

Original Contribution

Is There Correlation of Facet Joint Pain in Lumbar and Cervical Spine? An Evaluation of Prevalence in Combined Chronic Low Back and Neck Pain

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Among the chronic pain problems, pain emanating from cervical and lumbar regions, independently or in combination, constitutes a significant and frequently encountered problem in interventional pain management practices.

This study was designed to test the assumption that patients presenting with chronic low back pain of lumbar facet joint origin may also present with chronic neck pain of facet joint origin. Considering that many studies show the prevalence of facet joint involvement in chronic low back pain as ranging from 15% to 45% compared to prevalence of involvement of cervical facets in chronic neck pain, ranging from 54% to 60%, we sought to evaluate the correlation between lumbar facet joint to cervical facet joint pain.

One hundred twenty consecutive patients with chronic neck

and low back pain were evaluated utilizing controlled diagnostic blocks with lidocaine and bupivacaine. The results showed prevalence of cervical facet joint pain in 67% of the patients with a false-positive rate of 63% with a single block, whereas the prevalence of lumbar facet joint pain was seen in 40% of the patients with a 30% false-positive rate with a single block in patients presenting with chronic low back and neck pain. There was also significant correlation noted with 94% of the patients with confirmed lumbar facet joint pain also presenting with cervical facet joint pain.

Keywords: Chronic low back pain, chronic neck pain, lumbar facet joints, cervical facet joints, zygapophysial joints, controlled diagnostic blocks, false-positive rate, prevalence

The zygapophysial or facet joints are paired diarthrodial articulations between posterior elements of the adjacent vertebrae (1-3). These joints are formed by the articulation of the inferior articular processes of one vertebra with the superior articular processes of the next vertebrae. It has been assumed that degeneration of the disc and facet joints would lead to low back pain and neck pain. These assumptions were based on the pathogenesis of

degenerative cascade in the context of three joint complex that involves the articulation between two vertebrae consisting of the intervertebral disc and adjacent facet joints, as changes within each member of this joint complex will result in changes in others in lumbar and cervical spine (4-9). The prevalence of disc degeneration, spondylosis and facet joint osteoarthritis increase with increasing age (10). Sambrook et al (11) showed simultaneous disc degeneration in cervical and lumbar spine. Similarly, spondylosis is also common in cervical and lumbar spine. Spondylosis is often used to describe vertebral osteophytosis secondary to degenerative disc disease or osteophytosis of the facet joints. But, spondylosis only accurately describes vertebral osteophytosis secondary to degenerative disc disease. Osteophytes occurring at the facet joints are different from osteophytes occurring on the vertebral margins adjacent to the disc. However, radiographic changes of osteoarthritis have been shown to be equally common in patients with and without low back pain and degenerative joints seen on computed tomography (CT) are not always painful, even though some studies report severely degenerated joints as being more likely to be symptomatic.

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Funding: No financial support was obtained for this study.

Kuslich et al (12) identified facet joints, ligaments, fascia, muscles, intervertebral discs and nerve root dura as tissues capable of transmitting pain in the low back. However 80 years earlier, the concept that facet joints are involved in the etiology of low back pain was described by Goldthwait in 1911 (13). Since then, multiple investigators have implicated zygapophysial joints as cause of low back and neck pain (14). Zygapophysial or facet joints have been implicated as the source of chronic pain in 15% to 45% of patients with chronic low back pain (15-21) and 54% to 60% of patients with chronic neck pain (22-24). The mechanism of chronic neck pain and low back pain, specifically secondary to facet joints, continues to be controversial. Kirkaldy-Willis et al (4) described the pathogenesis of degenerative changes in the aging spine, whereas Handel et al (9) described a structural degenerative cascade for the cervical spine. In this model, degenerative cascade is viewed in a context of three-joint complex, with involvement of changes in the disc structure and composition paralleling changes in the articular cartilage and ligaments of joints. Thus, it is reasonable to assume that in a patient suffering with neck and low back pain, the causative structures of that pain may be the same in both regions, either discs or facet joints. The potential for correlation of pain generators in cervical and lumbar spine is exemplified by demonstration of similar degeneration of disc in cervical and lumbar spine in twins (11).

The correlation of facet joint pain in patients with chronic neck and low back pain has not been evaluated. It was also shown that in interventional pain management settings, combined incidence of lumbar and cervical pain is significant with involvement of at least two regions in 56% of the patients and three regions in 22% of the patients (25). Thus, it is conceivable that the patients with chronic low back pain of facet joint origin, will likely also present with cervical facet joint involvement if they present with both complaints. This study was undertaken to evaluate the prevalence and correlation of facet joint pain in patients with chronic low back pain and neck pain.

