

# Revitalising Hope: Unveiling the Efficacy of Platelet Rich Plasma in Chronic Non-Healing Ulcers

Dr. M. Prasanna Kumar<sup>1</sup>, Dr. R. Ashok Reddy<sup>2</sup>, Dr. G. Rajasekhara Babu<sup>3</sup>

<sup>1</sup>Post Graduate, Department of General Surgery, Great Eastern Medical School and Hospital, Srikakulam, A. P.

<sup>2</sup>Professor, Department of General Surgery, Great Eastern Medical School and Hospital, Srikakulam, A. P.

<sup>3</sup>Professor & HoD, Department of General Surgery, Great Eastern Medical School and Hospital, Srikakulam, A. P.

**Abstract:** ***Aim:** The aim of the study is to assess the role and efficacy of the platelet rich plasma in the healing of chronic non healing ulcers by comparing the wound healing between platelet rich plasma dressings over conventional dressings. **Methods:** 72 patients were divided into 2 groups with 36 patients in each group, Group A being Platelet Rich Plasma (PRP) and Group B Conventional dressing. for each patient ulcers have been treated up to wound closure, either spontaneously or surgically or until completion of 8 week period and wound tracing has been done at regular intervals. **Results:** Almost in 80.0% ulcer of group A and 50.0% of group B closed in 6th week of treatment and 88.9% ulcer of group A and 61.1% of group B closed in 8th week of treatment. There is decrease in depth of ulcer rapidly in PRP group than conventional group. It was observed the healthy granulation tissue was rapidly appeared in cases of group A compared to group B. **Conclusion:** This study shows more favourable results for Platelet Rich Plasma as compared to Conventional dressing. In patients treated with Platelet Rich Plasma, comparatively there was Early appearance of granulation and epithelialization with Rapid decrease in wound size. This study confirms that Platelet Rich Plasma is safe, cost effective has faster response in wound healing and gives better results compared to the conventional dressing in management of chronic non healing ulcers.*

**Keywords:** platelet rich plasma, chronic ulcers, wound healing, conventional dressing, efficacy

## 1. Introduction

Skin is the largest organ and it comprises about 10% of the total body mass. skin has a role in defense and its self - repairing and self - renewing capacity. wound is a disturbance of the normal anatomical and functional integrity of the skin. Wound healing is a tissue repair process and involves growth factors, chemokines and cytokines. Any interruption to this mechanism causes chronic, non - healing wounds.

PRP is autologous and which is obtained from the patient's blood, plasma fraction is obtained which has a platelet concentration that is higher than in circulating blood after a centrifugation process . It has a potential to accelerate and stimulate wound healing.

Wound healing process involves several growth factors such as platelet - derived growth factor, epidermal and fibroblast growth factor, insulin - like growth factor, vascular endothelial growth factor, transforming growth factor, and keratinocyte growth factor. various clinical applications of PRP include soft tissue and bone healing, nervous tissue, chronic skin ulcers, ophthalmology and is simple, safe and cost effective

### Stages of wound healing

| Wound Healing Stages | growth factors     |
|----------------------|--------------------|
| Inflammatory phase   | G - CSF, TGF       |
| Proliferative phase  | PDGF, VEGF, FGF    |
| epithelisation phase | EGF, GM - CSF, KGF |
| Remodeling phase     | TGF                |

## 2. Aims and Objectives

To compare the wound healing between platelet rich plasma dressings over conventional dressings in management of chronic ulcers in terms of

- Change in size and depth of ulcer
- Appearance of granulation tissue
- Pain
- Decrease in infection
- And to analyse the time required for wound healing after application of prp and conventional dressings.

## 3. Materials and Methods

- **Study Design:** prospective comparative observational study.
- **Sample Size:** 72 cases
- **Duration of Study:** 12 months
- **Source of Sample:** patients with chronic wounds admitted in tertiary care centre.

### Inclusion Criteria

- above 18 years of age
- patients willing to give informed and written consent.
- patients with ulcer more than 4 cms.

