
ORIGINAL ARTICLE

The Prevalence of Facet Joint-Related Chronic Neck Pain in Postsurgical and Nonpostsurgical Patients: A Comparative Evaluation

Laxmaiah Manchikanti, MD*; Kavita N. Manchikanti, BA*;

Vidyasagar Pampati, MSc*; Doris E. Brandon, CST*; James Giordano, PhD[†]

*Pain Management Center of Paducah, Paducah, Kentucky; [†]Georgetown University Medical Center, Washington, DC, U.S.A.

■ Abstract

Background: Facet (zygapophysial) joints may be clinically important sources of chronic cervical spinal pain. Previous studies have demonstrated the value and validity of controlled, comparative local anesthetic blocks in the diagnosis of facet joint pain, and reported an overall prevalence of 36% to 67% facet joint involvement in cervical spinal pain. The reports of lumbar facet joint-involvement in postsurgery syndrome have been shown to be highly variable with prevalence ranging from 8% to 32%. To date, however, the prevalence of postsurgical facet joint-related pain in the cervical spine has not been evaluated. In light of this, the present retrospective study was conducted to assess and compare the prevalence of chronic postsurgical facet joint cervical spinal pain to nonsurgical, chronic cervical facet joint pain.

Methods: Patients presenting with chronic neck pain were studied. The procedures were performed by a single physician in an interventional pain management ambulatory

surgery center. The prevalence of cervical facet joint pain in postsurgical patients was assessed and compared to nonsurgical patients.

Results: A total of 251 patients (45 postsurgery vs. 206 nonsurgical patients) with chronic persistent neck pain were evaluated using controlled, comparative local anesthetic blocks in accordance with IASP criteria. The prevalence of the cervical facet joint pain and false-positive rate of single blocks in postsurgical patients were 36% and 50% compared with 39% and 43% in nonsurgical patients.

Conclusions: Cervical facet joints are clinically important pain generators in a significant proportion of patients with chronic persistent neck pain after surgical intervention(s). The prevalence of cervical facet joint pain was similar in both postsurgical and nonsurgical patients. ■

Key Words: facet joint pain, cervical facet or zygapophysial joints, medial branch blocks, comparative local anesthetic blocks, false-positive response, postsurgery syndrome

Address correspondence and reprint requests to: Laxmaiah Manchikanti, MD, 2831 Lone Oak Road, Paducah, KY 42003, U.S.A. E-mail: drm@apex.net.

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INTRODUCTION

Cervical postsurgery syndrome is a cluster of clinical syndromes that can occur following cervical spinal surgery. Obviously, such persistent pain fails to achieve

the therapeutic outcomes expected by both patient(s) and physician(s), and can incur increased cost and burden to patients and the healthcare system.¹⁻⁴ It becomes important to define the source(s) of postsurgical spinal pain so as to better develop and implement therapeutic strategies to enhance patient response, decrease disability and provide durable pain relief. Patients with persistent pain following spine surgery are commonly seen in interventional pain management settings.¹⁻⁶ Approximately 15% to 40% of patients present with persistent disabling neck pain after spine surgery. These statistics reflect an overall trend for increasing persistent postsurgical pain as a consequence of a progressive increase in surgical interventions including discectomies, decompressions, and spinal fusions.^{5,7}

Animal models of postlaminectomy syndrome have shown that epidural and perineural scarring, nerve root adherence to the underlying disc and pedicle, and paraspinal muscle spasms can all contribute to pain behaviors, and tactile allodynia.⁷⁻⁹ Putative causes of spinal postsurgery syndrome include acquired stenosis, adjacent segment degeneration, internal disc disruption, recurrent disc herniation, retention of disc fragment(s), spondylolisthesis, epidural or intraneural fibrosis, degenerative disc disease, radiculopathy, deconditioning, sacroiliac joint pain, discitis, arachnoiditis, pseudoarthrosis, segmental instability, and facet joint pain.^{1,2,4-6,8,10,11} Many of these etiologies are interrelated and arise from biomechanical derangement at the facet joints. Facet joint-related chronic pain following lumbar surgery has been shown in approximately 8% to 32% of patients.^{10,11} While there is extensive literature to demonstrate that the overall prevalence of cervical facet joint involvement in chronic neck pain is 36% to 67% (with false-positive rates varying from 27 to 63%),^{1,12-26} the prevalence of postsurgical cervical facet joint pain is not known. The present retrospective evaluation was conducted to assess and compare the prevalence of chronic postsurgical facet joint pain to nonsurgical, chronic cervical facet joint pain.

METHODS

The purpose of this retrospective evaluation was to compare the prevalence of cervical facet joint pain in patients with chronic neck pain, with or without surgery, by means of diagnostic controlled, comparative, local anesthetic blocks. In total, 251 consecutive patients with persistent neck pain requiring diagnostic facet joint nerve blocks were evaluated and treated in an interventional pain management practice setting.

