



Short and Mid-term Results for Intraarticular Lumbar Facet Joint and Anterior Epidural Transforaminal Injections

İntraartiküler Lomber Faset Eklem ve Anterior Epidural Transforaminal Enjeksiyonların Kısa ve Orta Dönem Sonuçları

Ilyas Dolas¹*, Tugrul Cem Unal¹*, Duygu Dolen¹*, Metehan Ozturk¹*, Sefa Ozturk¹*, Cafer İkbâl Gulsever¹*, Musa Samet Ozata¹*, Fatih Koksoy¹*, Mehmet Osman Akcakaya²*, Pulat Akin Sabancı¹*, Aydin Aydoseli¹*, Yavuz Aras¹*, Altay Sencer¹*

¹Department of Neurosurgery, Istanbul University, Istanbul Faculty of Medicine, İstanbul, Türkiye.

²Department of Neurosurgery, Atasehir Florence Nightingale Hospital, İstanbul, Türkiye.

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ABSTRACT

Objective: Low back pain (LBP) is one of the most common causes of the loss of workforce and restriction of physical activity. Lumbar facet joint injection (FJI) and anterior epidural transforaminal injection (AETI) are minimally invasive techniques that can be useful in managing acute/chronic LBP. This study aimed to analyze short and mid-term results of patients who underwent lumbar FJI and AETI.

Materials and Methods: A single-center retrospective study was performed on 60 patients who received the lumbar FJI and AETIs between January 2022 to April 2022. Patients were evaluated with the Oswestry Disability Index (ODI) and Visual Analogue Scale (VAS) before and immediately after the procedure, on the 15th day, first, and third months after the procedure. Patients with a score reduction of 20 points or more on the ODI or a score reduction of 2 or more on the VAS were considered to have benefited from the procedure.

Results: This study included 78 AETIs and 244 FJIs performed on 60 patients. Four (6.7%) patients had only AETI, 12 (20%) patients had only FJI and 44 (73.3%) patients had combined AETI and FJIs. Of these patients,

Sorumlu yazar/Corresponding author: Cafer İkbâl Gulsever, Department of Neurosurgery, Istanbul University, Istanbul Faculty of Medicine, İstanbul, Türkiye. cafer.gulsever@gmail.com / 0000-0002-9246-1378

ORCID:

I. Dolas 0000-0002-3425-3220, **T. C. Unal** 0000-0001-6228-1379, **D. Dolen** 0000-0002-6929-4401, **M. Ozturk** 0000-0002-7772-6331, **S. Ozturk** 0000-0001-5583-0384, **M. S. Ozata** 0000-0003-4401-5741, **F. Koksoy** 0000-0002-2189-4715, **M. O. Akcakaya** 0000-0001-8617-202X, **P. A. Sabancı** 0000-0002-0283-0927, **A. Aydoseli** 0000-0002-4695-8295, **Y. Aras** 0000-0001-8418-2291, **A. Sencer** 0000-0001-9925-5422

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48 (80%) of them have benefited from the procedure in the short term (<1 month). Of these, 30 (50%) patients sustained pain relief during the mid-term follow-ups (1-3 months).

Conclusion: Lumbar FCI and AETI are minimally invasive techniques that can be useful for managing acute/chronic LBP. Lumbar steroid injections can be preferred in selected patients with a high risk for surgical intervention and to provide time for physical therapy.

Keywords: Anterior epidural transforaminal injection, facet joint, low back pain, steroid injection

ÖZ

Giriş: Bel ağrısı iş gücünü azaltan ve fiziksel aktiviteyi kısıtlayan en sık sebeplerden birisidir. Lomber faset eklem enjeksiyonu (FEE) ve anterior epidural transforaminal enjeksiyon (AETE) bel ağrısı tedavisinde uygulanabilecek minimal invazif tedavi seçeneklerindedir. Bu çalışmada lomber FEE ve AETE yapılan hastalarda kısa ve orta dönem sonuçlarının ortaya konulması amaçlandı.

Materyal ve Metodlar: Çalışmaya, tek merkezde, Ocak 2022 ve Nisan 2022 tarihleri arasında yapılan FEE ve AETE yapılan toplamda 60 hasta dahil edildi. Hastaların işlem öncesi, işlemden hemen sonra, 15'inci gün, birinci ay ve üçüncü ay Oswestry ve vizüel analog skalaları kayıt edildi. Oswestry skalasında 20 puanlık ve vizüel analog skalasında 2 puanlık bir düşüş anlamlı olarak kabul edildi.

