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FACET BLOCKAGE FOR MECHANICAL LOWER BACK PAIN

MEKANİK BEL AĞRILARINDA FASET BLOKAJI

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SUMMARY

Background data: Nearly 85% of all individuals are reported to have experienced lower back pain by the age of 50. The prevalence of lower back pain increases starting from the second decade, and reaches the highest level between the ages of 55–64. The large majority (97%) of lower back pain is mechanical in nature.

Purpose: To demonstrate the effectiveness of lumbar facet blockage for mechanical back pain (MBP).

Material and methods: Patients were laid in a prone position on the fluoroscopy table. A 22-G spinal needle was used to administer 10 mg prilocaine, 5 mg bupivacaine and 10 mg methylprednisolone acetate to all four of the L4–5 and L5–S1 facet joints with the aid of fluoroscopic AP and lateral visualization. The patients were discharged after a short waiting period of 20 minutes. Rest was not recommended for the patients. The patients were evaluated with the Modified Oswestry Low Back Pain Disability Questionnaire and the Visual Analogue Scale. For all patients, the questionnaire and scale values were recorded prior to surgery, and on the postoperative first day, tenth day, first month, and sixth month.

Results: After intervention, the VAS and OD scores were recorded to be significantly lower than in the preoperative period. The patients had no need to rest after the procedure.

Conclusion: Facet joint blockage has significant advantages, including statistically significant good early period results, greater reduction of pain during the follow-up period, and easy applicability of the procedure.

Key words: Facet blockage, lumbar facet joint, mechanical back pain

Level of Evidence: Retrospective clinical study, Level III

ÖZET

Geçmiş Bilgiler: 50 yaş üstünde bel ağrısı araştırılan kişilerin neredeyse %85'inde ağrı varlığı rapor edilmiştir. Bel ağrısı ikinci dekatta başlar ve 55-64 arası yaşlarda en yüksek sıklığa ulaşır. Bel ağrısının en büyük kısmını (%97) mekanik ağrılar oluşturur.

Amaç: Mekanik bel ağrılarında (MBP) lomber faset blokajının etkinliğinin gösterilmesi.

Materyal Metod: Hastalar floroskopi masası üzerinde pron pozisyonuna alındı. L4-5 ve L5-S1 her iki faset eklemlerine floroskopi yardımı ile ön arka ve yan grafiler rehberliğinde 22-G spinal iğne kullanılarak 10 mg prilocain ve 5 mg bupivacaine ve 10 mg methylprednisolone enjekte edildi. Hastalar 20 dk istirahat ettirildikten sonar taburcu edildi. Daha sonrası için istirahat önerilmedi. Modifiye Oswestry bel ağrısı maluliyet anketi ve görsel analog skala tüm hastalara uygulandı. Cerrahi öncesi ve sonrası 1. Gün, 10. Gün, 1. Ay ve 6. Ay bu skorlar yeniden belirlenip kaydedildi.

Sonuçlar: Uygulamadan sonraki VAS ve OD skorları uygulama öncesine nazaran belirgin olarak düşük olduğu belirlendir. İşlemden sonra hiçbir hasta istirahate ihtiyaç duymadı.

Sonuç: Faset eklem blokajının, istatistiki olarak belirgin iyi sonuçlara sahip olması, takip sırasında önemli ölçüde bel ağrısını azaltıyor olması ve kolayca uygulanan bir işlem olması en önemli avantajlarıdır.

Anahtar kelimeler: Faset blokajı, lomber faset eklem, mekanik bel ağrısı.

Kanıt düzeyi: Geriye dönük klinik çalışma, düzey III

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INTRODUCTION:

Lower back pain is a health problem that is commonly encountered worldwide. Nearly 85% of all individuals are reported to have experienced lower back pain by the age of 50 [14]. The prevalence of lower back pain increases starting from the second decade, and reaches the highest level between the ages of 55-64 [2]. Lower back pain can be classified as acute, sub-acute or chronic. Nearly 80% of patients with acute pain recover within six weeks, while in 7-10% of cases the complaints last longer than three months and become chronic, adversely affecting the patient's social life and leading to workforce and economic losses[4,11]. Lower back pain is the leading cause of absenteeism from work, accounting for 10-20% of all cases. The loss of workforce caused by lower back pain alone in the United States of America was determined as 1.3 billion dollars in 1985[1].

