

Retrospective Evaluation

Influence of Psychological Variables on the Diagnosis of Facet Joint Involvement in Chronic Spinal Pain

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Disclaimer: There was no external funding in the preparation of this manuscript.

Conflict of interest: None.

Manuscript received: 01/04/2008

Revised manuscript received:
01/28/2008

Accepted for publication:
02/20/2008

Free full manuscript:
www.painphysicianjournal.com

Background: Facet or zygapophysial joint pain is one of the common conditions responsible for chronic spinal pain. Controlled diagnostic blocks are considered the only means of reliable diagnosis of facet joint pain, due to the inability of physical examination, clinical symptoms, radiologic evaluation, and nerve conduction studies to provide a reliable diagnosis. The prevalence of facet joint pain has been established to be 15% to 45% of patients with low back pain, 39% to 67% of patients with neck pain, and 34% to 48% of patients with thoracic pain. However, using only a single block, false-positive rates of 27% to 63% in the cervical spine, 42% to 58% in the thoracic spine, and 17% to 50% in the lumbar spine have been reported.

While there are multiple reasons for false-positive results, psychological variables may also contribute to false-positive results. A lack of influence of psychological factors on the validity of controlled diagnostic local anesthetic blocks of lumbar facet joints has been demonstrated. However, no such studies have been performed in the thoracic or cervical spine.

Objective: To study the influence of psychopathology (depression, generalized anxiety disorder, and somatization individually or in combinations of multiple psychopathologic conditions) on the ability of controlled, comparative local anesthetic blocks to accurately identify facet joint pain and false-positive rates with a single block.

Methods: Four hundred thirty-eight patients undergoing controlled, comparative local anesthetic blocks were included in the study. Patients were allocated based on their psychological profiles — each diagnostic group or combination was divided into distinct categories. Primary groups consisted of patients with major depression, generalized anxiety disorder, and somatization disorder. Combination groups consisted of 4 categories based on multiple combinations.

All the patients were treated with controlled, comparative local anesthetic blocks either with 1% lidocaine or 1% lidocaine and 0.25% bupivacaine. A positive response was defined as at least an 80% reduction in pain and the ability to perform previously painful movements with appropriate relief with 2 separate local anesthetics.

Results: The prevalence of facet joint pain in chronic spinal pain ranged from 25% to 40% in patients without psychopathology, whereas it ranged from 28% to 43% in patients with a positive diagnosis of major depression, generalized anxiety disorder, and somatization disorder, respectively, compared to 23% to 39% in patients with a negative diagnosis. Regional facet joint pain prevalence and false-positive rates were higher in the cervical region in patients with major depression. In the lumbar and thoracic regions, no significant differences were noted.

Conclusion: This study demonstrated that, based on patient psychopathology, there were no significant differences among the patients either in terms of prevalence or false-positive rates in the lumbar and thoracic regions. A higher prevalence and lower false-positive rates in the cervical region were established in patients with major depression.

Key words: Zygapophysial joint pain, facet joint pain, prevalence, false-positive rate, controlled comparative local anesthetic blocks, major depression, generalized anxiety disorder, somatization disorder

Pain Physician 2008; 11:145-160

Among the multiple structures responsible for pain emanating from the spine, facet or zygapophysial joints have been described as common structures (1,2). Consequently, facet joint interventions have increased substantially over the years in the United States, in multiple settings (3-6). Due to the inability of physical examination, clinical symptoms, radiologic evaluation, and nerve conduction studies to provide a reliable diagnosis of facet joint pain, controlled diagnostic blocks are considered the only means of reliable diagnosis of facet joint pain (1,7-10). Consequently, in accordance with the criteria established by the International Association for the Study of Pain (IASP) (10), based on the controlled diagnostic blocks of facet joints, facet joints have been implicated as responsible for spinal pain in 15% to 45% of patients with low back pain (11-21), 39% to 67% of patients with neck pain (11,18,22-25), and 34% to 48% of patients with thoracic pain (11,18,26). However, utilizing the same IASP criteria (10), false-positive rates varying from 27% to 63% in the cervical spine (11,24,27), 42% to 58% in the thoracic spine (11,18,26), and 17% to 50% in the lumbar spine (11-18,21,28) have been demonstrated.

Several reasons exist for these false-positive results including technical aspects, amount of local anesthetic, sedation, and, importantly, multiple psychological variables. The specificity of the effect of cervical and lumbar facet joint blocks has been demonstrated in controlled trials (29-32). Minimal effects of sedation were shown in the cervical and lumbar spine if strict criteria were utilized (33-35). In addition, a lack of influence of psychological factors on the validity of controlled diagnostic local anesthetic blocks of facet joints was demonstrated in the lumbar spine (36). Similarly, multiple other variables have also been evaluated (37-40). Psychological variables such as depression, anxiety, and excessive somatic symptoms are recognized as actively contributing to a patient's perception of pain (41-46). Unrecognized and untreated psychopathology has been shown to interfere with the successful management of chronic pain and patient rehabilitation (47-49) and has also been shown to be predictive of poor surgical outcomes (48,50). Further, psychopathology can serve to propitiate pain related dysfunction (51). A diagnosis of depression correlates with increased pain (47,48,51) and anxiety decreases a patient's pain threshold and tolerance (52). Emotional distress has been linked to physical symptoms

through autonomic arousal and vigilance (53) or somatic amplification (54), and anxiety and depression have been associated with the magnification of medical symptoms (55). It is well known that psychopathology affects treatment and outcomes. Even then, the influence of psychological factors on diagnosis and outcomes has not been well studied (36,56-60).

There is extensive evidence associating chronic pain with psychopathology including a host of studies showing that depression and anxiety are highly prevalent among persons with chronic pain (52,61-72). In samples evaluating chronic pain patients, rates of current major depression and anxiety ranged from 15% to 59%, significantly higher than the rate of 5% to 10% in persons without pain found in the general population (70). In addition, major depression is also frequently reported in association with somatization (43,61,63-65,71,72). The prevalence of somatization disorder ranges from 0% to 97% (43,61,65,67,71). Studies conducted in interventional pain management settings have shown a prevalence of somatization disorder of 20% to 34% (66-69).

