ORIGINAL RESEARCH PAPER

Orthopaedics

FUNCTIONAL EFFICACY OF INTRA ARTICULAR INJECTION OF PLATELET RICH PLASMA IN PATIENTS WITH OSTEOARTHRITIS OF KNEE

KEY WORDS: PRP injection, Osteoarthritis knee

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ABSTRACT

This study was undertaken to study the efficacy of intraarticular injection of platelet rich plasma in relieving pain and improving function in patients suffering from osteoarthritis of the knee. This is a prospective study of 57 knees. PRP was prepared using standard technique and the intervention was performed as an outpatient procedure. The outcome was determined on the basis of VAS and IKDC score, before the injection and at 6 weeks 12 weeks and 24 weeks. At 6 weeks improvement in IKDC scores was seen with a mean value of 7.0, which was statiscally significant. At 12 weeks, there was statiscally significant improvement in IKDC score with a mean value of 12.2. At 24 weeks again there was improvement in IKDC score with a mean value of 12.6. Clinical improvement was also evident by VAS score as it showed decrease in pain. At 4 weeks VAS score ranged from 16 to 34 mm at 6 weeks and mean score of 26.7 and standard deviation of 8.60766.At 12 weeks VAS score ranged from 18 to 32 mm and mean score of 24.9 and standard deviation of 6.96126. At 24 weeks VAS score ranged from 20 to 30 mm and mean score of 23.6 and standard deviation of 5.62792. At 6 weeks only 14% cases showed excellent, 68% cases showed good and. 18% cases showed fair results. At 12 weeks follow up 16% cases showed excellent, 82% cases showed good and fair results were seen in 2% cases. No case had poor results. At 24 weeks follow up 16% cases showed excellent, 86% cases showed good and 6% cases showed fair results and no case had poor results. Based on the above findings our study does suggest that intra articular injections of PRP do help in relieving pain and improving function in patients with mild to moderate osteoarthritis of knee

INTRODUCTION

Knee osteoarthritis is one of the most common conditions seen in orthopaedic clinical practice (1). A significant percentage of population is affected and in severe cases, it causes considerable pain and limitation of function, restricting activities of life. Treatment is mainly directed towards symptomatic relief. Non operative modalities in the early stages include analgesics, weight loss and physiotherapy. They provide symptomatic relief and may delay surgery. Long term use of analgesics is associated with significant side effects (2, 3, 4). Intra articular injection of visscosupplements like hyaluronic acid has been tried (5), but it has got variable efficacy (6-8). The cost of the treatment is another limiting factor with this therapy. Recent research suggests that products released by platelets like growth and other cytokines do play a role in maintenance and regeneration of tissues.(9,10).Hence there is an increased interest in exploring the efficacy of platelet rich plasma in healing of soft tissues after tendon and ligament injuries and regeneration of cartilage(11,12,13). Recent studies have demonstrated clinical improvement in self-reported pain and symptoms with no major adverse events after intrarticular injections of PRP in patients with knee OA (14,15,16) This study was undertaken to evaluate the efficacy intra articular injection of platelet rich plasma in relieving pain and improving function in patients suffering from osteoarthritis of the knee.

MATERIAL AND METHODS

This is a prospective study of 57 knees (21 patients with unilateral knee and 18 patients with bilateral knee involvement) conducted at our institution, a 350 bedded corporate hospital. All the knees had Kellgren-Lawrence grade 2 or 3 knee OA (17). Exclusion criteria were

- Systemic or inflammatory joint disease
- History of crystalline or neuropathic arthropathy
- Other intra-articular lesions or treatments in the previous six months
- Allergy to any test substance.

Method of obtaining PRP. PRP was prepared using a standard technique in which 30 ml of patient's blood was withdrawn added with anti coagulant and then centrifuged two times, at the rate of 2500 rpm for first 5 minutes and then 3200 rpm for the next 10 minutes. Ninety-five percent of the plasma layer was discarded and the remaining layers were mixed. This yielded about 2.5 - 3 ml of PRP .The concentration of platelets in PRP was1.4 million/µl on average.

The intervention was performed as an outpatient procedure. Patients were placed in supine position and the involved knee was cleaned and sterile draped.PRP was injected in the knee using an anteromedial approach and then passive flexion and extension of knee was then done 10 times. The patients were discharged the same day and then followed in the outpatient department. The outcome was measured at 0 weeks,4 weeks,12 weeks and 24 weeks. At all these visits patients were evaluated using VAS and IKDC scores.

Results were evaluated according to Visual Analogue Scale (VAS) (18). Before the surgical procedure the pain was considered at 100 mm in all patients and at every follow up; patient was asked to mark a point on the line to explain how much of pain relief he/she is having.

