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ORIGINAL ARTICLE

Does the Weishaupt Facet Grading System Affect Healing in Facet Joint Blockage?

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Abstract

Introduction: Lower back pain is one of the most common complaints in the general population, with approximately 25% of the population experiencing lower back pain at least once in life. Of these individuals, approximately, 10% seek medical help. Facet-origin pathologies are one of the most important causes of lower back and hip pain.

Methods: Therefore, in cases not responding to medical treatment, facet joint blockages are used as an effective method. In this study, a retrospective examination was made of the results of facet joint blockages applied in our clinic between July 2013 and August 2018 to 175 cases thought to have facet-origin lower back pain. The patients were evaluated with the Weishaupt score before the procedure and with Visual Analog Scale (VAS) values before and after the procedure.

Results: The VAS scores decreased from 7.4±0.6 preoperatively to 4.1±0.7 postoperatively in Grade 1 patients, from 7.6±0.7 to 3.8±0.6 in Grade 2 patients and from 7.5±0.7 to 3.7±0.7 in Grade 3 patients. In all three groups, the difference between pre- and post-operative values was determined to be statistically significant ($p<0.05$). No significant correlation of the effect of the Weishaupt grade on the blockage ($p>0.05$).

Discussion and Conclusion: Facet joint blockage was seen to provide a significant improvement in patients with the complaint of lumbago and increased comfort, but there was not determined to be any significant importance of the facet joint grade before blockage and there was no effect on the treatment outcome.

Keywords: Blockage; facet joint; lower back pain; visual analog scale; weishaupt grading system.

Lower back pain is one of the most common complaints in the general population, with approximately 25% of the population experiencing lower back pain at least once in life. Of these individuals, approximately, 10% seek medical help. In 1927, Victor Putti stated that the formation of lower back and sciatic pain was associated with degenerative changes in the articular facets and thereby in the zygomatico-apophyseal joints[1]. Spine surgeons generally consider that the majority of lower back and sciatic-origin pains originate from the disc space. Lumbar disc hernias are associated with root pressure and sciatalgia, which forms biochemical mediators and can lead to lower back pain associated with instability and neural pressure. However, this etiology constitutes a small percentage of cases of lower back pain.

Facet-origin pathologies are one of the most important causes of lower back and hip pain. Therefore, in cases not responding to medical treatment, facet joint blockages are used as an effective method. Facet joints are capsular, diarthrodial, synovial joints in the plane formed between the

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zygoapophyseal superior process of the vertebra below and the zygoapophyseal inferior process of the vertebra above. In the facet joint, there is mean 1–2 ml fluid, synovial membrane, hyalin cartilage approximately 2–4mm in thickness and a fibrous capsule 1mm thick[2]. It is thought that the nerve endings containing substance p, calcitonin and neuropeptide Y, which terminate in the capsule, have an important role in transmitting facet pathologies.

Innervation of the facet joints is provided by the dorsal branch of the sinovertebral nerve (meningeal or recurrent nerve) and fibers of the medial branch of the posterior primary ramus. Together with threebranches (medial, intermediate and lateral) of the posterior arch of the vertebral corpus, the dorsal primary ramus innervates the paraspinal muscles and facet joints, providing sensation in the lower back. The medial branch is the most important branch, and as it innervates the facet joint and the lumbar multifidus muscle, it is the target of treatment for pain originating from the facet joint[3]. The aim of this study was to retrospectively examine the results of facet joint blockage applied to 175 patients thought to have lower back pain of facet joint origin.

Materials and Methods

The data were examined of 175 patients applied with facet joint blockage in our clinic between July 2013 and August 2018, due to an initial diagnosis of facet-origin pain. Demographic data (age, gender) were noted and all patients were evaluated radiologically with magnetic resonance imaging (MRI) and with Visual Analog Scale (VAS) values before and after the procedure to determine levels of pain. The level of degeneration of the facet joint was evaluated using the Weishaupt grading system[4] on MRI and computed tomography (CT) images (Fig. 1-4). The relationships between the Weishaupt score and pre and post-procedure VAS scores were evaluated.

Blockage Method Applied

The facet joint blockages were applied under operating theatre conditions with the patient in the prone position. Under biplane fluoroscopy guidance, 1 ml (40 mg) methylprednisolone acetate, and 1 ml local anesthetic (5 mg bupivacaine HCL+80mg glucose monohydrate) were administered to each facet joint.

Statistical Analysis

Data obtained in the study were analyzed statistically using MedCalc Software. Descriptive statistics were used to describe continuous variables (mean±standard deviation, minimum, maximum, median values). Comparisons of more than two independent and not normally distributed continuous variables were made using the Kruskal–Wallis test. Two dependent and not normally distributed continuous variables were compared using the Wilcoxon test. A value of $p<0.05$ was accepted as statistically significant.

