

Radiofrequency treatment has a beneficial role in reducing low back pain due to facet syndrome in octogenarians or older

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Introduction: Chronic low back pain is a disabling phenomenon that can cause a severe reduction in quality of life, especially in elderly patients. Surgical treatment is sometimes a big challenge for these elderly patients. Radiofrequency (RF) ablation is an increasingly popular method for treating low back pain caused by facet syndrome. The purpose of this study was to evaluate whether RF neurotomy is effective in terms of pain reduction and functional outcome in elderly patients.

Patients and methods: Fifty-eight patients aged 80 years and older who had chronic mechanical low back pain were examined after they underwent RF heat lesion of the medial branch. Follow-up occurred 1, 3, 6, and 12 months after treatment. Pain was measured on the visual analog scale and functional outcome was measured using the Oswestry Disability Index.

Results: After 1 month, 43 patients (74%) were satisfied with the results. After 3 months, 38 patients (66%) had clinically significant pain relief. After 6 months, 33 patients (57%) had pain relief, and at the 1-year follow-up, 30 patients (52%) showed good results while 28 patients (48%) showed no effect. The Oswestry Disability Index score was substantially improved even after 1 year. Minor complications occurred in eleven patients (19%), who had transient discomfort and burning pain.

Conclusion: RF is a safe and partially effective procedure for treating elderly patients with mechanical back pain due to facet syndrome.

Keywords: radiofrequency, mechanical back pain, facet syndrome, elderly, octogenarians

Introduction

Low back pain is a common phenomenon among adults. The prevalence of low back pain is estimated to be as high as 84%, although the specific pathology underlying this condition often is not known.¹ Some studies have shown that chronicity or recurrence of low back pain is seen in 35%–79% of patients.² The burden that low back pain causes to both patients and society is enormous.³ Its great effect on society and health care economics has engendered a growing number of therapeutic modalities to manage this problem.⁴ Study results indicate that lumbar facet joint syndrome accounts for up to 90% of occurrences of lower back pain.^{5–6} Especially in elderly patients, chronic low back pain can cause a severe reduction in quality of life.⁷ These patients sometimes do not go outside their homes and in many cases even develop depressed mood.⁸

Treatment options for chronic low back pain include conservative treatment, pain management therapy, or surgical treatment. Surgical treatment with instrumentation and fusion of the lumbar spine is sometimes a big procedure for these elderly patients, who usually suffer from comorbidities.⁹ A rational pain management procedure that

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has gained popularity over the last years is radiofrequency (RF) neurotomy of the medial branch that innervates the facet joint, which is believed to be the source of pain in this group of patients.

RF lesions are an important part of complex minimally invasive treatment of chronic pain conditions and are used for reducing noxious transmission in the nervous system. The principle behind RF is production of heat that damages some or all of the nerve fibers in the target nervous structure ("conventional" RF is applied to the medial branches that supply the facet joints). Its target is to block pain stimuli transmission from peripheral receptors to the central pain structures. In recent years; however, contradictory results from studies of RF treatment of back pain have been published.^{10–16} Leclaire et al¹² reported that the procedure is effective for pain improvement only in the short-term period (4 weeks after the procedure) and has failed to improve pain even after 12 weeks. Other authors supported this data.¹¹ Conversely, other studies showed long-term improvement in pain after the procedure.^{10,13–16}

The purpose of this study was to evaluate the long-term effect of RF applied to the medial branch in elderly patients (aged 80 years and older) who suffer from low back pain caused by facet syndrome.

Patients and methods

Our study was comprised of 58 elderly patients who underwent the RF procedure for mechanical low back pain of spinal origin and who were followed up for 1 year.

Eligible patients were at least 80 years of age; had experienced at least 6 months of mechanical low back pain attributed to the facet joints (facet syndrome), as determined by physical examination with pain magnification in extension of the lumbar spine; had undergone conservative treatment (physiotherapy and nonsteroidal anti inflammatory medications) for at least 6 months; and had no radicular low back pain or central spinal stenosis, as evidenced by computed tomography and/or magnetic resonance imaging of the lumbar spine.

