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Evaluation of a blind technique for peri-articular injection in patients with lumbar facet syndrome: a retrospective study

Abstract

Background: Low back pain induced by facet joint problems is a healthcare issue with great importance. Regardless of the routine rehabilitative and conservative care, injection therapies targeting nerve roots or facet joints play a vital role in alleviating the related pain and confirming the diagnosis of facet joint problems. Currently, imaging modalities, such as Computed Tomography (CT) scan or fluoroscopy, are widely used for facet joint injection guidance. Considering the limitations of previous blind techniques and the inconvenience of the imaging-guided injection techniques, we aimed to evaluate the effectiveness and safety of a straightforward and fast blind technique for peri-articular facet injections.

Methodology: The present retrospective study included the medical records of 111 patients with lumbar facet syndrome who underwent peri-articular injection using the blind technique. The patients' demographic data, such as age and gender, were extracted from their records. Moreover, the clinical data, including the patients' pain assessed using the Visual Analogue Scale (VAS), the related disability assessed using the Oswestry Disability Index (ODI), and the patients' satisfaction scores, were recorded pre-intervention and one-month post-intervention.

Results: The present study included 111 patients. 62 patients (55.8%) were female, while 49 (44.2%) were male. The participants' mean age was 48.3±11.55 years. According to our findings, the mean VAS score reduced significantly 2 and 4 weeks following the injection compared to pre-intervention assessments (P <0.001). Moreover, the mean ODI score was significantly improved one-month post-injection compared to the baseline assessments (P <0.001). Also, 83.7% of the patients reported a moderate to high (≥level 4) satisfaction level 1 month following the injection. Eventually, no post-injection complication was reported in the patients.

Conclusion: According to our findings, we concluded that this blind technique proved to be practical, easy-to-use, and reliable in the short-term alleviation of facetogenic lumbar pain. We believe that our technique is a safe and quick pain management procedure in outpatient settings.

Keywords: low back pain, facetogenic pain, lumbar facet injection, blind lumbar injection

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Introduction

Low back pain is the second most common cause of physician visits and healthcare-related costs.[1] Numerous anatomical structures can cause this problem, such as facet (zygapophyseal) joints, nerve roots, discs, and sacroiliac joints. However, facet joint syndrome and radicular pain are the most prevalent types of low back pain. According to studies, as a potential cause of low back pain, lumbar facet joint syndrome can even lead to referral lower extremity pain in 15%-45% of the affected patients.[2–4]

Rehabilitative and conservative approaches are beneficial for managing this problem and are considered the treatment of choice. However, since clinical examination or radiologic findings are of little help in diagnosing the facet syndrome, local anesthetic and/or steroid injection into the facet joint is globally practiced as a diagnostic and therapeutic procedure for alleviating the facetogenic pain.[3] These procedures are usually imaging-guided and use different imaging modalities, such as CT scan, fluoroscopy, or ultrasound imaging. Nevertheless, these imaging modalities make the procedure inconvenient due to a need for specialized and equipped clinics, excessive procedure cost, potential exposure of the patients to ionizing radiation, potential hypersensitivity of the patients to contrast agents, and operator-dependency of the procedure.[5–8]

Therefore, the present study aimed to evaluate the efficacy and safety of a blind injection technique in patients with facet-induced lumbar pain. This blind technique has several advantages: it is radiation-free, relatively inexpensive, significantly less time-consuming, and easily learnable and applicable. If it proves to be efficient, this technique may successfully lead to early rehabilitation due to quick pain relief.

Methodology

The present retrospective study included all the patients older than 18 years diagnosed with L4-L5 facet involvement and facetogenic pain who underwent peri-articular injection using the blind technique at the Physical Medicine and Rehabilitation Clinic of the Shariati Academic Hospital, Tehran, Iran, during 2015-2020. Moreover, the participants had lumbosacral radiographs and MR images in their medical records. The data were extracted from the patients' medical records. The patients with incomplete records, a history of

chronic function-limiting low back pain of longer than six months (postoperatively), previous peri-articular facet joint injection using other injection techniques, or previous surgeries were excluded from the study. Eventually, 111 patients met the eligibility criteria and entered the study.

The present study was approved by the Ethics Committee of the Tehran University of Medical Sciences with the ethics code of IR.TUMS.MEDICINE.REC.1399.708. Moreover, the patients gave written informed consent for their medical data to be published.