It is difficult to determine the etiology of a patient with lower back pain. Only in 15% of cases of acute lower back pain can the definite etiology be identified. The large majority (97%) of lower back pain is mechanical in nature[1,5]. Mechanical back pain (MBP) is defined as a clinical picture associated with strain, sprain and degeneration pathologies that arise due to excessive loading of the spinal structures[10]. In addition, lumbar facet syndrome is observed as being the underlying cause in 15–40% of patients with chronic lower back pain. Facet joint syndrome is most commonly encountered in middle-aged patients, and is typically characterized by a pain complaint that spreads between the hip and knee[6,7]. The pain associated with facet joint syndrome is alleviated by changes in posture and position, and is also reduced by gentle repetitive movements and leaning forward. On the other hand, the pain is worsened by hypertension and rest. Sensitivity on palpation of the facet joints is generally observed in affected patients. The accompanying neurological deficits are not manifest.

Traumatic strain leads to loading on the facet joint and annulus fibrosus. Small ruptures of the articular capsule annulus lead to the development of slight subluxation and synovitis. As a reflex, the muscles of the lower back enter into spasm to reduce the load on the articulations. These alterations eventually lead to fibrosis in the joints. Reduced joint spacing, subchondral cysts, calcification of the articular capsule, sclerosis or irregular articular surfaces, facet hypertrophy and intra-articular air may be observed in the resulting facet joint syndrome.

The structures that constitute the spine can be examined as anterior and posterior segments. While the spinal elements and intervertebral discs are part of the anterior segment, the joints of the arcus vertebrae and facet joints are located on both sides of the posterior segment. With the intervertebral discs located in the anterior section of this structure, the two facet joints located on the left and right of the posterior section constitute the mobile segment. The facet joint is a synovial diarthrodial joint, located between the facies articularis superior of the vertebra from the level of the disc and the facies articularis inferior of the vertebra above. The superior articular protrusion is larger and more concave, and has a posteromedial orientation, while the inferior protrusion is smaller and has an anterolateral orientation.

Facet joints in the lumbar region form the posterior side of the neural foramen. Each facet joint is surrounded by a capsule, which in turn is covered by a synovial joint. A 2–4 mm hyaline type cartilaginous structure is found on the surface of each articulation. This cartilage has a tendency to degenerate with age. The fibrous capsule contains 1–1.5 ml of synovial fluid. The capsules are composed of two layers: the external layer is an extensive connective tissue composed of parallel collagen fibers, while the internal layer is composed of elastic fibers similar to the ligamentum flavum. The adipose tissue located on the upper surface of the facet joint and positioned on the ligamentum flavum is closely associated with the nerve root sheath. The anterior and posterior primary branches of the nerve root separate at the intervertebral foramen. The posterior branch advances in the dorsal and caudal directions, and separates into medial, lateral and intermediate branches 5 mm from its point of exit from the

vertebra. The medial branch provides innervations for the lower tip of the facet joint of the same level, and also for the upper tip of the joint belonging to the vertebra below. The innervations of each facet joint are composed of the medial branches of the two primary posterior branches. While one of the branches originates from the nerve at the same level, the other branches originate from the nerve of the segment above.

The medial branch of the posterior ramus extends into the passage formed by the accessory and mammillary protrusions, at the point of junction between the base of the articular protrusion of the lumbar region and the upper surface of the transverse protrusion. The nerve passes below the mammillo-accessory ligament. This is the safest point at which to reach the nerve. Calcification may occur at this ligament, which may lead to compression of the medial branch and facet pain[3].

The S1 nerve root at the lumbosacral junction provides a cephalad branch to innervate the L5–S1 facet joint. This allows the L5–S1 facet to be innervated by three separate nerves. For this reason, it is necessary to block each of these three nerves to anesthetize this joint.

In addition to the facet joint, the medial branch of the posterior primary ramus also innervates the multifudus, interspinalis and intertransversalis medialis muscles, the neural arc ligaments, and the periosteum. This allows each joint to have a dual segment innervation, with each segmental nerve providing innervation to the surrounding soft tissues in addition to the two facet joints. As a result of dual segmental innervation, denervation for each facet joint needs to be performed at two levels (this may be three levels for L5–S1).