Bulgular: Bu çalışmada 60 hastaya toplam 78 adet AETE ve 244 adet FEE uygulandı. 4 (%6,7) hastada sadece AETE, 12 (%20) hastada sadece FEE ve 44 hastada (%73,3) kombine tedavi uygulandı. Bu hastaların 48'i (%80) işlemden kısa dönemde (<1 ay) fayda gördü. Bu hastaların ise 30'u (%50) orta dönemde (1-3 ay) fayda görmeye devam etti.

Sonuç: Lomber FEE ve AETE, akut ve kronik bel ağrısı tedavisinde minimal invazif bir teknik olarak kullanılabilir. Cerrahi açıdan yüksek riskli hastalarda orta döneme kadar ağrı azaltmada etkili olup hastalara bu sürede fizik tedavi alma imkanı sağlar.

Anahtar Kelimeler: Anterior epidural transforaminal enjeksiyon, bel ağrısı, faset eklem, steroid enjeksiyonu

INTRODUCTION

Low back pain (LBP) is one of the most common causes of the loss of workforce and restriction of physical activity. Approximately 80% of the population suffers LBP at some point in their lives ⁽¹⁾. In some long-term studies, nearly 50% of these patients have recurrent LBP episodes by one year ⁽²⁾. Most of these LBP episodes improve with bed rest, medical therapy, and physical therapy. According to some studies, remission rates of LBP in a one-year follow-up period range from 54% to 90%. On the other hand, some become chronic and affect patients' quality of life. Although there are many causes of LBP, lumbar disc herniation (LDH) and lumbar spinal stenosis (LSS) can be cited as the primary reasons ⁽³⁻⁵⁾.

Lumbar steroid injections such as facet joint injection (FJI) and anterior epidural transforaminal injection (AETI) are among the most common non-surgical treatment methods for LBP caused by LDH and LSS ^(6,7). This study aimed to analyze short and mid-term results of patients who underwent lumbar FJI and AETI.

MATERIALS AND METHODS

Ethical approval

This study was performed by the ethical standards of the Institutional Review Board of Istanbul University, Faculty of Medicine ethics committee.

Patient population

A single-center retrospective study was performed on 60 patients who received intraarticular lumbar facet joint and anterior epidural transforaminal injections between January 2022 to April 2022. Patients who received lumbar steroid injections for acute or chronic LBP and followed up at least three months after the procedure were included in this study. Patients with absolute indication for operation (progressive neural deficit, cauda equina syndrome, etc.) and contraindication for lumbar steroid injection (known allergy against the drug to be used, coagulopathy, infection of intervention area, etc.) were excluded from this study. Short and mid-term results of lumbar steroid injections for acute and chronic LBP were evaluated by Oswestry Disability Index (ODI) and Visual Analogue Scale (VAS).

Technique

The patient was placed in a prone position on a radiolucent table with an intravenous line. C-arm fluoroscopy was set. The region was cleaned with an iodinated antiseptic solution. Local anesthesia (0.5-1 ml of 1% lidocaine) was applied to the site before the procedure. 24 G spinal needle and C-arm fluoroscopy guidance were used in all interventions. For AETI, the target point was a subpedicular safe triangle approach in a 15-degree oblique position. After the needle was positioned in the target point, AP and lateral X-ray images were taken with C-arm fluoroscopy to check the final position of the spinal needle. Then 0.5 ml of non-ionic contrast material was injected. With the anterior epidural spread pattern of contrast material, the final position was confirmed. If venous leakage occurs during AETI, the needle is repositioned, and the final position is controlled again via contrast material injection. In FJI, the needle was positioned on the targeted facet joint with C-arm fluoroscopy. Meanwhile, neither contrast material injection nor lateral X-ray imaging was necessary. After the needle was placed on the target position, for both AETI and FJI, 40 mg methylprednisolone and 15 mg bupivacaine were injected for each. After the procedure, patients were transported to the recovery room and rested for 2 hours under the observation of a clinical nurse. After the rest period, patients were mobilized under the supervision of a physiotherapist.

Clinical Evaluation and Data Collection

Detailed anamnesis was obtained from the patients before the procedures. Patients were evaluated with the ODI and VAS before and after the procedure, on the 15th day, first, and 3rd months after the procedure. Patients with a score reduction of 20 points or more on the ODI or a score reduction of 2 or more on the VAS after evaluations were considered to have benefited from the procedure.

