INTRODUCTION

This prospective study aimed to know the use and safety of platelet-rich plasma (PRP) injections in knee osteoarthritis (KOA) patients. Primary knee osteoarthritis (O. A.) continues to be a hard-to-control degenerative disease. With the increase in average life expectancy and the prevalence of obesity, O. A. is creating a rising economic and physical burden [1]. Knee osteoarthritis (O. A.) is a chronic musculoskeletal condition that can eventually require surgical in knee osteoarthritis (O. A.) intervention. Thus patients continue to search for potential non operative therapies, such as platelet-rich plasma (PRP) injections into the affected knee [2]. According to Jayaram et al., platelet-rich plasma (PRP) is an emergent therapeutic approach for treating O. A.; however, clinical evidence is still needed for its effectiveness, and its mechanisms of action are indeterminate [3]. Despite promising outcomes reported about platelet-rich plasma (PRP) utilization in knee O. A., crucial issues such as conclusive evidence about its effectiveness, standard dose, and good. Preparation techniques still need to be discovered [4]. Contemporary guidelines advise both non-drug (such as exercise) and drug treatments, such as oral non-steroidal anti-inflammatory drugs (NSAIDs) [5]. Repeated injections are related to augmented cartilage Loss [6]. An autologous blood product containing various growth factors (G. F. s), cytokines, and platelet-rich plasma (PRP) is given intra-articular has shown promising results in achieving this goal and evaluating the effects of Intra articular platelet-rich plasma (PRP) injections on symptoms and joint structure in patients with symptomatic mild to moderate Osteoarthrits from January 2022 to January 2023. Patients received three consecutive platelet-rich plasma (PRP) injections and Western Ontario and McMaster University Arthritis Index (WOMAC), Visual Analogic Scale (VAS), Knee society score (KSS). Knee society score (KSS) are evaluated before giving platelet-rich plasma (PRP) injection (T0), three months (T1), six months (T2), and twelve months (T3) after the treatment. All patients underwent baseline, and at 12 mo, follow-up, MRI and X-ray evaluation was done.
Blood was injected into the centrifuge vial through the upper port. After 1st centrifugation in the "REMI" platelet-rich plasma (PRP) centrifuge, the height was adjusted, pulling the knob up and down. Plasma and the RBC layer were blocked. After the 2nd centrifugation, the upper silicone lid was opened, and a pipette was extracted from the platelet-rich plasma (PRP). A leukocyte filter was then used, and platelet-rich plasma (PRP) activation was done by adding 10% calcium chloride. Platelet-rich plasma (PRP) was injected with the help of a 10 ml syringe. Finally, the platelet concentration was drawn. The platelet-rich plasma (PRP) was divided into two disposable syringes. One syringe was sent for analysis of platelet concentration, and the second part was used for intra-articular injection in patients within two hours of preparation. The first injection was given under aseptic conditions- 10 ml of platelet-rich plasma (PRP) through the anterolateral approach with a 22-gauge needle was given into the knee joint. Moving the knee allows the platelet-rich plasma (PRP) to spread in the knee joint. The knee was kept in extension for 25 min. After injection, some patients who developed complications like sweating, dizziness, and nausea were observed and discharged when fully recovered. All patients were followed up at three months, six months, and one year.

RESULTS

The current study recruited one hundred patients (38 males and 62 females) affected by knee osteoarthritis (O. A.). The mean age of the knee osteoarthritis (O. A.) patient was 59, with the patients’ age range between 40 and 81 y. Out of these 100 patients, some patients were lost to follow-up. Out of 96 finally analyzed patients, 60 were female and 36 were male and received platelet-rich plasma (PRP) injections. No complications were observed during the follow-up period.

