Diagnostic Accuracy Study

Low Back Pain and Diagnostic Lumbar Facet Joint Nerve Blocks: Assessment of Prevalence, False-Positive Rates, and a Philosophical Paradigm Shift from an Acute to a Chronic Pain Model

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Background: Lumbar facet joints are a clinically important source of chronic low back pain. There have been extensive diagnostic accuracy studies, along with studies of influence on the diagnostic process, but most of them have utilized the acute pain model. One group of investigators have emphasized the importance of the chronic pain model and longer lasting relief with diagnostic blocks.

Objective: To assess the diagnostic accuracy of lumbar facet joint nerve blocks with controlled comparative local anesthetic blocks and concordant pain relief with an updated assessment of the prevalence, false-positive rates, and a description of a philosophical paradigm shift from an acute to a chronic pain model.

Study Design: Retrospective study to determine diagnostic accuracy, prevalence and false-positive rates.

Setting: A multidisciplinary, non-university based interventional pain management practice in the United States.

Methods: Controlled comparative local anesthetic blocks were performed initially with 1% lidocaine, followed by 0.25% bupivacaine if appropriate response was obtained, in an operating room under fluoroscopic guidance utilizing 0.5 mL of lidocaine or bupivacaine at L3, L4 medial branches and L5 dorsal ramus. All patients non-responsive to lidocaine blocks were considered to be negative for facet joint pain. All patients were assessed after the diagnostic blocks were performed with ≥ 80% pain relief for their ability to perform previously painful movements.

Results: The prevalence of lumbar facet joint pain in chronic low back pain was 34.1% (95% CI, 28.8%, 39.8%), with a false-positive rate of 49.8% (95% CI, 42.7%, 56.8%). This study also showed a single block prevalence rate of 67.9% (95% CI, 62.9%, 73.2%). Average duration of pain relief ≥ 80% was 6 days with lidocaine block and total relief of ≥ 50% of 32 days. With bupivacaine, the average duration of pain relief ≥ 80% was 13 days with total relief of ≥ 50% lasting for 55 days.

Conclusion: This study demonstrated that the chronic pain model is more accurate and reliable with concordant pain relief. This updated assessment also showed prevalence and false-positive rates of 34.1% and 49.8%.

Key words: Chronic spinal pain, lumbar facet or zygapophysial joint pain, facet joint nerve blocks, medial branch blocks, controlled comparative local anesthetic blocks, diagnostic accuracy, prevalence, false-positive rate

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Chronic persistent low back pain secondary to facet joint pathology is prevalent in 27% to 40% of selected populations with false-positive rates of 27% to 47%, utilizing ≥ 80% pain relief as the criterion standard using controlled comparative local anesthetic blocks (1). Facet joint pain with its diagnosis and specifically diagnostic facet joint nerve blocks have been marked by extensive discussions of its prevalence, false-positive rates, non-interventional diagnosis, single block response, controlled comparative local anesthetic blocks, or placebo-controlled blocks, type and concentration of local anesthetics injected, and criterion standards of relief variable from 50% to 100% (1-29). The approach to diagnose facet joint pain with diagnostic facet joint nerve blocks was pioneered by Bogduk (10-13,17-21) with extensive research and publications, and then by Manchikanti in the United States (1,3-6,14,22-27,29). Bogduk postulated that for any structure to be deemed a cause of back pain (30):

- The structure should have a nerve supply.
- The structure should be capable of causing pain similar to that seen clinically, ideally demonstrated in normal volunteers.
- The structure should be susceptible to diseases or injuries that are known to be painful.
- The structure should have been shown to be a source of pain in patients, using diagnostic techniques of known reliability and validity.

