

# Comparative Study Between Standard Dressing with EUSOL and Topical Platelet Derived Growth Factor in Healing of Diabetic Foot Ulcer.

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## ABSTRACT

**Background:** Diabetic patients with foot ulcer constitute the majority of hospital admissions. Unless treated appropriately a worsening infection can set of a chain of events, a spreading infection which penetrates into the deep soft tissue excites cellulitis, produces necrosis and gangrene and eventually necessitates the amputation of limb. Management of established foot ulcer lesion is multidisciplinary and even demands expertise in surgery, endocrinology, podiatry, orthopedics, vascular surgery, neurology, infectious disease. Platelet-derived growth factor (PDGF) is one of the numerous growth factors that regulate cell growth and division, in particular angiogenesis. PDGF promote formation of granulation tissue and thus stimulate cutaneous ulcer healing. **Methods:** A study was conducted on 50 patients to compare the outcome and efficacy of topical PDGF v/s EUSOL in healing of diabetic foot ulcer. **Result:** 50 patients of diabetic of diabetic foot ulcer were studied, divided into two groups of 25 each. One group received PDGF and other group received EUSOL. It was observed that patient receiving PDGF had better wound contraction of 39.55% as compared to group receiving EUSOL in whom the mean wound contraction was 11.79%. **Conclusion:** PDGF dressing therapy in the treatment of diabetic foot ulcer was found to be more effective, safe, promoter of wound healing.

**Keywords:** EUSOL, PDGF.

## INTRODUCTION

The diabetic foot may be defined as a group of syndromes in which neuropathy, ischemia and infection leads to tissue breakdown resulting in morbidity and possible amputation. Unless treated appropriately a worsening infection can set off a chain of events, a spreading infection which penetrates into the deep tissue excites cellulitis, produces necrosis and gangrene and eventually amputation of limb. The following protocol has been developed for patient with diabetic foot ulcer-(1) Measurement of wound by planimetry, (2) Optimal glucose control, (3) Surgical debridement, (4) Systemic antibiotics, (5) Offloading, (6) Moist wound environment, (7) Treatment with growth factor if the wound is not healing after 2 weeks.

PDGF is of particular relevance due to its chemotactic, mitogenic, angiogenic and stimulatory effects leading to matrix formation and wound bed granulation. PDGF can potentially bridge the gap to

complete healing.<sup>[1]</sup> PDGF has been shown to be safe, reproducible and effective in mimicking the natural process of soft tissue wound and osseous healing.<sup>[2]</sup>

Topical PDGF has shown significant benefits and should be considered in non-healing, well perfused ulcer.<sup>[3]</sup> PDGF stimulates production and secretion of collagenase by fibroblast suggesting a role in the remodeling phase of wound healin.<sup>[4]</sup> Growth factors result in faster healing and regain limb function in addition to a decreased rate of amputation.<sup>[5]</sup>

PDGF help to treat large non-healing diabetic ulcer of lower extremity.<sup>[6]</sup> PDGF based dressing achieved complete healing in 63.2% of patients at 10 weeks which was 28.4% higher than that observed in standard dressing.<sup>[7]</sup> PDGF dressing is an effective modality for facilitating wound healing in patient suffering from diabetic foot ulcer.<sup>[8]</sup> PDGF stimulates chemotaxis, proliferation and new gene expression in monocytes-macrophages and fibroblast in vitro and may be the critical regulates of extracellular matrix deposition within healing wounds.<sup>[9]</sup>

## MATERIALS AND METHODS

This study was conducted on 50 patients admitted in Department of Surgery in Katihar Medical College,

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Katihar, Bihar during the period of October 2012 to October 2014 with diabetic foot ulcer.

Patients with foot ulcer other than diabetic etiology, pregnant women, patient above 80 years of age, associated malignancy and osteomyelitis and size of ulcer more than 10x10 cm were excluded.

After adequate control of infection, off-loading and meticulous debridement of ulcer, the area of ulcer was measured by planimetry using transparent graph sheet. 50 patients were divided into 2 groups of 25 each after randomization. One group received dressing with EUSOL and other group received dressing with PDGF.

After 4 weeks of dressing the area was again calculated using same method and result were calculated.

## RESULTS

**Table 1: Mean contraction of wounds in both groups.**

| Groups | Mean Contraction | Sd   | Median | P-Value |
|--------|------------------|------|--------|---------|
| EUSOL  | 11.79%           | 2.35 | 9.81   |         |
| PDGF   | 39.55            | 2.52 | 39.58  | P<.001  |

**Table 2: Wound contraction related to Site.**

| Group | Plantar         |      | Dorsum          |      |
|-------|-----------------|------|-----------------|------|
|       | Mean% Reduction | SD   | Mean% Reduction | SD   |
| EUSOL | 10.40%          | 1.64 | 13.87%          | 2.27 |
| PDGF  | 40.31           | 2.57 | 38.63%          | 2.20 |



AT THE TIME OF ADMISSION



AFTER 2 WEEKS



AFTER 3 WEEKS



AFTER 4 WEEKS

### Progressive healing of wound

## DISCUSSION

Platelet releasate is more effective than standard therapy. This effect is more pronounced in more severe wound. Growth factor released from activated platelets initiate and modulates wound

healing in both soft and hard tissue.<sup>[11]</sup> In the present study it was seen that more than half (58%) of patients had ulcer on the plantar surface of the forefoot and remaining (42%) had on dorsum of foot. It was observed that participants receiving PDGF had better wound contraction of 39.55% as compared to other group receiving EUSOL in whom mean contraction was 11.79% and wound contraction was slightly greater in ulcer over the plantar aspect(40.31%) of foot as compared to dorsum(38.63%) in patient using PDGF. The use of platelet rich plasma to enhance wound healing has increased dramatically over the decade. The result showed that healing in PRP group was significantly faster (P<0.005). PRP enhances healing of chronic diabetic foot ulcer.<sup>[12]</sup> Therapy with growth factors could be an effective and innovative add on to standard wound care in diabetic foot ulcers concerning complete wound closure and the time to complete wound healing.<sup>[13]</sup>

## CONCLUSION

Autologous platelet rich plasma is an advanced wound therapy used in hard to heal acute and chronic wounds which showed complete and partial wound healing.<sup>[14]</sup> Platelet rich plasma contain approximately 7.9 times as many platelets as whole blood and can enhance the proliferation of human dermal fibroblast.<sup>[15]</sup> It is seen that in patients receiving PDGF the wound contraction was more as compared to patients using EUSOL, which is significant. It indicates that dressing with PDGF is an effective modality to facilitate wound contraction in patients suffering from diabetes and can be used as an adjuvant to conventional mode of treatment for healing of diabetic foot ulcer.

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