This evaluation was undertaken to study the influence of psychopathology, namely depression, generalized anxiety disorder, and somatization, and combinations thereof, on the ability of controlled, comparative local anesthetic blocks to accurately identify facet joint pain and false-positive rates with a single block.

METHODS

Participants

Based on the policy of the Institutional Review Board of Ambulatory Surgery Center, approval is not required due to the retrospective nature of the study. The data was collected by individuals normally having access to this data as part of their routine clinical care. The privacy of the patients was protected in data collection and had no influence on patient care. In addition, all patients signed informed consent prior to the performance of the procedures which included consent for publication of the results. In addition, appropriate precautions were used in protecting the identity and privacy of the patients as per the Health Insurance Portability and Accountability Act (HIPAA) regulations.

The study population consisted of 438 consecutive patients with chronic spinal pain undergoing controlled, comparative local anesthetic facet joint nerve blocks (18). All the patients presented with either chronic neck, thoracic, or low back pain, or combined

involvement of 2 or 3 regions. All the patients were evaluated in a non-university, private practice setting in the United States.

Inclusion Criteria

Consecutive patients undergoing controlled, comparative local anesthetic blocks between the ages of 18 to 90 years who had non-specific spinal pain for at least 6 months were included. Disc related pain was excluded based on radicular symptoms using radiologic and neurologic testing. Further, pain that involved predominantly the upper or lower extremity or chest wall was also not included. Other criteria prior to undergoing diagnostic facet joint nerve blocks were failed conservative management including physical therapy, chiropractic manipulation, exercises, drug therapy, and bedrest.

Pre-procedure Evaluation

All patients had a work-up including comprehensive history, physical examination, evaluation of the results of prior procedures and investigations, and psychological evaluation.

The psychological evaluation was performed using a DSM-IV-TR (73) criteria-based questionnaire along with a physician interview. The comprehensive evaluation focused on 3 issues related to psychopathology: depression, anxiety, and somatization disorder.

Positive responses as measured by answers to multiple questions based on the DSM-IV-TR diagnostic criteria and by the examining physician's personal diagnostic interview determined the diagnosis of major depression, generalized anxiety disorder, and somatization disorder (73). The details of the criteria have been described elsewhere (73,74).

Allocation

Patients were allocated based on their psychological profiles — each diagnostic group or combination was divided into distinct categories. Thus, primary groups consisted of patients with major depression, generalized anxiety disorder, or somatization disorder. Combination groups consisted of 4 categories with category I of major depression and generalized anxiety disorder, category II of major depression and somatization disorder, category III of generalized anxiety disorder and somatization disorder, and category IV a combination of all 3 disorders with major depression, generalized anxiety disorder, and somatization disorder.

Procedures

All procedures were performed in a sterile setting in an ambulatory surgery center specializing in interventional pain management. All the patients were investigated with controlled, comparative local anesthetic blocks starting with diagnostic blocks using 1% lidocaine followed by confirmatory blocks using 0.25% bupivacaine if the results were positive for the lidocaine blocks. All the patients with lidocaine-positive results were studied with 0.25% preservative free bupivacaine on a separate occasion usually 3–4 weeks after the first injection with lidocaine. The controlled blocks were performed on the ipsilateral side in patients with unilateral pain or bilateral in patients with bilateral axial pain and they were performed at a minimum of 2 levels to block a single joint. The target joints were identified by the pain pattern, local or paramedian tenderness over the area of facet joints, and reproduction of pain with deep pressure. All blocks were performed with intermittent fluoroscopic visualization using a 22-gauge, 2-inch spinal needle at each of the medial branches in the cervical and thoracic spine, and with a 22-gauge, 3.5-inch spinal needle at each of the indicated medial branches at the L1-L4 levels, and the L5 dorsal ramus at the L5 level of the lumbar spine. Each facet joint nerve was infiltrated with 0.5 mL of 1% lidocaine or 0.25% bupivacaine after establishing intravenous access and administering light sedation with midazolam.

A positive response was defined as at least an 80% reduction of pain with the ability to perform previously painful movements as assessed using a verbal numeric pain rating scale. To be considered positive, pain relief from a block had to last at least 2 hours when lidocaine was used, and at least 3 hours or longer than the duration of relief with lidocaine, when bupivacaine was used; any other response was considered as a negative outcome. Consequently, following each block, the patient was examined and asked to perform previously painful movements.

Statistical Methods

Data were recorded on a database using Micro-soft® Access®. The SPSS Version 9.0 statistical package was used to generate the frequency tables, and the chi-squared statistic was used to test the significance difference between groups. Fisher's Exact Test was used wherever the expected value was less than 5. Student's t test was used to test the mean difference between gender. Results were considered statistically significant if the p value was less than 0.05.

RESULTS

Data were evaluated for patient characteristics, psychological characteristics, and results of comparative local anesthetic blocks. The results were correlated and compared to depression, generalized anxiety disorder, and somatization disorder, but also to patients without these disorders and to patients with combinations of psychopathology.

Demographic Characteristics

Demographic characteristics are illustrated in Tables 1 – 3. Table 1 illustrates the demographic characteristics of patients with neck pain undergoing facet joint nerve blocks, Table 2 illustrates the characteristics of patients with thoracic spinal pain undergoing thoracic facet joint nerve blocks, and Table 3 illustrates patients with chronic low back pain undergoing lumbar facet joint nerve blocks.

In the cervical spine, minor but statistically significant differences were noted with respect to age and height in patients with major depression, generalized

anxiety disorder, and somatization disorder compared to the negative group. However, there were no significant differences noted among the patients with no psychopathology compared to any of the patients with major depression, generalized anxiety disorder, somatization disorder, or absence thereof (Table 1).

In the thoracic spine there were no significant differences among the various categories under any of the parameters, whereas, as shown in Table 2, significant differences were noted in patients with major depression, generalized anxiety disorder, and somatization disorder compared to the patients without these disorders with distribution based on gender and age. Duration of pain was also significantly less in patients without depression compared to the patients with depression in the low back pain group as shown in Table 3.

