

A Prospective Observational Study Of Functional Outcome Of Leucocyte Poor Platelet Rich Plasma Therapy In Mild To Moderate (Early) Osteoarthritis Of Knee

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NO DISCLOSURES

INTRODUCTION:

Positive results have been uniformly observed by various researchers for PRP in early osteoarthritis (OA) knee in the past few years.

PRP has clearly demonstrated its supremacy in comparison to hyaluronic acid (HA) and placebo in various clinical trials and is undoubtedly the best option available for symptomatic treatment in early OA.

The release of growth factors from PRP occurs immediately and lasts for around three weeks and the clinical effect tends to wane down by the end of the year.

- Osteoarthritis (OA) is a leading cause of severe long-term pain and disability affecting approximately 10% of the global population (1) .
- Regenerative solutions and new tissue-engineering based strategies are promising for treatment of mild to moderate OA (2,3) .
- The research for treatment of knee OA with PRP is promising (4–6) , however there is a lack of consensus regarding the preparation of standardized dosing with an appropriate absolute number of platelets and concentration.
- Studies often report PRP preparations taken from between 20 to 100 ml of blood, with a concentration of $2-10 \times 10^6$ platelet/ μ l (4–6) .

- Most methods fail to provide a high yield and often have variable concentrations ranging two to four times of physiological count⁷ .
- Alternatively, clinicians may be reliant on expensive kits, ranging from between \$150–\$250 per treatment (7) .
- In order to have a high consistent platelet and low Leucocyte yield we designed a Pipette and Vacutainer ACD Tube based manual method.
- This prospective study was primarily aimed at standardizing the ideal PRP dosage and concentration, and to assess the subjective and physiological efficacy of PRP in early OA knee.

OBJECTIVE:

To determine the effectiveness of intra-articular leucocyte Poor Platelet Rich Plasma injection in patients with early osteoarthritis of Knee and to evaluate Functional outcome and Pain Relief.

MATERIALS AND METHODS:

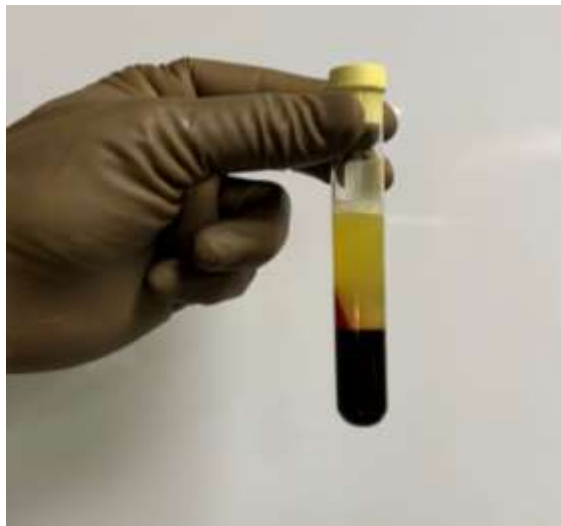
- We prospectively followed 938 patients with symptomatic Knee OA.
- All patients (327 Men and 623 women) were treated with single dose of Autologous Superdose Leucocyte Poor Platelet Rich Plasma (10ml) Intra-articular Injection Given.
- LP-PRP Prepared using Customised PRP Kit Prepared by Overself. We collect 42 ml of blood through ACD Vacutainer tube and subjected to double centrifugation and collect the final 10 ml of PRP.

