International Journal of Medical Sciences
2010; 7(3):120-123

Research Paper

Endoscopic Facet Debridement for the treatment of facet arthritic pain – a novel new technique

Scott M.W. Haufe [1,3] ✉ and Anthony R. Mork [2,3]

1. Chief of Pain Medicine and Anesthesiology
2. Chief of Spine Surgery
3. MicroSpine, DeFuniak Springs, FL 32435, USA

✉ Corresponding author: Scott M.W. Haufe, M.D., 101 MicroSpine Way, DeFuniak Springs, FL 32435. Phone: 888-642-7677; Fax: 850-892-4212; Email: Haufe@MicroSpine.com

Received: 2010.03.29; Accepted: 2010.05.24; Published: 2010.05.25

Abstract

Study design: Retrospective, observational, open label.

Objective: We investigated the efficacy of facet debridement for the treatment of facet joint pain.

Summary of background data: Facet joint disease, often due to degenerative arthritis, is common cause of chronic back pain. In patients that don't respond to conservative measures, nerve ablation may provide significant improvement. Due to the ability of peripheral nerves to regenerate, ablative techniques of the dorsal nerve roots often provide only temporary relief. In theory, ablation of the nerve end plates in the facet joint capsule should prevent reinnervation.

Methods: All patients treated with endoscopic facet debridement at our clinic from 2003-2007 with at least 3 years follow-up were included in the analysis. Primary outcome measure was percent change in facet-related pain as measured by Visual Analog Scale (VAS) score at final follow-up visit.

Results: A total of 174 people (77 women, 97 men; mean age 64, range 22-89) were included. Location of facet pain was cervical in 45, thoracic in 15, and lumbar in 114 patients. At final follow-up, 77%, 73%, and 68% of patients with cervical, thoracic, or lumbar disease, respectively, showed at least 50% improvement in pain. Mean operating time per joint was 17 minutes (range, 10-42). Mean blood loss was 40 ml (range, 10-100). Complications included suture failure in two patients, requiring reclosure of the incision. No infection or nerve damage beyond what was intended occurred.

Conclusions: Our results demonstrate a comparable efficacy of endoscopic facet debridement compared to radiofrequency ablation of the dorsal nerve branch, with durable results. Large scale, randomized trials are warranted to further evaluate the relative efficacy of this surgical treatment in patients with facet joint disease.

Key words: vertebral arthritis, facet syndrome, back pain, minimally invasive, nerve ablation

INTRODUCTION

Facet joint disease, often due to degenerative arthritis, is common cause of chronic back pain. Among low back pain patients, facet joint disease is present in an estimated 7 to 75% [6]. In epidemiological surveys, 40-45% of patients had evidence of facet joint pain based on anesthetic nerve blocks [9 10].

Conservative therapy for facet joint pain consists of rest, physical therapy, and short-term use of non-

steroidal anti-inflammatory drugs or oral steroids [18]. Local steroid injections and trigger point injects may provide rapid relief that continues to improve over 5-7 days, but lacks evidence in the form of well designed clinical trials [6] [18] [14] [16] [4]. With steroid injection, pain relief can last anywhere from 2 months to 2 years, but a subset of patients will have no significant benefit [18].

In patients with continued pain despite these measures, nerve ablation may provide significant relief. Rhizotomy is commonly performed by radiofrequency ablation (RFA); cryo-denervation has been reported in Europe [2] [17] [1]. Ablation of the dorsal nerve roots supplying the painful facet joint provides significant relief, but due the innate ability of peripheral nerves to regenerate, improvement is impermanent. Theoretically, removal of the capsular tissue within the joint, which contains the peripheral nerve endplate receptors, should prevent nerve regeneration. Without endplate receptors present within the joint, dorsal root axons should be incapable of re-innervating the joint.

In this study we investigate the long-term efficacy of facet debridement for the treatment of chronic back pain originating in the facet joint.

MATERIALS AND METHODS

Patient enrollment and evaluation

All patients treated with endoscopic facet debridement at our institution from 2003-2007 with at least 3 years follow-up were included in the analysis. Patients were diagnosed based on response to facet injections as follows: 1 ml of 0.25% bupivacaine was injected using a 22 gauge needle with fluoroscopic guidance into the joints near their reported pain. Patients with at least 75% improvement in their back pain immediately following injection were diagnosed with facet pain.

Primary outcome measure was percent change in facet-related pain as measured by Visual Analog Scale (VAS) score at final follow-up visit. Secondary outcome was change in OSWESTRY disability index from preoperative evaluation to final follow-up.