Table 1: Baseline evaluation of study participants

<table>
<thead>
<tr>
<th>Participant's variables</th>
<th>Age</th>
<th>Percentage</th>
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<tbody>
<tr>
<td></td>
<td>40 to 80 y</td>
<td>96</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>60</td>
</tr>
<tr>
<td>BMI Values</td>
<td>Less than 25</td>
<td>63</td>
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<tr>
<td></td>
<td>More than 25</td>
<td>33</td>
</tr>
<tr>
<td>Side</td>
<td>Left</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Right</td>
<td>68</td>
</tr>
<tr>
<td>Kellgren Lawrence grade</td>
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<td>27</td>
</tr>
<tr>
<td></td>
<td>Grade two</td>
<td>32</td>
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<tr>
<td></td>
<td>Grade three</td>
<td>37</td>
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Womac pain scale

It is a questionnaire consisting of 24 items divided into three subscales.

Pain (5 items): walking, using stairs, in bed, sitting or lying, and standing upright.

Stiffness (2 items): after first waking and during the day

Physical function (17 items)

Using stairs, standing, bending, walking, getting in or out of a car, shopping, putting on/taking off socks. The questions are scored on a scale from zero to four, corresponding to 0–none, 1-mild, 2-moderate, 3-severe, 4-extreme. The scores for each sub-scale are summed up with a score range of 0–20 for pain, 0–8 for stiffness, and 0–68 for function. Higher WOMAC scores indicate worse pain, stiffness and functional decrease in activity. The WOMAC functional limitations value demonstrated a statistically significant reduction between T0 and T1, T1-T2, T2-T3, and T0 and T3. The WOMAC pain value showed statistically significant reduction between T0-T1, between T1-T2, between T2-T3 and, and between T0-T3. The WOMAC total value showed a statistically significant reduction between T1 and T2, T2 and T3, and T0 and T3. The WOMAC stiffness value showed a statistically significant reduction between T0 and T1 and T2 and T3.

Fig. 1: Comparison between evaluation times of WOMAC Score. T0-Recruitment, T1-3 mo after the last injection, T2-6 mo after the infusion, T3-12 mo after the injection
Knee society score


The Knee score, part of KSS, significantly increased over time between T0-T1, T1-T2, T2-T3, and T0-T3. The functional KSS score showed statistically significant differences between T0 and T1, between T2-T3, and between T0-T3.

Visual analogue scale

Visual analogue scale (VAS) is a 10 cm line with statements on the left (no pain) and on the right (extreme pain). No pain (0-5 mm) Mild pain (5-45 mm) Moderate pain (45-74 mm) Severe pain (75-100 mm)

The Visual analogue scale (VAS) score improved statistically significantly between T0 and T1, T1 and T2, T2 and T3, and T0 and T3. No statistically significant difference was shown between T1 and T2.

MRI

The tibia and femoral plate thickness improved non-statistically between T0 and T3. MRI Evaluation of the knee at T0 and T 3. A) baseline (T0) MRI T1 Sagittal image of a 41 y old female (b) 12 mo (T3) follow-up MRI T1 sagittal image of a 41 y old female. No x-ray changes have been demonstrated using the Kellgren-Lawrence radiographic classification scale. Patients with knee osteoarthritis who received intra-articular injections of PRP had better pain relief when compared to steroids, hyaluronic acid, and placebo. The results of this study highlight that PRP infiltrations represent a beneficial conservative treatment to reduce pain and improve functional scores at the midterm 12-month follow-up. Positive effects were shown on patients with decreasing pain, as indicated by the WOMAC pain index, and KSS patients with reduced pain, as noted in the WOMAC pain index, Knee society score (KSS) index, and Visual analogue scale (VAS). WOMAC and Knee society score (KSS) also indicated that the physical function was improved, even if there was no statistical evidence comparing the Knee society score (KSS) at three-month, six-month, and 12 mo follow-ups. All the scores referring to stiffness and physical function showed improvement over time, agreeing with a previous study that pointed out a decrease in the WOMAC index and an increase in the Knee society score (KSS) total score, suggesting a positive influence of treatment.