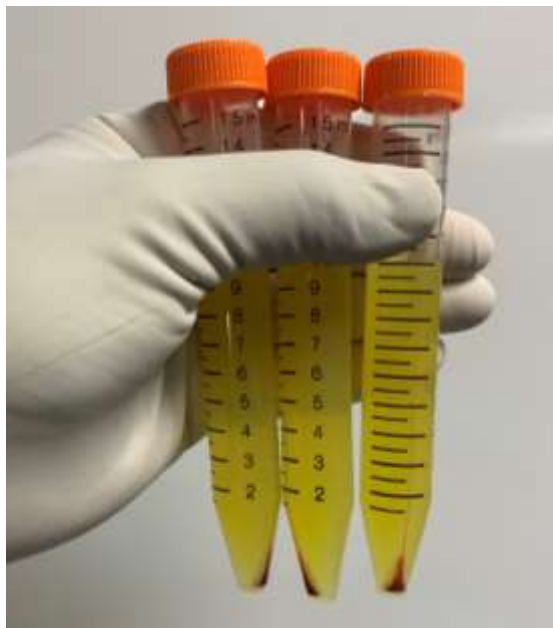
- Under All Aseptic Precautions Knee Joint Scrubbed Painted and Draped. Around 1.5 ml of Plane 2 % Xylocaine injected to the Standard Lateral Scopy Portal site (Soft part). 10 ml of LP-PRP Injected to Knee joint, Cycling done, sterile Dressing and Compression bandage applied.
- Patients Were followed after One Week, One month, 6 months, 12 months, 18 months, 24 months, 30 months and 36th month using Standard VAS and WOMAC index.
- The Mean age of patients was 43.8 years, Ranging from 35 to 65 Years, and Body Mass Index was 21.7 ± 2.5 .

MATERIALS AND METHODS:

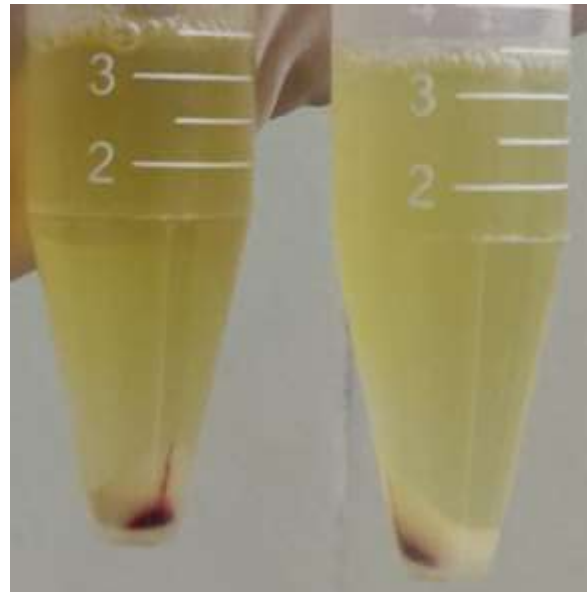
| INCLUSION CRITERIA | EXCLUSION CRITERIA |
|---|---|
| 1. Age 35 to 65 years. BMI < 30. | 1. Patients with blood diseases, systemic metabolic, immunodeficiency, hepatitis b or c, HIV-positive status, infection and septicemia, local infection |
| 2. Normal results for CBC, serum uric acid and coagulation profile, LP-PRP (Minimum Platelet concentration >5 times the normal and Leucocyte concentration <50% of the normal) minimum follow-up of 3 years. | 2. Patients with advanced and tricompartmental OA, rheumatoid or polyarticular arthritis, Symptomatic hip osteoarthritis, or symptomatic Contralateral knee osteoarthritis. |
| 3. Patients with symptomatic knees (KL grading 1 and 2) | 3. Significant joint swelling or clinical signs of acute inflammation. |
| 4. Patients with severe pain even after analgesics treatment for >3 months | 4. Varus-valgus malalignment above 5°, patellofemoral maltracking or untreated instability |
| 5. Patients with stable knee with normal Femoro-Tibial alignment and Patello - Femoral tracking. | 5. Pretreatment blood platelets value 25% below the reference value or alcoholism, smoking, drugs. |
| 6. Patients who gave consent for our LP-PRP treatment protocol. | 6. Treatment with corticosteroids < 3 months or medication < 7 days that could interfere with platelet aggregation |