The position of the facet joint on the vertebral column varies according to its location and level. This joint is horizontal or coronal in the cervical column with a 45° angle, more vertical in the dorsal column with a 60° degree angle, and fully vertical in the lumbar vertebrae with a 90° angle. The condition of lordosis is caused by the coronal plane positioning of the facet at the L5–S1 level.

When movements are effectuated by the spine, the facies articularis and supporting ligaments also participate to a certain extent in these movements. This serves to restrict excessive spinal movements.

Based on the anatomical placement of the facet joints, it is assumed that the primary function of these articulations is to control and balance torsional forces on the spinal column.

In an upright posture, it is known that 16–20% of the compressive forces on the lumbar vertebrae are loaded onto the facet joint. At the same time, 70% of the body weight is loaded onto the intervertebral discs and 30% is loaded onto the facet joints.

The facet joint at the cervical levels are longer and looser than the joints at the thoracic and lumbar levels. These cervical level joints can perform two main types of movement: translation and distraction. This joint, which limits hyperflexion movements, allows the facet joints to separate during lumbar flexion, to perform later flexion, and also to undergo a certain degree of rotation. The positioning of the lumbar facet can change according to the spinal movement of the segments. While the two upper lumbar vertebrae are in the sagittal plane during segment movements, they may reposition in the coronal plane further down[12,13]. The purpose of this study is to demonstrate the effectiveness of lumbar facet blockage for MBP.

MATERIALS AND METHODS:

A total of 2036 patients that applied to the neurosurgery clinic with lower back pain complaints between January 2008 and January 2010 were included in the study. All facet blockages were performed by a single physician.

A detailed anamnesis was obtained for patients included into the study. Patients were questioned in order to identify any history of systemic diseases. Physical examinations, musculoskeletal system examinations and neurological examinations

were performed. In addition to the demographic information of the patients (age, height, weight, level of education, occupation), the trauma history as well as the duration and characteristics of the pain were recorded.

Inclusion Criteria:

1. Patients aged between 20 and 65, male or female.
2. Patients suffering from lower back pain without any extension of the pain to the legs.
3. Patient pain exacerbated by hyperextension and alleviated by flexion.
4. Patient with a maximum four-month history of pain.

Exclusion Criteria:

1. Patients with lumbar pathologies diagnosed by radiology, such as herniated lumbar disc disease, spondylolisthesis, narrow spinal canal, spinal deformities, fractures, lumbar facet arthropathies, black discs, Modic changes and mass lesions.
2. Patients with pathologies diagnosed by electroneuromyography, such as neuropathies, or findings of nerve or root compression.
3. Patients with a history of previous lumbar surgery.
4. Patients with metabolic bone disease, rheumatoid disease or neoplastic diseases.
5. Patients with psychiatric or neurological diseases.
6. Patients with serious systematic diseases such as diabetes mellitus, chronic pulmonary diseases, kidney failure, or hypertension.
7. Patients with sciatalgia, radiculopathy, or neurological deficits.
8. Pregnant female patients or those with a suspicion of pregnancy.
9. Patients with a skin lesion in the lumbar area or a systematic dermatological disease.
10. Patients with venous failure in their legs.
11. Patients with a previously diagnosed surgical lumbar pathology, even if no surgery was performed.

Direct radiography and MRI were performed for radiological evaluation and the diagnosis of mechanical back pain was ascertained.

Facet Joint Blockage:

Patients were laid in a prone position on the fluoroscopy table, with a pillow placed under the abdomen to increase the spacing between the facet joints. Once sterile conditions were ensured, the C arm of the fluoroscopy equipment was moved 45° obliquely until the facet joint could be visualized. Following the range determination by fluoroscopy, a 22-G spinal needle was used to administer 10 mg prilocaine (Citanest - Astra Zeneca Pharmaceuticals Ind. and Trd. Ltd. Co. - Lüleburgaz-21.01.2000-194/78), 5 mg bupivacaine (Marcaine 0.5% - Astra Zeneca Pharmaceuticals Ind. and Trd. Ltd. Co. - Lüleburgaz-21.01.2000-194/85) and 10 mg methylprednisolone acetate (DepoMedrol 40 mg - Eczacıbaşı Pharmaceutical Industry and Trade Inc. - Lüleburgaz-05.08.1968-92/63) to all four of the L4–5 and L5–S1 facet joints with the aid of fluoroscopic AP and lateral visualization. The patients were discharged following a short waiting period of 20 minutes. Rest was not recommended for the patients.