DISCUSSION

Platelet-rich plasma (PRP) has shown outstanding promise as an agent of tissue repair and regeneration-studies involving platelet-rich plasma (PRP) point towards some improvement in pain and function. Zairi et al. developed a workflow to assess in vitro responses to platelet-rich plasma (PRP) and correlated them with platelet-rich plasma (PRP) composition and clinical results in knee osteoarthritis (O.A.), patients. Identified responders and no responders to platelet-rich plasma (PRP) treatment based on patient-reported results and minimal clinically significant differences [7]. French-speaking experts’ consensus recommended platelet-rich plasma (PRP) for early to moderate knee osteoarthritis (O.A.), preferring LP-PRP and advising against mixing platelet-rich plasma (PRP) with anesthetics or corticosteroids. Recommendations had a low level of evidence and were based on expert clinical experience [8]. However, the study by Benn et al. showed that among patients with symptomatic mild-to-moderate radiographic knee osteoarthritis (O.A.), intra-articular injection of platelet-rich plasma (PRP) did not result in a significant difference in symptoms at 12 mo compared with saline injection (placebo) [9]. The best outcomes were attained by individuals aged 51-65 with lower mechanical axis angles and patients with K/A stage 2 OA [10]. However, the study by Benn et al. showed that among patients with symptomatic mild-to-moderate radiographic knee osteoarthritis (O.A.), intra-articular injection of platelet-rich plasma (PRP) did not result in a significant difference in symptoms at 12 mo compared with saline injection (placebo) [11]. Compared with other studies in our study, we found that platelet-rich plasma (PRP) infiltrations represent a beneficial conservative treatment to reduce pain and improve functional scores at the midterm 12 mo follow-up. Positive effects were shown on patients with decreasing pain, as indicated by the WOMAC pain index, and KSS patients with reduced pain, as noted in the WOMAC pain index, KSS index, and Visual analogue scale (VAS), physical function was improved, even if there was no statistical evidence comparing the KSS Score at three-month, six-month, and 12 mo follow-ups. However, in our study, there need to be more statistical differences in the Knee Score part of KSS that refers to flexion contracture, extension lag alignment, anteroposterior and mediolateral stability. This aspect has never been pointed out by other authors, who directed only to the total KSS score, suggesting that further study is required to highlight the role of the pain score on the total KSS score. Most studies do not show an improvement in X-rays and MRI, which aligns with our results. However long term follows up with increase in sample size of patients is needed to know the clinical efficacy of platelet rich plasma (PRP).
CONCLUSION
The results confirm the efficacy of the platelet-rich plasma (PRP) injections on knee osteoarthritis (O.A.), suggesting that decreasing pain was obtained one month after injection, with the best results observed after 12 mo. They indicate in further studies that data could be collected and recorded at only three different times: at recruitment, six and twelve months after administration, leading to a time-reduced follow-up protocol. Long-term follow-up is required. The efficacy of intra-articular platelet-rich plasma (PRP) injections for knee osteoarthritis (O.A.) remains a topic of debate, even though recent publications indicate short-term pain relief. A recent meta-analysis of high-quality randomized controlled trials [evidence level I] found that platelet-rich plasma (PRP) yielded the most favorable overall outcomes compared to corticosteroids, hyaluronic acid (H.A.) and placebo for individuals with knee osteoarthritis (O.A.) at 3, 6, and 12 mo. Despite inconclusive clinical data and basic science information, orthopedic surgeons treating knee osteoarthritis (O.A.) patients are increasingly intrigued by PRP. There is a growing interest in platelet-rich plasma (PRP), but more studies directly comparing platelet-rich plasma (PRP) with a placebo are needed.

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AUTHORS CONTRIBUTIONS
Chella Sivakumar planned the study, collected the data and wrote the manuscript, Suyanarayana analyzed the data and reviewed the manuscript, Deepak and Ravi analyzed the data.

CONFLICT OF INTERESTS
Declared none

REFERENCES