Results evaluation as per VAS Scale improvement

Excellent	>80% Improvement
Good	60-80 % Improvement
Fair	40-60% Improvement
Poor	< 40 % Improvement

IKDC was chosen due to its high reliability and validity over other measurement tools like Knee Injury and Osteoarthritis Outcome Score (KOOS), and Western Ontario and McMaster Universities Arthritis Index (WOMAC) .According to Higgins et al (19) it showed the best performance on all measurement properties and hence is the ideal tool to assess functional outcome.

RESULTS

Patients showed improvements in terms of functional status based on IKDC scores as shown in fig 1. At 6 weeks improvement in IKDC scores was seen with a mean value of 7.0, which was statiscally significant. At 12 weeks, there was statiscally significant improvement in IKDC score with a mean value of 12.2. At 24 weeks again there was improvement in IKDC score with a mean value of 12.6

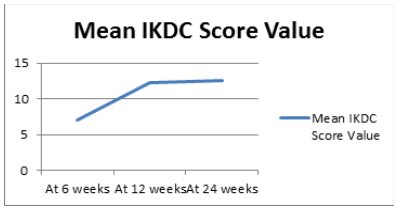

Figure 1: Improvement in IKDC score over time

Clinical improvement was also evident by VAS score as it showed decrease in pain.

At 4 weeks VAS score ranged from 16 to 34 mm at 6 weeks and mean score of 26.7 and standard deviation of 8.60766.At 12 weeks VAS score ranged from 18 to 32 mm and mean score of 24.9 and standard deviation of 6.96126.At 24 weeks VAS score ranged from 20 to 30 mm and mean score of 23.6 and standard deviation of 5.62792.

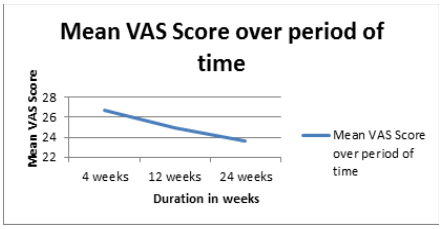

Figure 2: Mean VAS score over period of time

At 6 weeks only 14% cases showed excellent, 68% cases showed good and. 18% cases showed fair results. At 12 weeks follow up 16% cases showed excellent, 82% cases showed good and fair results were seen in 2% cases. No case had poor results. At 24 weeks follow up 16% cases showed excellent, 86% cases showed good and 6% cases showed fair results and no case had poor results.

Further analysis which was done on variables such as age, gender and side was not statistically significant in terms of outcome.

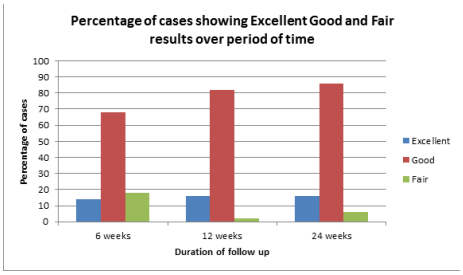

Figure 3: Percentage of cases showing Excellent, Good, and Fair results over period of time

No treatment-related major adverse events were noted in our study. Three patients did experience minor pain and swelling during the injection period which was probably related to the injection technique and was resolved in few days time.

DISCUSSION

In the present study maximum patients were in the 5th and 6th decade. The youngest patient in the study had an age of 40 years and the oldest had an age of 78 years with mean age of 60.5 years. These findings correlated well with those of Lawrence RC et al. (20) In our study of 57 cases, there were 40 females and 17 male patients with female to male ratio of approximately 7:3. Similar trend was observed in the series of Woolf et al (21) in which male to female ratio was 7:3 and Gabriel Frías (22) in their study on 299 patients with male female ratio was 7.8: 2.2. Harmonal changes due to menopause resulting in early onset of degeneration may explain the large number of females. In India, activities like squatting during worshipping, household cleaning and mopping may further aggravate the condition, for females.

Prospective study by Kon et al (23) on one hundred consecutive patients, , treated with PRP intra-articular injections and clinically evaluated by IKDC and VAS scores, before and at 6 and 12 months follow-up, showed statistically significant improvement of all clinical scores. The results remained stable up to 6 months follow up. In our study also there was consistent improvement in IKDC scores and consistent decrease in VAS scores over period of time. In fact percentage of cases showing excellent and good results in terms of VAS scores improved with duration. These findings do suggest that treatment with intraarticular injections of PRP has the potential to reduce pain and improve knee function and quality of life. In our study there was no major complication among study subjects. Similar studies by Sampson Set al (24), Filardo G (25) , Sun Y (26) and Giannini Set al(27) showed no major complication or adverse effects. These findings do imply the safety of intra articular injections of PRP. The relatively small sample size of our study may have influenced the outcome.

CONCLUSION

Our study does suggest that intra articular injections of PRP do help in relieving pain and improving function in patients with mild to moderate osteoarthritis of knee and is a useful adjunct in conservative management of this condition. However further studies with large number of patients across several centres are required to further establish the safety and efficacy of this procedure.

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