

The Effect of Radiofrequency Neurotomy on Chronic Low Back Pain

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Study Design: A prospective study.

Purpose: To determine the success rate and duration of relief of radiofrequency neurotomy for lumbar facet joint pain.

Overview of Literature: There is a lack of effective treatment for chronic low back pain. Radiofrequency denervation appears to be an emerging technology, with substantial variations in use.

Methods: Fifty-eight patients underwent radiofrequent neurotomy on the posterior primary ramus for chronic low back pain. All patients with low back pain of more than 3 months duration, with or without non-radicular radiation to the buttock and hip, were included in the study. From October 2005 to December 2006, eligible patients underwent a standardized diagnostic work-up, which included the use of a visual analog scale (VAS), physical examination, review of imaging studies, and diagnostic blockades. Pain relief was assessed on the third day, and at 3 months and 6 months post-treatment, using the visual analog scale.

Results: There were 44 women and 14 men included in the study. The mean age was 57.7 years (range, 20~80 years). Radiofrequency neurotomy denervated three segments and a bilateral lesion in all patients. The visual analogue scale (VAS) scores on the third day (mean VAS score: 1.48) and 3 months (mean VAS score: 1.79) after treatment decreased significantly when compared with the pre-treatment scores (mean VAS score: 6.56). However, the final values of the VAS scores after 6 months were slightly increased as compared to the VAS scores measured at the beginning of the study (mean VAS score: 2.91). No cases of infection, new motor deficits, or new sensory deficits were identified.

Conclusions: We suggest that radiofrequency neurotomy offers an effective palliative management of lumbar facet pain. However, there is limited evidence that radiofrequency neurotomy offers short-term relief for chronic low back pain. Further high-quality randomized controlled trials are needed with larger patient numbers and more data on the long-term effects, for which current evidence is inconclusive.

Key Words: Lumbar facet joint, Chronic low back pain, Radiofrequency neurotomy

Introduction

In most patients, low back pain tends to resolve with either no treatment or only conservative treatment; however, there is a substantial group of patients who develop chronic pain. In most cases, the cause of the chronic low back pain remains obscure, and there is no specific treat-

ment available¹. The facet (zygapophysial) joint may be the cause in 15 to 40% of patients². The diagnosis of facet joint pain is probable when there is at least 50 to 75% relief of the targeted pain after local anesthetic blockade of the medial branches of the posterior rami of the spinal nerves that supply the painful joint (s), on two separate occasions (medial branch block)^{3,7}. The rationale of the use of lumbar medial neurotomy is that patients with facet joint pain

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should obtain complete relief of pain if the nerves that innervate the painful joint are coagulated⁸. The current study was undertaken to document the efficacy of lumbar medial branch neurotomy and the duration of the relief of pain under optimal conditions.

Materials and Methods

Fifty-eight patients (male: 14, female: 44) were selected from 1 October 2005 to 31 December 2006. To be eligible, patients had to be literate, were between 20 and 80 years-old, and had chronic low back pain for longer than 3 months duration. These patients were selected when the VAS score was more than 4, and the patients were receiving some kind of conservative treatment with various combinations of non-opioid medications and physical therapy. Neurological examinations of the patients found no abnormalities. On magnetic resonance imaging, nerve compression was not found. Patients with spinal stenosis, instability, spondylolisthesis, diabetes mellitus, tumor infiltration, coagulation disorders, clinical radiculopathy, other neurological abnormalities, or systemic inflammatory diseases, were excluded from the study, and the patients had to be positive for lumbar facet joint pain after controlled diagnostic blocks. For the first diagnostic block, 0.5 mL of 2% lidocaine was used to anesthetize each target nerve (L3, 4, 5). Once blocks were completed, patients were allowed to ambulate briefly and then to rest seated for 20 minutes, after which they were allowed to move around their bed while remaining at the clinic. At 1 hour after the procedure, we checked for relief of pain.

After confirmed positive diagnostic block tests, radiofrequency medial neurotomy was performed in the usual manner, and the patients were allowed to rest for 1 or 2 hours. VAS assessments were conducted 3 days, 3 months and 6 months after the neurotomy procedure.

Results

All patients with positive test results were found to be eligible for inclusion in the study. The mean VAS scores were 6.57 (range, 5~8) at pre-treatment, 1.48 on the third day after treatment, and 1.79 at 3 months. The VAS scores were found to have decreased significantly as compared with the pre-treatment scores, but at 6 months after treatment, the

mean VAS score was 2.91. The duration of pain relief was 6 months after treatment in our study. Eighteen patients were found to have an increased VAS score at 6 months. Fifteen out of 18 patients were physically active and three patients were found to have compression fractures of the lumbar spine due to osteoporosis. No patients had any complications.

Discussion

The rationale of the use of lumbar medial neurotomy is that patients with facet joint pain should obtain complete relief of their pain if the nerves that innervate the painful joint are coagulated⁸. The failure of Van Kleef et al.⁹ to secure this outcome consistently can be attributed to either of two factors: First, these investigators selected patients on the basis of single diagnostic blocks, whereas controlled studies have shown that single blocks carry a false-positive rate of 38%¹⁰. Therefore, patients without true facet joint pain may have been treated. Second, the investigators placed the electrodes at an angle to the target nerve, whereas laboratory studies have shown that the electrode must lie parallel to the nerve, if the nerve is to be maximally and optimally coagulated⁴. Consequently, failure to coagulate the target nerve adequately may have occurred in some patients in the study by van Kleef and colleagues⁹. The study population in the van Kleef et al.⁹ study included patients with chronic low back pain of more than 12 months duration, and patients that obtained at least 50% pain relief from a diagnostic dorsal ramus nerve block with a local anesthetic solution. The study population in the study by Jerome and Garrett¹¹ included patients with low back pain of longer than 3 months duration that fulfilled the criteria for facet-joint pain, and showed either good or equivocal response to local anesthetic injected into and around the appropriate painful joints. The inclusion criteria of the patients in the study by Leclaire et al.¹² was chronic low back pain of longer than 3 months duration with significant pain relief for at least 24 hours during the week after an intra-articular facet injection¹¹. Van Kleef et al.⁹ used the original Shealy technique. Leclaire et al.¹² used a modified version of the Shealy technique, but all of the investigators induced a radio-frequency lesion at 85°C for 80 to 90 seconds⁹. Pain intensity was reported in all of the studies. Van Kleef et al.⁹ and Leclaire et al.¹² assessed disorder specific outcomes, whereas van Kleef et al.⁹ also assessed the gener-

ic functional status. The follow-up time in the van Kleef et al study was 2 months, and the follow-up time in the Leclaire et al study was 3 months. At 2-months follow-up in the van Kleef et al.¹² study, the intervention group showed greater reductions in the VAS score⁹ and it was reported that radiofrequency neurotomy had a positive short-term effect. We found that this treatment was effective for 6 months. Kornick et al.¹³ reported that the incidence of complications after radiofrequency neurotomy was 1%, and they were minor complications in most cases. We found no complications in our study.

Conclusions

We suggest that radiofrequency neurotomy offers an effective palliative management of lumbar facet pain. However, there is limited evidence that radiofrequency neurotomy offers short-term relief for chronic low back pain. Further, high-quality randomized controlled trials are needed with larger patient numbers and more data on the long-term effects, for which current evidence is inconclusive.

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