Surgical procedure

The procedure commenced as follows: the patient is appropriately prepped and draped. Using fluoroscopic guidance, the facet joints are identified. An incision of between ½ to ¾ of an inch is made in the skin at the entry site. A guide wire is inserted down to the facet joint and then secured into the joint surface. A dilation system is inserted over the guide wire and used to dilate the tissues and to allow adequate working environment. Various final dilation sizes were utilized during the study with a range of 7 to 14mm. The various sizes were utilized to determine the minimal size needed to achieve the procedure. Through the final dilation portal, pituitaries are then used to remove the capsular tissue under direct observation via a standard laparoscopic scope system. The scope size varied based on the size of the portal and ranged from 2.7 to 7mm in diameter. Electrocautery and holmium lasers are also used to complete the denuding of the joint surface to insure that the complete capsular region was removed. Once the joint is completely denuded of capsular tissue, the dilation system is removed and the site closed with subcutaneous sutures. Each joint takes approximately 15 to 20 minutes to properly treat. A maximum of 6 joints were treated at any time; most patients required treatment of 4 joints: 116 people had 4 joints treated (bilateral joints times two levels), 32 had 6 joints or 3 levels bilateral, and 26 had one level bilateral or two joints treated. The reason the maximum treated joints was 6 is due to time restraints of the surgery.

RESULTS

A total of 174 people (77 women, 97 men; mean age 64, range 22-89) were included. Length of follow-up was at least 3 years with a maximum of 6 years. Location of facet pain was cervical in 45, thoracic in 15, and lumbar in 114 patients.

Surgical times varied based on the number of joints treated. Mean operating time per joint was 17 minutes (range, 10-42). Mean blood loss was 40 ml (range, 10-100). Complications included suture failure in two patients, requiring re-closure of the incision. No infection or nerve damage beyond what was intended occurred.

Table 1 reports percent change in VAS at follow-up. A total of 77%, 73%, and 68% of patients with cervical, thoracic, or lumbar disease, respectively, showed at least 50% improvement in pain at last follow-up. Table 2 reports change in Oswestry score from preoperative evaluation to final follow-up. Overall, 76%, 60%, and 75% of patients with cervical, thoracic, or lumbar facet disease, respectively, had at least 50% improvement.

Table 1. Percent change in VAS pain score at long-term follow-up according to location of facet joint pain.

% Change VAS	No Change (N)	1-24% (N)	25-49% (N)	50-74% (N)	75-100% (N)	Total (N)
Cervical	5	3	2	2	33	45
Thoracic	4	0	0	3	8	15
Lumbar	11	11	15	15	62	114

Table 2. Percent change in Oswestry Disability Index at long-term follow-up according to location of facet joint pain.

% Change Oswestry	-1-25%	No Change (N)	1-24% (N)	25-49% (N)	50-74% (N)	75-100% (N)	Totals (N)
Cervical	1	3	2	5	8	26	45
Thoracic	0	5	1	0	3	6	15
Lumbar	1	8	7	13	17	68	114

In comparison of the endoscopic surgery approach to conventional facet joint therapies, out of the 114 lumbar facet patients, 72 patients underwent facet injections elsewhere as treatment prior to considering the endoscopic option. The facet injections in these 72 patients gave 50 to 100% relief of their pain in 86% of the patients with a median relief period of 3 months. The range of relief varied from zero days to up to 13 months for the facet injection group. None of the lumbar facet injection patients received permanent relief. Of the 114 lumbar facet patients, 26 underwent radiofrequency lesioning of the dorsal rami nerves prior to considering the endoscopic surgery option. Of these 26 patients, 14 patients had 50 to 100% relief with a median period of pain relief being 5 months. The range of relief for the radiofrequency group was from zero days to 16 months for all 26 patients who underwent the radiofrequency procedure. Of the 14 patients who revealed 50% or greater improvement from the radiofrequency procedure, the length of improvement varied from 3 months to 16 months. Again, no one in the radiofrequency group developed permanent relief of their pain. Thus, the endoscopic facet procedure offered long-term relief beyond what was seen when the patients underwent facet injections or rhizotomy procedures.

DISCUSSION

Studies of radiofrequency ablation (RFA) for facet pain report rapid symptomatic relief. Success rates range from 21-71%. However, most studies are small in size, do not include a control group, and have limited follow-up. Because of the capacity for peripheral nerves to regenerate, long term outcome following ablation of the dorsal nerve root or its branches should be evaluated. Cho et al. [3] reported a 71% success rate in 324 patients at a mean follow-up of 22.5 months. Tzaan et al. [19] reported good results at a mean follow-up of 5 months in 41% of 90 patients. Schaerer [13] reported good to excellent results in 50% of patients with cervical facet disease and 35% of patients with lumber disease after a mean follow-up of 13.7 months. Iwatsuki et al. [5] reported significant pain relief in 71% of 21 patients at one year follow-up with laser denervation of the dorsal facet capsule. Li et al. [8] treated 5 patients with RFA of the dorsal rami. Three patients had durable response after 6 to 16 months follow-up; two patients had no pain relief. Other authors have reported similar success rates but with limited or no follow-up data [7 12 15 11].

Cryorhizotomy is reported in to be of similar efficacy. In a study of 76 patients treated via CT-guided cryorhizotomy of the dorsal nerve medial branch, Staender et al. [17] reported a mean VAS pain score reduction of 3.3 at six months follow-up; 40% of patients had relief for at least 12 months, and mean duration of pain relief was 14 months. Barlocher et al. [1] treated 50 patients with cryorhizotomy of the medial branch. At 1-year follow up, 62% had good results.