Fifty-eight patients had fulfilled the inclusion and exclusion criteria for this study. They were treated with RF heat lesion of the medial branch of the dorsal ramus. There were 27 males (47%) and 31 females (53%). The age ranged from 80–92 years (mean 84 years). All patients underwent RF ablation of the medial branch of the dorsal ramus.^{17–21} Denervation was performed in an ambulatory outpatient setting under local anesthesia (lidocaine 1%) of the superficial tissue layers and with fluoroscopic guidance. SMK-10 and

SMK-15 electrodes with a 10 mm active tip and an RFG-3C generator (Cosman Medical, Inc, Burlington, MA, USA) were used to localize targets. After sensor stimulation with 50 Hz and motor stimulation with 2 Hz, 0.5 cc of local anesthetic (lidocaine 2%) was injected to prevent injury to the nerve roots. The ablation was done with a core temperature of 80°C around the electrode tip.^{11,14–15} The duration of the procedure was 90 seconds. One heat treatment was performed for each treated nerve. Between one and three levels were treated after symptoms reported by the patients were assessed. Ten patients underwent single-level treatment, while 15 and 33 patients underwent double- and triple-level treatment, respectively.

All patients were treated with nonsteroidal anti inflammatory drugs for 4–6 weeks after the procedure (unless contraindications to these drugs were documented) and underwent physiotherapy for 1 month after the procedure.

Follow-up of the patients included physical examination and completion of the visual analog scale (VAS) and Oswestry Disability Index questionnaire.

We used the VAS for evaluating the pain intensity before and after surgery. A pain-free result was considered as a complete resolution of pain; a good result was considered to be at least 50% relief in pain, a moderate result was a 30%–50% relief in pain, and no effect was defined as less than 30% relief in pain. We considered pain-free, good, and moderate results as clinically significant reductions in pain.

The patients were examined in four intervals during the first year: after 1, 3, and 6 months and after 1 year.

Statistical analysis

Averages were calculated for the different variables. Differences were compared using the one-way analysis of variance test. Differences of $P < 0.05$ were considered to be significant.

Results

Patients were treated with RF heat lesion of the medial branch of the dorsal ramus. Four weeks following the procedure, 43 patients (74%) had clinically significant reduction in pain. At the 3-month follow-up, 38 patients (66%) had reported some kind of improvement. Nine patients were pain-free, 21 patients reported good results, eight patients were classified as moderate, and 20 patients (34%) showed no effect. At the third evaluation (6 months after treatment), 33 patients (57%) had responded to RF (seven patients remained pain-free, 18 obtained good results, and eight

obtained moderate results), and 25 patients (43%) had no improvement.

At the fourth follow-up (1 year following the procedure), 30 patients (52%) had an improvement in pain (five patients were pain free, and 15 and ten patients showed good and moderate results, respectively), and for 28 patients (48%) there was no effect. The results are summarized in Tables 1 and 2.

Eleven patients (19%) developed discomfort at the operative site. In all eleven patients, this was spontaneously resolved within a 1-month period.

Functional improvement was measured by the Oswestry Disability Index questionnaire and improved from 62 points before the RF procedure to 30 points 1 month after the procedure, 36 points at the 3-month follow-up, 42 points at the 6-month follow-up, and 45 points at the 1 year follow-up ($P < 0.05$).

The results were not statistically different for patients who underwent the RF for single versus multiple facet joints in terms of pain reduction or improvement in the Oswestry Disability Index score.

Discussion

We evaluated and treated elderly patients (aged 80 years and older) suffering from chronic mechanical low back pain (facet syndrome pain) that had persisted for at least 6 months and that was not resolved by conservative treatment. A rational pain management procedure that has gained popularity over the last years is RF neurotomy of the medial branch that innervates the facet joint, which is believed to be the source of pain in this group of patients. We found that the patients had a substantial reduction in pain following the conventional procedure of RF ablation of the medial branch. At the 1-year follow-up, 52% of the patients still showed clinically significant improvement and the average reduction in VAS was 3.4 points. The patients in this series did not have any major complications, which can alter the procedure's effectiveness.

