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EFFICACY OF INJECTION THERAPY FOR LUMBAR FACET JOINT SYNDROME: CLINICAL STUDY

LOMBER FASET EKLEM SENDROMUNDA ENJEKSİYON TEDAVİSİNİN ETKİNLİĞİ: KLİNİK ÇALIŞMA

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ABSTRACT:

Aim: The purpose of this study was to investigate the diagnostic importance, duration of efficacy and the early, middle and late clinical efficacy of intra-articular facet joint injection for patients with chronic lower back pain.

Material and Methods: Ninety-one patients who had had chronic lower back pain for more than six months were selected for facet joint injection. The patients were divided into two groups by lumbar CT based on degenerated (group 1) or normal (group 2) facet joint imaging. Group 1 consisted of 54 patients with facet joint degeneration, and Group 2 consisted of 37 patients with no facet joint abnormality. The age of the 54 patients in Group 1 (30 female, 24 male) was between 21 and 71 (mean: 43.56). The age of the 37 patients in Group 2 (21 female, 16 male) was between 21 and 58 (mean: 39.24). All facet joint injections were done under a fluoroscope.

The Visual Analog Scale (VAS) was used to assess the pain relief before injection, and one week and one, three and six months after injection. An inquiry was performed to determine whether the patients were satisfied and would repeat the process.

Results: There was a statistically significant difference in the VAS values before and after treatment for Group 1 ($p<0.05$). There was also a statistically significant difference for the VAS values before and after treatment for Group 2 ($p<0.05$). There were no statistically significant differences between groups 1 and 2 ($p>0.05$).

Conclusion: Facet joint injection reduces pain for patients with chronic lower back pain. As a minimally invasive, reliable, and cost-effective method that reduces the workforce loss of patients, we advise this procedure as an alternative treatment for patients with lower back pain.

Key words: Facet joint syndrome, injection, lower back pain

Level of evidence: Retrospective clinical study, Level III

ÖZET:

Amaç: Bu çalışmanın amacı kronik bel ağrılı hastalarda intraartiküler faset eklem enjeksiyonunun tanısal önemini, etki süresini ve tedavide erken, orta ve geç dönem klinik etkinliğini araştırmaktır.

Materyal ve Metot: 6 aydan uzun süredir kronik bel ağrısı olan 91 hasta faset eklem enjeksiyonu için çalışmaya alınmıştır. Hastalar lomber BT'de faset eklem görünümlerine göre dejenere (Grup-1) ve normal olarak (Grup-2) diye iki gruba ayrıldı. Grup-1'deki 37 hastada radyolojik görüntülemede faset eklem de anormallik yoktu. Grup 2'deki 54 hastada ise faset eklem dejenerasyonu mevcuttu. Grup 1'deki 54 hastanın (30 bayan,24 erkek) yaşları 21 ile 71 arasında değişmekte ve yaş ortalaması 43,56 idi. Grup 2'deki hastaların (21 bayan,16 erkek) yaşları 21 ile 58 arasında değişmekte ve ortalaması 39,24 idi. Bütün faset eklem enjeksiyonları floroskopi altında yapıldı. Ağrı düzeyini değerlendirmek için işlem öncesi, işlem sonrası birinci hafta, birinci, üçüncü ve altıncı ay olmak üzere Vizüel Analog Skala (VAS) kullanıldı. Hastaların yapılan işlemden tatmin olup olmadıklarını belirlemek ve işlemin tekrarlanmasını isteyip istemediklerini belirlemek için anket yapıldı.

Sonuçlar: Grup I' in VAS değerlerinin karşılaştırılmasında istatistiksel olarak anlamlı farklılıklar mevcuttu ($p<0.05$). Grup II' in VAS değerlerinin karşılaştırılmasında istatiksel olarak anlamlı farklılıklar mevcuttu ($p<0.05$). Gruplar arasında istatistiksel olarak anlamlı bir farklılık yoktu ($p>0.05$).

