

# ABSTRACT

Diabetic foot ulcer is a devastating complication of diabetes mellitus. This condition is more common in old patients. The risk in a diabetic patient's lifetime having this complication of diabetic foot ulcer is estimated to be about 15%. Majority of diabetic foot ulcers may heal whereas a smaller percentage will remain active and finally lead to amputation of the limb. With increasing duration of the ulcer and the increasing age of the patient, the risk of amputation also rises. Early prevention plays a vital role in betterment of the quality of life of the patient and also reduces the financial toll. Diabetic foot ulcer is one of the most demanding problems and it is recommended that a multi disciplinary team work is essential for management. Wound dressings constitute a major part of the management of diabetic foot ulceration. An ideal dressing will have to reduce the symptoms, give adequate protection of the wound and promote good healing. There are many types of dressings available for the treatment of foot ulcers. There is no particular dressing that fulfils all the requirements of the patient. Platelet rich fibrin prepared from patients own blood is under extensive research and is used in the fields of orthopaedics and dentistry to promote wound healing. Platelet rich fibrin transfers growth factors to the wound surface. The use of an autologous preparation reduces the risk of allergic reactions and promotes delivery of many growth factors when compared to conventional preparations. There are many studies on the use of platelet rich

fibrin as a dressing alternative, but only very few studies compare the efficacy of PRF with other dressing materials. The normal wound healing process involves a series of stages namely acute inflammation, proliferation and remodeling. The innate immune system plays a major role in wound healing cascade and is usually mediated by toll like receptors. The down regulation of these receptors influence the normal healing pathway. The many chemokines and cytokines released have anti microbial effect. Toll Like Receptors were first discovered in 1985 by Christiane Nusslein- Volhard. The first discovered member of the TLR family was the toll like receptor 4 which is responsible for the release of a great range of cytokines. TLR 4 helps in immune-stimulation, inflammation, angiogenesis , tissue repair and regeneration and is recently under study for its major role in wound healing. Patients with down regulation of these receptors take longer time to heal. This also helps in expression of Vascular Endothelial Growth Factor. Therefore when there is differential expression of TLR 4 there is impaired wound healing. This study will compare the efficacy of PRF dressing with moist saline/povidone iodine dressing in diabetic patients having foot ulcers. Only a limited number of studies have been done to compare the efficacy of PRF dressing with other conventional methods. The molecular part of this study was done to determine the influence of TLR polymorphism in wound healing. The aim of this study was to compare the efficacy of autologous platelet rich fibrin (PRF) over moist sterile saline / povidone iodine dressing in diabetic foot ulcers and the influence of TLR 4

receptors in their healing. The objectives were to compare the mean reduction in ulcer area at the end of 4 weeks of dressings and to study the influence of expression of TLR 4 polymorphism in wound healing. 60 diabetic patients with foot ulcers from the department of general surgery, general medicine, endocrinology, and cardiology were prospectively studied. Detailed clinical history, evaluation of ulcer and presence of wound infection were assessed for all the patients. Patients were randomized into two groups of 30 patients each. While one group received PRF dressings, the other received saline/povidone iodine dressings. The wound healing was then compared in the two groups. Also the influence of TLR 4 receptor polymorphisms were studied in two different genes TLR 911 and TLR 914, in both saline and PRF treated groups.

The efficacy of platelet rich fibrin dressing over moist saline/povidone iodine dressings was assessed by comparing the percentage reduction at the end of four weeks, using chi square test and ANOVA test. The influence of TLR 4 receptor polymorphism in wound healing was also studied in 13 patients who received PRF dressings and 13 patients who received moist saline/povidone iodine dressings and analyzed using chi square test and ANOVA test. Diabetic foot ulcers pose a real threat to diabetic patients in terms of morbidity and expense. Many dressing materials and techniques are available these days and the need for same should be tailored according to each patient. Platelet Rich Fibrin (PRF) when used for dressing in diabetic foot ulcers had better and faster healing when

compared to saline/povidone iodine dressing. PRF is easy to prepare. Being an autologous preparation, it has the least adverse reactions. PRF has its best effect when left undisturbed for a week since it has the property of slow release of growth factors. Platelet Rich Fibrin dressing was found to be best suited for bed ridden patients. Toll like receptors 4 polymorphisms were found to influence wound healing in diabetic patients. It was found the expression of allele 'A' had better healing in diabetic foot ulcers treated with either saline/povidone iodine dressings or PRF dressings. However the molecular study did not show a statistically significant reduction the limitation being that it was done in a small sample size.

Keywords: PRF, diabetic foot ulcers, TLR 4 polymorphisms, TLR rs 911, TLR rs 914.