### Exclusion Criteria

- patient who do not give consent for study
- less than 18 years of age
- malignant ulcers
- acute wounds
- patients on immunosuppressants
- patients with deep infections such as osteomyelitis

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- gangrene

### 3.1 Methodology

Chronic ulcer patients who fulfilled the inclusion criteria admitted at department of General Surgery were screened and selected for this study. 72 patients were divided into 2 groups with 36 patients in each group, Group A being Platelet Rich Plasma (PRP) and Group B Conventional

dressings. for each patient ulcers have been treated upto wound closure, either spontaneously or surgically or until completion of 8 week period and wound tracing has been done at regular intervals.

#### Statistics/ Operative Details

- Group A - patients treated with PRP dressings
- Group B - Patients treated with conventional dressings

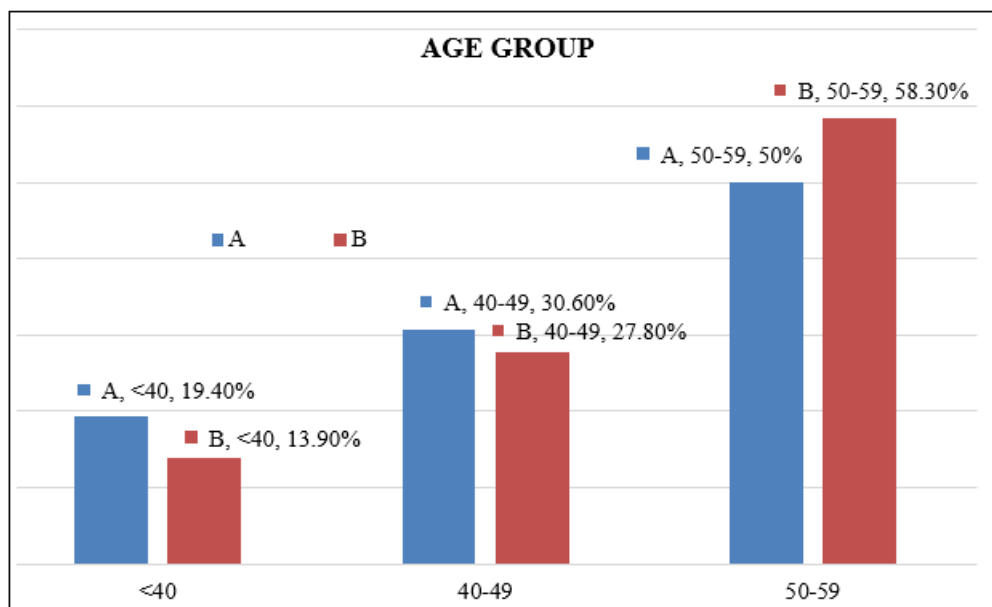


Table 1: Age Distribution

| Age Group | Group     |           | P Value |
|-----------|-----------|-----------|---------|
|           | A (n= 36) | B (n= 36) |         |
| <40       | 7 (19.4)  | 5 (13.9)  | >0.05   |
| 40- 49    | 11 (30.6) | 10 (27.8) |         |
| 50- 59    | 18 (50)   | 21 (58.3) |         |

Table 2: Gender Distribution

| Gender | Group     |           | P Value |
|--------|-----------|-----------|---------|
|        | A (n= 36) | B (n= 36) |         |
| Male   | 20 (55.6) | 5 (66.7)  | >0.05   |
| Female | 16 (44.4) | 12 (33.3) |         |