Our results are similar to those reported with RFA and cryorhizotomy. Importantly, the majority of our patients reported significant pain improvement for at least 36 months postoperatively. This durable effect is particularly promising, given the propensity for facet joint pain to return following dorsal root rhizotomy. We speculate that the direct visualization of the joint allows better de-innervation of the joint and removal of the entire end-plate receptors that adhere to the bone and capsular tissue.

Limitations of the current study include a lack of comparison group and lack of blinding. A randomized, controlled clinical trial would be ideal to further verify the efficacy we report here. We chose to include only patients with long-term follow-up in order to provide data on the duration of pain relief. The exclusion of patients with less than 3 years follow-up may bias our results, as patients with unsuccessful results may have left our clinic and received therapy elsewhere.

In conclusion, facet joint pain is a significant

source of chronic back pain and responds well to nerve ablation techniques. Our results demonstrate efficacy of endoscopic facet debridement comparable to the more commonly used RFA, with results durable for at least 3 years. Larger scale trials with a control group are warranted to further evaluate the relative efficacy of this surgical treatment in patients with facet joint disease.

Conflict of Interest

The authors have declared that no conflict of interest exists.

References

1. Barlocher CB, Krauss JK, Seiler RW. Kryorhizotomy: an alternative technique for lumbar medial branch rhizotomy in lumbar facet syndrome. *J Neurosurg* 2003;98:14-20.
2. Birkenmaier C, Veihelmann A, Trouillier HH, et al. Medial branch blocks versus pericapsular blocks in selecting patients for percutaneous cryodenervation of lumbar facet joints. *Reg Anesth Pain Med* 2007;32:27-33.
3. Cho J, Park YG, Chung SS. Percutaneous radiofrequency lumbar facet rhizotomy in mechanical low back pain syndrome. *Stereotact Funct Neurosurg* 1997;68:212-7.
4. Gorbach C, Schmid MR, Elfering A, et al. Therapeutic efficacy of facet joint blocks. *AJR Am J Roentgenol* 2006;186:1228-33.
5. Iwatsuki K, Yoshimine T, Awazu K. Alternative denervation using laser irradiation in lumbar facet syndrome. *Lasers Surg Med* 2007;39:225-9.
6. Kalichman L, Hunter DJ. Lumbar facet joint osteoarthritis: a review. *Semin Arthritis Rheum* 2007;37:69-80.
7. Koizuka S, Saito S, Kawauchi C, et al. Percutaneous radiofrequency lumbar facet rhizotomy guided by computed tomography fluoroscopy. *J Anesth* 2005;19:167-9.
8. Li G, Patil C, Adler JR, et al. CyberKnife rhizotomy for facetogenic back pain: a pilot study. *Neurosurg Focus* 2007;23:E2.
9. Manchikanti L, Pampati V, Fellows B, et al. Prevalence of lumbar facet joint pain in chronic low back pain. *Pain Physician* 1999;2:59-64.
10. Manchikanti L, Pampati V, Fellows B, et al. The diagnostic validity and therapeutic value of lumbar facet joint nerve blocks with or without adjuvant agents. *Curr Rev Pain* 2000;4:337-44.
11. Ogsbury JS3rd, Simon RH, Lehman RA. Facet "denervation" in the treatment of low back syndrome. *Pain* 1977;3:257-63.
12. Savitz MH. Percutaneous radiofrequency rhizotomy of the lumbar facets: ten years' experience. *Mt Sinai J Med* 1991;58:177-8.
13. Schaerer JP. Radiofrequency facet rhizotomy in the treatment of chronic neck and low back pain. *Int Surg* 1978;63:53-9.
14. Schwarzer AC, Aprill CN, Bogduk N. The sacroiliac joint in chronic low back pain. *Spine (Phila Pa 1976)* 1995;20:31-7.
15. Silvers HR. Lumbar percutaneous facet rhizotomy. *Spine (Phila Pa 1976)* 1990;15:36-40.
16. Slipman CW, Lipetz JS, Plastaras CT, et al. Fluoroscopically guided therapeutic sacroiliac joint injections for sacroiliac joint syndrome. *Am J Phys Med Rehabil* 2001;80:425-32.
17. Staender M, Maerz U, Tonn JC, et al. Computerized tomography-guided kryorhizotomy in 76 patients with lumbar facet joint syndrome. *J Neurosurg Spine* 2005;3:444-9.
18. Stone JA, Bartynski WS. Treatment of facet and sacroiliac joint arthropathy: steroid injections and radiofrequency ablation. *Tech Vasc Interv Radiol* 2009;12:22-32.
19. Tzaan WC, Tasker RR. Percutaeous radiofrequency facet rhizotomy--experience with 118 procdedures and reappraisal of its value. *Can J Neurol Sci* 2000;27:125-30.