They also postulated that for structures to be proven as the cause of pain, multiple reference standards may be applied in surgical situations, such as biopsy, surgery, or autopsy, which are difficult to apply in diagnosing chronic low back pain of facet joint origin. Consequently, the long-term or dedicated clinical follow-up of subjects appears to be the only solution (35). Subsequently, painstakingly, Bogduk (10-13,18-21,31,32) has proven that controlled diagnostic blocks provided concordant pain relief based on the duration of local anesthetic action, which has not been determined in chronic pain patients and may be highly variable based on the interpretation of an individual provider. Investigators led by Bogduk (12) described expected issues with comparative local anesthetic blocks and their duration of relief in chronic pain patients. They stated that the normal duration of action in patients with pain has not been measured and that the majority of the patients reported a duration of relief consonant with the expected durations determined in normal volunteers. Further, they described that some patients have temporary but inordinately prolonged responses to local anesthetics (31,32). They also described that those "discordant responses" were not necessarily placebo responses (32) and are compatible with local anesthetics having different sites of action depending on whether the sodium channels are open or closed (10). In addition, they stated that discordant or prolonged responses were valid and for practical purposes, but also stated that as prevalence decreases, as in the case of the lumbar spine, discordant responses become increasingly less valid because the diagnostic confidence they provide becomes substantially less than that of the concordant responses (32,33).

The only 2 studies published were by Bogduk's group, Schwarzer et al, with 3 publications, one of which was conducted in the United States (19,20) and the second one conducted in Australia (21). In contrast, Manchikanti et al (24) in 1999 published the first study in the United States in a heterogenous population utilizing 75% pain relief as the criterion standard found a prevalence rate of 42%. This was similar to one of the studies of Schwarzer et al (21) but much higher than the study in the United States in a younger population involved in motor vehicle accidents or workers' compensation injuries (19,20). Subsequent to this, a series of studies were conducted by Manchikanti and colleagues (5,6,22-27,29) assessing the prevalence and false-positive rates of lumbar facet joint nerve blocks in diagnosing facet joint pain with the last publication occurring in 2009 (5). Since then, DePalma et al (28) published a study from the United States showing a similar prevalence as others with 31%. During these times, Cohen et al published 3 manuscripts (7-9) contradicting the controlled diagnostic blocks approach. However, ≥ 80% pain relief, which has become the standard of care and has been incorporated into guidelines, as well as LCDs (1,33).

Manchikanti and colleagues, with their multiple publications, also evaluating factors influencing the diagnosis, prevalence and false-positives in various groups of patients, with sedation, opioid exposure, and psychological conditions, have observed that the relief from facet joint nerve blocks is much longer than the described relief of less than 8 hours with lidocaine and less than 24 hours with bupivacaine (5,22-27,29). In 2 of the studies (5,25), the authors showed with a single block with 1% lidocaine in dual block patients approximately 10 days relief and with the second block with

bupivacaine 0.25%, it was over 23 days (25) and ≥ 50% pain relief or 3.6 ± 3.82 weeks with lidocaine and 6.9 ± 4.55 weeks with bupivacaine.

This study is undertaken not only to update prevalence and false-positive rates of lumbar facet joint pain diagnosed by controlled diagnostic blocks with concordant relief of ≥ 80% pain relief as the criterion standard and to provide what is fundamentally a philosophical paradigm shift from an acute to a chronic pain model in managing chronic facet joint pain.

Methods

This assessment was undertaken with exemption received from Western Institutional Review Board (WIRB Work Order #1-1294799-1). In this study, the authors used the methodology and guidance described by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) (34) and the Standards for Reporting of Diagnostic Accuracy Studies (STARD 2015) – (an updated list of essential items for reporting diagnostic accuracy studies) towards complete and accurate reporting of studies of diagnostic accuracy (35).

Study Design

A retrospective analysis of chronic low back pain patients undergoing diagnostic lumbar facet joint nerve blocks to assess prevalence, false-positive rates, and duration of relief.

Setting

A non-university, private practice setting in the United States, offering comprehensive, interventional pain management services.

Participants

The study evaluated 299 consecutive patients undergoing lumbar facet joint nerve blocks for chronic low back pain by one physician

Schematic presentation of patient flow is shown in Fig. 1.

