AUTOLOGOUS PLATELET RICH PLASMA (PRP) VERSUS LEUCOCYTE-PLATELET RICH FIBRIN (L-PRF) IN CHRONIC NON-HEALING LEG ULCERS - A RANDOMISED, OPEN LABELLED, COMPARATIVE STUDY

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ABSTRACT

BACKGROUND
Our aim was to evaluate and compare the efficacy of Platelet-Rich Plasma (PRP) and Leucocyte Platelet Rich Fibrin (L-PRF) in the treatment of chronic non-healing leg ulcers.

MATERIALS AND METHODS
A randomised, open labelled comparative study was performed on 30 patients with non-healing ulcers of various aetiologies. 15 patients were treated with PRP and 15 patients with L-PRF at weekly intervals for a maximum of 6 treatments. At the end of the 6-week period, reduction in size of the ulcers (Area and volume) was assessed.

RESULTS
Of 30 ulcers, there were 22 venous ulcers, 1 ulcer due to vasculitis, 1 traumatic ulcer, 2 diabetic ulcers and 4 trophic ulcers. The mean duration of healing of the ulcers were 5.7 weeks in L-PRF and 6.5 in PRP (p = 0.034). About 100% resolution was seen in 11 of the ulcers in L-PRF and 8 of the ulcers in PRP at the end of the 6th treatment (73.3% vs. 53.3%).

CONCLUSION
L-PRF is more efficacious and has a quicker healing rate than PRP, probably due to its anti-inflammatory effects and also protection against infections. L-PRF will be more promising in future than PRP in treating chronic ulcers.

KEYWORDS
Leg Ulcers, Platelet rich Plasma, Leucocyte Platelet Rich Fibrin.


MATERIALS AND METHODS
Our aim was to evaluate and compare the efficacy of Platelet-Rich Plasma (PRP) and Leucocyte Platelet Rich Fibrin (L-PRF) in the treatment of chronic non-healing leg ulcers. It was a randomised (1:1), comparative, open labelled study. 30 patients with chronic non-healing ulcers of various aetiologies (n = 30) were included in the study. They were divided into two groups (Fig. 1). Group A - Patients who are chosen for PRP and Group B for L-PRF. Our study period was 6 weeks and we followed all cases for another 6 weeks.

After collecting 20 mL of patient’s blood, PRP was prepared by double spin technique and platelet rich fibrin by ultracentrifugation of the blood sample. Then Group A was administered PRP and for Group B L-PRF gel was applied. The technique was repeated weekly once for 6 weeks. The results were monitored every week through percentage reduction in area and volume of ulcers. In addition, patients will continue to receive standard treatment for the underlying cause.

Financial or Other, Competing Interest: None.
Submission 16-11-2016, Peer Review 10-12-2016,
Acceptance 16-12-2016, Published 22-12-2016.
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DOI: 10.14260/jemds/2016/1689

Figure 1
Inclusion Criteria
- Patients who have given written informed consent.
- Patients in the age group of 18 - 80 years.
- Wound duration of at least 8 weeks.
- Patients who have received conventional therapies for at least 6 weeks.
- Wound aetiologies include diabetic, arterial or venous ulcer, surgical or traumatic wound and other aetiologies.

Exclusion Criteria
- Patients with history of bleeding disorders.
- Patients on anti-coagulant medications (Aspirin, Warfarin, Heparin).
- Ulcers with active infection.
- Uncontrolled diabetes.

RESULTS
Thirty patients with non-healing ulcers of various aetiologies were treated with PRP and L-PRF at weekly intervals for a maximum of 6 treatments. The mean ages of the patients were 43.8 years and 47.1 years in Group A and B respectively. The duration of the ulcers ranged from 2 months to 1 year with a mean of 7.5 months in Group A and 7.2 in Group B (Table 1).

Of 30 ulcers there were 22 venous ulcers, 1 ulcer due to vasculitis, 1 traumatic ulcer, 2 diabetic ulcers and 4 trophic ulcers (Fig. 2). The mean duration of healing of the ulcers were 5.7 weeks in L-PRF and 6.5 weeks in PRP (p = 0.034). About 100% resolution was seen in 11 of the ulcers in L-PRF and 8 of the ulcers in PRP at the end of the 6th treatment (73.3% vs. 53.3%) > 90% improvement in area and volume of the ulcers (Table 2 and 3) seen in 13 and 10 cases in PRF and PRP respectively (86.6% vs. 66.6%). Except for very mild pain, there is no side effect noted with both procedures. There were no recurrences during followup.

### Table 1. Duration of the Ulcer

<table>
<thead>
<tr>
<th>Duration of the Ulcer (Months)</th>
<th>Number of Ulcers Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3 - 6</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>6 - 9</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>9 - 12</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

### Table 2. Improvement of Area of the Ulcer in Percentage at the End of 6th Sitting

<table>
<thead>
<tr>
<th>Percentage Improvement in the Area at the End of 6th Sitting</th>
<th>Number of Ulcers Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>61 - 70</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>71 - 80</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>81 - 90</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>91 - 100</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>

### Table 3. Improvement of Volume of the Ulcer in Percentage at the End of 6th Sitting

<table>
<thead>
<tr>
<th>Percentage Improvement in the Volume at the end of 6th Sitting</th>
<th>Number of Ulcers Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>61 - 70</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>71 - 80</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>81 - 90</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>91 - 100</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>

L-PRF

**Figure 2**

![Diagram of ulcer types](image-url)

1. venous
2. vasculitis
3. traumatic
4. diabetic
5. trophic

- **Case-1**
  - Before
  - After

- **Case-2**
  - Before
  - After
Platelet lling by promoting GFs for here was a direct correlation between the extra stimulate mesenchymal cell recruitment, proliferation, epidermal GF, insulin the healing process secondary to its GFs. These include significant effect on PDWHF the patients and the location of the ulcers had no statistically ± 6.5 weeks. The healing ulcers is attainable by the use of PRP and the mean duration of healing of the ulcers was 6.5 weeks. A study by Pinto Nelson et al on lower extremity ulcers with L-PRF included 45 patients. All patients showed significant improvements in the healing process and symptomatic relief. L-PRF has the potential to facilitate and accelerate the healing of chronic leg ulcer from different aetiology that were refractory to standard therapy.

In our study, the mean duration of healing of the ulcers were 5.7 weeks in L-PRF. Currently, there are many clinical studies available regarding the beneficial effects of PRP in the treatment of chronic leg ulcers. But we need more scientific data in L-PRF, as there are only few studies available.

CONCLUSION
Our study shows L-PRF is more efficacious and has a quicker healing rate than PRP, probably due to its anti-inflammatory effects and also protection against infections. L-PRF will be more promising in future than PRP in treating chronic ulcers.

REFERENCES