Sonuç: Bu çalışmanın verileri ışığı altında faset eklem enjeksiyonunun, kronik bel ağrılı hastalarda ağrıyı azaltmakla birlikte, minimal invazif, güvenilir, maliyet açısından uygun bir yöntem olduğu, hastaların iş gücü kaybını azaltması açısından önemli bir tedavi seçeneği olduğu fikri elde edilmiştir.

Anahtar Sözcükler: Faset eklem sendromu, enjeksiyon, bel ağrısı

Kanıt Düzey: Retrospektif klinik çalışma, Düzey III

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INTRODUCTION:

Lower back pain is a condition commonly encountered in the practices of physical therapy, orthopedics and neurosurgery. Its lifelong prevalence has been reported as between 60% and 90%[3,4]. For most patients with lower back pain, it is not possible to accurately determine the etiology and reveal the source of the pain. Although it is not easy to determine the specific etiology, it has been shown that some factors, such as harsh living conditions, improper use of body mechanics, repetitive movements, and lack of good physical condition play a role in the formation of lower back pain. The pain is classified as acute, sub-acute or chronic according to its duration. Chronic lower back pain has a prevalence of 5–20% in industrialized countries[6]. In two different studies conducted by Manchikanti and Pang et al., it was found that 15–45% of chronic lower back pain was due to facet joint pathologies, and 13–20% was due to disc hernia[23,25].

According to studies on controlled diagnostic facet joint block, facet joints cause chronic lower back pain at a rate of 15–45%[23]. In another study by Shealy, one or more affected facet joints were found in 82% of patients with lower back pain[31].

A diagnosis of lumbar facet joint syndrome is clinically performed, and all organic reasons such as disc hernia, inflammatory, infectious, tumoral or fracture-originated pains, or pain reflecting from internal organs, should be eliminated. Lumbar facet syndrome should be considered in patients with no radiological disc hernia, degeneration, or neurological loss, who have chronic lower back pain that does not spread below the knee.

Medical, herbal, physical and chiropractic methods are used in the treatment of chronic lower back pain, and are effective for pains of unknown origin[32].

However, minimally-invasive methods, such as facet joint injection, have become important in the treatment of chronic lower back pain. The aim of this study is to investigate the diagnostic importance, the effect duration and the early, middle and late period clinical efficacies of intra-articular facet joint injection for patients with chronic lower back pain.

MATERIALS AND METHODS:

91 patients, who were admitted to the Neurosurgery Clinic between January 2010 and December 2010 due to pain spreading to the lower back and/or hip or femur and were clinically diagnosed with facet joint pain, were included in the study. The patients had had lower back pain lasting for at least six months and paraspinal sensitivity and/or pain. Facet joint syndrome was diagnosed according to the clinical presentation. In these patients, there was pain spreading to the lower back and/or hip, femur, inguinal canal, an increase in pain due to hyperextension, morning detention, and pain developing due to movement[11,19].

Patients were excluded if they had lower back pain due to tumor or infection, previous spinal surgery, allergy to local anesthesia, rheumatic disorder, radicular leg pain, radiological disc hernia, neurological deficit, major depression or psychological disorder, pregnancy, bleeding diathesis and those using anticoagulants.

Antero–posterior and lateral lumbar X-rays and Computerized Tomography (CT) were taken for all patients. Based on the CT scans, the patients were divided into two groups, those with or without facet degeneration.

In the lumbar CT, the patients with irregular facet joints, subchondral bone cysts, osteophyte formation and vacuum phenomena were included in the group with facet degeneration.

According to the facet joint images by lumbar CT, the patients were divided into the degenerated (Group 1) or normal (Group 2) group. The age of the 54 patients in Group 1 (30 females, 24 males) varied between 21 and 71, and the mean age was 43.56. The age of the patients in Group 2 (21 females, 16 males) varied between 21 and 58, and the mean age was 39.24.