Injection technique

The procedure was performed by an experienced physiatrist, with the patients in the prone position while a pillow was under their abdomens. Several bony anatomical landmarks were used to locate the L4-L5 facet joint more accurately, including the anterior superior iliac spine, depression of the soft tissue of the iliac crest, and the spinous process of the L4 and L5 vertebras.[9]

The skin was disinfected with sterile gloves using an iodine solution. Then, it was draped under sterile conditions. The area was anesthetized with 2 ml of lidocaine 2% using a 25-G needle. Afterward, a 21-gauge spinal needle held by the operator's dominant hand was gently inserted into the skin at a location 2.5 cm lateral to the spinous process with an angle of 50°-60° and a lateral-to-medial direction until it encountered the bone. When the bone was felt, the needle was pulled back for a few millimeters, and a 5-cc syringe containing 1 mL of triamcinolone acetonide (40 mg/mL) and 3 mL of lidocaine (2%) was connected to the needle. Then, the needle was aspirated to ensure not being in a blood vessel, and the solution was pushed into this space by the index finger pressing the end of the syringe. If the needle were in the correct position, no significant resistance would be felt when pushing the solution out.

Patients tolerated the procedure well, with no side effects reported after the procedure. Some patients had light bleeding from the needle insertion site, which was easily stopped using firm pressure. In addition, the patients were then prescribed a personalized rehabilitation program.

Outcome measures

All data were extracted from the assessment charts in the patients' medical records. The patients' demographics, including age, gender, and BMI, were extracted and recorded. Moreover, the pre- and post-intervention outcome measures, including the pain severity assessed using the VAS, the related disability assessed using the ODI, and the patients' satisfaction scores, were extracted and recorded as well.

The VAS score was used for assessing the pain severity. This scale ranges from 0-10, with 0 representing painless and 10 representing extreme pain. Moreover, as a self-reporting questionnaire assessing the disability of the patients, the ODI includes 10 items evaluating the pain severity, lifting ability, self-caring, walking ability, sitting ability, sexual function, standing ability, social life, quality of sleep, and traveling ability of the patients. Each item is scored from 0 to 5, with 0 indicating the least level of disability and 5 as the most severe level of disability. In addition, the total ODI score ranges from 0-100. Also, the patients' satisfaction from injection was assessed using a 5-point Likert scale (1= poor, 2 = satisfied, 3 = much satisfied, 4 = very satisfied).

Statistical analysis

Data analysis was performed using the SPSS software version 26.0 for Windows (IBM Corp., Armonk, NY, USA). Demographic data were described as mean±standard deviation or frequency and percentage. The paired t-test or its nonparametric counterpart (Wilcoxon signed-rank) was used for intra-group comparisons of the outcome variables. Moreover, the significance level was considered at 0.05.

Results

The present study included 111 patients, of which 62 (55.8%) were female, while 49 (44.2%) were male. Moreover, 63 patients (56%) had their pain radiated to the lower limbs. The patients' demographics are presented in Table 1. According to our findings, the mean pre-intervention VAS score was 6.7±1.52, which was significantly decreased to 3.4±1.61 after 2 weeks from the procedure (P<0.001). Moreover, the VAS score one month post-injection was 3.4±1.97, which was significantly lower than the baseline value (P<0.001); however, there was no significant difference in the mean VAS score between the assessments performed at 2 weeks and one month (p=0.549). Also, 89 patients (80.1%) reported a VAS score reduction of 2 or higher after one month from the injection.

Regarding the disability assessments, the mean pre-intervention ODI score was 56.52±12.6, which was significantly decreased to 33.64±13.82 one month after the injection (P<0.001). Moreover, the mean satisfaction score was 3.8±0.8 immediately after the injection, while it was 3.6±1.1 one month post-injection. Also, 83.7% of the patients reported moderate-to-high (≥level 4) satisfaction scores one month after the injection. Eventually, we found that the improvements in the VAS and ODI scores were negatively correlated with the age (r=-0.415, p<0.001) and BMI (r=-0.539, p<0.001) of the patients, while these two outcome measures did not have a significant correlation with the variables of gender and radiated pain. The outcome measures of the present study are presented in Table 2. Also, some patients (n=12) reported that their pain was aggravated within 48 hours after the injection. However, no other complication was reported in the patients within one month after the procedure.

Table 1 Demographic characteristics

	n	%	Mean±SD
Age (year)			48.3 ±11.5
Gender			
Female	65	55.8	
Male	49	44.2	
Body Mass index			25.6±3.1
Pain radiation	63	56	

SD, Standard deviation

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Table 2 Mean and standard deviation of outcome measure before and after the spine injection

Outcome measure	Base line	2 weeks post injection	1 month post injection	P-value
	Mean±SD	Mean±SD	Mean±SD	
VAS	6.7±1.52	3.4±1.61	3.4±1.97	<0.0001
ODI	56.5±12.6	NA	33.6±13.82	<0.0001
Satisfaction	3.8±0.80	NA	3.6±1.10	

VAS, Visual analogue scale; ODI, odwestory disability index

Discussion

Low back pain induced by facet joint problems is a healthcare issue with great importance, with its management enduring a significant socioeconomic burden.[1] Generally, history and physical examination may not confirm the facet joint syndrome due to the lack of significant relationship between the clinical symptoms and spinal imaging findings.[2] Therefore, interventional procedures are the cornerstone of our diagnostic and therapeutic approaches in managing this problem.[3]