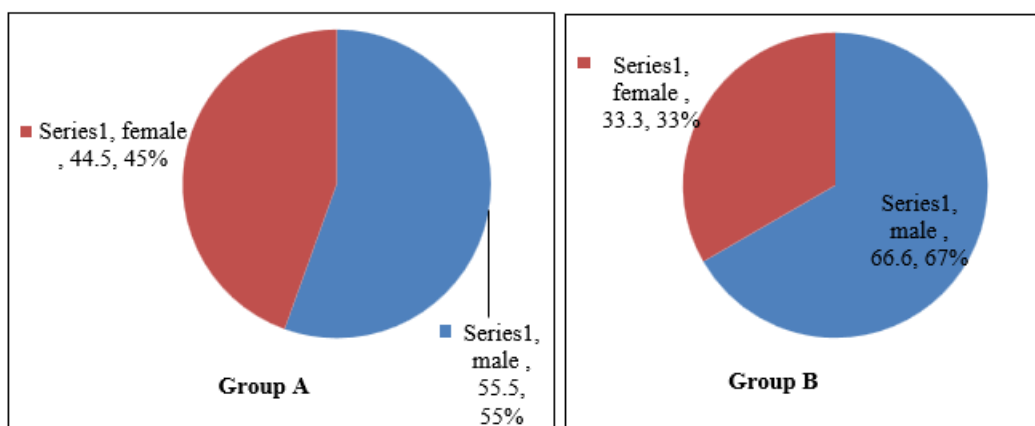


Table 3: Size of ulcer

| Size of ulcer in cm | Group     |           | P Value |
|---------------------|-----------|-----------|---------|
|                     | A (n= 36) | B (n= 36) |         |
| <1                  | 0         | 2 (5.6)   | >0.05   |
| 1- 3                | 8 (22.2)  | 14 (38.9) |         |
| 3- 6                | 20 (55.6) | 15 (41.7) |         |

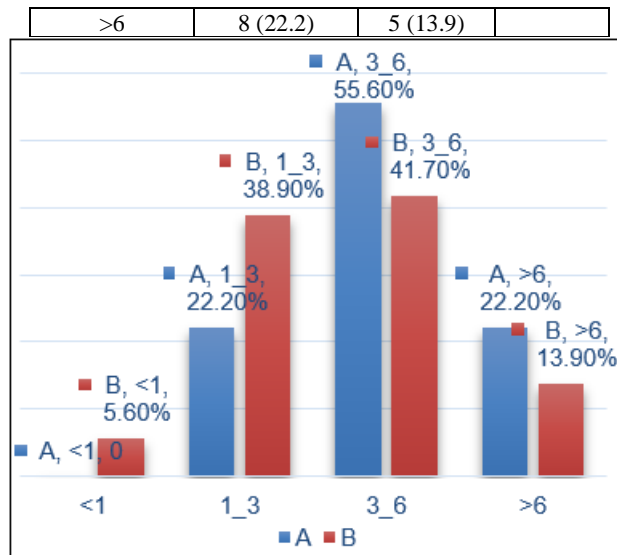


Table 4: Depth of ulcer

| Depth of Ulcer in mm | Group     |            | P Value |
|----------------------|-----------|------------|---------|
|                      | A (n= 36) | B (n= 36)  |         |
| <1                   | 0         | 0          | >0.05   |
| 1- 3                 | 12 [33.3] | 14 [38.09] |         |
| 3-6                  | 18 [50]   | 16 [44.4]  |         |
| > 6                  | 6 [16.7]  | 6 [16.7]   |         |

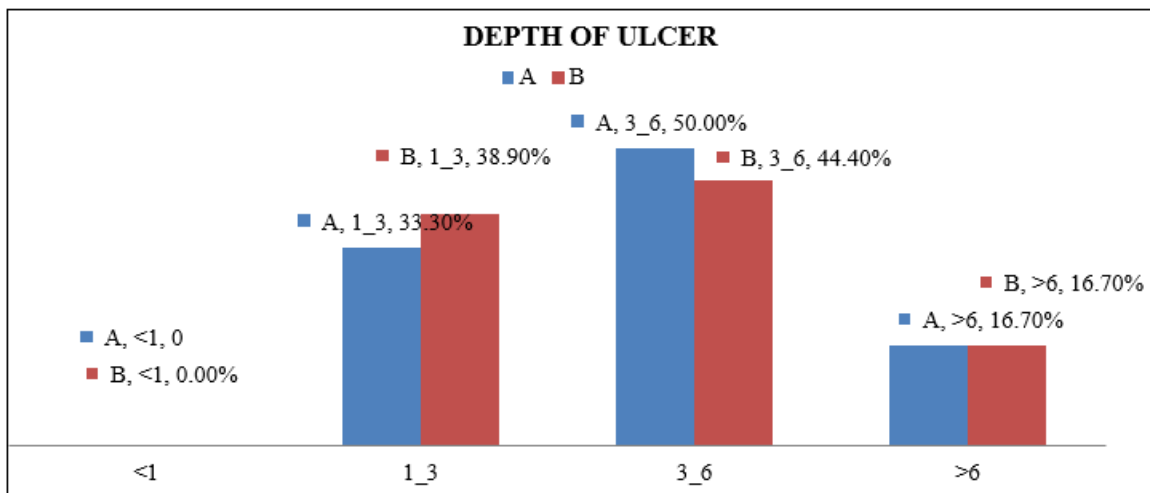


Table 5. Change in Size of Ulcer [N=72]