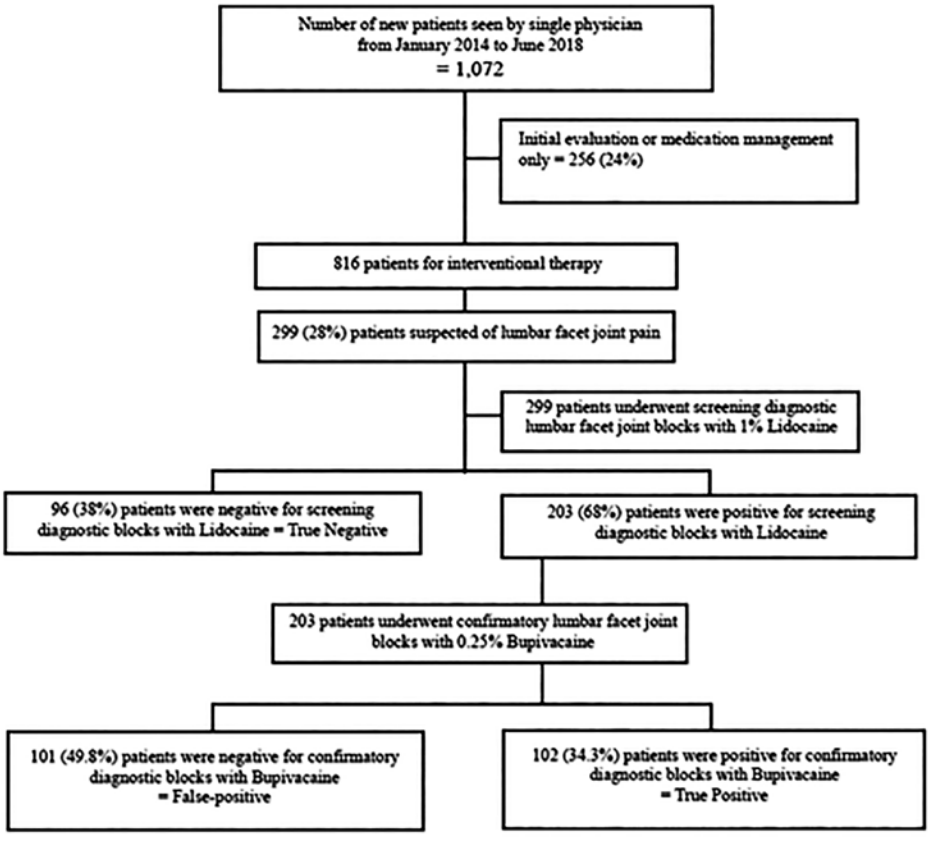

Fig. 1. *Schematic presentation of patient flow.*

Inclusion Criteria

Only patients above 18 years of age were included. They must have had axial pain with or without somatic radiation without radicular pain pattern for 6 months, and have failed conservative management. Conservative treatment included physician-ordered physical therapy, structured exercise program, chiropractic manipulation, drug therapy, and bedrest, etc. Clinical findings also included pain over the facet joints, relief with rest, negative straight leg raising, lack of disc herniation, increased levels of pain with extension and rotation.

Exclusion Criteria

Any disc-related pain with radicular pain pattern and positive neurological examination with reflex suppression or neurological deficit. Further, patients with disc herniation were also excluded. However, disc bulging was not a contraindication if they met all the other criteria.

Assessment

All patients underwent a comprehensive history, physical examination, and evaluation of the results of prior procedures and investigations. Examinations and evaluations of patients were performed by one physician (LM). The charts were reviewed and initially 310 patients were identified. However, 11 patients were scheduled for the procedure and diagnostic facet joint nerve blocks were not performed on them. Consequently, 299 patients who underwent at least one diagnostic facet joint nerve block.

Informed Consent

All patients received appropriate explanation and informed consent in reference to the diagnostic facet joint nerve blocks, along with associated complications.

Procedures

Facet joint nerve blocks were performed in a sterile operating room under appropriate monitoring with mild sedation with midazolam alone, or without sedation. Fentanyl was not administered. Procedures were performed for the first block with 1% lidocaine with 0.5 mL at each level at L3, L4 medial branches and L5 dorsal ramus, either unilaterally or bilaterally. Patients with lidocaine positive results further received 0.25% bupivacaine on a separate occasion, usually 4 to 6 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 2 levels, blocking 2 joints or 3 nerves; however, additional joints were blocked if necessary. The blocks were performed with intermittent fluoroscopic visualization using a #22 gauge, 3½" spinal needle at each of the indicated medial branch levels.