Psychological Characteristics

Tables 1 – 3 also illustrate the psychological characteristics in patients with chronic neck pain, thoracic pain, and low back pain. In the cervical spine group,

Table 1. Demographic characteristics of patients undergoing cervical facet joint nerve blocks.

		No psychopathology (50)	Major depression (251)		Generalized anxiety disorder (251)		Somatization disorder (251)	
			With major depression (161)	Without major depression (90)	With generalized anxiety disorder (178)	Without generalized anxiety disorder (73)	With somatization disorder (79)	Without somatization disorder (172)
Gender	Male	42% (21)	26% (42)	41%* (37)	28% (50)	40% (29)	33% (26)	31% (53)
	Female	58% (29)	74% (119)	59% (53)	72% (128)	60% (44)	67% (53)	69% (119)
Age (yrs)	Mean ± SEM	49 ± 2.1	43 ± 1.0	49* ± 1.5	44 ± 1.0	48* ± 1.8	42 ± 1.2	47* ± 1.1
Height (inches)	Mean ± SEM	67 ± 0.6	66 ± 0.3	67* ± 0.4	66 ± 0.3	67* ± 0.5	67 ± 0.5	66 ± 0.3
Weight (lbs)	Mean ± SEM	179 ± 6.5	182 ± 3.8	178 ± 4.4	180 ± 3.6	177 ± 2.9	187 ± 6.7	177 ± 2.9
Onset of the pain	Gradual	48% (24)	59% (95)	48% (43)	57% (102)	54% (39)	57% (45)	54% (93)
	Following an incident	52% (26)	41% (66)	52% (47)	43% (76)	46% (34)	43% (34)	46% (79)
Duration of pain (months)	Mean ± SEM	69 ± 11.2	89 ± 5.3	79 ± 9.0	89 ± 6.4	79 ± 9.0	87 ± 9.3	85 ± 6.4

* – indicates significant difference with positive group.

Table 2. Demographic characteristics of patients undergoing thoracic facet joint nerve blocks.

		No psycho-	Major depression (65)		Generalized anxiety disorder(65)		Somatization disorder (65)	
			With major depression (35)	Without major depression (30)	With generalized anxiety disorder (42)	Without generalized anxiety disorder (23)	With somatization disorder (11)	Without somatization disorder (54)
Gender	Male	45% (9)	23% (8)	37% (11)	21% (9)	43% (10)	27% (3)	30% (16)
	Female	55% (11)	77% (19)	63% (19)	79% (33)	57% (13)	73% (8)	70% (38)
Age (yrs)	Mean ± SEM	50 ± 3.6	43 ± 2.6	48 ± 3.3	42 ± 2.5	51* ± 3.4	45 ± 3.1	46 ± 2.4
Height (inches)	Mean ± SEM	67 ± 1.0	66 ± 0.6	67 ± 0.8	66 ± 0.5	67 ± 0.9	65 ± 1.2	66 ± 0.5
Weight (lbs)	Mean ± SEM	176 ± 9.0	168 ± 5.4	169 ± 6.8	163 ± 4.8	178 ± 7.9	166 ± 11.1	169 ± 4.6
Onset of the pain	Gradual	65% (13)	63% (22)	60% (18)	57% (24)	70% (16)	55% (6)	63% (34)
	Following an incident	35% (7)	37% (13)	40% (12)	43% (18)	30% (7)	45% (5)	37% (20)
Duration of pain (months)	Mean ± SEM	74 ± 20.4	77 ± 12.2	74 ± 15.2	78 ± 11.1	71 ± 18.1	116 ± 31.9	68 ± 9.3

* – Indicates significant difference in with versus without group.

Table 3. Demographic characteristics of patients undergoing lumbar facet joint nerve blocks.

		No psychopathology (89)	Major depression (303)		Generalized anxiety disorder (303)		Somatization disorder (303)	
			With major depression (173)	Without major depression (130)	With generalized anxiety disorder (192)	Without generalized anxiety disorder (111)	With somatization disorder (72)	Without somatization disorder (231)
Gender	Male	53% (47)	30% (52)	50%* (65)	32% (61)	50%* (56)	26% (19)	42%* (98)
	Female	47% (42)	70% (121)	50% (65)	68% (131)	50% (55)	74% (53)	58% (133)
Age (yrs)	Mean ± SEM	54 ± 1.9	45 ± 1.1	52* ± 1.5	44 ± 1.0	53* ± 1.6	42 ± 1.4	49* ± 1.1
Height (inches)	Mean ± SEM	67 ± 0.4	66 ± 0.3	67 ± 0.3	66 ± 0.3	67 ± 0.4	66 ± 0.5	67 ± 0.3
Weight (lbs)	Mean ± SEM	185 ± 5.1	189 ± 4.0	185 ± 4.4	190 ± 4.0	184 ± 4.2	196 ± 7.5	185 ± 3.11
Onset of the pain	Gradual	61% (54)	51% (89)	58% (75)	51% (98)	61% (68)	51% (37)	55% (127)
	Following an incident	39% (35)	49% (84)	42% (55)	49% (94)	39% (43)	49% (35)	45% (104)
Duration of pain (months)	Mean ± SEM	93 ± 11.1	120* ± 8.3	92* ± 9.1	112 ± 7.9	99 ± 10.0	123 ± 12.8	103 ± 7.0

* – Indicates significant difference in with versus without group.

50 of the 301 patients had no psychopathology compared to 20 of 85 patients in the thoracic spine group and 89 of 392 patients in the chronic low back pain group. There were no significant differences noted among the patients with psychopathology compared to those without psychopathology. However, as described, there were significant but minor differences in patients with neck pain and low back pain when compared with the positive diagnosis group with the negative group in major depression, generalized anxiety disorder, and somatization disorder.

Results of Diagnostic Blocks

Tables 4 – 6 illustrate the results of diagnostic blocks evaluating facet joint pain in all 3 regions.

