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ORIGINAL RESEARCH

Prolotherapy Method in Treatment of Chronic Low Back Pain

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Abstract

Objective: The aim of this study is to evaluate the effectiveness of 5% dectrose prolotherapy on low back pain in patients with chronic low back pain without neurological deficits.

Material-Method: Prolotherapy with 5% dextrose was applied to patients with localized low back pain, hip pain, spreading pain in the legs for more than six months. Stretching exercises were recommended after prolotherapy and an analgesic containing paracetamol (500 mg) + codeine phosphate (10 mg) + caffeine (30) mg was used for analgesia for the first 3 days. Prolotherapy was planned 3 times with an interval of twenty days.

Results: Thirty patients between the ages of 24-73 were included in the study. Eighteen patients received 3 sessions whereas twelve patients received 2 sessions of prolotherapy. Visual analogue scale (VAS) pain scores of all patients decreased. The mean pre-treatment VAS score was 8.43 and it decreased to 2.41 after the treatment. None of the patients had side effects that would terminate the treatment.

Conclusion: The data obtained in the study show that prolotherapy is effective in treating chronic low back pain. We did not conduct long-term follow-up in our study. After three sessions and between sessions, we assessed the current state of well-being. More extensive studies will guide clarification of its place in the treatment of long-term low back pain.

Keywords: Low Back Pain, Prolotherapy, Visual Analogue Scale

INTRODUCTION

Low back pain is a common medical complaint. It affects more than 5 million people in the United States. In industrialized countries, it has been the most commonly reported disease in human life after influenza[1].

With the development of imaging methods, it is thought that a large part of low back pain is due to disc herniations. However, ligament injuries are also an important cause of low back pain[2]. Prolotherapy is an injection method designed to promote healing[3].

With prolotherapy, proliferating substances are applied with a purpose of creating microtraumas in the desired anatomical regions. Different proliferating agents and cells can be applied. For example, 5% dextrose, mannitol, sodium morrhuate, platelet-rich plasma[4]. With the use of 5% dextrose in prolotherapy treatment the patients feel less pain after the procedure. For this reason, we did our study with 5% dextrose as a proliferating agent.

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MATERIALS AND METHODS

We started our study after receiving the ethics committee approval numbered 2020-98 from the Gebze State Hospital. We conducted a retrospective study with 30 patients aged between 24-73, who had applied to the traditional and complementary medicine outpatient clinic in 2019 and had had low back pain for more than six months. Patients with sequestered and extruded disc herniations according to the magnetic resonance imaging were not included in this study.

According to the examination of the iliolumbar ligament, facet joint and transverse ligaments, 1 cc 5% dextrose prolotherapy was applied to the sensitive structures with a 23 gauge 0.6x80 mm needle. After prolotherapy, waist stretching exercises were given designed by physiatrists. The given exercises were recommended to be performed with 10 repetitions twice a day, in the morning and in the evening. After the injection, an analgesic containing paracetamol (500 mg) + codeine (10 mg) + caffeine (30 mg) was given for the first 3 days.

Patients who did not take their medication regularly and did not do stretching exercises regularly were excluded from the study. Prolotherapy was applied 3 times in total with an interval of 20 days. If there was 80% or more reduction in pain after the first or second injection, the treatment was terminated.

Statistical analysis

SPSS 15.0 for Windows was used for statistical analysis. Descriptive statistics were given as numbers and percentages for categorical variables; average, standard deviation, minimum, maximum for numerical variables. As the differences of numerical variables in dependent groups did not meet the normal distribution condition, repeated measurement analyzes were performed with Friedman Analysis.

Subgroup analysis were performed with Wilcoxon test and interpreted with Bonferroni correction. Comparisons of numerical variables between two independent groups were made with Student's t-Test, when they met the normal distribution condition, and with Mann Whitney U test, when they did not meet the normal distribution condition.

Relationships between numerical variables were analyzed with Pearson Correlation Analysis, when the parametric test condition was met, and with Spearman Correlation Analysis, when the parametric test condition was not met. Statistical alpha significance level was accepted as $p<0.05$.

RESULTS

Patients with persistent pain for more than six months were included in the study. None of the patients had previously received a similar or different injection therapy. Patients with sequestered or extruded disc herniations according to the lumbar magnetic resonance imaging were not included in the study.

The characteristic features of the patients are shown in Table 1. The decrease in the evaluated VAS scores of the patients was found statistically significant ($p<0.001$) (Table 2). The results of the VAS scores before and after the prolotherapy session by gender are shown in Table 3.

The results of the pretreatment and posttreatment VAS scores by gender are shown in Table 3. Three sessions of prolotherapy were applied to 18 patients. Through the VAS score of 12 patients decreased by 80% or more after 2 sessions of prolotherapy treatment, the third session of prolotherapy was not performed. Ligament and joint examinations were performed at each session. Painful and tender ligaments were detected and these ligaments were injected. Non-painful ligaments were not treated.

Table 1. Demographic table of patients based on gender and age.