RESULTS

Of the 60 patients included in this study, 32 (53.3%) were female, and 28 (46.7%) were male. The mean age was 58.3 (39-72). Twelve (20%) patients had acute LBP (<6 months), and 48 (80%) patients had chronic LBP. Six (10%) of these patients had previous surgery, and 10 (16.6%) had previous lumbar steroid injections. Thirty (50%) of these patients had no comorbidity, 8 (13.3%) patients had diabetes mellitus, 12 (20%) patients had hypertension, and 4 (6.7%) had rheumatoid arthritis. A total of 78 AETIs and 244 FJIs were performed on 60 patients. Four (6.7%) patients had only AETI, 12 (20%) patients had only FJI and 44 (73.3%) had combined AETI and FJIs. Of sixty of these patients who were injected, 48 (80%) of them have benefited from the procedure in the short term (<1 month after the procedure). Of these, 30 (50%) patients sustained pain relief during the mid-term follow-ups (1-3 months).

Of 4 (6.7%) patients with AETI, 2 (3.4%) benefited from the procedure in short and mid-term follow-ups. On the other hand, from 6 out of 12 patients who had FJI benefited from the procedure in the short term, 4 (6.7%) had sustained benefits in mid-term follow-ups. Forty-four (73.3%) patients had combined lumbar steroid injections. Forty (66.7%) of these patients benefited from the procedure in the short term. Six (10%) of these patients' pain complaints increased again in mid-term follow-ups, and 24 (40%) of them had sustained benefits in mid-term follow-ups (Table 1).

DISCUSSION

AETI is widely used in Neurosurgery and Orthopedy Clinics for treating radiculopathy and LBP commonly caused by LDH and LSS. The coverage guidelines deem surgical treatment for lumbar disc herniation unnecessary unless

Table 1. Pain relief rates after FJI and AETI in the mid and long term. (FJI: facet joint injection, AETI: anterior epidural transforaminal injection).

	Pain Relief	Patient (n.)	Percent (%)
AETI		4	6.7%
	Short-term pain relief	2	3.4%
	Mid-term pain relief	2	3.4%
	No pain relief	2	3.4%
FJI		12	20%
	Short-term pain relief	6	10%
	Mid-term pain relief	4	6.7%
	No pain relief	6	10%
Combined		44	73.3%
	Short-term pain relief	40	66.7%
	Mid-term pain relief	24	40%
	No pain relief	4	6.7%
Total		60	100%
	Short-term pain relief	48	80%
	Mid-term pain relief	30	50%
	No pain relief	12	20%

physical and medical therapy, such as nonsteroidal anti-inflammatory drugs or FJI and AETI (8).

Botwin et al. performed a prospective cohort study to identify the short- and long-term therapeutic benefits of AETI in patients with radicular leg pain from degenerative lumbar stenosis. From a total of 34 patients who were followed for one year, Seventy-five percent of patients had successful long-term outcomes, reporting at least a 50% reduction between pre-injection and post-injection pain scores (9). However, in our study, 42 of 48 (87.5%) patients who underwent AETI benefited in the short term. 8 of 42 patients' pain complaints increased again in mid-term follow-ups, and 26 (54.1%) had sustained benefits in mid-term follow-ups. In the literature, controlled studies have shown that initial pain relief is 42 to 92% of patients in 1-4 weeks after FJI. However, long-term pain relief at three months is about 18 to 62% (10-13). Besides the therapeutic effects of lumbar AETI and FEE, studies show a high diagnostic accuracy for facet joint syndrome and radicular pain (14,15).

A recent study of 52935 patients who received AETI reported major complications in only six patients (0.011%), 4 of which developed an infection, and two developed hematoma (16). Shakya et al. showed a 3.2 times higher risk of an intraoperative dural tear if the surgery is performed within three months after AETI (17). No major complication was found in our study.

CONCLUSION

Although lumbar steroid injections are not a treatment method for the underlying pathology of LBP, they are an effective alternative for medical treatment and physiotherapy. With its analgesic effect, the lumbar steroid injection can provide pain relief and enable patients to reduce the limitation in their physical activity during LBP episodes.

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Conflict of interest: There is no conflict of interest in our study.