Patients were managed by a single physician in a nonuniversity, private practice setting in the United States. The procedures were performed in an interventional pain management ambulatory surgery center. The practice provides comprehensive, interventional pain management services. Based on the policy of the Institutional Review Board of the Ambulatory Surgery Center, an approval was not required because of: (1) the retrospective nature of the study, (2) the fact that the data were collected by individuals normally having access to the data as part of routine care, (3) the privacy of the patients was protected per the Health Insurance Portability and Accountability Act regulations, and (4) data collection had no effect on patient care. The nature of the (diagnostic) intervention and the potential future use of data were explained to all patients; all patients provided written informed consent prior to the performance of any/all procedures.

Inclusion Criteria

Patients were divided into two groups: (1) patients without a history of surgical intervention were included in the nonsurgical group, and (2) patients who underwent surgical interventions at least 1 year prior to evaluation were included in the postsurgical group. Other criteria included consecutive patients undergoing controlled, comparative local anesthetic blocks who were 18 to 90 years of age and had persistent pain (ie, for at least 6 months) that was non-specific rather than radicular in nature. Patients with disc-related pain with radicular symptoms, or pain that involved predominantly the upper extremity were excluded based on radiologic or neurologic testing. Neurologic testing included objective findings with reflex suppression, motor weakness, and sensory dysfunction.

Patient evaluation included completion of a standard comprehensive pain management questionnaire, history, physical examination, and evaluation of the results of all procedures and investigations. All patients had failed prior conservative management (eg, physical therapy, exercise program, drug therapy, and bedrest). The study period lasted from January 2004 to March 2006.

Procedures

With appropriate informed consent, cervical facet joint pain was first investigated in all patients with diagnostic blocks using 1% lidocaine. Patients with lidocaine-positive results were further studied using 0.25% bupivacaine.

vacaine on a separate occasion, usually 3 to 4 weeks after the first injection. The blocks were performed on the ipsilateral side in patients with unilateral pain, or bilaterally in patients with bilateral or axial pain. All blocks were performed at a minimum of two levels to block a single joint. Target joints were identified by the pain pattern, local or paramedian tenderness over the area of the facet joints, and provocation/reproduction of pain with deep pressure. The blocks were performed with intermittent fluoroscopic visualization using a 22-gauge, 2-inch spinal needle at each of the indicated medial branches.

In all cases, intravenous access was established and light sedation with midazolam was offered to all patients. Each facet joint nerve was infiltrated with 0.5 ml of 1% lidocaine, or 0.25% bupivacaine. Following each block, patients were examined and asked to perform previously painful movements. A positive treatment response was defined as at least an 80% reduction of pain with ability to perform previously painful movements (assessed using a 1 to 10 verbal numeric pain rating scale). Pain relief had to last at least 2 hours when lidocaine was used, and at least 3 hours (or longer than the duration of relief produced by lidocaine) when bupivacaine was used. Any other responses were considered to be negative outcomes.

All patients assessed to have a positive treatment response to lidocaine blocks subsequently underwent bupivacaine blocks.

Statistical Methods

Data were recorded on a Microsoft® Access® 2003 database. The SPSS version 9.0 Statistical Package was used to generate frequency tables. The prevalence and 95% confidence intervals were calculated according to the methods described by Miettinen.²⁷ Differences in proportion of facet joint pain between populations of postsurgical and nonsurgical patients were evaluated using the chi-squared test. Fischer's exact test was used whenever the expected value was less than 5. Results were considered statistically significant if the *P* value was < 0.05.

RESULTS

A total of 251 patients with chronic persistent neck pain (45 patients following surgical intervention(s); 206 nonsurgical patients) were evaluated using controlled, diagnostic local anesthetic blocks to evaluate facet joint involvement.

Demographic Characteristics

Table 1 illustrates the demographic characteristics of patients in this study. There were no significant differences noted in any of the demographic parameters recorded.

Of the 45 postsurgery patients, anterior fusion was performed in 35 patients while posterior fusion was performed in 10 patients. The majority of the patients (34) underwent a single surgery, nine patients underwent two surgeries, and three patients underwent three or more surgical interventions.

Prevalence

Table 2 illustrates the results of diagnostic blocks evaluating facet joint pain in the cervical spine. Lidocaine blocks were performed in each of the 206 nonsurgical and 45 postsurgical patients. Thirty-two patients reported a definite response to initial lidocaine blocks in the postsurgical group, and 143 patients reported positive response to lidocaine in the nonsurgical group. All lidocaine-positive patients underwent subsequent bupivacaine blocks. Of these, 16 postsurgical patients were positive for a confirmatory block with bupivacaine, and 81 nonsurgical patients showed positive confirmation of bupivacaine block.

Based upon these results, the calculated prevalence of facet joint-related chronic cervical pain in postsurgical patients was determined to be 36%, while the prevalence of facet joint-related cervical pain in nonsurgical patients was 39%.