Diagnostic blocks were performed as described by Manchikanti et al (36).

Assessment of the Response

A positive response was defined as ≥ 80% reduction of pain with the ability to perform previously painful movements as assessed using Numeric Rating Scale (NRS) by someone other than the physician who performed the block. Following each block, the patient was examined and asked to perform previously painful movements. To be considered positive, pain relief from a block had to last at least 24 hours with ≥ 80% relief and an overall relief of one week following lidocaine, and greater than the duration of relief with bupivacaine than lidocaine.

Discharge and Postoperative Assessment

All patients were discharged 30 to 45 minutes after completion of the diagnostic blocks. All patients were contacted within 24 hours following the block by a registered nurse and responses were recorded. All patients also returned for a follow-up visit in 2 to 4 weeks with assessment of pain relief and functional status improvement, the duration of 80% relief, and total duration of ≥ 50% relief.

Criterion Standard

All patients with less than the proposed response were considered as not to have facet joint pain after the first block. The patients with appropriate relief with the first block with lidocaine also received a second block with bupivacaine and the response was assessed after 6 to 8 weeks. If they obtained a concordant response, they were considered positive and further treatment with therapeutic facet joint nerve blocks or radiofrequency neurotomy was considered. If they failed to show concordant relief, i.e., longer than lidocaine with bupivacaine, they were considered false-positives and no further facet joint therapy was carried out.

Variables and Measures

Analysis was carried out for prevalence of lumbar facet joint pain, false-positive rates with a single block, and duration of relief with each block.

Bias

This was a retrospective evaluation utilizing all consecutive patients. In order to mitigate bias, data was collected by a physician and clinical coordinator not involved in the provision or assessment of patients during the period of treatment. There was no external funding.

Sample Size

The sample size is appropriate for diagnostic accuracy studies and is considered on the larger side compared to the previous studies (5-9,23-31). With 95% sensitivity and 30% prevalence, the required sample size is 243 and with 70% specificity and 30% prevalence the required sample size 322.

Statistical Analysis

Data was entered on Microsoft Access database. The IBM SPSS® Statistics version 22 used to generate the tables. Chi square test used to compare between gender, age, and BMI. Prevalence, sensitivity (true positive rate), specificity (true negative rate), and accuracy were calculated.

Sources of Funding

There was no external funding.

Results

All new patients scheduled for 2014 to 2018 were included. Diagnostic facet joint nerve blocks with potential diagnosis of lumbar facet joint pain.

Patient Characteristics

Table 1 shows demographic features.

Results of Diagnostic Blocks

As shown in Table 2, the prevalence of facet joint pain utilizing double-blocks was 34.1% (95% CI, 28.8%, 39.8%). The study also showed a false-positive rate of 49.8% (95% CI, 42.7%, 56.8%), and a sensitivity of 100% accuracy of 66.2% (95% CI, 41.6%, 55.9%) and specificity of 48.7% (95% CI, 41.6%, 55.9%).

Lidocaine blocks were performed in the 299 patients enrolled. Of these, 96 patients were judged to be negative for facet joint pain with a prevalence rate of lumbar facet joint pain of 67.9% (95% CI, 62.9%, 73.2%) using a single block with lidocaine. The remaining 203 patients underwent a second block with bupivacaine.

Table 1. *Demographic characteristics*

Gender	
Male	43% (129)
Female	57% (170)
Age	
Mean + SD	50.8 + 12.9
< 45 year	33% (100)
45-60 Years	48% (143)
>60 Years	19% (56)
Weight (lbs)	198.6 + 55.5
Height (inches)	66.9 + 4.0
BMI	
Mean + SD	31.2 + 8.4
<≤ 25	23% (70)
≥ 25-29.99	28% (82)
30-39.99	34% (102)
≥=40	15% (45)

Table 2. *Results of single and dual controlled comparative local anesthetic lumbar facet joint nerve blocks with 1% lidocaine and 0.25% bupivacaine.*