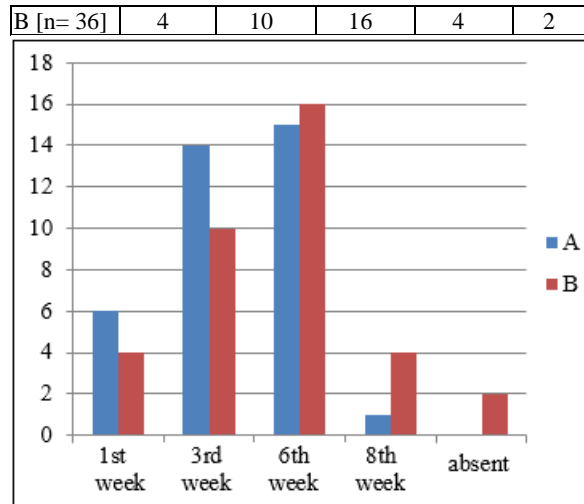
| Change in Size of Ulcer in % | 1 <sup>st</sup> Week |    | 3 <sup>rd</sup> Week |    | 6 <sup>th</sup> Week |    | 8 <sup>th</sup> Week |    |
|------------------------------|----------------------|----|----------------------|----|----------------------|----|----------------------|----|
|                              | A                    | B  | A                    | B  | A                    | B  | A                    | B  |
| <30                          | 10                   | 12 | 6                    | 6  | 2                    | 5  | 2                    | 4  |
| 30- 60                       | 16                   | 18 | 4                    | 15 | 1                    | 3  | 0                    | 2  |
| 60- 90                       | 8                    | 8  | 14                   | 9  | 5                    | 10 | 2                    | 8  |
| >90                          | 2                    | 1  | 12                   | 6  | 28                   | 18 | 32                   | 22 |

Table 6: Change in Depth of Ulcer [n=72]

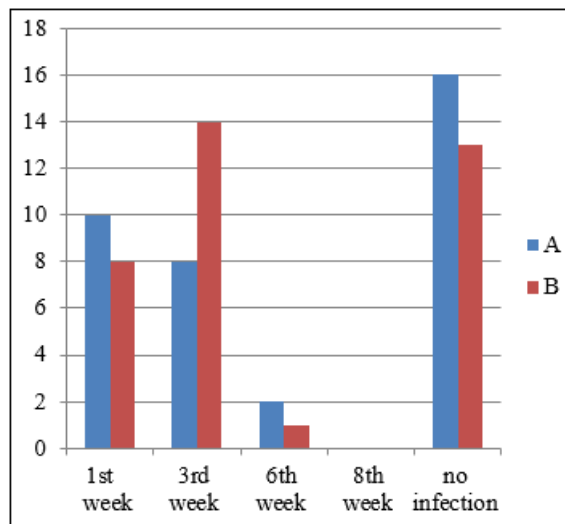
| Change in Depth of Ulcer in % | 1 <sup>st</sup> Week |    | 3 <sup>rd</sup> Week |    | 6 <sup>th</sup> Week |    | 8 <sup>th</sup> Week |    |
|-------------------------------|----------------------|----|----------------------|----|----------------------|----|----------------------|----|
|                               | A                    | B  | A                    | B  | A                    | B  | A                    | B  |
| <30                           | 10                   | 20 | 4                    | 10 | 1                    | 6  | 1                    | 4  |
| 30- 60                        | 14                   | 8  | 6                    | 14 | 2                    | 2  | 0                    | 2  |
| 60- 90                        | 10                   | 6  | 8                    | 2  | 3                    | 8  | 2                    | 8  |
| >90                           | 4                    | 2  | 18                   | 10 | 30                   | 20 | 33                   | 24 |