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REFERENCES

1. Amin RM, Andrade NS, Neuman BJ. Lumbar Disc Herniation. *Curr Rev Musculoskelet Med.* 2017;10(4):507-516. <https://doi.org/10.1007/s12178-017-9441-4>

2. Hoy D, Brooks P, Blyth F, Buchbinder R. The Epidemiology of low back pain. *Best Pract Res Clin Rheumatol.* 2010;24(6):769-781. <https://doi.org/10.1016/j.berh.2010.10.002>
3. van den Hoogen HJ, Koes BW, Devillé w, van Eijk JT, Bouter LM. The prognosis of low back pain in general practice. *Spine (Phila Pa 1976).* 1997;22(13):1515-1521. <https://doi.org/10.1097/00007632-199707010-00019>
4. Schiøttz-Christensen B, Nielsen GL, Hansen VK, Schødta T, Sørensenb HT, Olesen F. Long-term prognosis of acute low back pain in patients seen in general practice: a 1-year prospective follow-up study. *Family Press, Oxford University Press.* 1999;16(3):223-232. <https://doi.org/10.1093/fampra/16.3.223>
5. Hancock MJ, Maher CG, Latimer J, Herbert RD, McAuley JH. Can rate of recovery be predicted in patients with acute low back pain? Development of a clinical prediction rule. *European Journal of Pain.* 2009;13(1):51-55. <https://doi.org/10.1016/j.ejpain.2008.03.007>
6. Benny B, Azari P. The efficacy of lumbosacral transforaminal epidural steroid injections: A comprehensive literature review. *J Back Musculoskeletal Rehabil.* 2011;24(2):67-76. <https://doi.org/10.3233/BMR-2011-0279>
7. Vekaria R, Bhatt R, Ellard DR, Henschke N, Underwood M, Sandhu H. Intra-articular facet joint injections for low back pain: a systematic review. *European Spine Journal.* 2016;25(4):1266-1281. <https://doi.org/10.1007/S00586-016-4455-Y/FIGURES/3>
8. Yuce I, Kahyaoglu O, Ataseven M, Cavusoglu H, Aydin Y. Diagnosis and Treatment of Transforaminal Epidural Steroid Injection in Lumbar Spinal Stenosis. *The Medical Bulletin of Sisli Etfal Hospital.* 2020;54(3):327. <https://doi.org/10.14744/SEMB.2020.89983>
9. Botwin KP, Gruber RD, Bouchlas CG, et al. Fluoroscopically guided lumbar transformational epidural steroid injections in degenerative lumbar stenosis: an outcome study. *Am J Phys Med Rehabil.* 2002;81(12):898-905. <https://doi.org/10.1097/00002060-200212000-00003>
10. Won HS, Yang M, Kim YD. Facet joint injections for management of low back pain: a clinically focused review. *Anesth Pain Med (Seoul).* 2020;15(1):8-18. <https://doi.org/10.17085/apm.2020.15.1.8>
11. Marks RC, Houston T, Thulbourne T. Facet joint injection and facet nerve block: a randomised comparison in 86 patients with chronic low back pain. *Pain.* 1992;49(3):325-328. [https://doi.org/10.1016/0304-3959\(92\)90239-8](https://doi.org/10.1016/0304-3959(92)90239-8)
12. Crette S, Marcoux S, Truchon R, et al. A controlled trial of corticosteroid injections into facet joints for chronic low back pain. *N Engl J Med.* 1991;325(14):1002-1007. <https://doi.org/10.1056/NEJM199110033251405>
13. Lynch MC, Taylor JF. Facet joint injection for low back pain. A clinical study. *J Bone Joint Surg Br.* 1986;68(1):138-141. <https://doi.org/10.1302/0301-620X.68B1.2934398>
14. Revel M, Poiraudau S, Auleley GR, et al. Capacity of the clinical picture to characterize low back pain relieved by facet joint anesthesia. Proposed criteria to identify patients with painful facet joints. *Spine (Phila Pa 1976).* 1998;23(18):1972-1977. <https://doi.org/10.1097/00007632-199809150-00011>
15. Lawson GE, Nolet PS, Little AR, et al. Medial branch blocks for diagnosis of facet joint pain etiology and use in chronic pain litigation. *Int J Environ Res Public Health.* 2020;17(21):1-13. <https://doi.org/10.3390/ijerph17217932>
16. Chester J, Donnally I, Augustus J, Rush I, Rivera S, et al. An epidural steroid injection in the 6 months preceding a lumbar decompression without fusion predisposes patients to post-operative infections. *Journal of Spine Surgery.* 2018;4(3):529. <https://doi.org/10.21037/JSS.2018.09.05>
17. Shakya A, Sharma A, Singh V, et al. Preoperative Lumbar Epidural Steroid Injection Increases the Risk of a Dural Tear During Minimally Invasive Lumbar Discectomy. *Int J Spine Surg.* 2022;16(3):505. <https://doi.org/10.14444/8249>