Abstract

Background: Diabetes mellitus is a clinical syndrome characterized by hyperglycemia caused by absolute or relative deficiency of insulin. The present study was conducted to compare PRP and conventional dressing in management of diabetic foot ulcer. Subjects and Methods: The present study was conducted on 120 patients with diabetic foot ulcers. Patients were divided into 2 groups of 60 each. Group I was those who received conventional dressing and group II patients received PRP dressings. Patients were examined and recalled regularly to see effect of dressing and size of the lesions. Results: Common site was mid foot seen in 35 and 30 in group II, fore foot seen 20 in group I and 18 in group II, hind foot seen 5 in group I and 12 in group II. The difference was non-significant (P> 0.05). At 0 week mean size of DFU was 4.2 mm in group I and 4.1 mm in group II, at 1 week was 4.0 mm in group I and 3.8 mm in group II, at 3rd week was 3.6 mm in group I and 2.4 mm in group II and 2.6 mm in group I and 1.2 mm in group II. The difference was significant (P< 0.05). Conclusion: Platelet rich plasma was effective in the management of diabetic foot ulcer. There was comparatively increase in size reduction in PRP group than conventional group.

Keywords: Diabetes, Platelet rich plasma, Ulcer.

Introduction

Diabetes mellitus (DM) is one of the most deceitful diseases that affect more than 371 million people all over the world in 2012. Diabetes mellitus is a clinical syndrome characterized by hyperglycemia caused by absolute or relative deficiency of insulin. Diabetes mellitus is of two types, Type 1 DM was previously known as insulin dependent diabetes mellitus (IDDM). Type 2 DM was previously termed as non insulin dependent diabetes mellitus (NIIDM). There are several complications of DM. Among all, diabetic foot ulcer, diabetic neuropathy, diabetic nephropathy, diabetic retinopathy and diabetic foot ulcer are common. In diabetic foot, ulceration occurs as a result of trauma in the presence of neuropathy and/or peripheral vascular disease with infection as a secondary phenomenon following disruption of the protective epidermis. The disease often leads to the development of serious health threatening complications.

One of the most common causes of chronic wounds is growth factor abnormality. Platelets are considered a rich source of growth factors. Platelet-rich plasma (PRP) enhances wound healing by either the barrier effect to prevent bacterial invasion into the wound or the growth factors stimulate wound healing. About 15% of diabetic patients will develop chronic wounds and about 25% of these patients will have to undergo foot amputation. The healing process is impaired in part because of deficiency of growth factors. The present study was conducted to compare PRP and conventional dressing in management of diabetic foot ulcer.

Subjects and Methods

The present study was conducted in the department of Surgery. It comprised of 120 patients with diabetic foot ulcers. The study was approved from the institutional ethical committee. All were informed regarding the study and written consent was obtained. Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 60 each. Group I was those who received conventional dressing and group II patients received PRP dressings. Patients were subjected to fasting blood sugar, random blood sugar and glycosylated hemoglobin to know diabetic status. A thorough clinical examination was done. Excision of necrotic tissue was extended as deeply and proximally as necessary until healthy, bleeding soft tissue encountered. Patients were examined and recalled regularly to see effect of dressing and size of the lesions. Results were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results
[Table 1] shows that out of 120 patients, group I patients received conventional dressing and group II patients received PRP dressings.

**Table 1: Distribution of patients**

| Groups       | Group I (conventional dressing) | Group II (PRP dressing) |
|--------------|----------------------------------|-------------------------|
| Number       | 60                               | 60                      |

[Table 2], graph I shows that common site was mid foot seen in 35 and 30 in group II, fore foot seen 20 in group I and 18 in group II, hind foot seen 5 in group I and 12 in group II. The difference was non-significant (P> 0.05).

**Table 2: Site of ulcer**

| Site         | Group I | Group II | P value |
|--------------|---------|----------|---------|
| Fore foot    | 20      | 18       | 0.32    |
| Mid foot     | 35      | 30       |         |
| Hind foot    | 5       | 12       |         |

**Discussion**

Diabetic foot ulcers (DFUs) are a prevalent complication of diabetes mellitus and account for significant morbidity, mortality, and healthcare expenditures.\(^7\) It is estimated that 19–34% of patients with diabetes are likely to be affected with a diabetic foot ulcer in their lifetimes, and the International Diabetes Federation reports that 9.1–26.1 million people will develop DFUs annually. These numbers are alarming, as the clinical implications for the development of a DFU are not negligible. Diabetic foot ulcers result from the simultaneous action of multiple contributing causes. The major underlying causes are noted to be peripheral neuropathy and ischemia from peripheral vascular disease. More than 60% of diabetic foot ulcers are the result of underlying neuropathy.\(^8\) The development of neuropathy in affected patients has been shown in animal and in vitro models to be a result of hyperglycemia-induced metabolic abnormalities. One of the more commonly described mechanisms of action is the polyol pathway.\(^9\) The present study was conducted to compare PRP and conventional dressing in management of diabetic foot ulcer.

In present study, out of 120 patients, group I patients received conventional dressing and group II patients received PRP dressings. We found that common site was mid foot seen in 35 and 30 in group II, fore foot seen 20 in group I and 18 in group II, hind foot seen 5 in group I and 12 in group II. Kumar et al\(^{10}\) compared Platelet-Rich Plasma versus conventional dressing in the management of diabetic foot ulcers. Group A received conventional ordinary dressing (N=10, 50%) and Group B received PRP dressing (N = 10, 50%). The mean follow-up period was 8 weeks. The estimated time of wound healing was 8 weeks and healing was found to be more effective for patients in group B compared to patients in group A; the PRP group was found to be more effective in wound healing with fewer complications, less infection, exudates and pain.

We found that at 0 week mean size of DFU was 4.2 mm in group I and 4.1 mm in group II, at 1 week was 4.0 mm in group I and 3.8 mm in group II, at 3rd week was 3.6 mm in group I and 2.4 mm in group II and 2.6 mm in group I and 1.2 mm in group II. The difference was significant (P< 0.05).
to be more effective with fewer complications, less infection, exudates, pain, and failed healing: 17.5, 12.5, 32.5, and 2.5% versus 27.5, 42.5, 62.5, and 17.5% in group B, respectively. The highest healing rate was observed for both groups at the fourth week, but it was better for the PRP group (group B): 0.89±0.13 versus 0.49±0.11 cm²/week in group A.

**Conclusion**

Platelet rich plasma was effective in the management of diabetic foot ulcer. There was comparatively increase in size reduction in PRP group than conventional group.

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