Injection Technique:

The injection site and distance to the facet joint were chosen according to the patient's clinical situation and/or the injection was performed at the site detected to have facet joint osteoarthritis. Facet joint injection was performed under fluoroscopy when the patient was in a prone position, and a pillow was placed under the abdomen to correct lumbar lordosis. After routine sterilization and covering, a 22-gauge spinal needle was inserted from 2 cm lateral to the spinous projection. When the spinal needle tip was in the joint space, arthrography was performed with contrast material (iopamidol <0.3 ml). When it was detected with arthrography that the spinal needle was in the joint space, 10 mg (2 ml) of 0.5% bupivacaine and 10 mg (0.5 ml) of methylprednisolone were applied into the facet joint and its surrounding area (Figure-1).

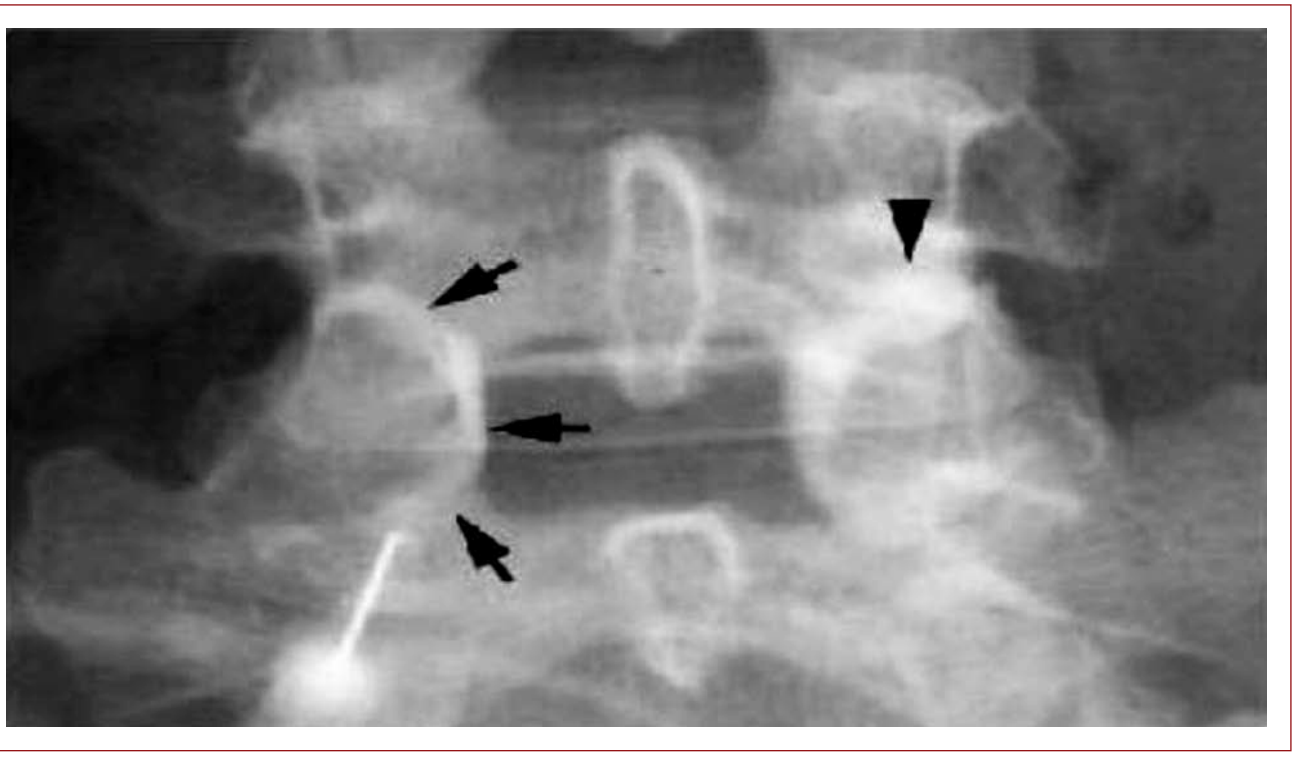

Figure-1. X-ray showing long percutaneous screw instrumentation (T11–L4) performed for T12 and L3 fracture. In total, seven screws were placed in pedicles.