Table 7: Appearance of healthy granulation tissue

| Infection | Week                 |                      |                      |                      |        |
|-----------|----------------------|----------------------|----------------------|----------------------|--------|
|           | 1 <sup>st</sup> Week | 3 <sup>rd</sup> Week | 6 <sup>th</sup> Week | 8 <sup>th</sup> Week | Absent |
| Control   |                      |                      |                      |                      |        |
| A [n= 36] | 6                    | 14                   | 15                   | 1                    | 0      |



8. Infection Control [n=72]

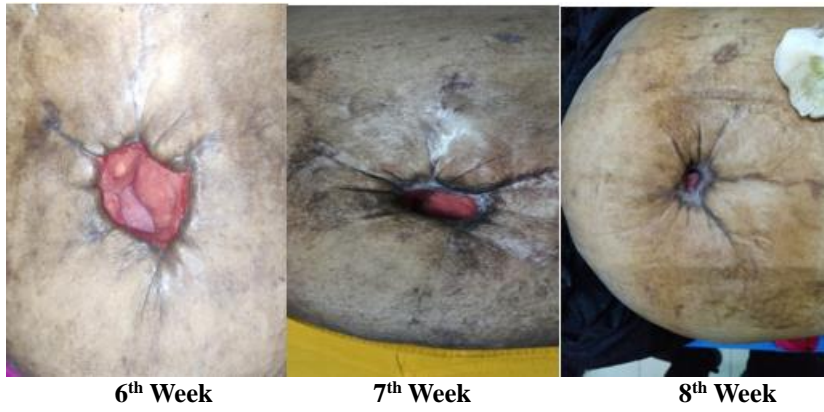


| Infection Control | Week                 |                      |                      |                      |              |
|-------------------|----------------------|----------------------|----------------------|----------------------|--------------|
|                   | 1 <sup>st</sup> Week | 3 <sup>rd</sup> Week | 6 <sup>th</sup> Week | 8 <sup>th</sup> Week | No infection |
| A [n= 36]         | 10                   | 8                    | 2                    | 0                    | 16           |
| B [n= 36]         | 8                    | 14                   | 1                    | 0                    | 13           |