As illustrated in Table 4, patients with cervical pain were categorized into several groups: no psychopathology, major depression (with or without), generalized anxiety disorder (with or without), and somatization disorder (with or without). The results showed a prevalence of 28% facet joint pain in patients with no psychopathology. In patients with or without major depression, the prevalence was 43% (95% CI 36%-51%) vs 30% (95% CI 20%-40%), in patients with or without generalized anxiety disorder it was 42% (95% CI 35%-50%) vs 30% (95% CI 19% – 41%), and in patients with or without somatization disorder the

prevalence was 38% (95% CI 27% – 49%) vs 39% (95% CI 31% – 46%). A significant difference was noted in patients with or without depression.

Table 5 illustrates the prevalence of facet joint pain in patients suffering with chronic upper or mid back pain involving thoracic facet joints. The prevalence was 40% (95% CI 18% – 62%) in patients without psychopathology, whereas it was 31% (95% CI 16% – 47%) vs 37% (95% CI 19% – 54%) in patients with or without major depression, 33% (95% CI 19% – 48%) vs 35% (95% CI 15% – 55%) in patients with or without generalized anxiety disorder, and 36% (95% CI 7% – 65%) vs 33% (95% CI 21% – 46%) in patients with or without somatization disorder.

As illustrated in Table 6, for lumbar facet joint involvement, the prevalence was 25% (95% CI 16% – 34%) in patients without psychopathology, whereas it was 31% (95% CI 24% – 38%) vs 23% (95% CI 16% – 30%) in patients with or without major depression, 28% (95% CI 21% – 34%) vs 27% (95% CI 18% – 35%) in patients with or without generalized anxiety disorder, and 32% (95% CI 21% – 43%) vs 26% (95% CI 20% – 32%) in patients with or without somatization disorder.

Tables 4 – 6 also illustrate the false-positive rates with single lidocaine blocks. False-positive rates were calculated by assuming that all patients with no re-

Table 4. Results of cervical facet joint nerve blocks (single block with lidocaine and double block with lidocaine and bupivacaine).

Single Block	No psychopathology (50)		Major depression (251)				Generalized anxiety disorder (251)				Somatization disorder (251)			
			With major depression (161)		Without major depression (90)		With generalized anxiety disorder (178)		Without generalized anxiety disorder (73)		With somatization disorder (79)		Without somatization disorder (172)	
			Double Block		Double Block		Double Block		Double Block		Double Block		Double Block	
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg
Pos	14	19	70	45	27	33	75	51	22	27	30	22	67	56
Neg		17		46		30		52		24		27		49
Prevalence (95% CI)	28% (15%–41%)		43% (36%–51%)		30%* (20%–40%)		42% (35%–50%)		30% (19%–41%)		38% (27%–49%)		39% (31%–46%)	
False Pos rate (95% CI)	58% (40%–75%)		39% (30%–48%)		55%* (42%–68%)		40% (32%–49%)		55% (41%–69%)		42% (29%–56%)		46% (36%–55%)	

* – Indicates significant difference in with versus without group (p <0.05); Pos –positive; Neg – negative.

Table 5. Results of thoracic facet joint nerve blocks (single block with lidocaine and double block with lidocaine and bupivacaine).

Single Block	No psychopathology (20)		Major depression (65)				Generalized anxiety disorder (65)				Somatization disorder (65)			
			With major depression (35)		Without major depression (30)		With generalized anxiety disorder (42)		Without generalized anxiety disorder (23)		With somatization disorder (11)		Without somatization disorder (54)	
	Double Block		Double Block		Double Block		Double Block		Double Block		Double Block		Double Block	
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg
Pos	8	6	11	8	11	8	14	8	8	8	4	2	18	14
Neg		6		16		11		20		7		5		22
Prevalence (95% CI)	40% (18%–62%)		31% (16%–47%)		37% (19%–54%)		33% (19%–48%)		35% (15%–55%)		36% (7%–65%)		33% (21%–46%)	
False Pos rate (95% CI)	43% (16%–69%)		42% (19%–77%)		42% (19%–77%)		36% (16%–57%)		50% (25%–75%)		33% (0%–72%)		44% (26%–61%)	

Pos – positive; Neg – negative.

Table 6. Results of lumbar facet joint nerve blocks (single block with lidocaine and double block with lidocaine and bupivacaine).

Single Block	No psychopathology (89)		Major depression (303)				Generalized anxiety disorder (303)				Somatization disorder (303)			
			With major depression (173)		Without major depression (130)		With generalized anxiety disorder (192)		Without generalized anxiety disorder (111)		With somatization disorder (72)		Without somatization disorder (231)	
	Double Block		Double Block		Double Block		Double Block		Double Block		Double Block		Double Block	
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg
Pos	22	22	53	33	30	34	53	40	30	27	23	15	60	52
Neg		45		87		66		99		54		34		119
Prevalence (95% CI)	25% (16%–34%)		31% (24%–38%)		23% (16%–30%)		28% (21%–34%)		27% (18%–35%)		32% (21%–43%)		26% (20%–32%)	
False Pos rate (95% CI)	50% (35%–65%)		38% (28%–49%)		53% (41%–66%)		43% (33%–53%)		47% (34%–61%)		39% (24%–55%)		46% (37%–56%)	

Pos – positive; Neg – negative

sponse to lidocaine to be true negative, and all patients with a positive response to lidocaine and a negative response to bupivacaine as false-positives. A true-positive response was considered as a positive response to both lidocaine and bupivacaine as defined

by 80% relief and the ability to perform multiple prior painful movements and also with the appropriate duration of action following each block.

As shown in Table 4, in the diagnosis of cervical facet joint pain, false-positive rates with single blocks

were 58% (95% CI 40% – 75%) in patients without psychopathology, 39% (95% CI 30% – 48%) vs 55% (95% CI 42% – 68%) in patients with or without major depression, 40% (95% CI 32% – 49%) vs 55% (95% CI 41% – 69%) in patients with or without generalized anxiety disorder, and 42% (95% CI 29% – 56%) vs 46% (95% CI 36% – 55%) in patients with or without somatization disorder. The false-positive rates were significantly higher in patients without depression compared to patients with depression 39% (95% CI 30% – 48%) vs 55% (95% CI 42% – 68%).

As illustrated in Table 5, in the thoracic spine, the false-positive rate was without any significant differences among patients without psychopathology or with or without major depression, with or without

generalized anxiety disorder, and with or without somatization disorder, which varied from 33% to 50%.

