two or more blocks diagnostics. In 66% (39) bilateral radiofrequency was performed, while in 22% (13) only the left side was operated and 12% (7) were operated on the right side; in 80% (47) more than 4 medial branches were intervened, while in 20% (12) there were less than 4 branches.

The procedure was effective in 80% (47) of the patients in the

first control; effectiveness gradually decreased over time: at three months it reached 70%, at six months 61%, at nine months 44%, while at one year there was effectiveness in only 25% of the patients. In the five controls, including the one performed at one year, the difference was statistically significant considering the percentage of patients who maintained a 50% improvement (p: <0.001) (Table 2). The mean time to relapse was 194 +137.7 days. Two patients (3%) reported adverse effects: one reported an initial increase in pain and another manifested weakness in walking that recovered spontaneously during the first week.

Discussion

A study was carried out to describe the short-term clinical, therapeutic and evolutionary data of the thermal radiofrequency of the medial branches in the relief of low back pain of facet origin. It was found to be a safe method, and with clinical improvement in 80% of the patients one month after it was performed, however, the effects of the procedure diminish over time, until only 25% improvement is achieved at one year of follow-up.

The results derived from lumbar facet denervation published by other researchers show great differences in the successful results of treatment, ranging from 9% to 83%; Explanations to support these large differences are based on the presence of different research designs, inadequate radiofrequency techniques, or differences in inclusion criteria. Similar data were reported by other authors (33,34); an improvement of 76% was found at 21 days, 32% at 6 months and at one year it decreased to 22%; These results coincide with those of our study, since 80% improvement was found at one month and 25% at one year of treatment. A shorter duration of relief in patients with depression, previous surgery, and a greater number of joints treated, although only depression was statistically significant (33).

In relation to gender, in our study more women were intervened with a H: M ratio of 1: 1.3. Other studies showed an inverse relationship 16: 1 (35) and 1.4: 1 (36). Studies carried out in Spanish communities also found a higher prevalence of low back pain in women (24.5%) than in men (15.1%), affecting more people between 31 and 50 years of age, in full productive age (37-39); the great difference with respect to the age of our patients is possibly due to the fact that we selected people who clinically suffered from low back pain of facet origin, this entity being more prevalent in elderly people. A possible bias in the results can be generated by the fact that the physicians who carried out the controls belong to the same team that performed the procedure. The results obtained in the present study are not generalizable, since they are obtained from a captive sample, belonging to the patients who attend the Pain Unit of the Rafael Uribe Uribe Clinic.

Table 2. Comparison of the response to treatment across time n = 59. Time (months) – Change

Time (meses)	Change n (%)	
1	47 (79.7)	0.00000
3	41 (69.5)	0.00000
6	36 (61.0)	0.00000
9	26 (44.0)	0.00000
12	15 (25.4)	0.00018

Evaluation of the response by group, comparing the baseline and subsequent evaluations, the non-parametric McNemar test was performed. A change was considered to be any patient whose percentage of change had >50% with respect to the baseline VAS.

Conclusions

Thermal radiofrequency of the medial branches reduces chronic low back pain of facet origin. However, the improvement gradually diminishes. The low incidence of collateral effects and complications of radiofrequency justify its use.

Conflicts of interest
The authors declare that they have no conflict of interest in this publication.

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