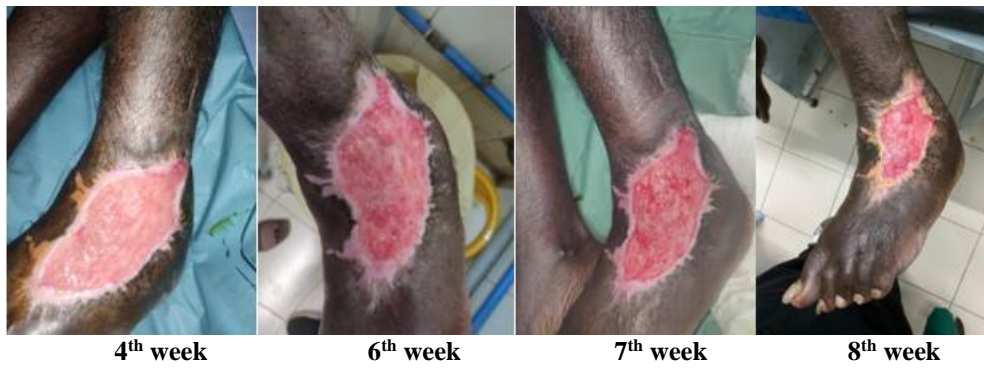
4. Observations

Patient 1





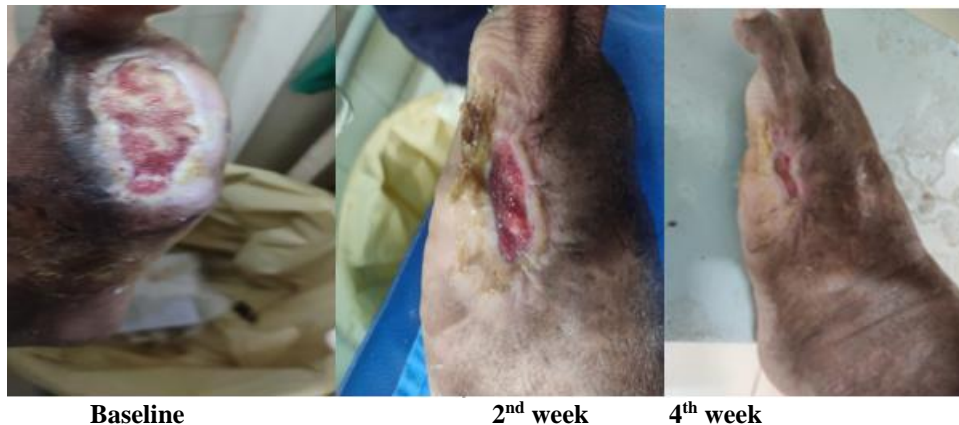
**Patient 2**



**Patient 3**



**Patient 4**



Baseline

2<sup>nd</sup> week4<sup>th</sup> week

### Patient 5



Baseline

Week 2

## 5. Results

Cross sectional study conducted among 72 patients taking treatment for chronic ulcers admitted at tertiary care hospital at general surgery department with aim to compare prp versus conventional dressings in management of chronic ulcers.

table 1 shows that mean age was 55.4+<sub>-</sub>8.9 years in group A and 56.1 +<sub>-</sub>8.4 years in group B respectively.

this study shows that male: female ratio was 1: 0.8 and 1: 0.5 in group A and B but difference in gender was not significant.

Chronic leg ulcers affect 0.6–3% of those aged over 60 years, increasing to over 5% of those aged over 80 years.

CLU is a common cause of morbidity, and its prevalence in the community ranges from 1.9% to 13.1%.

It is thought that the incidence of ulceration is rising as a result of aging population and increased risk factors for atherosclerotic occlusion such as smoking, obesity, and diabetes.

Present study found that highest number of study participants was noted in 50 to 59 years age in both the groups but difference was statistically not significant

Present study found that highest number of ulcers with size 3 to 6 cm was observed in both the groups but difference was statistically not significant.

Almost in 80.0% ulcer of group A and 50.0% of group B closed in 6th week of treatment and 88.9% ulcer of group A and 61.1% of group B closed in 8th week of treatment.

Present study found that highest number of ulcers with depth 3 to 6 mm was observed in both the groups but difference was statistically not significant.

Almost in 80.3% ulcer of group A and 55.6% of group B closed in 6th week of treatment and 91.7% ulcer of group A and 66.7% of group B closed in 8th week of treatment.

So, the decreasing in depth of ulcer rapidly in PRP group than conventional group

Present study found that in 2.8% and 11.1% cases in both the group A and B respectively granulation tissue appeared very

late [8th week].

Almost 95% cases of both the group noted granulation tissue within 6 weeks. It was observed the healthy granulation tissue was rapidly appeared in cases of group A compared to group B.

Almost 95% cases of both the group noted infection control within 3 weeks. Almost half of the cases of group A and 1/3rd cases of group B have not noted infection.

## 6. Conclusions

This prospective study was done to compare the Efficacy of Platelet Rich Plasma versus Conventional dressing in the management of chronic non healing ulcers.

This study shows more favourable results for Platelet Rich Plasma as compared to Conventional dressing.

In patients treated with Platelet Rich Plasma, comparatively there was Early appearance of granulation and epithelialization with Rapid decrease in wound size.

This study confirms that Platelet Rich Plasma is safe, cost effective has faster response in wound healing and gives better results compared to the conventional dressing in management of chronic non healing ulcers. Hence it is a good choice.

## References

- [1] Crovetti, G.; Martinelli, G.; Issi, M.; Barone, M.; Guizzardi, M.; Campanati, B.; Moroni, M.; Carabelli, A Platelet gel for healing cutaneous chronic wounds. *Transfus. Apher. Sci.* 2004, 30, 145–151.
- [2] Anitua, E.; Sanchez, M.; Nurden, A. T.; Nurden, P.; Orive, G.; Andia, I. New insights into and novel applications for platelet - rich fibrin therapies. *Trends Biotechnol.* 2006, 24, 227–234
- [3] Murphy, P. S.; Evans, G. R. Advances in wound healing: A review of current wound healing products *Plast. Surg. Int.* 2012, 2012, 190436.
- [4] Mazzucco, L.; Medici, D.; Serra, M.; Panizza, R.; Rivara, G.; Orecchia, S.; Libener, R.; Cattana, E.; Levis, A.; Betta, P. G.; et al. The use of autologous platelet gel to treat difficult - to - heal wounds: A pilot study. 2004, 44, 1013–1018.