When the facet joint to be treated was visualized with fluoroscopy, entry was performed approximately 3 cm lateral to the midline with a 22-G spinal needle. By continuing visualization with fluoroscopy, the interior of the facet joint was reached and the prepared medication was injected. Facet joint injection was performed from at least two sides and two levels.

Patients were evaluated with the Modified Oswestry Low Back Pain Disability Questionnaire (OD) and the Visual Analogue Scale (VAS). For all patients, the questionnaire and scale values were recorded prior to the operation and also postoperatively on the first day, tenth day, first month and sixth month.

Patients were evaluated using the VAS. An explanation was provided to the patients as to the meaning of the numbers on the 10 cm horizontal line. It was described that 0 meant the absence of pain, 10 signified the worst pain ever experienced, and 5 described moderate pain. Patients were asked to describe the severity of their pain on this scale[14,17].

The Modified Oswestry Disability Questionnaire was used. Initially developed by Fairbanks and later modified by Hudson-Cook, this questionnaire is recommended due to its utility and repeatability as a sensitive scale for the measurement of functional disability in patients with lower back pain. The questionnaire consists of eight questions, each with six choices ranging from 0 to 5 points. The patients were asked to mark the choices that best described their current condition[14,15]

RESULTS:

The average age of the cases within the study group was 38.2 ± 10.0 years. The study group was 36.4% female patients and 63.6% male patients (Table-1).

The VAS values of the patients were found to be lower in the postoperative assessments on the tenth day, first month and sixth month in comparison to the values obtained prior to the intervention (Table-2). This decrease was statistically significant ($p<0.001$*- Friedman test).

The changes in the VAS values over time in comparison to the VAS values from the period prior to facet joint blockage were evaluated. According to the Bonferroni correction, the VAS values following facet joint blockage were found to be statistically significant ($p<0.005$). Between the VAS values for the early postoperative tenth day, the first month and the sixth month, there were no statistically significant ($p>0.005$) differences according to the Bonferroni correction.

DISCUSSION:

Different symptoms are observed in association with various factors affecting the anatomical structures of the lower back. Most of the symptoms of lower back pain lead to lowerback disability, engendering a severe limitation of daily activities[9]. The prevalence of lower back pain can vary with age. It has been reported that the prevalence is high between the ages of 40–60. However, it was also reported that the relationship between prevalence and incidence was not certain[9]. In this study, it was observed that most of the patients were between 30 and 40 years of age.

No relationship between gender and lower back pain has been demonstrated in the literature. Although there are studies where lower back pain is more commonly observed among women, this higher frequency can be associated with the greater awareness of women for physical symptoms, and their tendency to better identify their symptoms. The ratio of women to men in this study was approximately 1/2.

There are numerous studies in the literature demonstrating the effectiveness of facet joint blockage[8,16]. Nevertheless, the long-term clinical results of other treatment methods have also been studied in detail and their effectiveness has been well established. One of the main goals in the treatment of lower back pain is to rapidly alleviate the complaints of the patient, and therefore to minimize the loss of workforce caused by this common disease. In addition to ensuring the proper treatment of patients, facet joint blockage also provides important advantages in comparison to other methods in minimizing the significant loss of workforce, and hence the economic loss, caused by lower back pain.

The most common and alarming complications encountered with facet joint blockage are related to the positioning of the spinal needle and the administration of the medication. Potential complications include infections, intra-arterial or intravenous injections, spinal anesthesia, dural injections, chemical meningitis, spinal cord trauma, neural trauma, radiation contact, rupture of the facet capsule, hematoma formation and side effects related to the use of steroids.

In our study, the effectiveness of facet joint blockage was investigated. This study shows the significant advantages of facet joint blockage, including statistically significant good early periodresults, the greater reduction of pain during the follow-up period (tenth day, first month and sixth month), and the easy applicability of the procedure.

As facet joint-related pathologies are no longer overlooked, and as better results are being obtained, based on clinical and radiological diagnoses, we conclude that facet joint blockage is becoming a preferred method for the treatment of lower back pain.

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