False-Positive Rates

For purposes of calculating false-positive rates, all patients with no response to lidocaine were assumed

Table 1. Demographic Characteristics

	<i>n</i> = 251	
	Nonsurgery (206)	Postsurgery (45)
Gender		
Male	28% (58)	47% (21)
Female	72% (148)	53% (24)
Age (years)		
Range	17–78	24–77
Mean ± SD	45 ± 14.0	50 ± 11.2
Height (inches)		
Mean ± SD	66.1 ± 3.8	67.6 ± 4.3
Weight (pounds)		
Mean ± SD	181 ± 47.7	179 ± 39.4
Bilateral	73% (150)	67% (30)
Left	15% (31)	16% (7)
Right	12% (25)	18% (8)

Table 2. Results of Cervical Facet Joint Nerve Blocks (Single Block With Lidocaine and Double Block With Lidocaine and Bupivacaine)

	Nonsurgery (206) Double [†]		Postsurgery (45) Double [†]	
	Positive	Negative	Positive	Negative
Single*				
Positive	81	62	16	16
Negative		63		13
Prevalence	39% (95% CI, 33–46%)		36% (95% CI, 22–51%)	
False-positive rate	43% (95% CI, 35–52%)		50% (95% CI, 32–68%)	

*Total number of patients with single blocks with no surgery were 143 patients (ie, 81 ± 62) and postsurgery were 32 (16 + 16) with positive responses with lidocaine blocks.

[†]With double blocks, positive responses were seen in 81 patients with no surgery and 16 patients with postsurgery.

to be true-negatives, and all patients with a positive response to lidocaine and negative response to bupivacaine were considered to be false-positives. The false-positive rate to a single lidocaine block was 43% in the nonsurgical group, and 50% in the postsurgical group.

Adverse Effects

No major adverse effects were noted.

DISCUSSION

This retrospective evaluation of patients with chronic nonspecific neck pain with or without surgery demonstrated a similar prevalence of facet joint pain in postsurgical and nonsurgical patients. The false-positive rates were also similar between groups in this consecutive series of patients.

A number of potential factors may be considered limitations of this study; these include: (1) its retrospective nature, (2) the controlled, comparative local anesthetic blocks used instead of placebo blocks, (3) the use of a single operator, and (4) uneven group sizes. Yet, we feel that each of these factors may be justified, and/or their potential limiting effect(s) reasonably addressed.

First, although the study was retrospective, the data can be generalized and compared to those derived from studies of the overall prevalence of facet joint involvement in chronic neck pain.^{12,13,16–18,21,22} The generalizability of this retrospective evaluation provides a relative measure of the extent that these findings are applicable to populations of patients seen in private practice(s), and, in this way, provide meaningful data illustrating the prevalence of cervical facet joint pain in both postsurgical and nonsurgical patients that present with chronic neck pain.

Second, the use of controlled, comparative local anesthetic blocks for diagnostic purposes is well-established and feasible in clinical settings.^{12–26} In contrast, placebo-

controlled (ie, “sham”) blocks are not feasible or ethical in clinical settings in the United States. Third, the fact that all procedures were performed by a single physician avoided technical variations and inconsistencies (ie, served as a single-operator control) providing congruity of technique (in all phases of intervention), uniformity of results, and reduced false-positive rates. Finally, uneven samples have previously had no clinical or statistical significance.²⁸

Cervical facet joints have been shown to be a source of chronic spinal pain by means of diagnostic techniques of known reliability and validity.^{12–19,21–26} The blocks of cervical facet joints prove or disprove speculation that the target joint is a source of the patient’s pain.²³ If pain is relieved following the anesthetization or blockade of medial branches of the dorsal rami that innervate the target joint, the joint is considered to be a pain generator. However, single blocks are not reliable. True-positive responses are determined by performing controlled blocks, either in the form of a placebo injection of normal saline, or as more commonly in the United States, by using comparative local anesthetic blocks on two separate occasions—employing a protocol by which the same joint is anesthetized using local anesthetics with different durations of action.²³ The value and validity of medial branch, and comparative local anesthetic blocks in the diagnosis of cervical facet joint pain has been well demonstrated.^{12–19,21–26,29} Further, because of the lack of clinical features or diagnostic imaging that can determine whether a facet joint is painful or not, controlled blocks appear to be the only reliable tool in the diagnosis of chronic neck pain,^{21–26,29–32} (although this remains controversial).³³ Once the facet joints have been accurately identified as the site of pain generation, there is abundant evidence to demonstrate that pain relief can be effectively and efficiently provided by interventional techniques of known reliability and validity.^{1,34–38}

CONCLUSION

This study utilized comparative local anesthetic (eg, lidocaine and bupivacaine) blocks to evaluate the prevalence of facet joint-related chronic neck pain in postsurgical and nonsurgical patients. The prevalence of cervical facet joint-related pain and false-positive rates with single lidocaine blocks were similar in nonsurgical and postsurgical patients. These results support that: (1) facet joints are a viable source of chronic neck pain in both postsurgical, and nonsurgical patients, (2) comparative local anesthetic blocks can effectively discriminate cervical facet joint pain, and (3) such accurate diagnosis is an important step toward subsequent pain control using therapeutic interventional techniques.

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