METHODS

The study was designed to evaluate 120 consecutive patients presenting with complaints of chronic low back pain and neck pain, in a non-university setting, in one private comprehensive interventional pain management practice. Inclusion criteria included patients of 18 years to 90 years of age, those who exhibited no neurological deficits, those who had pain for at least 6 months, those

who presented without a definite diagnosis based on findings of radiologic or neurologic testing and those who have failed conservative management. Conservative management included physical therapy, chiropractic, exercises, drug therapy, bedrest, etc., which has failed to provide significant improvement either with the neck or low back pain. Evaluation of the patients included completion of a comprehensive pain management questionnaire; history, physical examination and evaluation of the results of all procedures and investigations. All the patients consented and participated in the study after the nature of the study and the potential hazards of the procedures were explained to them.

Facet joints were investigated in all patients with diagnostic blocks using lidocaine 1%, initially followed by bupivacaine 0.25% on separate occasions, usually 3 to 4 weeks apart. Injectate was prepared by mixing equal volumes of Sarapin to 2% lidocaine and 0.5% bupivacaine, with or without addition of 2 mg. of methylprednisolone to each mL of mixture. The blocks were performed on the ipsilateral side in patients with unilateral pain or bilaterally in patients with bilateral or axial pain. Blocks were performed at two levels at least to block a single joint. Target joints were identified by either or combination of the history of pain pattern, local paramedian or tenderness over the area overlying facet joints and reproduction of symptomatology with deep pressure. Blocks were performed under fluoroscopic visualization with a 22-gauge, 3.5-inch spinal needle under intermittent fluoroscopy at each of the medial branches at the L1-L4 and L5 dorsal ramus in the lumbar spine and with a 22-gauge, 2-inch spinal needle under intermittent fluoroscopy at each of the medial branches in the cervical spine. Each nerve was infiltrated with 0.5 mL of either 1% or 0.25% bupivacaine. A definite response was defined as relief of at least 80% in the symptomatic area. Following each block, the patient was examined and previously painful movements were performed. In order to be considered positive, the response to a block has to last at least 2 hours or longer when lidocaine was used; and either longer than the duration of effect from lidocaine, or at least 3 hours, when bupivacaine was used.

Intravenous access and mild sedation with midazolam were carried out in all the patients.

Data were recorded on a database using Microsoft® Access. The SPSS version 9.0 statistical package was used to generate frequency tables.

Table 1. Duration, onset distribution of pain and number of facet joints blocked in cervical and lumbar regions

	Cervical	Lumbar
Duration of pain (months)	111 ± 10.8	127 ± 11.4
Onset of pain		
Gradual	58%	51%
Following an incident	42%	49%
Distribution of pain		
Bilateral	70%	60%
Left	12%	20%
Right	18%	20%
Number of joints blocked		
Four	38%	0%
Three	47%	32%
Two	15%	68%

RESULTS

Total number of patients studied were 120. Gender distribution was 30% male vs 70% female. Mean age was 43 + 1.2 years with a range of 20 to 80 years. Mean height was 66 + 0.3 inches with a range of 56 to 76 inches. Mean weight was 175 + 4.2 lbs. with a range of 103 to 336 lbs. Table 1 illustrates salient characteristics of low back and neck pain with duration, mode of onset, and distribution. Number of joints blocked were 2 to 4, with 3 joints blocked in 47% of patients in cervical spine, with 2 joints blocked in 68% of patients in lumbar spine. Forty-eight percent of patients were treated with bilateral facet

joint blocks in both areas, only 4% of patients with left-sided blocks in both of regions and only 5% of patients with right-sided blocks in cervical and lumbar regions.

Table 2. Results of cervical facet joint nerve blocks (single blocks with lidocaine and double blocks with lidocaine and bupivacaine)

Single Block	Double Blocks	
	Positive	Negative
Positive	80	25
Negative		15
Prevalence	67%(95% CI 58% , 75%)	
False-positive rate	63%(95% CI 48% , 78%)	

Table 2 illustrates the results of evaluation of facet joint pain in cervical spine. One hundred and five or 88% of the patients reported a definite response to lidocaine blocks. Confirmatory blocks with bupivacaine were performed in each of these 105 patients. Of this group, 80 patients i.e., 67% of total sample or 76% of lidocaine-positive group reporting definite response with improvement in their pain. This latter group provides a prevalence rate of facet joint pain for patients with chronic neck pain presenting to an interventional multidisciplinary private pain management practice of 67% (95% CI, 58%, 75%). For the purposes of calculating false-positive rate, all the patients who had no response to lidocaine were assumed to be true-negative and all the patients who had a positive response to lidocaine and negative response to bupivacaine were considered to be false-positive. The resultant false-positive rate was 63% (95% CI, 48%, 78%)

Table 3 illustrates the results of evaluation of facet joint pain in the lumbar spine. Sixty-nine or 58% of the patients reported a definite response to lidocaine blocks. Confirmatory blocks with bupivacaine were performed in each of these 69 patients. Of this group, 48 patients, i.e., 40% of the total sample or 70% of lidocaine-positive group

Table 3. Results of lumbar facet joint nerve blocks (single blocks with lidocaine and double blocks with lidocaine and bupivacaine)

Single Block	Double Blocks	
	Positive	Negative
Positive	48	21
Negative		51
Prevalence	40%(95% CI 31% , 49%)	
False-positive rate	30%(95% CI 20% , 40%)	

reporting a definite response with improvement in their pain. This latter group provides a prevalence rate of facet joint pain in patients with chronic low back pain of 40% (95% CI, 31%, 49%). The false-positive rate was 30% (95% CI, 20%, 40%).