1st Diagnostic Block	2nd Diagnostic Block		Single Total
	Positive	Negative	
Positive	102	101	203
Negative	0	96	96
Double block total	102	197	299
Single Block Prevalence	67.9% (95% CI, 62.9%, 73.2%)		
Double block Prevalence	34.1% (95% CI, 28.8%, 39.8%)		
False Positive Rate	49.8% (95% CI, 42.7%, 56.8%)		
False negative rate	0% (95% CI, 0%, 0.05%)		
Specificity	48.7% (95% CI, 41.6%, 55.9%)		
Sensitivity	100% (95% CI, 95.5%,100%)		
Accuracy	66.2%		

Of these, 102 patients were positive. This provided a prevalence of 34.1% (95% CI, 28.8%, 39.8%). This also provided a false-positive rate of 49.8% (95% CI, 42.7%, 56.8%). Table 2 also shows sensitivity and specificity with both single and dual blocks. As shown in Table 3, the prevalence and false-positive rates by gender, age, and BMI were assessed. Table 4 shows the duration of relief with each block described in days as an average with first block with lidocaine in patients with ultimately controlled comparative local anesthetic positive blocks. 6.07 days ≥ 80% relief was reported with a total relief of 32.11 days of ≥ 50%. In contrast, with the second block, the ≥ 80% pain relief was noted in 12.96 days with total relief (>50%) of 55.44 days.

Discussion

The present diagnostic accuracy study showed a prevalence of facet joint pain with dual diagnostic blocks, using ≥ 80% pain relief as the criterion standard, of 34.1% (95% CI, 29.0%, 39.6%).

This diagnostic accuracy study updated prevalence and false positive rates of facet joint pain in the lumbar region with controlled comparative local anesthetic utilizing the hypothesis of chronic pain algorithm expecting duration of relief longer than pharmacological action of each local anesthetic. This assessment showed significantly longer improvement with ≥80% relief of 6 days with lidocaine and almost 13 days with bupivacaine and with a total relief of ≥ 50% of 32 days with lidocaine and 55 days with bupivacaine. The study showed a false-positive rate of 49.8% and 95% confidence interval (CI) (49.7%, 56.8%) with a single block prevalence rate of 67.9% ± 5.3% with 95% CI (62.9%, 73.2%). As a result, a single block is not recommended, specifically in the lumbar spine, considering that there is significant difference in the prevalence rate with single blocks and dual blocks. Further, instead of considering long-lasting relief as discordant or out of normal, we should consider the chronic pain hypothesis and an appropriate time period should elapse with proper assessment prior to embarking on therapeutic interventions.

This study is in concordance with multiple other publications by Manchikanti and colleagues (5,6,26,27,29). It is uncertain if these results are similar to results by DePalma's study (28), due to his criterion standard relief of < 8 or < 24 hours. However, except for a few studies by Manchikanti et al (5,29), the duration of relief has not been reported with diagnostic blocks. In fact, Bogduk has categorized philosophical approaches into 3 categories (13). He described a purist approach by him and his colleagues (10-13,17,18), a second approach by Manchikanti and colleagues (5,6,22-27) without giving it a particular name and a pragmatic approach by Cohen et al (7-9). There are stark contrasts and differences between these approaches. Further, Bogduk stated that lumbar facet joint pain is not that common, consequently, the only way it can be diagnosed is by performing placebo controlled blocks, and he believes

Table 3. *Prevalence and false positive rate by gender, age, and BMI.*

	Prevalence	False Positive Rate
Gender		
Male	35.3% (60/170)	50.8% (62/122)
Female	32.6% (42/129)	48.1% (39/81)
P value	0.358	0.409
Age (years)		
≤ 45	31% (31/100)	50.8% (32/63)
46-60	37% (53/143)	47.5% (48/101)
>60	32% (18/56)	53.8% (21/39)
P value	0.582	0.783
BMI		
≤25	27.1% (19/70)	56.8% (25/44)
>25-30	37.8% (31/82)	43.6% (24/55)
30-40	36.3% (37/102)	46.3% (32/69)
>40	33.3% (15/45)	57.1% (20/35)
P value	0.525	0.427