		Mean±SD	**Min.-Max.**
Age (year)		49.0±12.5	24-73
		n	**%**
Gender	**Male**	9	30.0
	Female	21	70.0

Table 2. Changes in VAS score before and after treatment

		Mean±SD	**Min.Max.**
VAS	Pre-treatment	8.43±1.07	6-10
	After the 1st session	4.27±1.23	2-7
	After the 2st session	3.40±1.94	0-8
	After the 3st session	2.41±1.58	0-5
	p	<0.001	

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Table 3. Results of mean VAS scores before and after treatment by gender

		Male		Female		
		Mean±sD	**Min.-Max.**	**Mean±SD**	**Min.-Max.**	**p**
VAS	Pre-treatment	8.11±1.05	7-10	8.57±1.08	6-10	0.215
	After the 1st session	4.22±0.67	3-5	4.29±1.42	2-7	0.900
	After the 2st session	2.56±1.13	1-5	3.76±2.12	0-8	0.081
	After the 3st session	1.50±1.00	1-3	2.69±1.65	0-5	0.197

DISCUSSION

It was shown that there were no significant difference between the two groups in a study examining the long-term efficacy of surgical and conservative treatments in patients with acute sciatica who do not have an absolute surgical indication[5]. Considering the risks of surgical treatment, the importance of conservative treatments such as prolotherapy becomes even more prominent.

It has been stated that 70% of low back pain cases occur due to ligament injuries. The sacroiliac ligament is the most commonly injured ligament. Pain as a result of damage to this ligament is reflected in the lateral of the leg and in the posterior thigh[6].

We found that all of our patients included in the study had tenderness in this ligament. We performed the iliolumbar ligament injection in all our patients especially in patients who had pain in the groin and lateral leg. There was a significant reduction in their pain after this injection.

The lumbar vertebrae and pelvis are held together by the lumbosacral and iliolumbar ligaments. The spinous processes are connected to each other by interspinous and supraspinous ligaments. Supraspinous ligaments strengthen the interspinous ligaments[7].

As a result of injury and instability in the ligaments, the facet joint and disc in the relevant segment cannot be protected and excessive pressure occurs on it. It is the most common site of injury between the lumbar vertebra and the sacrum. The lumbosacral ligament is the ligament between the 5th lumbar vertebra and the sacrum. Injury and instability in this ligament predisposes to herniation.

The iliolumbar, interspinous and supraspinous ligaments are other ligaments that protect from intervertebral disc herniation. If the separation in the spinal processes is excessive, disc herniation occurs[9].

In this study, we also examined the iliolumbar ligament, transverse ligament and facet joint in each prolotherapy session and injected 1 cc 5% dextrose into the sensitive structures.

Disc degeneration is so common that it is considered as a part of the normal aging process. As a natural course of aging, the disc loses its flexibility[8]. The first onset of a disc herniation is usually extremely painful. In approximately 10% of patients, pain and muscle spasms may continue and develop into chronic pain. Pain may persist for a long time after disc herniation due to weakened ligaments and unhealed connective tissue support[9].

We aimed at initiating regeneration with prolotherapy in the weakened ligaments, to strengthen them and increase the support of the connective tissue in patients with chronic pain.

Prolotherapy can be used in many musculoskeletal disorders, such as pain of knee, shoulder, low back and neck, osteoarthritis, tennis and golfer's elbow, tendinopathy.

The inflammation process begins with prolotherapy. With inflammation, fibroblast activation occurs, growth factors and collagen synthesis increase in the region. It activates tissue repair. Thus, the weakness of ligaments and tendons decreases.

Prolotherapy can be done when the pain first starts, or it can be used at any time after the pain onset[10]. Also, we did our study with patients whose low back pain has been going on for more than six months and with pain that spreads to the buttocks and legs.

Prolotherapy, also known as regenerative injection therapy, triggers local inflammation by stimulating collagen production at the injection site. As a result, the growth of new ligament and tendon tissue is believed to relieve pain[11].

Merriman determined in his study with 15000 patients that the success rate of the conservative method of prolotherapy in chronic low back and sciatic pain is between 80% and 90%, and the side effects are very low compared to surgery[12]. We did not see any side effects in our study.

In a study conducted with 145 people with chronic low back pain, where the mean VAS score of the patients before the prolotherapy session was 5.6, and the mean VAS score was 2.6 after the prolotherapy. 80% of patients reported that the improvement in pain levels was still ongoing one year after treatment[13].

We also obtained similar results after three sessions of prolotherapy in our study. While the mean VAS score of our patients was 8.43 before the treatment, it decreased to 2.41 after the treatment.

In the study of Hauser et al., more than 80% of the patients showed improvement in mobility (walking and daily activities), exercise ability, anxiety and depression states. After one year of follow-up from the last prolotherapy session, it was observed that the well-being continued[13]. The lack of long-term follow-up of the patients in our study is one of the limitation of our study.

Maniquis-Smigel et al. reported clinically significant improvement in pain for 12 months when they administered repeated caudal injections of 5% dextrose to patients with chronic low back and hip pain. This study shows that dextrose has a potential sensorineural effect on neurogenic pain[14]. In our study, we benefited from the analgesic and proliferative properties of 5% dextrose.

In a study of 366 patients with chronic low back pain, prolotherapy was found to reduce chronic low back pain when it was combined with spinal manipulation, exercise, and other adjunctive interventions[15]. In our study, our patients used an analgesic for 3 days containing paracetamol + caffeine + codeine after prolotherapy and we warned them that they should definitely do stretching exercises.

In a study by Solmaz et al., they applied prolotherapy with 5% dextrose to 79 patients whose pain persisted after unsuccessful low back surgery. Oswestry Disability Index and VAS scores of the patients were examined before and after prolotherapy and significant results were obtained[16]. According to this study, prolotherapy may be an appropriate treatment option for chronic pain before revision surgery.

CONCLUSION

In this study, we found a significant reduction in the pain of the patients with prolotherapy treatment who had chronic low back pain. Therefore, with the available data, we have determined that prolotherapy is a safe, economical and effective method, and 5% dextrose prolotherapy can be safely used for low back pain.

In our study, we did not perform long-term pain control of the patients. Randomized controlled trials with more patients and long-term follow-up are needed on this subject.

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