As illustrated in Table 6, in the lumbar spine, the false-positive rate with single blocks was 50% (95% CI 35% – 65%) in patients without psychopathology, compared to 38% (95% CI 28% – 49%) vs 53% (95% CI 41% – 66%) in patients with or without major depression, 43% (95% CI 33% – 53%) vs 47% (95% CI 34% – 61%) in patients with or without generalized anxiety disorder, and 39% (95% CI 24% – 55%) vs 46% (95% CI 37% – 56%) in patients with or without somatization disorder with no significant differences among the groups.

Influence of Combined Psychopathology

Table 7 illustrates the prevalence of facet joint

Table 7. Prevalence of facet joint pain with controlled, comparative local anesthetic blocks based on various psychological variables.

		Prevalence		
		Cervical	Thoracic	Lumbar
No psychopathology		28% (14/50)	40% (8/20)	25% (22/89)
Major depression	With major depression	43% (70/161)	31% (11/35)	31% (53/173)
	Without major depression	30%* (27/90)	37% (11/30)	23% (30/130)
Generalized anxiety disorder	With generalized anxiety disorder	42% (75/178)	33% (14/42)	28% (53/192)
	Without generalized anxiety disorder	30% (22/73)	35% (8/23)	27% (30/111)
Somatization disorder	With somatization disorder	38% (30/79)	36% (4/11)	32% (23/72)
	Without somatization disorder	39% (67/172)	33% (18/54)	26% (60/231)
Major depression & generalized anxiety disorder	Positive¹	44% (62/140)	34% (11/32)	30% (45/152)
	Negative ²	32%* (35/111)	33% (11/33)	25% (38/151)
Major depression & somatization disorder	Positive¹	40% (28/70)	36% (4/11)	34% (23/67)
	Negative ²	38% (69/181)	33% (18/54)	25% (60/236)
Generalized anxiety disorder & somatization disorder	Positive¹	39% (28/71)	36% (4/11)	31% (21/68)
	Negative ²	38% (69/180)	33% (18/54)	26% (62/235)
Major depression, generalized anxiety disorder & somatization disorder	Positive (all three +)	41% (26/64)	36% (4/11)	33% (21/64)
	Negative (at least one)	42% (57/137)	29% (10/34)	27% (40/150)

¹ Both positive; ² One or both is/are negative; * – indicates significant difference in with versus without group ($p < 0.05$).

pain by controlled, comparative local anesthetic blocks based on various psychological variables in the cervical, thoracic, and lumbar regions. The prevalence in patients without any psychopathology was 28%, 40%, and 25% in the cervical, thoracic, and lumbar regions. In patients with major depression it varied from 31% in the lumbar and thoracic regions to 43% in the cervical region with a significant difference noted in patients without major depression in the cervical region only. In the generalized anxiety disorder group, either positive or negative for the diagnosis, the prevalence varied from 27% to 42%. Table 7 illustrates the results for patients without psychopathology, with or without major depression, with

or without generalized anxiety disorder, and with or without somatization disorder, as well as with combined diagnoses of major depression, and/or generalized anxiety disorder, and/or somatization disorder with a combination of more than one diagnosis. Any patient with only one diagnosis or negative for at least one diagnosis was considered negative for that particular group. Significant differences were noted in the prevalence of cervical facet joint pain in patients with combined major depression and generalized anxiety disorder with a prevalence of 44% in the positive group compared to 32% in the negative group. There were no differences noted in the other regions or other psychopathological combinations.

Table 8. False-positive rate of diagnosis of facet joint pain with controlled, comparative local anesthetic blocks based on various psychological variables.

		False-Positive Rates		
		Cervical	Thoracic	Lumbar
No psychopathology		58% (19/33)	43% (6/14)	50% (22/44)
Major depression	With major depression	39% (45/115)	42% (8/19)	38% (33/86)
	Without major depression	55%* (33/60)	42% (8/19)	53% (34/64)
Generalized anxiety disorder	With generalized anxiety disorder	40% (51/126)	36% (8/22)	43% (40/93)
	Without generalized anxiety disorder	55% (27/49)	50% (8/16)	47% (27/57)
Somatization disorder	With somatization disorder	42% (22/52)	33% (2/6)	39% (15/38)
	Without somatization disorder	46% (56/123)	44% (14/32)	46% (52/112)
Major depression & generalized anxiety disorder	Positive¹	38% (38/100)	35% (6/17)	38% (28/73)
	Negative ²	53%* (40/75)	48% (10/21)	51% (39/77)
Major depression & somatization disorder	Positive¹	40% (19/47)	33% (2/6)	36% (13/36)
	Negative ²	46% (59/128)	44% (14/32)	47% (54/114)
Generalized anxiety disorder & somatization disorder	Positive¹	43% (21/49)	33% (2/6)	42% (15/36)
	Negative ²	45% (57/126)	44% (14/32)	46% (52/114)
Major depression, generalized anxiety disorder & somatization disorder	Positive (all three +)	42% (19/45)	33% (2/6)	38% (13/34)
	Negative (at least one)	41% (40/97)	44% (8/18)	44% (32/72)

¹Both positive; ²One or both is/are negative ; * – indicates significant difference ini with versus without group ($p < 0.05$).

Table 8 illustrates false-positive rates of single facet joint nerve blocks based on various psychological variables in the cervical, thoracic, and lumbar regions. Results for patients without psychopathology, major depression, generalized anxiety disorder, and somatization disorder are described in Tables 4 – 6. In the cervical spine, significant differences were observed with a higher false-positive rate in patients without a combined diagnosis of major depression and generalized anxiety disorder with 53% compared to 38% false-positive rates in patients with a combined diagnosis. There were no differences in the other groups.

Correlation of Psychological Variables

Figure 1 illustrates the prevalence and false-positive rates based on the presence or absence of the diagnosis of major depression in all 3 regions.

Figure 2 illustrates the prevalence and false-positive rates based on the diagnosis of generalized anxiety disorder.

Figure 3 illustrates the prevalence and false-positive rates based on the presence or absence of somatization disorder.