Table 4. *Average duration of relief in days.*

Outcome	N	1st Diagnostic Block			2nd Diagnostic Block		
		50-79%	>=80%	Total Relief	50-79%	>=80%	Total Relief
False positive	101	24.89	5.95	30.83	23.58	3.02	26.60
Negative	96	9.63	0.02	9.65	0.00	0.00	0.00
Positive	102	26.04	6.07	32.11	42.47	12.96	55.44
Total	299	20.38	4.09	24.47	33.07	8.02	41.09

they are cost effective (10-13). However, both groups, Bogduk and Cohen, continue to utilize the acute pain model with one recommending placebo-controlled blocks with 100% pain relief despite the fact that they themselves utilized 50% relief as the criterion standard in the studies of the lumbar spine (23-25). In contrast, Manchikanti et al utilized a chronic pain model. Further, Bogduk and colleagues' patients were recruited from Australia, which showed a similar prevalence as shown in US studies by Manchikanti and colleagues (5,6,26-31), whereas others were recruited from New Orleans after involvement in motor vehicle injuries or workers' compensation in a younger group or population. Cohen et al (7-9) also utilized only military personnel with high morale, non-opioid therapy, excellent body mechanics, and a desire to get better and return to work. These patients cannot be utilized as a common path to heterogenous populations, specifically the elderly as using the patient population described in Cohen is not representative of population as a whole.

Pampati et al (5), in assessing the value and validity of diagnostic facet joint nerve blocks with long-term follow-up, also showed sustained pain relief and sustained diagnosis of facet joint pain in 93% of the patients at the end of one year and 89.5% of the patients at the end of 2 years when diagnosed using 80% pain relief as the criterion standard. Further, they also showed the sustained diagnosis was sustained in patients with 50% pain relief as well (6). The diagnosis continued to be positive in 75% of the patients at the end of one year; however, it dissipated to 51% of the patients after 2 years (6). These data provided not only the accuracy and dependability of ≥ 80% pain relief with controlled comparative local anesthetic blocks and also confirmed the value of the diagnostic blocks with long-term follow-up.

Derby et al (16,37) made valuable points based on ISIS standards with their assessment. However, it was under the assumption that there is no other treatment left for these patients and radiofrequency neurotomy as the only definitive treatment.

Derby et al (16), during the same period, described indications for repeat diagnostic medial branch nerve blocks followING a failed first medial branch nerve block and correlation of lumbar medial branch neurotomy results with diagnostic medial branch block cutoff values to optimize therapeutic outcome. However, they have not assessed the duration of relief with each type of block. They concluded that patients reporting between 50 and 69% of pain relief have a false-negative response rate of 47.1% and they recommended that they should be considered for a confirmatory block (16). Further, they also concluded that the double medial branch block protocol better correlated with favorable medial branch neurotomy outcomes compared with a single block protocol with 70% cutoff value and 80% cutoff value with a single block also provided optimal value.

A significant misunderstanding in reference to the relief provided by local anesthetics and the duration of relief persists, with the hypothesis that 1 or 2 hours based on acute pain model. Thus, we have approached this discussion with a change of philosophical approach with a paradigm shift from acute pain to chronic pain. Acute pain is unidimensional, with only a nociceptive component. In contrast, chronic pain is a complex biopsychosocial phenomenon, which is multidimensional (1). Many of the authors have missed this aspect, even the one manuscript published in the United States with a heterogenous population (28). Consequently, Manchikanti and others(38-43) have described the role of local anesthetics in multiple manuscripts, which is longer lasting than acute pain and is also similar to steroids with lidocaine, as well as bupivacaine. In fact, local anesthetics have been used extensively in interventional pain management, specifically in epidural injections since 1901 (44-47), until the description of steroid injections into sacral epidural space (48,49) following the discovery of steroids by Hench in 1940s (50). In chronic pain, local anesthetics provide long-term relief based on various principles, in addition to the traditional duration of their pharmacological actions. The effectiveness of local anesthetics on duration of relief in chronic pain is based on antiinflammatory activities (38-47,51-54), alteration of multiple pathophysiologic mechanisms, including noxious peripheral stimulation, excess nociception, sensitization of pain pathways and excess release of neurotransmitters, causing complex central responses including hyperalgesia windup, nociceptive sensitization, and phenotype changes, which are also considered as part of neural plasticity (38-41,45,52,55-63). In fact, multiple experimental and clinical studies have shown extended pain relief with local anesthetic only and also showing no significant prolongation of the duration of relief with the addition of steroids (60-67).