Table 1 Results after radiofrequency treatment of 58 patients with facet syndrome pain

Posttreatment follow-up	Pain relief level, number of patients				
	Pain-free	Good	Moderate	Total	No effect
1 month	13	22	8	43 (74%)	15 (26%)
3 month	9	21	8	38 (66%)	20 (34%)
6 month	7	18	8	33 (57%)	25 (43%)
12 month	5	15	10	30 (52%)	28 (48%)

Table 2 Mean visual analog scale scores before and after radiofrequency treatment of 58 patients with facet syndrome pain

Before treatment	Posttreatment follow-up			
	1 month	3 months	6 months	12 months
8.8 (range 7–10)	4.3 (range 0–10)	4.5 (range 0–10)	5.2 (range 0–10)	5.4 (range 0–10)

All complications (discomfort at the operative site) resolved spontaneously within a 1-month period.

Reduction in VAS by about 2 points, or more than 30%, has been reported to represent a clinically important difference in pain between treatments.²² Yilmaz et al¹⁶ demonstrated in their study that 48% percent of patients obtained a relative reduction in VAS of at least 70%, and 86% obtained a reduction of at least 60% at the 12th month following RF neurotomy. Their results are better than those from our study. However, they had a younger cohort of patients, with a mean age of 52 years; in our study, the mean age was 84 years with a minimum of 80 years. Moreover, we defined a clinically significant reduction to be more than 30% of the original VAS, a stricter criterion than that used by Yilmaz et al.¹⁶ If we had used their criterion we would have achieved even better results.

The issue of prognostic blocks prior to the definitive procedure was questioned in previous articles.^{16,19} In the past, we used to perform prognostic blocks of the treated region before every RF procedure. With time, we changed this approach. We realized that we could rely on a combination of accurate history taking, physical examination, and imaging studies without confirmation of diagnosis by blocks prior to the procedure. In addition, prognostic blocks can produce false-positive and false-negative result rates as high as 25%, along with increased waiting time and additional hospitalizations.

Among our criteria for RF treatment were patients with at least 6 months of symptoms (mean symptomatic period until the procedure was 14 months).

Our complication rate would be quite high in comparison with other studies if we included postprocedural discomfort as a complication.²³ However, these complications were all minor and resolved in a short time period (less than 1 month) after the procedure.

This study has some limitations. In this study, no control group with similar characteristics and who did not undergo the RF treatment was examined. We also did not use diagnostic controlled blocks prior to the RF procedure.²⁴ However, we purposely did not perform these blocks, as discussed above. In addition, positioning the needle parallel

to the nerve root is recommended for RF success. For this study we tried to put the needle parallel to the end-plate and to the nerve roots, but we cannot be completely sure about it. Moreover, in this study we relied on clinical examination alone, so we cannot be completely sure whether the correct levels were treated.

