Efficacy of the Platelet-Rich Plasma on Pain Severity in Patients with Knee Osteoarthritis: Case Series

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Abstract

Objectives
Platelet-Rich Plasma (PRP) is produced from the patient’s own blood, which plasma with significantly higher platelet concentrations. Biologic researches have indicated the importance of growth factors in the maintenance of cartilage repair. There is an increasing number of evidence confirming the potential benefits of plasma, which is rich in growth factors. Our aim was to evaluate the efficacy of PRP for knee pain in patients with osteoarthritis based on current available literature.

Methods
Twenty five patients with knee pain were determined in terms of osteoarthritis. The patients were enrolled according to the following inclusion criteria: age > 45 years, history of chronic (at least 3 months) pain of the knee. The knee joint is typically evaluated using the extended-knee radiograph. All patients were diagnosed as knee osteoarthritis, according to radiological and clinical findings. Kellgren-Lawrence (KL) grading system (0-5) is the most widely used and accepted standard for diagnosis of radiographic OA. All patients were evaluated as grade II-III knee osteoarthritis, according to KL scale. The intensity of knee pain was evaluated by the visual analogue scale (VAS). PRP was intra-articularly injected once a week for a total of 3 weeks. Adverse events were also recorded.

Results
The mean score of VAS knee pain was significantly lower in patients with knee osteoarthritis after the third PRP injection than at baseline (9.6 ± 1.1 vs. 5.4 ± 1.6; p < 0.001).

Conclusion
We aimed to share our experiences in the management of the knee osteoarthritis with PRP injection in this paper.

Keywords
PRP; Knee; Osteoarthritis; Injection; Cartilage; Arthritis

Introduction
Knee Osteoarthritis (OA) is a degenerative disease which one of the major causes of pain and disability in older people. About 13% of women and 10% of men aged 60 years and older have symptomatic knee OA [1].

The development of OA is dependent to interactions between several factors, including age, genetic, traumatic, misalignment and increased biomechanical loading of joints. The lesion to the articular cartilage of the knee


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is a common problem and can be difficult to effectively manage due to its inherent low healing potential within the tissue [2].

Platelet-Rich Plasma (PRP) was introduced by M. Ferrari in 1987 [3]. PRP was defined as a biological product from autologous blood with a platelet concentration above baseline count (200000 platelets/μL) [4]. Platelets are sources of growth factors which regulate healing processes as well as tissue regeneration. Growth factors regulate key processes in tissue repair, including cell proliferation, chemotaxis, migration, cellular differentiation, and extracellular matrix synthesis. The initial popularity of PRP has grown from its promise as a safe, natural effective choice for knee pain due to osteoarthritis [5].

The purpose of this paper was to share our experiences on PRP for knee osteoarthritis based on current available literature.

Patients and Methods

The study included 25 patients who were attended by our department with knee pain. The patient group comprised 20 women and 5 men, with an average age of 65 (range 50-80) years.

Patients older than 45 years of age with chronic knee pain were enrolled if the duration of the pain was at least three months. Routine hematological and biochemical parameters were determined. The knee joint is typically evaluated using the extended-knee radiograph. All patients were diagnosed as knee osteoarthritis, according to radiological and clinical findings. Knee osteoarthritis was determined according to the criteria of Kellgren–Lawrence grading scale in our patients [6]. All patients were evaluated as grade II or III knee osteoarthritis, according to the KL scale. Kellgren-Lawrence (KL) grading system (0-5) is the most widely used and accepted standard for diagnosis of radiographic OA. Patients with inflammatory rheumatic disease, or infectious or endocrine-related arthropathy, pregnancy, lactation, clinically unstable medical illness, or the use of any medication within 4 weeks before the initiation of the study were excluded. All subjects were informed about the study. The intensity of the pain was evaluated by Visual Analogue Scale (VAS) in all patients. VAS [7] which assesses the pain intensity and degree of relief experienced by the patient (score of 0 = no pain; 10 = unbearable pain). Pain score was recorded prior to injection and after three weeks following injections. PRP is prepared by a process known as differential centrifugation. In differential centrifugation, acceleration, force is adjusted to sediment certain cellular constituents based on different specific gravity. In this method, an initial centrifugation to separate red blood cells (RBC) is followed by a second centrifugation to concentrate platelets, which are suspended in the smallest final plasma volume. Finally, PRP was applied to bilaterally knee joints. All patients were treated with three intraarticular injections (once weekly) with PRP.

Results

Demographic data was shown in Table 1. The mean age of patients was 60.5 ± 5.4 years; the mean disease duration was 6.8 ± 1.2 years in patients.

Table 1: Demographic Data of Patients

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Mean ± S.D</th>
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<tbody>
<tr>
<td>Disease duration (years)</td>
<td>60.5 ± 5.4</td>
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<tr>
<td>6.8 ± 1.2</td>
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V AS: Visual Analogue Scale

As shown in Table 2. The mean V AS score for pain was decreased significantly when compared to the baseline and after treatment (9.6 ± 1.1 vs. 5.4 ± 1.6; p < 0.001).

Statistical Analysis

The Statistical Package for Social Sciences (SPSS 11.5, SPSS Inc, Chicago, IL) was used for all statistical analyses. A paired sample t-test is used to determine the difference between the average values of the V AS in baseline and after treatment. P <0.05 was considered significant.

Discussion

Osteoarthritis (OA) is a degenerative joint disease that is common in the elderly population [8]. Unfortunately, there is presently no effective medical treatment can halt OA progression [9].

One of the major results of this study was the effectiveness of PRP treatment for pain in grade 1-2 knee OA. Further, PRP injection was safe, tolerable, minimally invasive and effective method in a short term. All patients showed significant improvement in V AS pain score in 3 weeks, demonstrating that PRP injections can represent a
different treatment approach in patients with knee OA.

There were a few prospective studies have been designed to evaluate the effectiveness of PRP in knee OA. One study reported significant improvements in functional activities after PRP injections compared with baseline [10]. Another case series with OA patients who were receiving a single PRP injection showed pain scores were reduced at six months [11].

Our results suggest that PRP provides relief from the symptoms of knee OA and could be an important therapeutic tool to lessen the impact of the disease reducing the intensity of the pain. Furthermore, no adverse effects were observed during PRP applications. PRP can be considered as a complementary therapy in addition to other conventional therapies that can achieve transient improvements in the symptoms of patients with knee OA.

An objective limitation of this study was the absence of a control group and the relatively small number of patients.

Our study was not a comprehensive study. However, these results may shed light on the treatment in patients with knee osteoarthritis. PRP may be a complementary therapy approach in patients with knee OA who especially may not tolerate analgesics and in patients in whom other treatments are contraindicated. PRP therapy seems to be a simple, low-cost, effective and safety for short-term treatment of knee OA. However, at this time, PRP injection is not a standard treatment of knee OA.

Further study and clinical trials are needed to confirm the results observed. It seems likely that PRP will become increasingly more available and affordable for patients with early knee OA and is becoming more popular also in Turkey.

Future randomized controlled trials of PRP powered for efficacy are needed to determine; if selected patient characteristics can be applied to select the most efficacious therapy technique, or determine the ideal dose of therapy.

References