Figure 4 illustrates the prevalence of facet joint

pain derived from double-diagnostic blocks and false-positive rates with a single block based on the combined diagnosis of major depression, generalized anxiety disorder, and somatization disorder in the cervical, thoracic, and lumbar regions.

DISCUSSION

The primary findings of this study illustrate the significant prevalence of psychopathology in patients with chronic spinal pain but with no influence of the psychological variables of major depression, generalized anxiety disorder, somatization disorder, or a combination of any of these variables on the prevalence of facet joint pain based on controlled, comparative local anesthetic blocks in the thoracic and lumbar regions with a prevalence ranging from 29% to 40% in the thoracic spine and 25% to 34% in the lumbar spine. However, in patients with chronic neck pain utilizing controlled, comparative local anesthetic blocks, the prevalence of cervical facet joint pain was significantly higher in patients with major depression compared to those without major depression, and combined major depression and generalized anxiety disorder. There were no significant differences noted in the categories

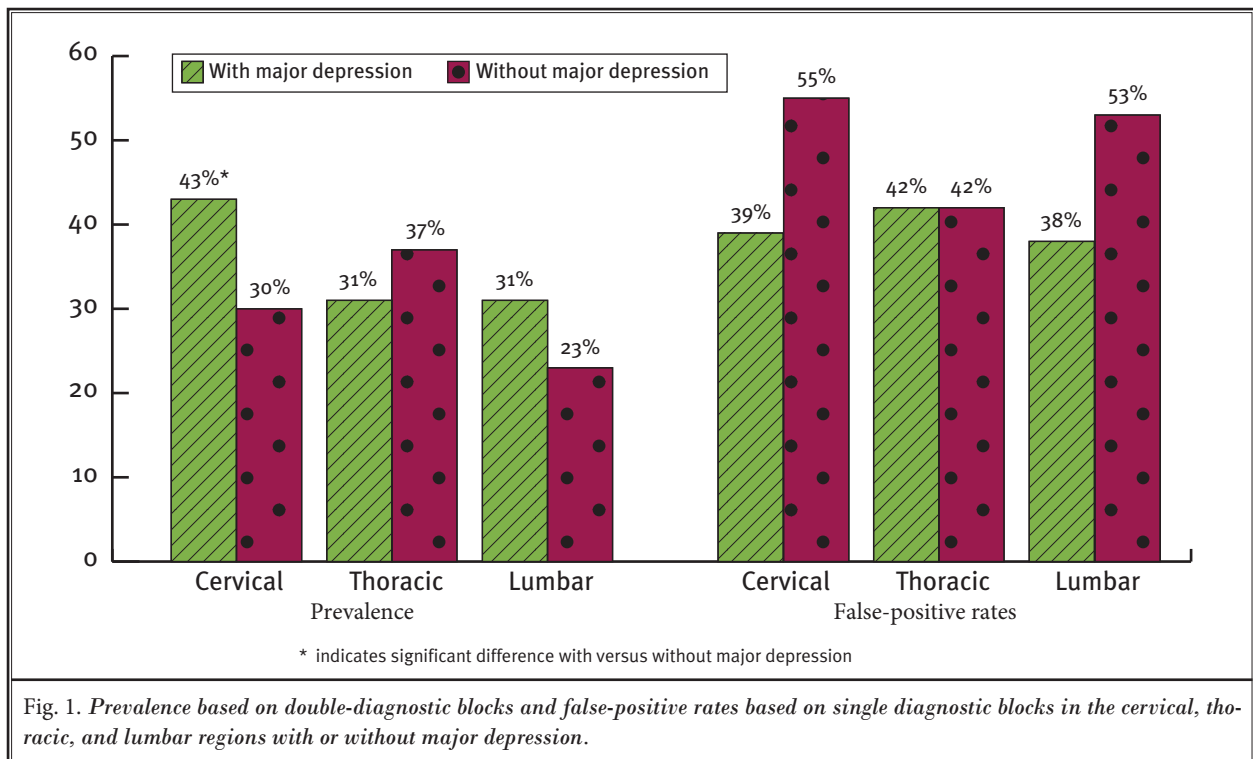
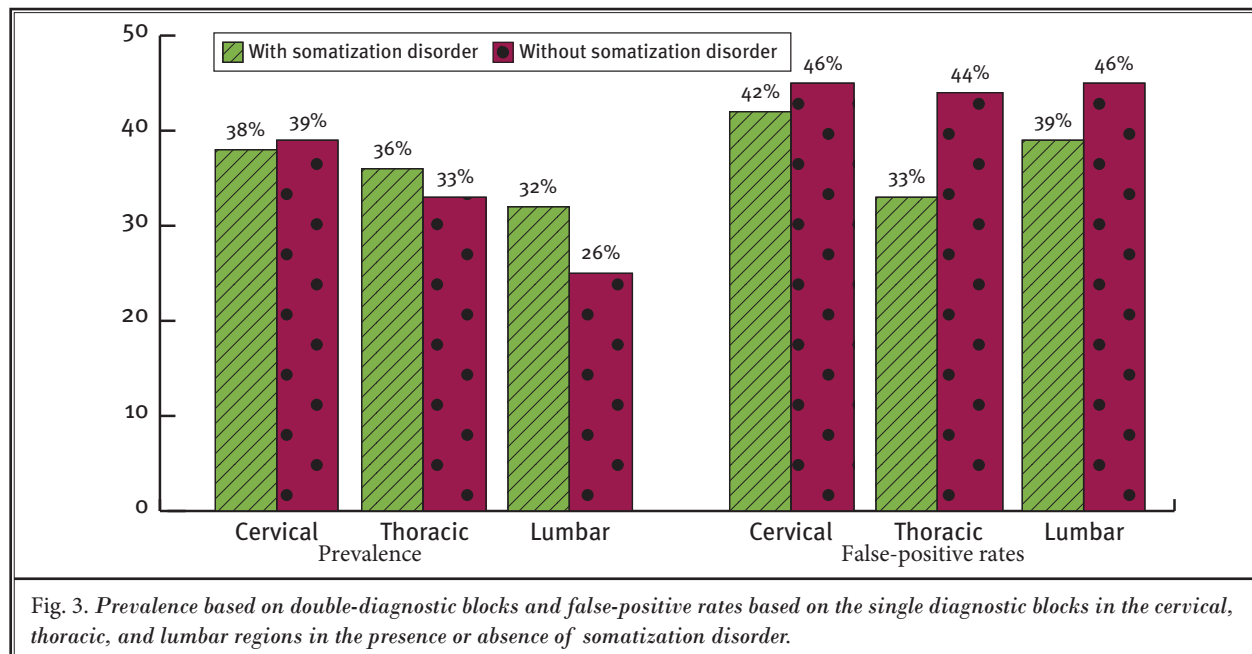
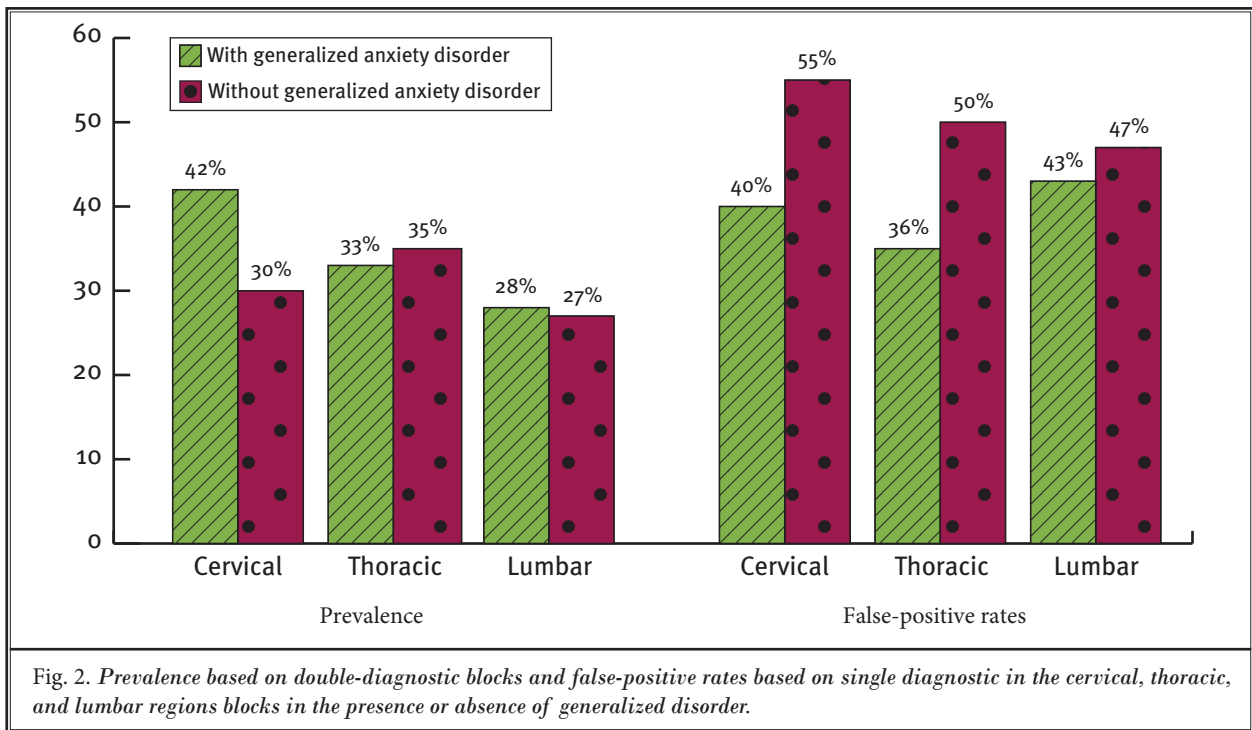
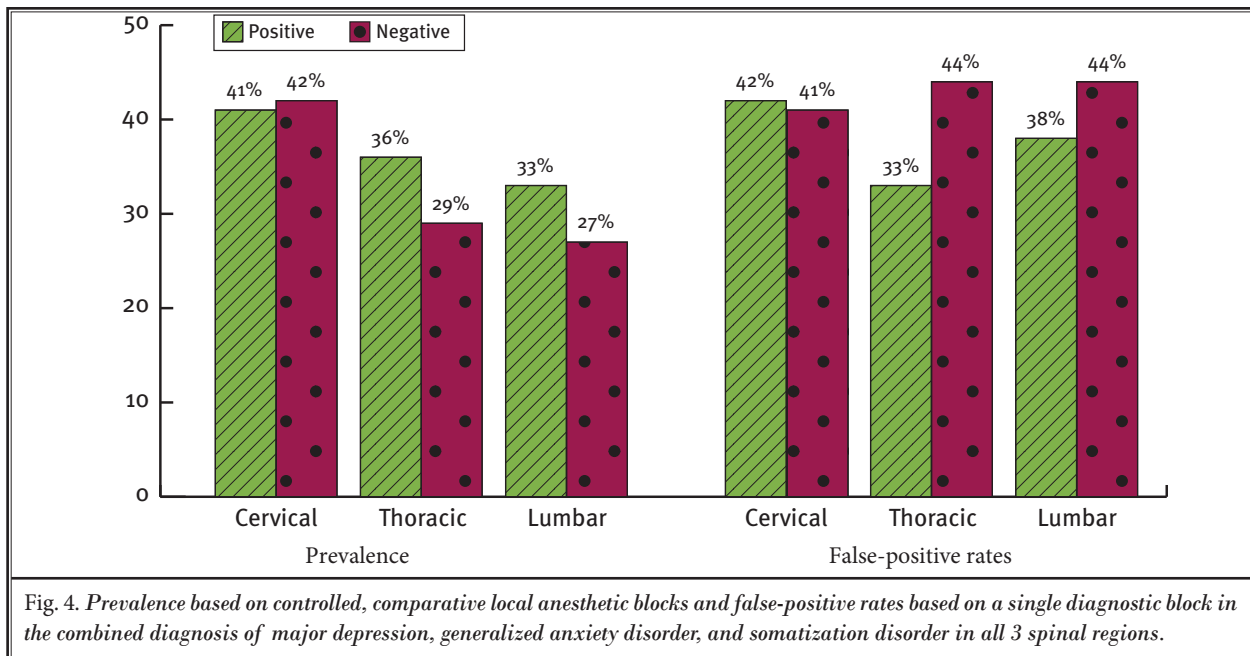


Fig. 1. Prevalence based on double-diagnostic blocks and false-positive rates based on single diagnostic blocks in the cervical, thoracic, and lumbar regions with or without major depression.





of generalized anxiety disorder, somatization disorder, and various other combinations in the cervical spine. The results of false-positive rates with a single diagnostic block also mirrored the prevalence rates with significant differences noted in patients with major depression compared to those without major depression (39% vs. 55%), and combined major depression and generalized anxiety disorder, whereas in both the thoracic and lumbar regions, and all other combinations and categories, there were no significant differences.