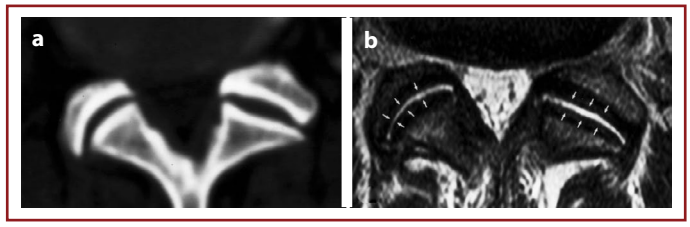

Figure 1. Normal facet.

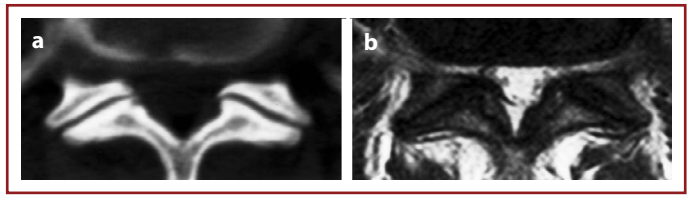

Figure 2. Grade 1 Hypertrophy on the facet joint surfaces on CT and MR images.

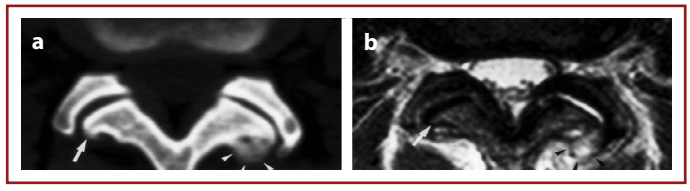

Figure 3. Grade 2 Hypertrophy and minimal osteophytes in the facet joints.

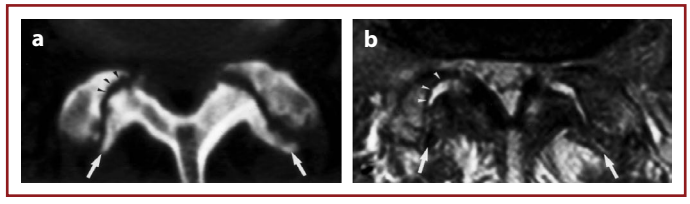

Figure 4. Grade 3 Hypertrophy in the facet joints, large osteophytes, and subarticular bone erosion.

Patient Inclusion and Exclusion Criteria

The patients were selected from those who presented at our clinic with lower back pain. Without any gender differentiation or age limitations, patients were included in or excluded from the study on the basis of the criteria shown in Table 1.

Table 1. Study inclusion and exclusion criteria

Patient Inclusion Criteria	Patient Exclusion Criteria
• All age groups • No extruded or sequestered disc on lumbar MRI • Lower back pain determined in the physical examination and sensitivity of the facet joint on palpation.	• Extruded or sequestered disc on lumbar MRI • Cases with spondylolisthesis, spinal stenosis or lateral recess syndrome • Cases with rheumatismal disease such as spinal infection or spondylitis, or with a spinal malignancy • Cases with sciatalgia or neurogenic claudication together with lower back pain.

Results

Evaluation was made of 175 patients, comprising 121 females and 54 males with a mean age of 54.9 years (range, 25–87 years). All the patients had typical axial pain. The duration of symptoms was mean 9 months. Preoperatively, the mean VAS score was 7.12±0.4. In the radiological evaluation, the bilateral facet joints were examined at 195 levels in 175 patients. The Weishaupt score of facets corresponding to the same level in the same patient were evaluated according to the higher score. On the lumber MR examination 75 facets were evaluated as Grade 1 (38.5%), 86 as Grade 2 (44.1%), and 34 as Grade 3 (17.4%). Facet blockage was applied at a single level to 155 patients and at 2 levels to 20.

The VAS scores decreased from 7.4±0.6 preoperatively to 4.1±0.7 postoperatively in Grade 1 patients, from 7.6±0.7 to 3.8±0.6 in Grade 2 patients and from 7.5±0.7 to 3.7±0.7 in Grade 3 patients (Table 2). In all three groups, the difference between pre- and post-operative values was determined to be statistically significant ($p<0.05$).

VAS for cases of Grades 1, 2, and 3. (Wilcoxon $p<0.05$)

The improvement in the VAS values was calculated as 29.2%±0.9% in Grade 1 cases, 30.7%±0.8% in Grade 2 and 30%±1.4% in Grade 3 (Table 3).There was no statistically significant difference between the grades. (Kruskal–Wallis $p>0.05$).