Our options for interventional therapy include intra-articular steroid injection, the medial branch blockade, and radiofrequency treatments.[4,5] These methods are usually performed under fluoroscopy or CT scan guidance, ensuring the accuracy of needle insertion. However, they have some disadvantages, including exposure to ionizing radiation, hypersensitivity reactions to the contrast agents, the need for specialized and equipped clinics, and excessive procedure costs.[6–8]

Over the past few decades, the application of Ultrasound (US) imaging for spinal injections has dramatically increased.[10,11] Ease of performance, lack of radiation, and real-time visualization of the procedure are some of the superiorities of this method over previous imaging modalities.[12] However, ultrasound has its own limitations.[13] For example, the quality of the ultrasound images is completely operator-dependent. While the proper use of this modality requires experience, the needed skill is challenging to master. Also, visualization of the structures deep to bone is difficult in ultrasound imaging due to the acoustic shadowing artifact.[10,11]

Despite the higher accuracy and effectiveness of imaging-guided facet injections, some practitioners prefer blind procedures. This preference is somehow reasonable because the imaging devices are not accessible to all outpatient settings. In addition, increased medical expenses will make the patients reluctant to undergo imaging-guided procedures. Also, several needle insertions are required to get into the narrow facet joint space even under the imaging guidance.[14,15] To the best of our knowledge, all non-imaging-guided technical approaches traditionally used for depositing steroids into the facet space were intramuscular or similar to the myofascial trigger point injections. Moreover, these procedures needed short needles and multiple insertions.[16–20]

To overcome these limitations, we introduced a blind peri-facet injection technique, which provided adequate analgesia through a single injection of local anesthetic and steroid solution with no vascular or visceral puncture and other complications. To prevent post-procedural infections, the procedure was performed aseptically. Moreover, we used a peri-facet approach to eliminate the complications related to intra-articular injections, such as facet joint capsule rupture or difficulty accessing the joint recess due to prominent osteophytes.[21,22] Also, studies have shown no differences between the outcomes of intra-articular and peri-articular approaches.[23–25]

Our technique was used for the L4-L5 facet joint pain due to the high prevalence of facetogenic pain at this level.[26,27] However, pain induced by other facet joints can also be addressed using the same technique, with only minor differences in the anatomical landmarks and needle insertion orientation. Moreover, our technique is practical and straightforward and can provide significant pain relief. Also, the procedure duration is considerably shorter, and it is much more cost-effective than the previous methods. It helps to achieve quick pain relief for early rehabilitation initiation, which has shown to be beneficial for low back pain in several meta-analyses including randomized controlled trials.[28–30]

In conclusion, the present blind technique proved practical, quick, and feasible in alleviating facetogenic pain. We believe that our technique is a safe and quick pain management procedure in outpatient settings. However, it is recommended to perform large-scale clinical trials with longer follow-up duration to confirm the success rate and safety of this method.

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None.

Conflicts of interest

The authors declare that they have no conflict of interest.

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References

1. Breivik H, Collett B, Ventafridda V, et al. Survey of chronic pain in Europe:prevalence, impact on daily life, and treatment. *Eur J Pain*. 2006;10(4):287–333.
2. Kalichman L, Kim DH, Li L, et al. Computed tomography-evaluated features of spinal degeneration:prevalence, intercorrelation, and association with self-reported low back pain. *Spine J*. 2010;10(3):200–208.
3. Hancock MJ, Maher CG, Latimer J, et al. Systematic review of tests to identify the disc, SIJ or facet joint as the source of low back pain. *Eur Spine J*. 2007;16(10):1539–1550.
4. Kleef M, Vanelderen P, Cohen SP, et al. Pain Originating from the Lumbar Facet Joints. *Pain Practice*. 2010;10(5):459–469.
5. Cohen SP, Huang JHY, Brummet C. Facet joint pain advances in patient selection and treatment. *Nature Reviews Rheumatology*. 2013;9:101–116.
6. Greher M, Scharbert G, Kamolz LP, et al. Ultrasound-guided lumbar facet nerve block:A sonoanatomic study of a new methodologic approach. *Anesthesiology*. 2004;100(5):1242–1248.