One of the primary findings of this study is the higher prevalence (43% vs 30%) of cervical facet joint pain and lower incidence false-positive rates (39% vs 55%) in patients with major depression, compared to patients without major depression is in contrast to the diagnosis of facet joint pain in the thoracic and lumbar regions. For the thoracic and lumbar regions, since there were no significant differences, it is assumed that psychopathology has no influence on the diagnosis of the prevalence rate or the false-positive rate with controlled, comparative local anesthetic blocks. Similarly, for cervical facet joint pain diagnosis, other psychological variables or combinations had no influence except for major depression and major depression when combined with generalized anxiety disorder only, whereas no other combinations of psychopathological disorder resulted in significant differences. The results of this study therefore do not support the common assumptions that psychopathology

may interfere with the successful diagnosis of chronic spinal pain by means of reduction of a patient's pain threshold and tolerance due to anxiety (47-49,52). Further, the results also do not show interference in the diagnosis of somatic amplification (54) nor anxiety as associated with magnification of medical symptoms (55). The previous results of lumbar discography findings as described by Carragee et al (57,58,75-77) were not confirmed in this study. Further, depression was the only significant variable, and then only in the cervical spine, which is difficult to explain and needs to be evaluated carefully in larger trials.

Depression, generalized anxiety disorder, and somatization, or combinations thereof are complex psychological issues. While the value of a diagnosis of depression and generalized anxiety disorder is well accepted, the validity of somatization disorder is questioned (41). A diagnosis of somatization should meet all the criteria described in the DSM-IV-TR (73). Major depression is a frequently reported condition in patients suffering with spinal pain, either independently or in association with somatization and generalized anxiety disorder. Studies have shown (52,62,66-70) that major depression and generalized anxiety disorder are commonly seen in patients suffering with chronic pain, even among those on antidepressant and/or anti-anxiety therapy. It has been shown that a DSM-IV-TR criteria-based questionnaire evaluation incorporated into the overall pain man-

agement intake questionnaire, along with a short clinical interview is a reliable means of assessing depression and anxiety in patients suffering with chronic pain (70). For somatization disorder, the DSM-IV-TR criteria are the available standard.

The presence of psychological issues (psychopathology), according to some, has been described as being similar to the diagnosis of chronic pain syndrome, which is a complex condition composed of physical, psychological, emotional, and social components (78). Both chronic pain and chronic pain syndrome are defined in terms of duration and persistence of the sensation of pain, even though the chronic pain syndrome, as opposed to chronic pain, has the added component of certain recognizable psychological and socioeconomic influences with characteristic psychological and sociological behavioral patterns that distinguish the 2 conditions. While psychological problems are extremely common, chronic pain syndrome is not a common phenomenon (78,79). It has been shown in the literature that in matched samples of pain-free individuals compared to chronic pain groups, there were significantly higher prevalence rates of anxiety and depressive disorders in the chronic pain groups (52,62,66-69).

It has been a common assumption that patients with psychological or emotional factors are not amenable to accurate diagnosis and respond poorly to surgical and interventional techniques. However, there is no convincing evidence that chronic spinal pain develops secondary to psychopathology nor that response to treatment is hindered significantly based on psychopathology. The literature has shown that physical factors have been found to predict the outcome in lumbar surgery and there is a growing body of evidence indicating that psychosocial factors may also have a significant influence on the outcome of lumbar surgery (79-82). Carragee (50) found psychological screenings were most useful for those patients with lesser degrees of disc pathological findings, longer disability, and confounding economic issues. However, there is no significant research available related to interventional techniques except that some studies have shown that psychological issues improve simultaneously with decreased physical pain and improvement in functional status (83-87).

The current study may be criticized for its retro-

spective nature and the controlled diagnostic blocks and their reliability and validity. The retrospective nature of the study essentially confirms previous results and thus provides external validity of the primary findings. Further it also provides initial results for the cervical and thoracic spine, thus, further randomized controlled trials may be performed.

Facet joints have been shown to be a source of chronic spinal pain by means of diagnostic techniques of known reliability and validity. Controlled diagnostic blocks are performed to diagnose facet joint pain by blocking the medial branches of the dorsal rami that innervate the target joint. Relief of pain demonstrates that a joint is the source of the pain. The true responses are determined by performing controlled blocks, either in the form of placebo injection or normal saline or more commonly in the form of comparative local anesthetic blocks on 2 separate occasions, when the same joint is anesthetized using local anesthetics with different durations of action.

The results noted in this study confirm the previous results of a lumbar facet study on the role of psychological factors in the lumbar spine (36) and also in the diagnosis of discogenic pain with provocation discography (88). The results also provide the basis for evaluation in the thoracic spine. However, caution must be exercised in patients with major depression with chronic neck pain even though the results were similar in all other patients with generalized anxiety disorder and/or somatization disorder without depression.

The study may also be criticized for the type of psychological evaluation performed. The psychological evaluation was performed by utilizing the criterion standard which is used for all other tests, namely DSM-IV-TR.

Caution must be exercised in the interpretation of these results as they are only applicable in patients utilizing controlled, comparative local anesthetic blocks based on IASP criteria. Further, the results need to be confirmed in further evaluations with larger population samples, preferably in controlled evaluations.

ACKNOWLEDGMENTS

The authors wish to thank Tonie M. Hatton and Diane E. Neihoff, transcriptionists, for their assistance in the preparation of this manuscript; and the *Pain Physician* editorial board for their constructive comments and suggestions.

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