Discussion

Since the beginning of the 20th century, problems in the facet joints have been thought to be among the reasons for lower back pain. At some time in life, especially after the age of 40 years, 70–80% of the general population will experience lower back pain, and although the majority of these complaints spontaneously recover, more than 50% recur within a year. Up to 15% of cases of chronic lower back pain are thought to be facet joint arthropathy[5]. By applying intra-articular stimulation to healthy facets, Robertson proved that facet joint degeneration caused lower back pain. The injection of hypertonic sodium chloride into the facet joints of healthy individuals was seen to cause pain in the posterior thigh and the lower back[6,7]. Mooney and Robertson administered intra-articular local anesthetic to the facet joint, and it was suggested that this application could be used to eliminate lower back pain[5]. Following this application, diagnostic blockage methods used were successful in both diagnosis and treatment[7]. Facet joint degeneration may form as a result of abnormal movements originating from disc degeneration and arthritis of similar synovial joints. Micro and macro traumas emerging in the facet joint with advancing age cause the development of vertical fibrillation in the joint cartilage following the first occurrence of synovitis and proliferation of synovial cells. Over time, hypertrophy and sclerosis of the subchondral bone develop, and as age progresses, osteophytes develop on the attachment sites of the joint capsule and ligamentum flavum[8]. The resulting pathogenesis is known as facet joint syndrome, and clinically, persistent lower back pain is observed. The treatment for facet joint syndrome can be defined as medical, physical therapy and percutaneous or surgical interventions. While relief can be provided with bedrest and the appropriate

Table 2. A statistically significant difference was determined between pre- and post-operative

	Preop VAS	Postop VAS	p
Grade 1 (n=75; case=96)	7.4±0.6	4.1±0.7	<0.05*
Grade 2 (n=86; case=48)	7.6±0.7	3.8±0.6	<0.05*
Grade 3 (n=34; case=31)	7.5±0.7	3.7±0.7	<0.05*

VAS: Visual analog scale.

Table 3. The improvement in the VAS values

	VAS improvement
Grade 1	29.2%±0.9
Grade 2	30.7%±0.8
Grade 3	30%±1.4
p	p>0.05

VAS: Visual analog scale.

medical treatment (non-steroid anti-inflammatory drugs, muscle relaxants, and antidepressants), for some patients with persistent pain despite the appropriate treatment algorithm, percutaneous facet injections are preferred to provide rapid relief. Just as these injections are applied to the facet joint, denervation of the joint can also be applied using radiofrequency[9].

In previous controlled studies, it has been confirmed that the sources of spinal and extremity pain are intervertebral discs, facet joint and the sacroiliac joint. The facet joint, which contains hyalin cartilage, meniscus synovium and a capsule, is innervated by the medial branch of the dorsal ramus. The capsule is surrounded by synovium, and there is a rich nociceptive nerve network. In facet joint degeneration, cytokine mediators entering the area of inflammation, angiogenesis, and the stimulation of sensory neurons constitute the components associated with pain[10]. Physical therapy is one of the treatment methods applied for facet joint syndrome. It is important that the patient is first taught how to use the back, the exercises to be performed and what s/he should and should not do.

Radiologically, several changes can be seen to have occurred together with facet joint degeneration, such as apophyseal hypertrophy, subchondral sclerosis, osteophytes, narrowing in the joint area and irregularity on the joint surface. Tomography is extremely sensitive in the evaluation of facet degeneration and is extremely beneficial in the determination of osteophytes, joint hypertrophy, tearing of the joint cartilage, vacuum phenomenon in the joint space, and calcification in the joint[11].

Radiofrequency ablation is widely used in the treatment of facet-origin lower back pain. One of the percutaneous invasive interventions used in the treatment of facet joint syndrome is the radiofrequency thermocoagulation method. In a 10-year study by Gofeld, it was concluded that denervation of the facet joints with radiofrequency provided patients with pain relief for up to 2 years[12]. Before facet denervation, major findings should be supported with diagnostic facet block. After the procedure, when there is >50% reduction in lower back pain, the test is evaluated as positive and the radiofrequency procedure can be applied. Facet joint blockage to be applied for diagnostic or prognostic purposes and positive responses obtained suggest that the radiofrequency procedure may be successful. In an extensive study of facet joint complications, Manchikanti et al.[13] reported intravascular penetration at 11.4% (lumbar 4%, cervical 20%), and local bleeding, nerve root irritation and vasovagal reaction at <1%.

Conclusion

In the identification and elimination of facet-related pain, facet joint blockage has been evaluated as an effective intervention. In this study, the lumbar MR images of patients with lower back pain were evaluated in respect of facet joint degeneration and the Weishaupt scale was used in this evaluation. When the preoperative and postoperative VAS values were examined, no clinically significant correlation was determined between the preoperative Weishaupt grading and the postoperative VAS value. A significant improvement was determined in the postoperative VAS values of all the patients of all grades as a result of the facet joint blockage applied, regardless of the degree of facet degeneration.

In conclusion, the results of this study demonstrated that facet joint blockage provided significant improvements in patients with the complaint of lumbago, and the grading of the facet joint before the blockage was of no significant importance and had no effect on the treatment outcomes.

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