The Evaluation of Pain:

Whether the patients benefitted from the process was evaluated with the Visual Analogue Scale (VAS) five times: preoperatively, and postoperatively in the first week and the first, third and sixth month. In the VAS, 0 represented no pain and 10 represented the most severe pain. Using the VAS, a 50% or more pain reduction was accepted as significant. When evaluating the efficacy of facet joint injection, the VAS was used for being an objective method, and adequate for evaluating changes in the pain of patients rapidly.

Also, other published studies use the VAS to evaluate the efficacy of facet joint injection, and so our use of this scale allows a comparison of our study with these studies. We also conducted a survey to understand whether the patients were satisfied, which included this question and options: How satisfied were you with the treatment? a) completely satisfied; b) very satisfied; c) partially satisfied; d) not satisfied; e) definitely not satisfied. A second survey was conducted in the third month postoperatively to determine whether they would have the treatment again, which included this question and options: You received a treatment to eliminate or reduce your pain. You had some problems. Had you known the result of this treatment beforehand, would you take this treatment again? a) yes; b) possibly yes; c) maybe; d) not sure; e) no).

Statistical Analysis:

A t-test and correlation test were applied to dependent and independent groups to evaluate the VAS scores of the patients. $p<0.05$ was accepted as significant.

RESULTS:

For Group 1, the VAS scores in the preoperative period, and postoperative first week and first, third and six months were 8.41 ± 0.90, 2.80 ± 1.07, 3.17 ± 1.02, 3.54 ± 1.09 and 4.17 ± 0.99, respectively. In Group 2, the VAS scores at the same times were 8.19 ± 0.74, 2.68 ± 1.49, 2.91 ± 1.42, 3.32 ± 1.53 and 3.70 ± 1.68, respectively (Table 1). There were no statistically significant differences between the two groups in terms of the VAS scores ($p>0.05$). When comparing the VAS scores of Group 1 at different times, there was a statistically significant difference ($p<0.05$).

Group 2 also showed a statistically significant difference when comparing the VAS scores at different times ($p<0.05$). In terms of age, the VAS scores were not significantly different between the two groups ($p>0.05$). The percentage of patients who benefited from facet joint injection in Group 1 were 74% in the first week, 70% in the first month, 58% in the third month and 50% in the sixth month. In Group 2, this was found to be 81% in the first week, 78% in the first month, 65% in the third month and 57% in the sixth month.

In the patient satisfaction survey, 80% of the responses were 'completely satisfied' or 'very satisfied'. In the survey for whether they would take the treatment again performed in the third month, 70% of the responses were 'yes' or 'possibly yes'.

Table-1. VAS scores of the patients

	preoperative VAS	1 week VAS	1 month VAS	3 month VAS	6 month VAS
Group 1	8.41 ± 0.90	2.80 ± 1.07	3.17 ± 1.02	3.54 ± 1.09	4.17 ± 0.99
Group 2	8.19 ± 0.74	2.68 ± 1.49	2.92 ± 1.42	3.32 ± 1.53	3.70 ± 1.68

DISCUSSION:

Facet joints are the synovial joints innervated by the medial branches of the dorsal root. In 1911, Goldthwait suggested that lower back pain could be due to the lumbar zygapophyseal joint[13], and in 1963, Hirsch et al. reduced lower back pain by applying hypertonic saline to the lumbar zygapophyseal joint[15]. In 1976, Money and Robertson reported a decrease in lower back pain on the application of a local anesthetic to the lumbar zygapophyseal joint[24].