Conclusion

RF neurotomy has a role in treating elderly patients with chronic mechanical back pain at different levels. It can overcome the hazards of surgical treatment for these elderly patients, with a reasonable tradeoff in terms of pain reduction and functional disability improvement. This procedure should be performed only as a second line of treatment after conservative treatment has failed. The complication rates and side effects of this procedure are relatively small and the patients benefit by relatively long-term pain relief.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Walker BF. The prevalence of low back pain: a systematic review of the literature from 1966 to 1998. *J Spinal Disord.* 2000;13(3):205–217.
2. van den Hoogen HJ, Koes BW, Devillé W, van Eijk JT, Bouter LM. The prognosis of low back pain in general practice. *Spine (Phila Pa 1976).* 1997;22(13):1515–1521.
3. Maharty DC. The history of lower back pain: a look “back” through the centuries. *Prim Care.* 2012;39(3):463–470.
4. Manchikanti L, Boswell MV, Singh V, et al; for ASIPP-IPM. Comprehensive evidence-based guidelines for interventional techniques in the management of chronic spinal pain. *Pain Physician.* 2009;12(4):699–802.
5. Bogduk N. International Spinal Injection Society guidelines for the performance of spinal injection procedures. Part 1: Zygapophysial joint blocks. *Clin J Pain.* 1997;13(4):285–302.
6. Van Zundert J, Vanelderden P, Kessels A, van Kleef M. Radiofrequency treatment of facet-related pain: evidence and controversies. *Curr Pain Headache Rep.* 2012;16(1):19–25.
7. Gore M, Sadosky A, Stacey BR, Tai KS, Leslie D. The burden of chronic low back pain: clinical comorbidities, treatment patterns, and health care costs in usual care settings. *Spine (Phila Pa 1976).* 2012;37(11):E668–E677.
8. Kaptan H, Yalçın ES, Kasımcan O. Correlation of low back pain caused by lumbar spinal stenosis and depression in women: a clinical study. *Arch Orthop Trauma Surg.* 2012;132(7):963–967.
9. Choma TJ, Schuster JM, Norvell DC, Dettori JR, Chutkan NB. Fusion versus nonoperative management for chronic low back pain: do comorbid diseases or general health factors affect outcome? *Spine (Phila Pa 1976).* 2011;36(Suppl 21):S87–S95.
10. Dreyfuss P, Halbrook B, Pauza K, Joshi A, McLarty J, Bogduk N. Efficacy and validity of radiofrequency neurotomy for chronic lumbar zygapophysial joint pain. *Spine (Phila Pa 1976).* 2000;25(10):1270–1277.
11. Geurts JW, van Wijk RM, Wynne HJ, et al. Radiofrequency lesioning of dorsal root ganglia for chronic lumbosacral radicular pain: a randomised, double-blind, controlled trial. *Lancet.* 2003;361(9351):21–26.
12. Leclaire R, Fortin L, Lambert R, Bergeron YM, Rossignol M. Radiofrequency facet joint denervation in the treatment of low back pain: placebo-controlled clinical trial to assess efficacy. *Spine (Phila Pa 1976).* 2001;26(13):1411–1416; discussion 1417.
13. van Wijk RM, Geurts JW, Wynne HJ. Long-lasting analgesic effect of radiofrequency treatment of the lumbosacral dorsal root ganglion. *J Neurosurg.* 2001;94(Suppl 2):227–231.
14. Masala S, Nano G, Mammucari M, Marcia S, Simonetti G. Medial branch neurotomy in low back pain. *Neuroradiology.* 2012;54(7):737–744.
15. Son JH, Kim SD, Kim SH, Lim DJ, Park JY. The efficacy of repeated radiofrequency medial branch neurotomy for lumbar facet syndrome. *J Korean Neurosurg Soc.* 2010;48(3):240–243.
16. Yilmaz C, Kabatas S, Cansever T, et al. Radiofrequency facet joint neurotomy in treatment of facet syndrome. *J Spinal Disord Tech.* 2010; 23(7):480–485.
17. Bogduk N, Long DM. The anatomy of the so-called “articular nerves” and their relationship to facet denervation in the treatment of low-back pain. *J Neurosurg.* 1979;51(2):172–177.
18. Mooney V, Robertson J. The facet syndrome. *Clin Orthop Relat Res.* 1976;115:149–156.
19. North RB, Han M, Zahurak M, Kidd DH. Radiofrequency lumbar facet denervation: analysis of prognostic factors. *Pain.* 1994;57(1):77–83.
20. Shealy CN. Percutaneous radiofrequency denervation of spinal facets. Treatment for chronic back pain and sciatica. *J Neurosurg.* 1975;43(4):448–451.
21. van Kleef M, Barendse GA, Kessels A, Voets HM, Weber WE, de Lange S. Randomized trial of radiofrequency lumbar facet denervation for chronic low back pain. *Spine (Phila Pa 1976).* 1999;24(18): 1937–1942.
22. Farrar JT, Young JP Jr, LaMoreaux L, Werth JL, Poole RM. Clinical importance of changes in chronic pain intensity measured on an 11-point numerical pain rating scale. *Pain.* 2001;94(2):149–158.
23. Munglani R. The longer term effect of pulsed radiofrequency for neuropathic pain. *Pain.* 1999;80(1–2):437–439.
24. Bogduk N, Dreyfuss P, Govind J. A narrative review of lumbar medial branch neurotomy for the treatment of back pain. *Pain Med.* 2009;10(6): 1035–1045.

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