7. Ha DH, Shim DM, Kim TK, et al. Comparison of ultrasonography and fluoroscopy-guided facet joint block in the lumbar spine. *Asian Spine J.* 2010;4(1):15–22.
8. Kim HS, Ahn KH, Yun DH, et al. Skin lesion after repeated fluoroscopically guided procedures: a case report. *J Korean Acad Rehab Med*. 2001;25(4):729–733.
9. Cooperstein Robert, Truong Felisha. Would adopting a revised landmark rule for the spinal level of the iliac crests improve the accuracy of lumbar level identification. *J Can Chirop Assoc.* 2019;63:26–35.
10. Narouze SN. Ultrasound-guided interventional procedures in pain management. *Reg Anesth Pain Med.* 2010;35(2 Suppl):S55–S58.
11. Narouze SN, Provenzano DA. Sonographically-guided cervical facet nerve and joint injections:why sonography? *J Ultrasound Med*. 2013;32(11):1885–1896.
12. Bhatia A, Brull R. Review article: is ultrasound guidance advantageous for interventional pain management? A systematic review of chronic pain outcomes. *Anesth Analg.* 2013;117(1):236–251.
13. Korbe S, Udoji EN, Ness TJ, et al. Ultrasound-guided interventional procedures for chronic pain management. *Pain Manag*. 2015;5(6):465–482.
14. Tsai CT, Hsieh LF, Kuan TS, et al. Injection into cervical facet joint region in treating shoulder pain with myofascial trigger points in the upper trapezius muscle. *Orthopedics*. 2009;32(8):557–565.
15. Galiano K, Obwegeser AA, Walch C, et al. Ultrasound-guided versus computed tomography-controlled facet joint injections in the lumbar spine:a prospective randomized clinical trial. *Reg Anesth Pain Med.* 2007;32(4):317–322.
16. Karkucak M, Batmaz İ, Kerimoglu S, et al. Comparison of clinical outcomes of ultrasonography-guided and blind local injections in facet syndrome:A 6-week randomized controlled trial. *J Back Musculoskelet Rehabil.* 2020;33(3):431–436.
17. Ribeiro LH, Furtado RN, Konai MS, et al. Effect of facet joint injection versus systemic steroids in low back pain:a randomized controlled trial. *Spine (Phila Pa 1976)*. 2013;38(23):1995–2002.
18. Huang J, Chen H, Hong C, et al. Lumbar facet injection for the treatment of chronic piriformis myofascial pain syndrome:52 case studies. *Patient Prefer Adherence.* 2014;8:1105–1111.
19. Ribeiro LH, Furtado RN, Konai MS, et al. Effect of facet joint injection versus systemic steroids in low back pain:a randomized controlled trial. *Spine (Phila Pa 1976)*. 2013;38(23):1995–2002.
20. Yoon SH, Park H, Lee K, et al. Comparison of Nonimage- and Fluoroscopy-Guided Interlaminar Epidural Block:A Matched Paired Analysis in the Same Individuals. *Pain Res Manag*. 2019;2019:7513617.
21. Kim S, Lee JW, Chai JW, et al. Fluoroscopy-guided intra-articular facet joint steroid injection for the management of low back pain:therapeutic effectiveness and arthrographic pattern. *J Korean Soc Radiol.* 2015;73:172–180.
22. Peh W. Image-guided facet joint injection. *Biomed Imaging Interv J*. 2011;7(1):e4.
23. Albayrak A, Ozkul B, Balioglu MB, et al. Factors affecting results of fluoroscopy-guided facet joint injection: Probable differences in the outcome of treatment between pure facet joint hypertrophy and concomitant diseases. *J Craniovertebr Junction Spine.* 2016;7(1):38–42.
24. Karavelİoğlu E, Kokulu S, Eser O. Lomber faset eklem sendromunda enjeksiyon tedavisinin etkinligği:Klinik çalışma effıcacy of ınjectıon theraphy at lumbar facet joınt syndrome: Clınıcal study. *J Turkish Spinal Surg.* 2012:23(4):319–328.
25. Kershen LM, Nacey NC, Patrie JT, et al. Fluoroscopically guided facet injections: comparison of intra-articular and periarticular steroid and anesthetic injection on immediate and short-term pain relief. *AJNR Am J Neuroradiol*. 2018;39(11):2161–2165.
26. Fujiwara A, Lim TH, An HS, et al. The effect of disc degeneration and facet joint osteoarthritis on the segmental flexibility of the lumbar spine. *Spine (Phila Pa 1976)*. 2000;25(23):3036–3044.
27. Kalichman L, Hunter DJ. Lumbar facet joint osteoarthritis:a review. *Semin Arthritis Rheum.* 2007;37(2):69–80.
28. Cairns MC, Foster NE, Wright C. Randomized controlled trial of specific spinal stabilization exercises and conventional physiotherapy for recurrent low back pain. *Spine.* 2006;31(19):E670–E681.
29. Hayden JA, van Tulder MW, Malmivaara A, et al. Exercise therapy for treatment of non-specific low back pain. *Cochrane Database Syst Rev.* 2005(3):CD000335.
30. Philadelphia Panel. Philadelphia Panel evidence-based clinical practice guidelines on selected rehabilitation interventions for low back pain. *Phys Ther.* 2001;81(10):1641–1674.