In the literature, possible reasons for facet joint pain have been reported as chronic synovial and/or capsular reaction due to trauma, spinal instability, degenerative osteoarthritis, or combinations of these[5,7]. It has also been stated that some facet joint pains could originate from neuropathic pain[7].

There is no accurate method for the diagnosis of facet joint syndrome clinically or radiologically. However, the presence of pain spreading from the hip or femur to the knee, with lower back pain without root pain or neurological loss, the presence of pain developing due to hyperextension and lateral bending, and paraspinal sensitivity, can suggest facet joint syndrome[33].

Today, facet joint injection performed as a treatment is accepted as a gold standard for diagnosis. With the development of imaging methods and the common use of CT and MRI, changes in the facet joints can be understood better. However, many studies were unable to find any correlation between facet joint pain and radiological images[10,12,30].

In two studies by Jackson et al., it was reported that there were no factors predicting the response to facet joint injection[16,17]. In a study conducted by Revel et al., it was stated that patients aged over 65 who had no increase in pain with coughing, had no worsening pain while straightening up from hyperextension, forward flexion or flexion positions and when performing extension-rotation movement, showed a good response to facet joint injection[27].

In a study conducted by Schulte et al., it was reported that age, body mass index and previous spinal surgery had no effect[29], in agreement with our study. However, they also stated that the main factor determining the efficacy of facet joint injection was clinically-detected paraspinal sensitivity[9,10,14,].

In a study by Gorbach et al., patients with pain that reduced with movement and advanced osteoarthritis had a shorter-term response to facet joint injection[14]. There was also no correlation between the degree of facet joint degeneration and the mid-term efficacy of the process (at three months) according to CT and/or MRI findings. In Gorbach's study, facet degeneration was graded from 0 to 3, and there were no patients with grade 0 facet degeneration in the study group[14]. In our study, no difference was found radiologically between the groups

with or without facet joint degeneration in terms of the efficacy of the process.

In two different studies, it has been stated that facet joint injection is the first and best option for patients who have a synovial cyst by lumbar CT or MRI and are clinically symptomatic, and better results were reported[26,32].

In some studies, it has been stated that results were better for patients without any spinal surgery[10,28]. In our study, there were no patients with synovial cysts, and the patients who had had spinal surgery were excluded.

In Table-2, the clinical success rates of other published studies on facet joint injection are listed. Facet joint injection can be performed in two ways, intra-articular and pericapsular. In the studies, it was reported that there was no difference in terms of efficacy between intra-articular and pericapsular local anesthetic and steroid injections[20,21,32]. In our study, the intra-articular method was preferred.

The major complications of facet joint injection are misplacement of the spinal needle, bleeding and infection[8]. Other complications are dural rupture, septic arthritis and spondylitis, chemical meningitis, hematoma formation and spinal cord trauma[2,22,34,35]. We did not encounter any complications in our study.

Comparisons between the studies in the literature are difficult, because patient groups are heterogenic and the methods of evaluating the efficacy of the process are different. Also, the drugs used for facet joint injection and their usage doses vary. Our study shows that lumbar facet joint injection is effective in both diagnosis and treatment of chronic lower back pain. In the light of this study, we suggest that facet joint injection is a minimally invasive, safe and cost-effective method providing a reduction in chronic lower back pain, and is also an important treatment option in terms of reducing the workforce loss of the patients.

Table-2. Benefit ratio of patients according to VAS (n=patient number.)

	1 hour	1 week	1 month	3 months	6 months
Keykubatlı (34), n=31[18]	52%	-	-	36%	-
Shih (7), n=277	-	74%	72%	31%	-
Gorbach (23), n=42	74%	57%	-	33%	-
Schulte (22), n=39	80%	76%	62%	41%	36%
Ackerman (35), n=46[1]	-	-	-	61%	-
Chaturverdi (29), n=44	82%	86%	93%	86%	63%
Karavelioğlu, n=91 - Group 1	-	74%	70%	58%	50%
- Group 2	-	81%	78%	65%	57%

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