An analysis of growth of utilization of interventional techniques in fee-for-service (FFS) Medicare population (68-74) showed an overall decline in utilization of interventional techniques from 2009 to 2018 of 6.7%

with an annual decline of 0.8% per 100,000 FFS Medicare population. However, this is despite an increase of 0.7% per year of population growth of 3.2% of those 65 years or older, and a 3% annual increase in Medicare participation from 2009 to 2018. In contrast, utilization patterns of facet joint interventions (69,70) showed an increase of facet joint interventions of 1.9% annually and 18.8% total from 2009 to 2018 per 100,000 FFS Medicare population compared with annual increase of 17%, an overall increase of 309.9% from 2000 to 2009. However, these analyses further showed that lumbosacral facet joint nerve block sessions decreased at an annual rate of 0.2% from 2009 to 2018 compared with an increase of 15.2% from 2000 to 2009. In contrast, lumbosacral facet joint neurolysis sessions increased at an annual rate of 7.4% from 2009 to 2018, compared to an annual increase of 23% from 2000 to 2009. Similar but less dramatic patterns were observed slightly in the cervical spine. Manchikanti et al (73) also published trends in the expenditures in 2013 covering until 2008 and again in 2020 (69) covering from 2009 to 2018. This analysis showed that expenditures increased by 79% from 2009 to 2018 in the form of total costs for facet joint interventions. Cervical and lumbar facet joint injections increased 35% and 37%, whereas cervical and lumbar radiofrequency neurotomy increased 185% and 169% with a total increase of costs of 79% at an annual rate of 6.7%. Further, inflation-adjusted expenditures with 2018 US dollars showed still an overall increase of 53% with an annual increase of 4.9%.

In a commercially-insured population, Starr et al (74) assessed the trends in lumbar radiofrequency ablation utilization from 2007 to 2016 showing an increase of radiofrequency sessions at annual rate of 9.7% per 100,000 enrollees. They also showed lesser increases for facet joint injections of 2.5% annual increase. Further, data showed fewer number of procedures were performed in the younger population as the data was derived from MarketScan Commercial Claims and Encounters Databases. This stand in contrast to data from the FFS Medicare population. Starr et al (74) also looked at the costs. Their estimated cost for lumbar radiofrequency ablation per 100,000 enrollees increased annually at 12.2% and for facet joint injections, it increased annually, a 4.9%. However, these costs were not adjusted to reflect inflation.

The major advantages of this study include utilizing a chronic pain model with a proven diagnostic approach with controlled comparative local anesthetic blocks with concordant pain relief. The study was also conducted based on STROBE and STARD criteria. This study clearly shows that the relief lasts much longer than hours as described earlier. Appropriate selection of the patients with chronic pain model may improve access, success rate, and, finally, utilization. Those who do not respond or are negative to facet joint nerve blocks may undergo epidural injections as described for discogenic pain in multiple manuscripts (75-79). The limitations of this study include its retrospective nature, patient recall bias, and lack of acceptance of the chronic pain hypothesis by other investigators.

Conclusion

This study shows that applying controlled comparative local anesthetic blocks in diagnosing lumbar facet joint pain, prevalence was similar to previous assessments with 34.1% (95% CI, 28.8% to 39.8%) and with a false-positive rate of 49.8% (95% CI, 42.7% to 56.8%). In addition, this study showed longer relief than previously described with diagnostic facet joint nerve blocks, utilizing chronic pain model instead of acute pain model.

Author Contributions

The study was designed by LM, RK, and VP.

Statistical analysis was performed by VP.

All authors contributed to preparation to the manuscript, reviewed, and approved the content with final version.

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