Customised PRP Preparation





Leucocyte poor PRP



| ID. P | | MARUTHI DIAGNOSTICS CENTRE MANDYA | |
|----------|-------------------------|-----------------------------------|------------------------|
| Date | 02/01/2019 | Date | 02/01/2019 |
| Time | 17:44 | Time | 18:20 |
| Mode | WB | Mode | WB |
| Operator | | Operator | |
| WBC | 11.4 $\times 10^9/L$ | WBC | 5.4 $\times 10^9/L$ |
| RBC | 5.03 $\times 10^{12}/L$ | RBC | 1.0 $\times 10^{12}/L$ |
| HGB | 13.2 g/dL | HGB | 0.2 g/dL |
| HCT | 41.4 % | HCT | 0.5 % |
| MCV | 82.3 fL | MCV | 5.0 fL |
| MCH | 26.2 pg | MCH | 0.2 pg |
| MCHC | 31.9 g/dL | MCHC | 0.0 g/dL |
| PLT | 431 $\times 10^9/L$ | PLT | 1500 $\times 10^9/L$ |
| LYM# | 34.3 % | LYM# | 55.0 % |
| MXD# | 9.2 % | MXD# | 0.0 % |
| NEUT# | 56.5 % | NEUT# | 0.0 % |
| RDW-SD | 39.8 fL | RDW-SD | 0.0 fL |
| RDW-CV | 12.5 % | RDW-CV | 0.0 % |
| PDW | 9.3 fL | PDW | 10.1 fL |
| MPV | 8.5 fL | MPV | 8.6 fL |
| P-LCR | 13.2 % | P-LCR | 14.2 % |
| PCT | 0.37 % | PCT | 0.31 % |

| ID. P | | MARUTHI DIAGNOSTICS CENTRE MANDYA | |
|----------|-------------------------|-----------------------------------|------------------------|
| Date | 02/01/2019 | Date | 02/01/2019 |
| Time | 17:44 | Time | 18:20 |
| Mode | WB | Mode | WB |
| Operator | | Operator | |
| WBC | 9.7 $\times 10^9/L$ | WBC | 3.5 $\times 10^9/L$ |
| RBC | 5.23 $\times 10^{12}/L$ | RBC | 1.0 $\times 10^{12}/L$ |
| HGB | 15.0 g/dL | HGB | 0.0 g/dL |
| HCT | 45.6 % | HCT | 0.4 % |
| MCV | 87.2 fL | MCV | 0.4 fL |
| MCH | 28.7 pg | MCH | 0.0 pg |
| MCHC | 32.9 g/dL | MCHC | 0.0 g/dL |
| PLT | 385 $\times 10^9/L$ | PLT | 1279 $\times 10^9/L$ |
| LYM# | 35.4 % | LYM# | 70.8 % |
| MXD# | 0.0 % | MXD# | 0.0 % |
| NEUT# | 0.0 % | NEUT# | 0.0 % |
| LYM# | 3.4 $\times 10^9/L$ | LYM# | 2.5 $\times 10^9/L$ |
| MXD# | 0.0 $\times 10^9/L$ | MXD# | 0.0 $\times 10^9/L$ |
| NEUT# | 0.0 $\times 10^9/L$ | NEUT# | 0.0 $\times 10^9/L$ |
| RDW-SD | 47.8 fL | RDW-SD | 0.0 fL |
| RDW-CV | 13.7 % | RDW-CV | 0.0 % |
| PDW | 10.0 fL | PDW | 10.4 fL |
| MPV | 8.6 fL | MPV | 8.6 fL |
| P-LCR | 15.1 % | P-LCR | 17.2 % |
| PCT | 0.31 % | PCT | 1.10 % |

RESULTS:

| STUDY | TYPE | PATIENTS | CONTROL | OUTCOME MEASURE | FOLLOWUP | RESULTS | MEAN VAS |
|----------|------|----------|---------|-----------------|-----------|------------------------------|------------|
| UMESHA C | POS | 938 | NILL | VAS,WOMAC, | 36 MONTHS | SIGNIFICANTLY BETTER RESULTS | 8.2 to 2.9 |

CONCLUSION:

Intra-articular autologous LP-PRP injection therapy is a simple and minimally invasive intervention which is feasible to deliver in primary care to treat osteoarthritis of the knee joint. It's a procedure of choice for treating patients with Mild and Moderate osteoarthritis knee for a significant period of time to combat pain and disability with a significant outcome in VAS score and WOMAC index.

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