As shown in Table 4, results of cervical and lumbar facet joint blocks were correlated. Thirty-seven percent of the total patients or 94% of the patients judged to be positive for facet joint pain by the double-block algorithm were also shown to be positive for cervical facet joint pain. This provided with a prevalence rate of 37% positive for both cervical and lumbar facet joint pain in contrast to 40% with lumbar facet joint pain and 67% with cervical facet joint pain.

DISCUSSION

Among the chronic pain problems, spinal pain, which includes not only the pain emanating from lumbar and cervical spine, but also from thoracic spine, constitutes the majority of the problems (26-28). It is estimated that episodes of low back pain that are frequent or persistent have been reported in 15% of the US population, with a lifetime prevalence of 65% to 80% (28). Further, age related low back pain has been shown of significance (28).

Table 4. Correlation of results of lumbar and cervical facet joint nerve blocks

Cervical	Lumbar	
	Positive	Negative
Positive	45	35
Negative	3	37

While 12% of children and adolescents suffer with persistent low back pain in contrast to 15% of adults, it is reported to be as high as 27% in the elderly (28). Multiple studies also have shown an incidence of recurrent or chronic low back pain at 3 months, 6 months and 12 months to range from 35% to 79% (28). Cassidy et al (29) showed that point prevalence of low back pain as 29%, 6-months prevalence of 69%, and lifetime prevalence of 84% in Canada. They also showed that grades III and IV categories of back pain with disability were reported in 30% of the population.

Neck pain, though not as common as low back pain, is also encountered frequently in modern medical practices. It is considered one of the most common chronic pain conditions and a major problem in modern society behind low back pain. Côté et al (30, 31) in evaluating neck pain and its related disability, reported that in the Canadian population, the estimated lifetime prevalence as 67%, point prevalence of 22% and 14% prevalence of high pain intensity with disability. Croft et al (32) in a longitudinal study in the general population, in the United Kingdom, with no current neck pain, reported a one-year incidence of estimated cumulative episodic neck pain of 18%. Studies also have reported that 15% of whiplash patients suffer severe pain for one to three years in between 26% and 44% of the whiplash patients develop long-term problems (33).

Multiple structures in the spine, including facet joints, intervertebral discs, dorsal root ganglia, muscle and ligaments are capable of causing headaches, neck pain and shoulder pain or low back, hip and lower extremity pain. Lumbar facet joints have been shown to be capable of being a source of pain in the low back and referred pain in the lower extremity in normal volunteers (14, 34-37). Multiple authors also have shown referred pain distribution of cervical facet joints (14, 38-41). Cervical and lumbar facet joints are innervated by the medial branches of the dorsal rami (42-44).

The prevalence of lumbar facet joint pain of 40% established in this study with prevalence of false-positive rate of 30% with a single-block is similar to the most previous investigations (15-21, 45), whereas, 67% of cervical facet joint pain with a false-positive rate of 63% are higher than the previous reports (22-24, 46). A significant proportion of patients presenting to an interventional pain management setting, with chronic low back and neck pain, show evidence of facet joint pain in the low back and neck, with 94% of the patients with

lumbar facet joint pain, also presenting with cervical facet joint pain. There is significant correlation with lumbar facet joint pain to presence of cervical facet joint pain. However, since the prevalence of cervical facet joint pain is higher than lumbar facet joint pain, even in the patients with combined chronic low back and neck pain, the decision on lumbar facet joint pain may not be based on presence of cervical facet joint pain. Thus, we consider the results of this study to be valid and reliable in interventional pain management settings in patients without evidence of radicular pain and also without response to physical therapy, chiropractic management and medical therapy.

Medial branch blocks are the only reliable diagnostic tool in chronic spinal pain, since there are no features or any form of imaging that indicate whether a facet joint is painful or not. The target specificity of medial branch blocks in the diagnosis of facet joint pain in the cervical and lumbar spine has been established (47-49). The reliability of controlled, comparative local anesthetic blocks and medial branch blocks has been addressed under stringent conditions (14, 50-52). The present study has evaluated clinical response appropriately with stringent criteria.

CONCLUSION

The results of this study show prevalence of lumbar facet joint pain in 40% of the patients with chronic low back pain with a false-positive rate of 30% and cervical facet joint pain in chronic neck pain in 67% of the patients with a false-positive rate of 63% with single block; in patients presenting with a combination of chronic low back and neck pain. The results of this study also show significant correlation between lumbar facet joint pain and cervical facet joint pain, with 94% of the patients with confirmed diagnosis of lumbar facet joint pain also have cervical facet joint pain when they present with both complaints.

ACKNOWLEDGMENTS

The authors wish to thank Tonie Hatton, Marla Neihoff and Lorie Caldwell for their assistance in preparation of this manuscript.

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